

**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING**

**AND TECHNOLOGY**

**DEPARTMENT**

**OF**

**COMPUTER SCIENCE AND ENGINEERING**

**Bachelor of Technology (B.Tech)**

**In**

**Computer Science & Engineering Programme**

**&**

**Bachelor of Technology (B.Tech)**

**In**

**Computer Science & Engineering Programme**

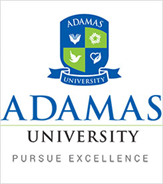
**With Hons.**

**In**

1. **Artificial Intelligence and Machine Learning**
2. **Blockchain Technology**
3. **Cyber Security & Forensics**

**W.e.f. AY 2020-21**

**SoET 2.0 (Engineering +)**



**ADAMAS UNIVERSITY, KOLKATA**

**SCHOOL OF ENGINEERING & TECHNOLOGY**

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**VISION OF THE UNIVERSITY**

**To be an internationally recognized university through excellence in inter-disciplinary education, research and innovation, preparing socially responsible well-grounded individuals contributing to nation building.**

**MISSION STATEMENTS OF THE UNIVERSITY**

**M.S 01: Improve employability through futuristic curriculum and progressive pedagogy**

**with cutting-edge technology**

**M.S 02: Foster outcomes based education system for continuous improvement in**

**education, research and all allied activities**

**M.S 03: Instill the notion of lifelong learning through culture of research and innovation**

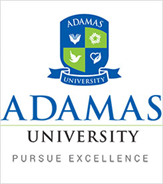
**M.S 04: Collaborate with industries, research centers and professional bodies to stay**

**relevant and up-to-date**

**M.S 05: Inculcate ethical principles and develop understanding of environmental and**

**social realities**

**CHANCELLOR / VICE CHANCELLOR**



**ADAMAS UNIVERSITY, KOLKATA**

**SCHOOL OF ENGINEERING & TECHNOLOGY**

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**VISION OF THE SCHOOL**

To develop well-grounded, socially responsible engineers and technocrats in a way to create a transformative impact on Indian society through continual innovation in education, research, creativity and entrepreneurship.

**MISSION STATEMENTS OF THE SCHOOL**

**M.S. 01:** Build a transformative educational experience through disciplinary and inter-disciplinary knowledge, problem solving, and communication and leadership skills.

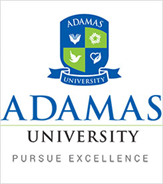
**M.S. 02:** Develop a collaborative environment open to the free exchange of ideas, where research, creativity, innovation and entrepreneurship can flourish among individual students.

**M.S. 03:** Impact society in a transformative way – regionally and nationally - by engaging with partners outside the borders of the university campus.

**M.S. 04:** Promote outreach programs which strives to inculcate ethical standards and good character in the minds of young professionals.



**DEAN / SCHOOL CONCERNED**



**ADAMAS UNIVERSITY, KOLKATA**

**SCHOOL OF ENGINEERING & TECHNOLOGY**

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**VISION OF THE DEPARTMENT**

Graduates of the Department of Computer Science and Software Engineering will be recognized as innovative leaders in the fields of computer science and software engineering. This recognition will come from their work in software development in a myriad of application areas, as well as through their work in advanced study and research. The faculty is, and will continue to be, known for their passion for teaching and for their knowledge, expertise, and innovation in advancing the frontiers of knowledge in computer science and software engineering.

**MISSION STATEMENTS OF THE DEPARTMENT**

**M.S 01:** Our mission is to teach and prepare liberally educated, articulate, and skilled computer scientists and software engineers for leadership and professional careers and for advanced study.

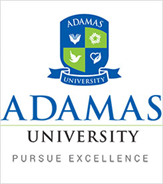
**M.S 02:** A central objective of our program is to contribute to society by advancing the fields of computer science and software engineering through innovations in teaching and research, thus enhancing student knowledge through interactive instruction, global engagement, and experiential learning.

**M.S 03:** The program will serve as a resource to inform society about innovations related to the production and uses of computers and software.

**M.S 04:** To impart moral and ethical values, and interpersonal skills to the students.



**HOD DEAN / SCHOOL CONCERNED**



**ADAMAS UNIVERSITY, KOLKATA**

**SCHOOL OF ENGINEERING & TECHNOLOGY**

**Name of the Programme: B.Tech (Computer Science & Engineering)**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 01:** To prepare students to excel in Computer Science and Engineering post graduate programs, to succeed in computing industry profession or successful entrepreneurs through quality education.

**PEO 02:** To provide students an ability to analyse and solve computer science and engineering problems through application of fundamental knowledge of math’s, science and engineering.

**PEO 03:** To train students with good Computer Science and Engineering breadth, so as to comprehend, analyse, design and create innovative computing products and solutions for real life problems.

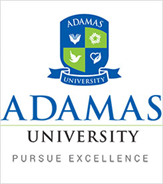
**PEO 04:** To inculcate in students professional and ethical attitude, communication skills, teamwork skills, lifelong learning, multidisciplinary approach and an ability to relate computer engineering issues with social awareness.

**PEO 05:** To equip students with excellent academic environment for a successful carrier as engineers, scientist, technocrats, administrators and entrepreneurs.



**HOD DEAN / SCHOOL CONCERNED**

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**



**ADAMAS UNIVERSITY, KOLKATA**

**SCHOOL OF ENGINEERING & TECHNOLOGY**

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**Name of the Programme: B.Tech (Computer Science & Engineering)**

**GRADUATE ATTRIBUTE / PROGRAMME OUTCOME (PO)**

**GA 01 / PO 01: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**GA 02 / PO 02: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**GA 03 / PO 03: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**GA 04 / PO 04: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**GA 05 / PO 05: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

**GA 06 / PO 06: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**GA 07 / PO 07: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**GA 08 / PO 08: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**GA 09 / PO 09: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

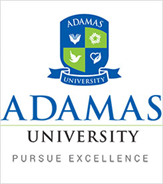
**GA 10 / PO 10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**GA 11 / PO 11**: **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**GA 12 / PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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**ADAMAS UNIVERSITY, KOLKATA**

**SCHOOL OF ENGINEERING & TECHNOLOGY**

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**Name of the Programme: B.Tech (Computer Science & Engineering)**

**PROGRAMME SPECIFIC OUTCOME (PSO)**

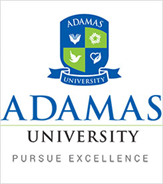
**PSO 01:** Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity.

**PSO 02:** The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future.

**PSO 03:** Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems.



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**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING**

**AND TECHNOLOGY**

**DEPARTMENT**

**OF**

**COMPUTER SCIENCE AND ENGINEERING**

**Course Structure & Syllabus of**

**Bachelor of Technology (B.Tech)**

**In**

**Computer Science & Engineering**

**W.e.f. AY 2020-21**

**SoET 2.0 (Engineering +)**

**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING & TECHNOLOGY**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER -I** | | | | | | | | |
| **Sl. No** | **Type** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact**  **Hrs/wk** | **Credits** |
| 1 | Theory | MTH11501 | Engineering Mathematics-I | 3 | 1 | 0 | 4 | 4 |
| 2 | Theory | PHY11201 | Applied Science (Physics+Chemistry) | 3 | 0 | 0 | 3 | 3 |
| 3 | Theory | CSE11001 / GEE11001 | Introduction to Programming / Electrical and Electronics Technology | 3 | 0 | 0 | 3 | 3 |
| 4 | Theory | ENG11053 | HSSM –I (English Communication- I) | 3 | 0 | 0 | 3 | 3 |
| 5 | Theory | BIT11003 | Life Sciences | 3 | 0 | 0 | 3 | 3 |
| 6 | Practical | PHY12202 | Applied Science Lab | 0 | 0 | 3 | 3 | 2 |
| 7 | Practical | CSE12002 / GEE12002 | Programming Lab / Electrical and Electronics Technology Lab | 0 | 0 | 3 | 3 | 2 |
| 8 | Practical | CEE12001/ MEE12001 | Engineering Drawing and CAD/Engineering Workshop | 0 | 0 | 3 | 3 | 2 |
| 9 | Practical | ENG11043 | Communication and Collaboration Skill -I | 0 | 0 | 2 | 2 | 1 |
| 10 | Practical | GEE14003 | Capstone Project-I | 0 | 0 | 2 | 2 | 1 |
| 11 | Theory | DGS11001 | Design Thinking | 2 | 0 | 0 | 2 | 2 |
| **Total** | | | | **17** | **1** | **13** | **31** | **26** |

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| **SEMESTER -II** | | | | | | | | | | |
| **Sl. No** | **Type** | **Course Code** | **Course Title** | **L** | **T** | **P** | | **Contact**  **Hrs/wk** | | **Credits** |
| 1 | Theory | MTH11502 | Engineering Mathematics –II | 3 | 1 | 0 | 4 | | 4 | |
| 2 | Theory | GEE11001 / CSE11001 | Electrical and Electronics Technology/ Introduction to Programming | 3 | 0 | 0 | 3 | | 3 | |
| 3 | Theory | MEE11002 | Engineering Mechanics | 3 | 1 | 0 | 4 | | 4 | |
| 4 | Theory | EVS11107 | Environmental Science | 3 | 0 | 0 | 3 | | 3 | |
| 5 | Practical | GEE12002 / CSE12002 | Electrical and Electronics Technology Lab/ Programming Lab | 0 | 0 | 3 | 3 | | 2 | |
| 6 | Practical | MEE12001/ CEE12001 | Engineering Workshop/Engineering Drawing and CAD | 0 | 0 | 3 | 3 | | 2 | |
| 7 | Practical | ENG11044 | Communication and Collaboration Skill -II | 0 | 0 | 2 | 2 | | 1 | |
| 8 | Practical | GEE14004 | Capstone Project-II | 0 | 0 | 2 | 2 | | 1 | |
| 9 | Practical | IDP14001 | Interdisciplinary Project | 0 | 0 | 5 | 5 | | 3 | |
| **Total** | | | | **12** | **2** | **15** | **29** | | **23** | |

**Credits (First Year): 49**

**# CS will be taken up during the summer break after 2th semester, and will be evaluated in the 3rd semester.**

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| **SEMESTER -III** | | | | | | | | | | | | | | | | | |
| **Sl. No** | **Type** | | **Course Code** | | **Subject Name** | | | **L** | | **T** | | **P** | | **Contact Hrs/week** | | **Credits** | |
| 1 | Theory | | SMA42111 | | Engineering Mathematics –III (Probability, Statistics and Numerical Methods) | | | 3 | | 1 | | 0 | | 4 | | 4 | |
| 2 | Theory | | HEC42180 | | HSSM –IV (Economics for Engineers) | | | 3 | | 0 | | 0 | | 3 | | 3 | |
| 3 | Theory | | CSE11003 | | Data Structures and Algorithms (Prof. Core- I) | | | 3 | | 0 | | 0 | | 3 | | 3 | |
| 4 | Theory | | CSE11004 | | Switching Circuits and Logic Design (Prof. Core- II) | | | 3 | | 0 | | 0 | | 3 | | 3 | |
| 5 | Theory | | CSE11005 | | Formal Languages and Automata Theory (Prof Core- III) | | | 3 | | 0 | | 0 | | 3 | | 3 | |
| 6 | Theory | | CSE11006 | | Engineering Science Course (Introduction to Python) | | | 3 | | 0 | | 0 | | 3 | | 3 | |
| 7 | Practical | | CSE12007 | | Data Structures and Algorithms Lab (Prof. Core-I Lab) | | | 0 | | 0 | | 3 | | 3 | | 2 | |
| 8 | Practical | | GEE14005 | | Capstone Project-III | | | 0 | | 0 | | 2 | | 2 | | 1 | |
| 9 | Practical | | SOC14100 | | Community Service# | | | -- | | -- | | - | | -- | | 1 | |
| 10 | Theory | | EIC11001 | | Venture Ideation | | | 2 | | 0 | | 0 | | 2 | | 2 | |
| **Total** | | | | | | | | **20** | | **1** | | **5** | | **26** | | **25** | |
| **SEMESTER-IV** | | | | | | | | | | | | | | | | |  |
| **Sl. No** | | **Type** | | **Course Code** | | **Subject Name** | **L** | | **T** | | **P** | | **Contact Hrs/week** | | **Credits** | |  |
|  | | Theory | | SMA42112 | | Operations Research | 3 | | 0 | | 0 | | 3 | | 3 | |  |
|  | | Theory | | CSE11008 | | Design & Analysis of Algorithm (Prof. Core- IV) | 3 | | 0 | | 0 | | 3 | | 3 | |  |
|  | | Theory | | CSE11009 | | Object Oriented Programming (Prof. Core- V) | 3 | | 0 | | 0 | | 3 | | 3 | |  |
|  | | Theory | | CSE11010 | | Software Engineering (Prof. Core- VI) | 3 | | 0 | | 0 | | 3 | | 3 | |  |
|  | | Theory | | CSE11011 | | Computer Architecture (Prof. Core- VII) | 3 | | 0 | | 0 | | 3 | | 3 | |  |
|  | | Theory | | PSG11021 | | Human Values and Professional Ethics | 2 | | 0 | | 0 | | 2 | | 2 | |  |
|  | | Practical | | SMA42211 | | Numerical Techniques Lab | 0 | | 0 | | 3 | | 3 | | 2 | |  |
|  | | Practical | | CSE12012 | | Design & Analysis of Algorithm Lab (Prof. Core- IV Lab) | 0 | | 0 | | 3 | | 3 | | 2 | |  |
|  | | Practical | | CSE12013 | | Object Oriented Programming Lab (Prof. Core- V Lab) | 0 | | 0 | | 3 | | 3 | | 2 | |  |
|  | | Practical | | GEE14006 | | Capstone Project -IV | 0 | | 0 | | 2 | | 2 | | 1 | |  |
| **Total** | | | | | | | **17** | | **0** | | **11** | | **28** | | **24** | |  |

**Total Credits (Second Year): 49**

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| **SEMESTER -V** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
|  | Theory | CSE11014 | Compiler Design (Prof. Core- VIII) | 3 | 0 | 0 | 3 | 3 |
|  | Theory | CSE11015 | Database Management Systems (Prof. Core- IX) | 3 | 0 | 0 | 3 | 3 |
|  | Theory | CSE11016 | Operating Systems (Prof. Core- X) | 3 | 0 | 0 | 3 | 3 |
|  | Theory |  | Prof. Elective -I | 3 | 0 | 0 | 3 | 3 |
|  | Practical | CSE12020 | Compiler Design Lab (Prof. Core- VIII Lab) | 0 | 0 | 3 | 3 | 2 |
|  | Practical | CSE12021 | Database Management Systems Lab (Prof. Core- IX Lab) | 0 | 0 | 3 | 3 | 2 |
|  | Practical | CSE12022 | Operating Systems Lab (Prof. Core- X Lab) | 0 | 0 | 3 | 3 | 2 |
|  | Practical | GEE14007 | Capstone Project -V | 0 | 0 | 2 | 2 | 1 |
| **Total** | | | | **12** | **0** | **11** | **23** | **19** |

**# CSR Activity will be taken up during the summer break after 4th semester, and will be evaluated in the 5th semester.**

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| **SEMESTER -VI** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
|  | Theory | CSE11023 | Computer Networks (Prof. Core- XI) | 3 | 0 | 0 | 3 | 3 |
|  | Theory | CSE11024 | Artificial Intelligence and Machine Learning (Prof. Core- XII) | 3 | 0 | 0 | 3 | 3 |
|  | Theory |  | Prof. Elective -II | 3 | 0 | 0 | 3 | 3 |
|  | Theory |  | Open Elective -I | 2 | 0 | 0 | 2 | 2 |
|  | Practical | CSE12029 | Computer Networks Lab (Prof. Core- XI Lab) | 0 | 0 | 3 | 3 | 2 |
|  | Practical | CSE12030 | Artificial Intelligence and Machine Learning Lab (Prof. Core- XII Lab) | 0 | 0 | 3 | 3 | 2 |
|  | Practical |  | Prof. Elective -II Lab | 0 | 0 | 3 | 3 | 2 |
|  | Seminar | CSE15034 | Technical Seminar | 0 | 0 | 2 | 2 | 1 |
| **Total** | | | | **11** | **0** | **11** | **22** | **18** |

**Total Credits (Third Year): 37**

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| **SEMESTER -VII** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
|  | Theory | MBA43144 | HSSM –V (Industrial Management) | 3 | 0 | 0 | 3 | 3 |
|  | Theory |  | Prof. Elective –III | 3 | 0 | 0 | 3 | 3 |
|  | Theory |  | Prof. Elective –IV | 3 | 0 | 0 | 3 | 3 |
|  | Theory |  | Open Elective –II | 3 | 0 | 0 | 3 | 3 |
|  | Theory |  | Open Elective –III | 3 | 0 | 0 | 3 | 3 |
|  | Theory |  | Prof. Elective- III Lab | 0 | 0 | 3 | 3 | 2 |
|  | Internship/Training | CSE14049 | **#**Summer Internship | -- | -- | -- | -- | 2 |
|  | Project | CSE14050 | Minor Project | 0 | 0 | 6 | 6 | 3 |
| **Total** | | | | **15** | **0** | **09** | **24** | **22** |

**# Summer Internship for 30 days will be taken at the end of 6th semester, and will be evaluated in the 7th semester.**

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| **SEMESTER -VIII** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
|  | Project | CSE14051 | Industry Work Experience / SIRE\* / Major Project | 0 | 0 | 6 | 06 | 4 |
|  | Viva | CSE15052 | Comprehensive Viva Voce | ---- | ---- | ---- | ------ | 2 |
| **Total** | | | | **0** | **0** | **6** |  | **06** |

**\*SIRE: Scientific Investigation & Research Experience**

**Total Credits (Fourth Year): 28**

**Total Credits (Over four years): 49+49+37+28 = 163 (Regular)**

**List of Electives:-**

**PE I (Theory): Applied Graph Theory (CSE11017)**

**Communication Network (CSE11018)**

**Big Data Analytics (CSE11019)**

**PE II (Theory): High Performance Computer Architecture (CSE11025)**

**Pattern Recognition (CSE11026)**

**Computational Geometry (CSE11027)**

**PE II (Lab): High Performance Computer Architecture Lab (CSE12031)**

**Pattern Recognition Lab (CSE12032)**

**Computational Geometry Lab (CSE12033)**

**Prof. Elective -III (Theory):**

**Image Processing (CSE11035)**

**Cloud Computing (CSE11036)**

**Information Retrieval (CSE11037)**

**Computer Graphics (CSE11038)**

**Artificial Neural Network and Deep Learning (CSE11039)**

**Prof. Elective -III (Lab):**

**Image Processing Lab (CSE12044)**

**Cloud Computing Lab (CSE12045)**

**Information Retrieval Lab (CSE12046)**

**Computer Graphics Lab (CSE12047)**

**Artificial Neural Network and Deep Learning Lab (CSE12048)**

**Prof. Elective -IV (Theory):**

**Cryptography & Cyber Security (CSE11040)**

**Internet of Things (IoT) (CSE11041)**

**5G Wireless Communication Network (CSE11042)**

**Open Elective -I (Theory): Artificial Intelligence (CSE11028)/ Computational Geometry (CSE11027)**

**Open Elective -II (Theory): Machine Learning (CSE11043)**

**Open Elective -III (Theory): Internet of Things (IoT) (CSE11041)**

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| --- | --- | --- | --- | --- | --- |
| **MTH11501** | Engineering Mathematics -I | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours –60** | **3** | **1** | **0** | **4** |
| **Pre-requisites/Exposure** | **12th level Mathematics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To help the student to understand basic concept of abstract and vector algebra with its uses in engineering science.
2. To give emphasis about concepts of differential calculus and enable students to apply these topics in real life problems.
3. To give the students a perspective to learn integral calculus and it’s importance in advanced study in engineering science.
4. To enable students, acquire fundamental concept of ordinary differential equation and it’s applications in engineering science.

**Course Outcomes:**

On completion of this course, the students will be able to

|  |  |
| --- | --- |
| CO1 | **Develop** the idea of basic concepts of abstract algebra and geometrical idea of vector analysis with real world applications. |
| CO2 | **Find** the fundamental concepts of differential calculus and apply these topics in real life problems |
| CO3 | **Find** the fundamental concepts of Integral Calculus and apply these topics in real life problems. |
| CO4 | **Apply** the various solution procedures of Ordinary Differential equations in engineering problems. |

**Catalog Description:**

For engineering course, Mathematics is the backbone. Students will be having good engineering skills if their idea for Mathematics is clear. In this course the focus will be to learn Mathematics in depth which will motivate students to grow their thinking ability for engineering also. By knowing the theory student will be able to apply that successfully to all kind of problems of Engineering and science. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities (Problem solving, presentation etc.).

**Course Content:**

**Unit- I 20 Lecture Hours**

**Group Theory:** Review of concept of set theory, Binary operations, group, abelian group, subgroups, necessary and sufficient condition for a subset of group to be a subgroup, ring, field, examples.

**Sequences and Series:** Sequences and their limits, convergence of series, comparison test, Ratio test, Root test, Absolute and conditional convergence, alternating series, Power series.

**Vector Algebra:** Scalar and vector fields, Vector product, Scalar triple product and their interpretation, directional derivative, gradient, Curl, divergence.

**Unit- II 16 Lecture Hours**

**Differential Calculus (Functions of one Variable):** Limit, continuity, differentiability of functions of single variable, successive differentiation, Leibnitz’s theorem, Rolle’s Theorem, Cauchy’s mean value theorem, Taylor’s and Maclaurin’s theorems with remainders, indeterminate forms, concavity and convexity of a curve, points of inflexion, asymptotes and curvature.

**Differential Calculus (Functions of several variables):** Limit, continuity, Differentiability of functions of several variables, partial derivatives and their geometrical interpretation, differentials, derivatives of composite and implicit functions, Euler s theorem on homogeneous functions, harmonic functions, maxima and minima of functions of several variables, Lagrange’s method of multipliers.

**Unit- III 14 Lecture Hours**

**Integral Calculus:** Fundamental theorem of integral calculus, mean value theorems, evaluation of definite integrals, reduction formulae. Convergence of improper integrals, tests of convergence, Beta and Gamma functions, elementary properties, Differentiation under integral sign, differentiation of integrals with variable limits, Leibnitz rule. Rectification, double and triple integrals, computations of area, surfaces and volumes, change of variables in double integrals, Jacobian’s of transformations, integrals dependent on parameters, applications.

**Unit-IV 10 Lecture Hours**

**Ordinary Differential Equations:** First order differential equations, exact, linear and Bernoulli’s form, second order differential equations with constant coefficients, method of variation of parameters, general linear differential equations with constant coefficients, Euler’s equations, Cauchy-Legendre’s equation system of differential equations.

**Text Books:**

1. Erwyn Kreyszig : Advanced Engineering Mathematics, John Wiley and Sons
2. B.V. Ramana, Higher Engineering Mathematics Tata McGraw-Hill.
3. B.S.Grewal  : Higher Engineering Mathematics, Khanna Publications
4. C B Gupta, S R Singh, Mukesh Kumar: Engineering Mathematics, McGraw Hill Publication.
5. R.K.Jain and S.R.K.Iyengar :  Advanced Engineering Mathematics,  Narosa Publishing House, 2002

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Develop** the idea of basic concepts of abstract algebra and geometrical idea of vector analysis with real world applications. | **PO2, PO3, PO4, PO12** |
| **CO2** | **Find** the fundamental concepts of differential calculus and apply these topics in real life problems | **PO2, PO3, PO4, PO12** |
| **CO3** | **Find** the fundamental concepts of Integral Calculus and apply these topics in real life problems. | **PO2, PO3, PO4, PO12** |
| **CO4** | **Apply** the various solution procedures of Ordinary Differential equations in engineering problems. | **PO2, PO3, PO4, PO12** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| MTH11501 | Engineering Mathematics -I | - | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | - | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| Course: MTH11501 – Engineering Mathematics -I **Program: B.Tech Stream: CSE Semester: ODD 2020-21**  **Time: 03 hrs. Max. Marks:40**  **Instructions:**  **Section A is compulsory** (each carrying 4 marks); All questions from **Section B** (each carrying 10 marks)**, Any one from Section C** (carrying 8 marks)**.** | | | | |
| **Section A** | | | | |
| 1. | **Find** the solution of the following differential equation after reducing it to a homogeneous differential equation | | **R** | **CO4** |
| 2. | **Solve** the following system of simultaneous linear differential equations: | | **Ap** | **CO4** |
| ­­­ 3. | **Find** if | | **R** | **CO2** |
| **SECTION B** | | | | |
| 4. | (a) **Find** the dimension of a rectangular box of maximum capacity whose surface area is given when the box is open at the top.   1. **Show** that , where . 2. **Find** . 3. **Show** that , if where | | **R** | **CO2** |
| 5. | **Illustrate** the convergence of the following series:   1. , if is convergent. | | **U** | **CO1** |
|  | **SECTION C (Any ONE)** | |  | |
| 6. | a) **Show** that , where are any three vectors.  b) **Show** that , if and . | | **R** | **CO1** |
| 7. | **Apply** the method of variation of parameters to solve: | | **Ap** | **CO4** |

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| **PHY11201** | Applied Science | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **12th level Physics, Chemistry, and Mathematics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To develop the capability of the students for understanding fundamental aspects of physics.
2. To give students theoretical background, the key prerequisite for performing laboratory experiments.
3. To build up the foundations for further studies in physics and engineering.
4. Learn to analyze and evaluate various thermodynamic cycles used for energy production - work and heat, within the natural limits of conversion
5. To impart the knowledge of measurement of the rate of a chemical reaction and to gain knowledge of electrochemical procedure

**Course Outcomes:**

At the end of the course, the student will be able to:

|  |  |
| --- | --- |
| CO1 | **Illustrate** the basics of vector calculus, its application in mechanics, and different harmonic motions. |
| CO2 | **Build** the knowledge of physical optics and related application. |
| CO3 | **Develop** the basic concepts of electromagnetic theory and em wave. |
| CO4 | **Apply** fundamental concepts of thermodynamics to engineering applications, estimate thermodynamic properties of substances in gas and liquid states, and determine thermodynamic feasibility and efficiency of various energy related processes. |
| CO5 | **Determine** the rate law, effect of temperature on the rate of a chemical reaction and determine the activation energy and assess the role of a catalyst on the rate of a chemical reaction, calculate the cell potential for a nonstandard cell. |

**Catalog Description:**

Applied science is a discipline that is used to apply existing scientific knowledge to develop more practical applications, for example: technology or inventions. In applied science different aspects of Mathematical Physics is used to develop information to explain phenomena in the natural world. This information is then put to use for practical endeavours through a controlled Laboratory environment. Applied science is generally engineering, which develops technology, although there might be dialogue between basic science and applied science (research and development).In this course the focus will be on improving the logical learning moved into a physical environment. Classroom activities will be designed to encourage students to play an active role in the construction of their own knowledge and in the design of their own learning strategies. We will combine traditional lectures with other active teaching methodologies, such as group discussions, cooperative group solving problems, analysis of video scenes and debates. Class participation is a fundamental aspect of this course.

Basic knowledge in chemistry is essential for understanding various energy-work relationships. Student will be able to develop engine. They will be able to increase the efficiency of an engine. Student will understand the different processes in chemical and physical science and their feasibility. The basic knowledge of the molecular structure and their bonding will impart the knowledge of the reactivity and the application of different molecules. The knowledge of electrochemistry will impart a deep sense in preparing different electrochemical cells and their applications. Students will be encouraged to develop new models. We will apply different methodologies to inspire our students combining traditional classes with modern techniques. They will also take part in different project work in fundamental as well as in practical fields.

**Course Content:**

**Module 1: Mechanics 10 Lecture Hours**

Basic ideas of Vector Calculus Potential energy function, Conservative and non-conservative forces. Conservation laws of energy & momentum. Central and non-central forces, Gravitation, Kepler’s Laws, Angular Velocity and Torque, Moment of Inertia, SHM, Damped, Undamped and forced Oscillations (no derivations).

**Module 2: Optics** **05 Lecture Hours**

Principle of Superposition and Interference from parallel thin films, Single slit and double slit diffraction, Diffraction grating, and dispersive power of Grating, resolving power of prism and grating. Production of plane polarized light by different methods, Brewster and Malus Laws. Double refraction, Nicol prism, specific rotation.

**Module 3: Electromagnetic Theory** **10 Lecture Hours**

Gauss’s Law in Electrostatics, Boundary Value problems, Dielectrics, Motion of Charged Particles in crossed electric & magnetic fields, Velocity Selector & Magnetic focussing, Gauss law, continuity equation, Biot-Savart Law and its applications, inconsistency in Ampere’s Law, Maxwell’s equations (differential and integral forms), Poynting vector, Poynting Theorem (Statement only).

**Module 4: Thermodynamics**  **10 Lecture Hours**

Importance and scope, definition of system and surroundings: type of systems (isolated, closed and open); extensive and intensive properties; steady state versus equilibrium state; concept of thermal equilibrium and the zeroth law of thermodynamics; thermodynamic coordinates, state of a system, equation of state, state functions and path functions; concept of heat and work (IUPAC convention); first law of thermodynamics, internal energy (U) as a state function; enthalpy as a state function; energy conservation in the living organism; heat changes at constant volume and constant pressure; relation between Cp and Cv using ideal gas; Thermodynamics of Chemical Processes, Concept of entropy, 2nd law of thermodynamics, Idea of Chemical potential, Equilibrium conditions for closed systems.

**Module 5: Reaction Kinetics, Catalysis & Electrochemistry**  **10 lecture hours**

Rate laws, 1stOrder reaction & 2ndorder reaction, Arrhenius equation, Mechanism and Theories of reaction rates, kinetic and thermodynamic control of reaction; idea of rate determining step; steady-state approximation; Characteristics and types of Catalyst, Theories of Catalysis, Electrode potential, Redox reaction & Nernst Equation.

**Text Books:**

|  |  |
| --- | --- |
|  | Principles of Engineering Physics by S. P. Kuila, (Volume I) New Central Book Agency (P) Ltd. |
|  | Principles of Engineering Physics by S. P. Kuila, (Volume II) New Central Book Agency (P) Ltd. |
|  | Engineering Physics by Partha Pratim Das and Abhishek Chakraborty |
|  | Engineering Physics I by S. K. Bhattacharya and Soumen Pal |
|  | Engineering Physics II by S. K. Bhattacharya and Soumen Pal |
|  | Engineering Chemistry (Cambridge University Press-Ist Edition) –Shikha Agarwal |
|  | P. W. Atkins, Physical Chemistry, ELBS/Oxford, 10th Edition, 2014 |

**Reference Books:**

|  |  |
| --- | --- |
|  | Optics by Ajoy Ghatak, Mc-graw Hill |
|  | Introduction to Electrodynamics, David J. Griffiths, Pearson Education Limited |
|  | Engineering Chemistry (Pearson Ed.)- K. Sesha Maheswaramma and MridulaChugh |
|  | Physical Chemistry (Sarat Book House)- P. C. Rakshit |

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Illustrate** the basics of vector calculus, its application in mechanics, and different harmonic motions. | **PO1, PO12** |
| **CO2** | **Build** the knowledge of physical optics and related application. | **PO1, PO4** |
| **CO3** | **Develop** the basic concepts of electromagnetic theory and em wave. | **PO1, PO5, PO6, PO3** |
| **CO4** | **Apply** fundamental concepts of thermodynamics to engineering applications, estimate thermodynamic properties of substances in gas and liquid states, and determine thermodynamic feasibility and efficiency of various energy related processes. | **PO1, PO2, PO4, PO5, PO12** |
| **CO5** | **Determine** the rate law, effect of temperature on the rate of a chemical reaction and determine the activation energy and assess the role of a catalyst on the rate of a chemical reaction, calculate the cell potential for a nonstandard cell. | **PO1, PO2, PO4, PO6** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| PHY11201 | Applied Science | 3 | 2 | 1 | 3 | 2 | 2 | - | - | - | - | - | 2 | - | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Stream: CSE Semester: I

PAPER TITLE: Applied Science PAPER CODE: PHY11201

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 14 Total No of Pages: 02

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Define** polarization of light. | **R** | **CO2** |
| 2. | **State** Faraday’s law of Electromagnetic induction. | **R** | **CO3** |
| ­­­ 3. | **Define** Gauss’s divergence theorem. | **R** | **CO1** |
| 4. | **Define** internal energy of a thermodynamics system | **R** | **CO4** |
| 5. | **State** Arrheniusrelation between rate constant and temperature | **R** | **CO5** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | A cubical block of side *L* and density *d* is floating in a water of density ρ(ρ>d). The block is slightly depressed and released. **Show that** it will execute simple harmonic motion and hence **determine** the frequency of oscillation. | **Ap** | **CO1** |
| 7. | **Show** that intensity distribution for diffraction in a single slit is given by,  Where , *a* is the width of the slit, is the wavelength of light and is the angle of diffraction. | **U** | **CO2** |
| 8. | **Explain** Maxwell’s modification on Ampere’s law. | **Evaluate** | **CO3** |
| 9. | Show that .  Hence find the value for an ideal gas. Comment on the value of (CP-CV) for a solid or a liquid. | **Ap** | **CO4** |
| 10 | (a)When order and molecularity of reaction can be same? (b) Why does order can be fractional but molecularity cannot? (c) Write the units of rate constants for zero and second order reaction. | **U** | **CO5** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 11. | (a) **Find** out the condition for maximum and minimum intensity in Young’s Double slit experiment for Interference of Light.  **Show** that Energy remains constant in this phenomena. [3+1]  (b) In an interference experiment,‘d’ is the distance between the two coherent sources of light with wavelength λ and D is the distance between source to screen. **Show** that the separation between the two consecutive dark bands is given by β=λD/d. [4]  (c) In Newton’s Rings experiment the diameter of the 5th dark ring is 0.336 cm. and the diameter of the 15th dark ring is 0.590 cm. **Find** the radius of the plano-convex lens if the wavelength of the light used is 5890 A. [2] | **R**  **U**  **U**  **R** | **CO2** |
| 12. | (a) **Derive** equation of continuity for current. **Show** that for steady current it reduces to =0. [4]  (b) **Compare** the electrostatic force and Gravitational force between a proton and electron in a hydrogen atom. Given  (c) Five equal charges of 40 nC each are placed at five vertices of a regular hexagon of 6 cm side. The sixth vertex is free. **Determine** the electric field at the centre of the hexagon due to the distribution. | **U**  **U**  **Evaluate** | **CO3** |
| 13. | (a) dU=CV dT  Is this valid for all systems? State the conditions under which the equation is valid. [2]  (b) Show that PV= constant for an adiabatic process of a gas. State all the assumptions. [4]  (c) I mole of an ideal gas is allowed to expand freely under adiabatic condition to double of its volume. The initial temperature of the gas is 300 K and the initial pressure is 1 atm. Find the final temperature, final pressure of the gas. Also calculate U+H for the process. [4] | **U**  **U**  **Evaluate** | **CO-4** |
| 14. | (a) What effect does temperature has on the rate of chemical reactions? Explain it on the basis of Arrhenius equation. [4]  (b) Initial rate of a first order reaction increases three fold when temperature changes from 400 K to 420 K. If the half-life period of the reaction at 400 K is 10 min, calculate the time required for 20 % conversion of the reactant at 420 K and the activation energy**.** [4]  (c) What is the significance of activation energy? [2] | **U**  **Evaluate**  **U** | **CO-5** |

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| **CSE11001** | Introduction to Programming | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **10+2 Level Mathematics, Knowledge of Basics of Computer** | | | | |
| **Co-requisites** | **Knowledge of Logical Reasoning and Analysis** | | | | |

**Course Objectives:**

* + - 1. To understand the nature of programming as human activity.
      2. To practice the programming construct to solve multi-dimensional problems.
      3. To relate and implement mathematical concepts through programming in order to solve computational problems.
      4. To enable students to acquire structure and written expression required for their profession.
      5. To understand the principles of data storage and manipulation.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Define** basics concepts of programming structure and implement the basics concepts of

Programming.

CO2. **Solve** and execute various problems using programming language and select the best solution.

CO3. **Apply** modularized solution and design such programs to appraise the solution

CO4. **Illustrate** the basic usage of memory and construct such memory in terms of array in a

program. Students will also be able to define user defined data types using structure and Union. Create and manipulate permanent storage access through File Handling.

CO5. **Define** and construct different data structures for various collection of data.

**Catalog Description:**

Programming skills are mandatory for designing or solving problems through digital device. It is the language through which computational/digital devices are communicated rather interfaced. To develop any software programming language is a must. In present era almost all aspect of life is somehow largely related to virtualization and digital data/information. Devices from smartphones to other handheld devices, drones, cameras, medical instruments etc. all needs programming at some part. In engineering it has become quintessential for the students/research scholars to learn programming. In this course, students will learn how to solve problems in various domains through a programming language. This course enables students with the basic skills of C Programming Language. Five Different related modules comprise this course. First Unit familiarizes students with basics of computers, algorithmic method to solve problem, introduction to generic programming construct. Basics of C Programming is upto iterative structure is depicted in Unit II. In Unit III students will learn about modularization using functions and one advance concept of C Programming, Pointers. Unit IV will cover one of the most important concepts in C Programming, Array and Strings. Unit V will accomplish this course with the advance concept like Structure, Union and File Handling. After this course students will grow their analytical ability to solve problem and logical skill. Also, this course effectively creates the ability to grasp any other Programming Language in easier manner.

**Course Content:**

**Unit I: 4 lecture hours**

**Basic Concepts of Programming:** Introduction to components of a Computer System (disks, memory, processor, where a program is stored and executed, operating systems, compilers, etc.), Idea of Algorithm: steps to solve logical and numerical problems, Representation of Algorithms: Flowchart/Pseudo code with examples, From Algorithms to Programs; source code, variables and memory locations, Syntax and Logical Errors in compilation, Object and Executable code

**Unit II: 10 lecture hours**

**Basics of C Programming :**Characters used in C, Identifiers, Keywords, Data type & sizes, Constants &Variables, Various Operators used such as Arithmetic Operators, Relational & Logical Operators, Increment & Decrement Operators, Assignment Operators, Conditional or Ternary Operators, Bitwise Operators & Expressions; Standard Input & Output, formatted input scanf( ), formatted output printf( ); Flow of Control, if-else, switch-case, Loop Control Statements, for loop, while loop, do-while loop, nested loop, break, continue, goto, label and exit( ) function

**Unit III: 10 lecture hours**

**Functions and Pointers:** Definition of Function, Declaration or Prototype of Function, Various types of Functions, Call by Value, Call by Reference, Recursion, Tail Recursion, Definition of Pointer, Declaration of Pointer, Operators used in Pointer, Pointer Arithmetic, Functions with Pointer

**Unit IV**  **17 lecture hours**

**Arrays and String:** Definition, Single and Multidimensional Arrays, Representation of Arrays - Row Major Order, and Column Major Order, Application of arrays – searching and sorting, Sparse Matrices and their representations. Definition of a String, Declaration of a String, Initialization of a String, Various String Handling Functions with example

**Structures and Unions:** Definition of a Structure, Declaration of a Structure & Structure Variable, Initialization of a Structure, Operators used in Structure, Structure within Structures, Union, Difference between a Structure and a Union

**Files:** Types of File, File Processing, Handling Characters, Handling Integers, Random File Accessing, Errors During File Processing

**Unit V 4 lecture hours**

**Overview of Stacks and Queues:** Introduction to Stack, Primitive operations on Stack, Real-life applications of Stack, Introduction to Queues, Primitive operations on Queues, Real-life applications of Queues.

**Text Books:**

1. Balagurusamy, E., n.d. Programming In ANSI C. 5th ed. Bangalore: mcgraw-hill.
2. Gotfreid (196) Schaum's Outline of Programming with C, 2 edn., USA: McGraw-Hill
3. Brian W. Kernighan, Dennis Ritchie (1988) C Programming Language, 2 edn., : Prentice Hall.

**Reference Books:**

1. Al Kelley, Ira Pohl (1988) *A Book on C*, 4 edn., : Addision Wesley Longman

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Define** basics concepts of programming structure and implement the basics concepts of Programming. | **PO4** |
| **CO2** | **Solve** and execute various problems using programming language and select the best solution. | **PO1, PO3** |
| **CO3** | **Apply** modularized solution and design such programs to appraise the solution | **PO1, PO9** |
| **CO4** | **Illustrate** the basic usage of memory and construct such memory in terms of array in a program. Students will also be able to define user defined data types using structure and Union. Create and manipulate permanent storage access through File Handling. | **PO1, PO5** |
| **CO5** | **Define** and construct different data structures for various collection of data. | **PO1, PO11** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11001 | Introduction to Programming | 3 | - | 1 | 1 | 1 | - | - | - | 1 | - | 1 | - | - | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: I Stream: CSE

Paper Title: Introduction To Programming Paper Code: CSE11001

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (attempt any two)** | | | |
| 1. | **What** do you understand data types? | **U** | **CO1** |
| 2. | **Define** array? | **U** | **CO4** |
| ­­­3. | **How** user defined function reduces the no. of lines in a large program? | **R** | **CO2** |
| 4. | **Why** pointer is advantageous than array? | **U** | **CO5** |
| 5. | **What** is the size of an integer variable? | **R** | **CO1** |
|  | **SECTION B (**Attempt any **Two Questions)** |  | |
| 6. | **What** is dimension of an array? **How** many types of array are there? Can you store integer values and float type values in a single array, if not **why**? **What** you need to do to store such different types of values in a single array? | **U** | **CO4** |
| 7. | **Find** an user defined function in c that would return multiple values in main() function. | **Ap** | **CO3** |
| 8. | Suppose a paragraph is stored in a 2-D character array. **Find** a specific sentence in that paragraph using a c program. | **U** | **CO2/CO4** |
| 9. | State the types of data types and memory occupies. **What** are the ways to convert from one data type to another data type with suitable example? | **U** | **CO1** |
|  | **SECTION C is Compulsory** |  | |
| 10. | **How** is it possible to take input in a 2-D array using a single for loop? Make it possible using a suitable program in c. | **U** | **CO4** |
| 11. | **Design** a program in c to determine that a text is written in English or in any other language. If the text is written in any other language convert every character in its nearest English alphabets. | **Ap** | **CO4** |
| 12 | **Design** a program to create a pointer to an integer. Allocate memories for 50 elements into that pointer using both malloc() and calloc() function. Display the significance difference of using those two functions to allocate memory. Also state the specific needs of these two functions. | **Ap** | **CO4** |

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| **ENG11053** | **HSSM –I (English Communication -I)** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **12th level English** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To know the importance and techniques of communication skills in order to improve professional skills

2. To enhance the knowledge of the students on vocabulary, syntax, and grammatical skills

3. To improve writing skills by applying writing techniques, tools in practice sessions

4. To achieve an overall enhancement in terms of reading, listening and speaking

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Illustrate** the communication processes and to know the practical implications and its challenges at the workplace

CO2. **Find** the practical uses of English grammar and to use grammar correctly and unambiguously

CO3. **Apply** different formats of business communication like reports, letters, and other technical writings

CO4. **Build** competence in speaking, reading, listening, and writing in English.

CO5. **Apply** English pronunciation and use neutral accent successfully

CO6. **Explain** comprehend different other accents of spoken English

**Catalog Description:**

Effective communication is one of the basic requirements of a successful career. Both verbal and nonverbal communication is important to exchange ideas among the employees within the organisation and outside the organisation as well. In this course, the focus will be on improving LSRW skills, i.e. listening, speaking, reading and writing. Students will learn how to communicate effectively through prescribed syllabus. Classroom activities will be designed to encourage students to play an active role in the construction of their own knowledge and in the design of their own learning strategies. We will combine traditional lectures with other active teaching methodologies, such as group discussions, role play, small skit enactments, analysis of video scenes and debates. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities and to give an oral group presentation. Students will be expected to interact with media resources, such as, web sites, videos, DVDs, and newspapers etc.

**Course Content:**

**Module I: 9 Lecture hours**

**Communication Level 1**: Basics of Communication, Means of Communication, Barriers of Communication

**Module II: 9 Lecture hours**

**Grammar and Syntax Level 1**: Tense: types and uses, Idioms, One Word Substitutes, Discussion on the use of Articles and related exercises, Discussion on the use of Prepositions and related exercises, Exercises on Sentence –Making (Syntax), Practice exercises on Voice change, Class Exercises on Synonyms and Antonyms.

**Module III: 9 Lecture hours**

**Reading and Listening Skills Level 1**: Introduction to listening skills: purposes and practice, Discussion on types of listening: difference between listening and hearing, Active listening: introduction listening exercises, Elementary level listening exercise, Intermediate level listening exercise, Advance level listening exercise, Introduction to Reading Skills, Strategies of reading, Skimming, Scanning and Summarizing, Comprehension exercises.

**Module IV: 9 Lecture hours**

**Speaking Skills Level 1**: Introduction to Speaking Skills: Mother tongue influence, Discussion on various kinds of narrative styles and techniques: Welcome speech, Vote of Thanks, Farewell Speech, Debate and Elocution, Class Exercises on Descriptive narration, Practical Exercises on Narration styles, Presentation of small skits, Practicing Extempore in the class, Mock practices of Group discussion, Practicing speaking in pairs, Mock practice of job interviews.

**Module V:**  **9 Lecture hours**

**Writing Skills Level 1**: Business letters: definition, types and format, Practice exercises, Business reports: definition, types and format, Practice exercises, CV and Application letters: types and formats, Practice exercises, Compositions: Essays, precis paragraph writing

**Text Books:**

1. Kaul Asha. Effective Business Communication. PHI Learning Pvt Ltd. 2014.

2. Wren and Martin. High School Grammar And Composition. S. Chand, 1995.

3. Gupta, A. English Reading Comprehension. Ramesh Publishing House, 2009.

**Reference Books:**

1. Lewis, Norman. Word Power Made Easy. Anchor: 2014.

2. Riordan, Daniel G & Pauley Steven A. :Technical Report Writing Today. 2004.

3. Hamp-Lyons and Heasely, B . Study Writing; A Course in Written English. For Academic and Professional Purposes, Cambridge Univ. Press, 2006.

4. Quirk R., Greenbaum S., Leech G., and Svartik, J. A Comprehensive Grammar of the English language, Longman:London, 1985.

5. Balasubramaniam, T. A Textbook of English Phonetics for Indian Students. Macmillan: 2012.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | Course Outcomes (COs) | Mapped Program Outcomes |
| **CO1** | **Illustrate** the communication processes and to know the practical implications and its challenges at the workplace | **PO2, PO5, PO8, PO9, PO10** |
| **CO2** | **Find** the practical uses of English grammar and to use grammar correctly and unambiguously | **PO2, PO4, PO9, PO10** |
| **CO3** | **Apply** different formats of business communication like reports, letters, and other technical writings | **PO3, PO6, PO8, PO9, PO10** |
| **CO4** | **Build** competence in speaking, reading, listening, and writing in English. | **PO2, PO3, PO7, PO8, PO9, PO12** |
| **CO5** | **Apply** English pronunciation and use neutral accent successfully | **PO3, PO7, PO9, PO10** |
| **CO6** | **Explain** comprehend different other accents of spoken English | **PO3, PO7, PO9, PO10** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information manage  ement systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| ENG11053 | HSSM –I (English Communication- I) | - | 3 | 3 | 1 | | 1 | 1 | 3 | 3 | 3 | 3 | - | 1 | - | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |  |
| Course: ENG11053 – HSSM –I (English Communication- I) **Program: B.Tech. Stream: CSE Semester: I**  **Time: 03 hrs. Max. Marks:40**  **Instructions:**  Attempt all questions from **Group A** (each carrying 1 mark); any **Three Questions** from **Group B** (each carrying 5 marks)**; any Two questions from Group C** (each carrying 10 marks)**.** | | | | | |
| **Group A (Answer all the questions) (5×1=5)** | | | | | |
| 1.  2.  3.  4.  5. | **Where** were you \_\_\_ 28 February, 2019? (Fill in the blank with appropriate preposition)  **What** is non-verbal communication?  **Find** one word substitute for: “One who loves books”  **What** is the antonym of “Happiness”?  Give example of an idiom. | | **U**  **R**  **R**  **R**  **R** | **CO2, CO1** | |
|  | **Group B (**Attempt any **Three Questions) (3×5=15)** | |  |  | |
| 6. | **What** are the barriers to communication? **Explain** some physical and psychological barriers of communication | | **R** | **CO1** | |
| 7. | **What** do you understand by communication? Write a note on the importance of effective communication. | | **U** | **CO1** | |
| 8. | Fill in the blanks using suitable article. **Find** a copy the sentences given, while answering:  i. He was \_\_\_\_ first man to arrive.  ii. Would you like to be \_\_\_\_\_\_ teacher?  iii. I am going to buy \_\_\_\_\_\_ hat.  iv. Picasso was \_\_\_\_ famous painter.  v. The Ganga is \_\_\_\_ sacred river. | | **U** | **CO2** | |
| 9. | **Change** the following sentences from active to passive voice:  i. The cat killed a mouse  ii. People lined the road  iii. He was singing a song yesterday  iv. I have read this book.  v. Who broke the jug? | | **R** | **CO2** | |
|  | **Group C (**Attempt any **Two Questions) (2×10=20)** | |  | | |
| 10. | **Compose** a paragraph on the impact of COVID 19 in our society. | | **U** | **CO3** | |
| 11. | **Compose** an application to the Vice-Chancellor of your University as the class representative of your respective class requesting permission to organize a science exhibition in your department | | **U** | **CO3** | |
| 12. | .Read the following passage and **find** the answer the questions that follow.  A few countries already use powerful electromagnets to build high speed trains. These trains are called maglev trains. Maglev is the shortened form of magnetic levitation. Maglev trains work on the principles of magnetism and float over a guideway.  The maglev train is different from a conventional train in that it does not have an engine. At least it does not have the kind of engines that pull train cars along steel tracks. It does not consume fossil fuels either.  Since maglev trains float in the air, there is no friction between the train and the track. This lack of friction and the aerodynamic design of these trains allow them to reach speeds of over 500 kilometer per hour.  Japan and Germany pioneer research in the maglev train technology. They have already built their prototypes and are in the process of testing them. Transrapid is an electromagnetic suspension system developed by German engineers. The idea of maglev transportation has been in existence for over a century. The first commercial maglev train made its debut in Shanghai, China in 2002. This train was developed by a German company. Right now the Shanghai Transrapid line connects Longyang Road station and Pudong airport. China is planning to extend this line to Hangzhou by building a 99 miles guideway.  Several other countries are also planning to build their own maglev train system, but right now the Shanghai maglev train is the only commercial maglev line.  Complete the sentences: (2×5=10)  (a) The two main differences between maglev trains and conventional trains are: …………………………….., ……………………………………..  (b) Maglev trains are environment friendly because ………………………  (c) The two nations that lead the research in maglev train technology are ……………………………..  (d) The two factors that help maglev trains to achieve high speeds are …………………………………….  (e) A suitable title for the passage would be ……………………………………………. | | **U** | **CO4** | |

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| --- | --- | --- | --- | --- | --- |
| **BIT11003** | Life Science | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Class 12 Biology** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To acquire the knowledge about the cell structure and interaction with neighboring cells in biological system.

1. To gain the knowledge about the genetic switches and oscillators and evolutionary dynamics.
2. To acquire the knowledge about the transport of molecules in different cellular compartments.
3. To gain the knowledge about dynamics of different systems in human body.
4. To understand the application and significance of different techniques of medical biotechnology.

**Course Outcomes:**

At the end of the course, the student will be able to:

|  |  |
| --- | --- |
| CO1 | **Explain** the structure and functions cell organelles and their interrelationship. |
| CO2 | **Analyze** the genetic switches and evolutionary dynamics of living system. |
| CO3 | **Determine** the mode of transport of molecules in biological system numerically. |
| CO4 | **Compare** and contrast between the different networks of human body and other physiological systems and can summarize consequences of physiological disorders. |
| CO5 | **Choose** or identify different techniques of medical biotechnology on human body to analyse the malfunction of different human system during diseased conditions. |

**Course Description:**

Cell is the structural and functional unit of living organism, it is well known throughout the universe, but mystery the molecular mechanism for performing the different kinds of functions of cell organelle (along with their development in both plant and animal system) and their integration into a beneficial outcome for living organism and as well as the outcome of physiological responses is almost unknown. So the course consists of structure function relationship of cell organelles, trafficking of different molecules between different cellular compartments and their secretion, creation of physiological responses and their assessment by several kinds of instrumentation techniques which can create a common platform between science of engineering and biological science.

**Course Content:**

**Unit I: Cell biology & Communication:**  **7 Lecture Hours**

Structure, function, and synthesis of cellular membranes and organelles; cell growth and cancer; cytoskeleton and extracellular matrix; cell cycle; transport, receptors, and cell signalling; functions of specialized cell types.

**Unit II: Genetics & Systems Biology 4 Lecture Hours**

Genetic switches and oscillators, cell-to-cell interactions, cellular and genetic networks, and evolutionary dynamics.

**Unit III: Transport & Flow in Biological Systems 7 Lecture Hours**

Diffusion, osmosis, facilitated, and active transport; Heat Conduction and Radiation; Fluid Dynamics; Heat and Mass Transfer. Electromechanical and physicochemical interactions in cells and biomaterials.

**Unit IV: Human Physiology & Diseases 10 Lecture Hours**

Anatomical, physiological and pathological features of the cardiovascular, respiratory and renal systems. Identifications of deficiencies and diseases from blood, urine and feces; genetic disorders and gene therapy.

**Unit V: Neurophysiology 10 Lecture Hours**

Neuron structure and function; Regeneration of nerve; flow and transport of signals from one neuron to other; Nervous system; Aging and its effect on brain; Behavioral functions of the brain - emotion, memory, learning and consciousness; Disorders of the nervous system and treatment.

**Unit VI: Medical Biotechnology 7 Lecture Hours**

Understanding the handling and usefulness of electrocardiograms, ultrasound images, X-ray images, magnetic resonance images (MRI), computerized tomography (CT) or computerized axial tomography (CAT) images, glucose sensors, and other biosensors.

**Text Books:**

1. Biology for Engineers by Arthur T. Johnson. CRC Press, 1 edition, 2010.

1. New Biology for Engineers and Computer Scientists by AydinTozeren and Stephen W. Byers. Pearson, 1 edition, 2003.

**Reference Books:**

1. Applied Cell and Molecular Biology for Engineers by Gabi Nindl Waite and Lee R. Waite. McGraw-Hill Education, 1 edition, 2007.
2. Samson Wright’s Applied Physiology.

**Modes of Examination: Assignment/Quiz/Project/Presentation/Written Exam**

**Examination Scheme:**

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| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** the structure and functions cell organelles and their interrelationship. | **PO9, PO12, PSO1, PSO2** |
| **CO2** | **Analyze** the genetic switches and evolutionary dynamics of living system. | **PO2, PO5, PO6** |
| **CO3** | **Determine** the mode of transport of molecules in biological system numerically. | **PO2, PO3, PO5, PO8, PSO1, PSO2** |
| **CO4** | **Compare** and contrast between the different networks of human body and other physiological systems and can summarize consequences of physiological disorders. | **PO1, PO2, PO3, PO5, PO6,PO12, PSO1, PSO2** |
| **CO5** | **Choose** or identify different techniques of medical biotechnology on human body to analyse the malfunction of different human system during diseased conditions. | **PO1, PO2, PO3, PO5, PO6, PO8, PO12,PSO1, PSO2** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| BIT11003 | Life Science | 2 | 2 | 3 | - | 3 | 3 | - | 2 | 1 | - | - | 2 | 3 | 3 | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | |
| Name of the Program: B.Tech Semester: I  Stream: CSE  PAPER TITLE: Life Science PAPER CODE: BIT11003  Maximum Marks: 40 Time duration: 3 hours  Total No of questions: 08 Total No of Pages: 01  **Instructions:**  Attempt any three questions from **Section A** (each carrying 4 marks); any **Two Questions** from **Section B** (each carrying 10 marks)**. Section C** is Compulsory (carrying 8 marks)**.** | | | |
| **Section A (**Attempt **any Three)** | | | |
| 1. | **Discuss** role of different cell organelles in eukaryotic cells. | **U** | **CO1** |
| 2. | **Compare** between Prokaryotic and eukaryotic cells. | **U** | **CO1** |
| ­­­3. | **What** are theconsequences of physiological disorders? | **R** | **CO4** |
| 4. | If someone is suffering from cancer, **what treatment can be given to treat the cancerous cells?** | **Ap** | **CO3** |
|  | **SECTION B (**Attempt any **Two Questions)** |  | |
| 5. | **Explain** oncogenes. **How** can they affect the cells**? Is this relates with** Tumor suppressive gene? Discuss in detail. | **Ap** | **CO1**  **CO2** |
| 6. | a) **What** are the factors influencing living cells and negative as well as positive ways? (4)  b) **Explain** different type of networks in human body. (6) | **U** | **CO1**  **CO4** |
| 7. | a) **Explain** different techniques of medical biotechnology on human body to analyze the malfunction of different human system during diseased conditions.   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | A | B | C | D | E | F | G | H | I | J | K | L | | **Ap** | **CO5** |
|  | **SECTION C is Compulsory** |  | |
| 8. | a) **What** is cell? (2)  b) **How** plant cells are different from animal cells? **Explain** any two cell organelles which are considered to be evolved by bacterial cells.(6) | **U**  **U** | **CO1** |

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| **PHY12202** | Applied Science Lab | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Basics of knowledge of higher secondary level physics & Chemistry** | | | | |
| **Co-requisites** |  | | | | |

**Course Objectives:**

1. To understand the experiments on general properties of matter.
2. To apply the knowledge of physical optics in different practical experiments.
3. To analyse different experiments on electrical and electronic science.
4. To explore different experiments related to fundamental knowledge on quantum mechanics.
5. To impart a scientific approach and to familiarize the applications of chemistry in the field of

technology

1. An ability to gain knowledge about different types of qualitative and quantitative

estimation

**Course Outcomes:**

On completion of this course, the students will be able to

CO1: **Illustrate** about the elastic and other general properties of matter and their measurements.

CO2: **Acquire** the knowledge of physical optics and experimental techniques to verify them.

CO3: **Develop** the basic concepts related to electrical circuits.

CO4: **Find** the fundamental knowledge of basic quantum mechanics and few experiments related to it.

CO5: **Acquire** the basic information about semiconductor material and devices.

CO6: **Develop** the qualitative idea of thermo-electric currents and technique to measure it.

CO7: **Illustrate** and practice    different techniques of quantitative chemical analysis

generate experimental skills and apply these skills to various analyses

CO8: **Analyze** the quality of water by determining its hardness & alkalinity.

CO9: **Utilize** the fundamental laboratory techniques for analyses such as titrations

**Catalog Description:**

Applied Science Lab is used to apply existing scientific knowledge to develop more practical applications, for example: technology or inventions. In applied Science Lab different aspects of basic and modern physics has been explored. Applied Science Lab is generally developing technology, although there might be dialogue between basic science and applied science (research and development). In this course the focus will be on improving the logical learning moved into a physical environment.

Chemistry lab is a place where laboratory sessions is to enable the learners/students to get hands-on experience on the principles discussed in theory sessions and to understand the applications of these concepts in engineering. The course also includes theory on sampling, analyses of real samples, risk assessment of chemical experiments, important steps and procedures in analytical chemistry, and evaluation/interpretation of results.

**Course Content:**

**Experiments: Physics**

1. Determination of Young’s Modulus of a Beam by traveling microscope by FLEXURE method.
2. Carry Foster’s Method to Determine Resistance of a Given Coil.
3. Determination of the Coefficient of viscosity of water by Poiseulle’s Capillary Flow method.
4. To determine the wavelength of sodium light by forming Newton’s Ring.
5. Determination of Rigidity Modulus by dynamical method.
6. Determine the Plank’s constant using photocell.
7. To verify Stefan’s law by electrical method.
8. To study the temperature dependence of reverse saturation current in a junction diode and hence to determine the Band gap.
9. Determination of specific charge (e/m) of electron by J.J. Thomson’s method.
10. Determination of the Rydberg constant by studying hydrogen or helium spectrum.
11. Determination of dielectric constant of a given dielectric material.
12. Determination of Hall coefficient of Semiconductor.
13. Study current – voltage characteristic load response of photovoltaic solar cells.

**Experiments: Chemistry (Any Four)**

1. Determination of total hardness of water by complex metric titration method

2. Determination of carbonate and bicarbonate in water

3. Estimation of iron (ferrous ion in Mohr salt) by permanganometry.

4. Determination of strength of an unknown HCl solution with standardized NaOH solution by conductometric titration.

5. Dissolved oxygen by Winkler's method

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (Cos) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between Cos and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Illustrate** about the elastic and other general properties of matter and their measurements. | **PO1** |
| **CO2** | **Acquire** the knowledge of physical optics and experimental techniques to verify them. | **PO1** |
| **CO3** | **Develop** the basic concepts related to electrical circuits. | **PO1, PO5** |
| **CO4** | **Find** the fundamental knowledge of basic quantum mechanics and few experiments related to it. | **PO1** |
| **CO5** | **Acquire** the basic information about semiconductor material and devices. | **PO1, PO5, PO2** |
| **CO6** | **Develop** the qualitative idea of thermo-electric currents and technique to measure it. | **PO1** |
| **CO7** | **Illustrate** and practice different techniques of quantitative chemical analysis generate experimental skills and apply these skills to various analyses | **PO1, PO2, PO3** |
| **CO8** | **Analyze** the quality of water by determining its hardness & alkalinity. | **PO3, PO9** |
| **CO9** | **Utilize** the fundamental laboratory techniques for analyses | **PO2, PO3** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| SAS  41201 | Applied Science Lab | 3 | 3 | 3 | - | 2 | - | - | - | 1 | - | - | - | - | - | - |

1=weakly mapped

2=moderately mapped

3=strongly mapped

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| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| **Course: PHY12202 –** **Applied Science Lab**  **Program: B.Tech Stream: CSE Semester: I**  **Time: 03 hrs. Max. Marks: 40** | | | | |
| **SAMPLE QUESTIONS** | | | | |
| **1.** | **Determine** Young’s Modulus of a Beam by traveling microscope by FLEXURE method | | **Ap** | **CO1** |
| **2.** | Carry Foster’s Method to **Determine** Resistance of a Given Coil. | | **Ap** | **CO1** |
| **3.** | **Determine** the Coefficient of viscosity of water by Poiseulle’s Capillary Flow method. | | **Ap** | **CO1** |
| **4.** | **Determine** the wavelength of sodium light by forming Newton’s Ring. | | **U** | **CO2** |
| **5.** | **Determine** Rigidity Modulus by dynamical method. | | **Ap** | **CO1** |
| **6.** | **Determine** the Plank’s constant using photocell. | | **U** | **CO2** |
| **7.** | **Show** Stefan’s law by electrical method. | | **Ap** | **CO3** |
| **8.** | **Show** the temperature dependence of reverse saturation current in a junction diode and hence to **determine** the Band gap. | | **U** | **CO4** |
| **9.** | **Determine** specific charge(e/m) of electron by J.J. Thomson’s method. | | **Ap** | **CO5** |
| **10.** | **Determine** the Rydberg constant by studying hydrogen or helium spectrum. | | **Ap** | **CO6** |
| **11.** | **Determine** dielectric constant of a given dielectric material. | | **U** | **CO5** |
| **12.** | **Determine** Hall coefficient of Semiconductor. | | **U** | **CO5** |
| **13.** | **Show** current – voltage characteristic load response of photovoltaic solar cells. | | **U** | **CO6** |
| **14.** | Experiments: Chemistry (Any Four)  1. **Determine** total hardness of water by complexometric titration method  2. **Determine** carbonate and bicarbonate in water  3. **Estimate** iron (ferrous ion in Mohr salt) by permanganometry.  4. **Determine** strength of an unknown HCl solution with standardized NaOH solution by conductometric titration.  5. Dissolve oxygen by Winkler’s method | | **Ap**  **U**  **Ap**  **U**  **Ap** | **CO7, CO8, CO9** |

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| **CSE12002** | Programming Lab | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours –45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **10+2 Level Mathematics, Knowledge of Basics of Computer** | | | | |
| **Co-requisites** | **Knowledge of Logical Reasoning and Analysis** | | | | |

**Course Objectives:**

1. To comprehend the practical nature of programming by solving through computer systems.

2. To practice the programming construct to solve multi-dimensional problems.

3. To relate and implement mathematical concepts through programming in order to solve

computational problems.

1. To enable students to acquire structure and written expression required for their profession.

5. To understand the principles of data storage and manipulation.

**Course Outcomes:**

On completion of this course, the students will be able to

1. **List** and memorize various Unix commands. Also, students be able to construct various basic programs and appraise them.
2. **Design** and execute iterative statement in a program. Also, students be able to differentiate among different iterative structure.
3. **Construct** such programs that used to define user defined functions and to design library functions.
4. **Develop** array concept in 1-Dimensional and 2-Dimensional construct. Hence be able to design string functions to cater to various character array related problem.
5. **Find** the concept of Stack, Queue, and Linked List and appraise them in different cases.

**Catalog Description:**

Practical Programming skills are mandatory for designing or solving problems through digital device by implementation. To develop any software the behavior of a programming language is a must through problem solving. In present era almost all aspect of life is somehow largely related to virtualization and digital data/information. Devices from smartphones to other handheld devices, drones, cameras, medical instruments etc. all needs programming at some part. In engineering it has become quintessential for the students/research scholars to learn programming. In this course, students will learn how to solve problems in various domains through a programming language. This course enables students with the basic skills of C Programming Language. Five Different related modules comprise this course. First Unit familiarizes students with basics of computers, algorithmic method to solve problem, introduction to generic programming construct. Basics of C Programming is upto iterative structure is depicted in Unit II. In Unit III students will learn about modularization using functions and one advance concept of C Programming, Pointers. Unit IV will cover one of the most important concepts in C Programming, Array and Strings. Unit V will accomplish this course with the advance concept like Structure, Union and File Handling. After this course students will grow their analytical ability to solve problem and logical skill. Also, this course effectively creates the ability to grasp any other Programming Language in easier manner. In all these modules related programming problems are practiced to understand the syntactical and semantical correctness of a program. Gradually students become more comprehensive through the progress of the course.

**Course Content:**

**List of Experiments:**

1. Familiarization with LINUX commands and vi editor.
2. Programs to demonstrate Decision Making, Branching and Looping, Use of break and continue statement etc.
3. Implementation involving the use of Arrays with subscript, String operations and pointers.
4. Implementation involving the use Functions and Recursion.
5. Implementation involving the use Structures and Files.
6. Implementation based on Stack Queues and Linked List for example Insertion and Deletion.

**Text Books:**

* + - 1. Balagurusamy, E., n.d. Programming In ANSI C. 5th ed. Bangalore: McGraw-hill.
      2. Gotfreid (196) *Schaum’s Outline of Programming with C*, 2nd ed., USA: McGraw-Hill
      3. Brian W. Kernighan, Dennis Ritchie (1988) *C Programming Language*, 2nd ed., : Prentice Hall.
      4. Das Sumitabha, UNIX Concepts and Applications, 4th Ed., New Delhi, Tata McGraw-Hill

**Reference Books:**

Al Kelley, Ira Pohl (1988) *A Book on C*, 4th ed. Addision Wesley Longman

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continuous Assessment** | **End Term** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (Cos)** | **Mapped Program Outcomes** |
| **CO1** | **List** and memorize various Unix commands. Also, students be able to construct various basic programs and appraise them. | **PO3** |
| **CO2** | **Design** and execute iterative statement in a program. Also, students be able to differentiate among different iterative structure. | **PO1, PO4** |
| **CO3** | **Construct** such programs that used to define user defined functions and to design library functions. | **PO1, PO7** |
| **CO4** | **Develop** array concept in 1-Dimensional and 2-Dimensional construct. Hence be able to design string functions to cater to various character array related problem. | **PO1, PO2, PSO1** |
| **CO5** | **Find** the concept of Stack, Queue, and Linked List and appraise them in different cases. | **PO1, PO5, PO11** |

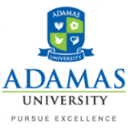
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12002 | Programming Lab | 3 | 1 | 1 | 1 | 1 | - | 1 | - | - | - | 1 | - | 1 | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: I Stream: CSE

Paper Title: Programming Lab Paper Code: CSE12002

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Section A (attempt any two)** | | | | | | | | | |
| 1. | **What** do you understand data types? | | | | | **U** | | | **CO1** |
| 2. | Define array? | | | | | **R** | | | **CO4** |
| ­­­3. | **How** user defined function reduces the no. of lines in a large program? | | | | | **R** | | | **CO2** |
| 4. | **Why** pointer is advantageous than array? | | | | | **R** | | | **CO5** |
| 5. | **What** is the size of an integer variable? | | | | | **R** | | | **CO1** |
|  | **SECTION B (**Attempt any **Two Questions)** | | | | |  | | | |
| 6. | **What** is dimension of an array. How many types of array are there? Can you store integer values and float type values in a single array, if not why? What you need to do to store such different types of values in a single array? | | | | | **R** | | | **CO4** |
| 7. | **Design** an user defined function in c that would return multiple values in main() function. | | | | | **Ap** | | | **CO3** |
| 8. | Suppose a paragraph is stored in a 2-D character array. **Find** a specific sentence in that paragraph using a c program. | | | | | **U** | | | **CO2/CO4** |
| 9. | State the types of data types and memory occupies. **What** are the ways to convert from one data type to another data type with suitable example? | | | | | **U** | | | **CO1** |
|  | **SECTION C is Compulsory** | | | | |  | | | |
| 10. | **How** is it possible to take input in a 2-D array using a single for loop? Make it possible using a suitable program in c. | | | | | **Ap** | | | **CO4** |
| 11. | **Design** a program in c to determine that a text is written in English or in any other language. If the text is written in any other language convert every character in its nearest English alphabets. | | | | | **U** | | | **CO4** |
| 12 | **Design** a program to create a pointer to an integer. Allocate memories for 50 elements into that pointer using both malloc() and calloc() function. Display the significance difference of using those two functions to allocate memory. Also state the specific needs of these two functions. | | | | | **U** | | | **CO4** |
|  |  | | | | |  | | |  |
| **CEE12001** | | Engineering Drawing and CAD | **L** | **T** | **P** | | **C** |  |  |
| **Version 1.0** | | **Contact Hours –45** | **0** | **0** | **3** | | **2** |  |  |
| **Pre-requisites/Exposure** | | **Class 12th Level physics** | | | | | |  |  |
| **Co-requisites** | |  | | | | | |  |  |

**Course Objectives:**

1. To comprehend general projection theory, with an emphasis on the use of orthographic projection to represent three-dimensional objects in two-dimensional views.

2. To understand the application of industry standards and techniques applied in engineering drawing.

3. To apply auxiliary or sectional views to most practically represent engineered parts.

4. To Dimension and annotate two-dimensional engineering drawings.

5. To employ freehand 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideas graphically.

**Course Outcomes:**

On completion of this course, the students will be able to

**CO1. Utilize** the principle and significance of engineering drawing.

**CO2. Design** letters, scales and conic sections.

**CO3. Estimate** the figure orthographic projection.

**CO4. Model** Isometric projection.

**CO5. Distinguish** Autocad.

**Catalog Description:**

In this fundamental course, students will be introduced to the basics of engineering drawing. Terms and definitions used in industries, such as manufacturing and construction, may also be covered. Specific skills introduced in this course may include sketching, geometric construction, auxiliary drawing, computing dimensions and lettering. Students will be also introduced to computer-aided drawing (CAD) software or techniques.

**Course Content:**

**Module 1 Contact Hrs. 9**

Introduction to Engineering Drawing covering, Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales.

**Module 2 Contact Hrs. 9**

Orthographic Projections covering, Principles of Orthographic Projections Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes.

**Module 3 Contact Hrs. 8**

Projections of Regular Solids covering, those inclined to both the Planes- Auxiliary Views.

**Module 4 Contact Hrs. 9**

Sections and Sectional Views of Right Angular Solids covering, Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone.

**Module 5 Contact Hrs. 10**

Isometric Projections covering, Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions

**Text Books:**

1. Engineering Drawing, N. D. Bhat, Charotar Publishing House (2012).
2. Shah, M.B. & B.C. Rana (2008), Engineering Drawing and Computer Graphics, Pearson Education.
3. Engineering Drawing & Graphics using Autocad, T. Jeyapoovan, Vikas Publishing House Pvt. Ltd.-Noida; Third edition (2010).
4. https://nptel.ac.in/courses/112103019/

**Modes of Evaluation: Quiz/Assignment/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continuous Assessment** | **End Term** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Utilize** the principle and significance of engineering drawing. | **PO1, PO12, PSO1, PSO2** |
| **CO2** | **Design** letters, scales and conic sections. | **PO1, PO2, PO3** |
| **CO3** | **Estimate** the figure orthographic projection. | **PO1, PO2, PO3, PO4** |
| **CO4** | **Model** Isometric projection. | **PO1, PO12** |
| **CO5** | **Distinguish** Autocad. | **PO1, PO6, PO12, PSO1, PSO2** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information manage  ement systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CEE12001 | Engineering Drawing and CAD | 3 | 2 | 2 | 1 | - | 1 | - | - | - | - | - | 3 | 2 | 2 | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| Course: CEE12001 – Engineering Drawing and CAD **Program: B.Tech Stream: CSE Semester: I**  **Time: 03 Hrs. Max. Marks: 40**  **Instructions:**  Attempt All Questions from **Section A** (Each Carrying 1 Marks); **Three Questions** from **Section B** (Each Carrying 5 Marks)**. Two Questions from Section C** (Each Carrying 10 Marks)**.** | | | | |
| **Section A ( attempt all)** | | | | |
| 1. | **What** are different methods are available for the construction of Ellipse? (1) | | **U** | **CO2** |
| 2. | **What** is the purpose of using Dashed thick line? (1) | | **R** | **CO1** |
| ­­­ 3. | If we are using Gothic Style double lettering then **what** should be the dimension of M in mm? (1) | | **U** | **CO1** |
| 4. | **Define** Involute. (1) | | **R** | **CO2** |
| 5 | The Offset tool should only be used for placing \_\_\_\_\_\_\_\_\_ in an isometric drawing. (1) | | **R** | **CO5** |
|  | **SECTION B (**Attempt any **Two Questions)** | |  | |
| 6. | The top view of a 75 mm long line AB measures 65 mm, while the length of its F.V. is 50 mm. Its one end A is in the H.P. and 12 mm in front of V.P. **Design** the projections of line AB. | | **U** | **CO3** |
| 7. | A line MP 40 mm long is parallel to HP and inclined at an angle 35° to VP. The end M is 20 mm above HP and 25 mm in front of VP. **Design** the projection of the line | | **U** | **CO2** |
| 8. | With a simple sketch explain revolved section. | | **U** | **CO5** |
|  | **SECTION C is Compulsory** | |  | |
| 9. | A cylinder 60 mm base diameter and 70 mm length of axis is resting on its base in the H.P. It is tilted on one of its base point in such a way that the generator passing through that point makes an angle of 45 deg with the H.P. and is parallel to V.P. **Design** its projections. | | **U** | **CO3** |
| 10. | A circle of 50 mm diameter rolls on the circumference of another circle of 150 mm diameter & outside it. Trace the locus of a point on the circumference of the rolling circle for one complete revolution. **Design** a tangent & normal to the curve at a point 85 mm from the centre of the directing circle. | | **U** | **CO2** |

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| **ENG11043** | **Communication and Collaboration Skill -I** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours –30** | **0** | **0** | **2** | **1** |
| **Pre-requisites/Exposure** | **12th level English** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To learn how to form and maintain a team.

2. To develop skills in collaboration in a project setting.

3. To develop Brainstorm alternatives effectively.

4. To identify the team’s strengths and resources.

5. To manage conflict collaboratively by creating a system for dealing with the most common problems that may create conflict.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1 **Show** the emotions to become highly motivated individuals exercising empathy

CO2 **Find** to form teams and communicate effectively and clearly.

CO3 **Develop** skills like writing, speaking, presentation and exercise time management

**Catalog Description:**

Through Communication and Collaboration students will learn how to collaboratively work in a group. It is a place where students will engage in active listening, accustomed in diverse and multi-lingual environments, and understanding verbal and non-verbal communication. They will also develop the ability to work in diverse international teams, including learning from and contributing to the learning of others, assuming shared responsibility, cooperating, leading, delegating and compromising to produce new and innovative ideas and solutions.

**Course Content:**

|  |  |
| --- | --- |
| **List of Experiments (Any ten)** | |
| 1 | The students are introduced to Emotional Intelligence and the need for it. |
| 2 | Self-evaluation / assessment happens through a peer-peer / group activity. |
| 3 | The groups will form a team to make a movie. |
| 4 | They will play the roles of director, producer, editor, actors, stuntmen etc. |
| 5 | They learn to team up and communicate. A jury will be elected by the students. |
| 6 | The jury will select the “AdOSCARS” winners. The winners are required to make the speech accepting the award. |
| 7 | 3 to 4 groups will be formed who will publish a magazine selecting a specific theme. |
| 8 | They will take multiple roles in this game. |
| 9 | Every class, the groups will do news broadcast on their chosen theme. |
| 10 | Video recording will be done, with follow up discussion on body language, tone etc. |

**Text Books:**

1. Stephen R Covey, Seven Habits of Highly Effective People, Free Press, 1989
2. Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 1998
3. Daniel Goleman, Emotional Intelligence, Bantam Book, 2006
4. Innovation and Entrepreneurship (1985) by Peter F. Drucker.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Show** the emotions to become highly motivated individuals exercising empathy | **P02,PO9,PO10,PSO1,PSO2** |
| **CO2** | **Find** to form teams and communicate effectively and clearly. | **PO9,PO10,PSO1,PSO2** |
| **CO3** | **Develop** skills like writing, speaking, presentation and exercise time management. | **PO2,PO9,PSO1,PSO2** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information manage  ement systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| ENG11043 | Communication and Collaboration Skill-I | - | 2 | - | - | - | - | - | - | 3 | 2 | - | - | 3 | 3 | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech Semester: I

# Paper Title: Communication and Collaboration Skill -I

Paper Code: ENG11043

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A** | | | |
| 1. | Q1. You have given daily broadcasts in front of the class in magazine module. **What** do you think are the skills that you have developed in this process? (5)  Q2.**What** was your approach towards negative criticism/feedback? (5)  Q3. **What** is your contribution in this magazine? Please justify your role in regards to your contribution. (5)  Q4. **What** is the theme of your magazine? What inspired you to select this theme? (5)  Point out the parts of speech of the underlined words. (10)  1. These books \_\_\_\_\_\_\_\_\_ (belong/belongs) to me.  2. She \_\_\_\_\_\_\_\_\_ (want/wants) to go.  3. We \_\_\_\_\_\_\_\_\_ (will like/would like) to visit the museum.  4. He \_\_\_\_\_\_\_\_\_ (has finished/have finished) talking.  5. My brother \_\_\_\_\_\_\_\_\_ (enjoy/enjoys) playing cricket. | **U** | **CO3** |
|  | **SECTION B (**Attempt any **One Question)** |  | |
| 4. | Q1. **Compose** a letter giving an application of 100-200 words for the post of an account’s assistant. 120 – 150 words)  Q2. **Compose** a letter giving an application of 100-200 words for the post of management trainee in Finance. | **U** | **CO3** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **GEE14003** | Capstone Project -I | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours –30** | **0** | **0** | **2** | **1** |
| **Pre-requisites/Exposure** | **Basic Computer Skills** | | | | |
| **Co-requisites** |  | | | | |

**Course Objectives:**

* 1. To provide design experience to the students through team work.
  2. To develop an understanding of various areas involved in any project.
  3. To train students with various project dealing areas like feasibility, communications, planning, design, deployment and testing.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Explain** the mechanics and control strategies of aerial robots and realize how careful component selection and design affect the vehicles' performance.

CO2. **Demonstrate** utility of electric vehicle & HEV for various applications

CO3. **Illustrate** the dimensions and performance of smart city

**Catalog Description:**

A well-defined capstone experience is comprehensive in nature allowing for the assessment of a wide range of abilities. A capstone-based assessment method includes mapping project deliverables and other artifacts to specified learning outcomes, establishing a scoring rubric that defines performance criteria, collecting and analysing data and reporting results. The main purpose of the capstone project is to simulate some knowledge acquired during their studies in previous semesters to manage complex projects based on real world or research.

**Course Content:**

**Unit I: 10 Lecture Hours**

**Introduction to Aerial Robotics:** Unmanned Aerial Vehicles, Quadrotors, Key Components of Autonomous Flight, State Estimation, Applications, Basic Mechanics, Dynamics and 1-D Linear Control, Design Considerations, Agility and Maneuverability, Component Selection, Effects of Size, Supplementary Material: Introduction, Dynamical Systems, Rates of Convergence, Matlab Tutorials - Introduction to the Matlab Environment, Programming Basics, Advanced Tools.

**Unit II: 10 Lecture Hours**

**Introduction to EV &&INDIAN and GLOBAL Scenario:** Past, Present & Feature of EV, Current Major Issues, Recent Development Trends, EV Concept, Key EV Technology, State-of-the Art EVs & HEVs, Comparison of EV Vs IC Engine, Technology Scenario, Market Scenario, Policies and Regulations, Payback and commercial model, Payback and commercial model, Polices in India.

**Unit III: 10 Lecture Hours**

**Introduction to Smart Cities:** Definition, Dimensions of smart city, socio-economic aspect for smart city planning, framework for smart city- Technology framework, Institutional framework, Human framework, Energy framework, Data management framework, transformation of urban digital and physical fabric of cities, Performance, Initiatives.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assesment** | **End Term** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** the mechanics and control strategies of aerial robots and realize how careful component selection and design affect the vehicles' performance. | **PO1, PO2, PO3** |
| **CO2** | **Demonstrate** utility of electric vehicle & HEV for various applications. | **PO1, PO2, PO3** |
| **CO3** | **Illustrate** about the dimensions and performance of smart city. | **PO1, PO2, PO3** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information manage  ement systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| GEE14003 | Capstone  Project- I | 3 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DGS11001** | Design Thinking | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours –30** | **2** | **0** | **0** | **2** |
| **Pre-requisites/Exposure** | **Knowledge of analysing society problems and product usage problems and a zeal to improve the current situation, in addition to knowing to using laptop/computers, internet, social media interaction, file sharing and uploading, email and communication etiquettes.** | | | | |
| **Co-requisites** | **-** | | | | |

**Course Objectives:**

1. To enable students to acquire knowledge, imagination and be more assertive on opinions on problems in society.
2. To enable students to learn basics of research, data collection, analysis, brainstorming to find solutions to issues.
3. To make them understand Design Thinking methodologies to problems in field of study and other areas as well.
4. To help students to understand future Engineering positions with scope of understanding dynamics of working between inter departments of a typical OEM.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Examine** design thinking concepts and principles

CO2. **Find** the methods, processes, and tools of design thinking

CO3. **Apply** the Design Thinking approach and model to real world scenarios

CO4. **Analyze** the role of primary and secondary research in the discovery stage of design thinking

**Catalog Description:**

Design thinking course is a completely online course offered to the first year UG programs across all streams. This course is designed to help understand the steps followed in the process of designing a solution to a problem.

**Course Content:**

**Unit I: 3 Lecture Hours**

**WHAT IS DESIGN THINKING:** Designers seek to transform problems into opportunities. Through collaboration, teamwork, and creativity, they investigate user needs and desires on the way to developing human-centered products and/or services. This approach is at the very heart of design thinking.

**Unit II: 3 Lecture Hours**

**THE DESIGN THINKING MODEL:** A tool that helps guide you along a design thinking path. The model does this by providing a series of activities that that will help you effectively design a product, service or solution to a user’s need. The model presents the approach as a process, allowing us to look at each step – or phase – along the journey to the development of a final design.

**Unit III: 4 Lecture Hours**

**PHASE 1: DISCOVER**: Begin the design thinking process with the Discover phase, where you will identify the specific problem your design is intended to solve, as well as important usability aspects from those who will use your design. Discovery can be performed through a variety of different research methods which you will learn in this module.

**Unit IV: 4 Lecture Hours**

**PHASE 2: DEFINE**: In the Define phase, you come to understand the problem. We often refer to this as framing the problem. You can do this by using a variety of tools, including storytelling, storyboarding, customer journey maps, personas, scenarios, and more.

**Unit V: 4 Lecture Hours**

**PHASE 3: DEVELOP:** Turn your attention to solving the problem. In this phase you brainstorm custom creative solutions to the problems previously identified and framed. To do this, you conceptualize in any way that helps, putting ideas on paper, on a computer, or anywhere whereby they can be considered and discussed.

**Unit VI: 4 Lecture Hours**

**Phase 4: Deliver**: This phase is all about testing and building concepts. Here you take all of the ideas that have been discussed to this point and bring them a little closer to reality by building a concept; something that makes it easier for a user to experience a design. This concept is referred to as a prototype.

**Unit VII: 4 Lecture Hours**

**Phase 5: Iterate:** You will test the prototype of your design solution, collecting and acting on feedback received. These actions may mean minor or major revisions to your design, and are repeated as often as necessary until a solution is reached. Tools such as focus groups and questionnaires are used to help you collect feedback that can help with your final design.

**Unit VIII: 4 Lecture Hours**

**Beyond Design Thinking:** The Design Thinking Model is a tool that helps guide you along a design thinking path. The model does this by providing a series of activities that that will help you effectively design a product, service or solution to a user’s need. The model presents the approach as a process, allowing us to look at each step – or phase – along the journey to the development of a final design.

**Text Books:**

* + 1. Brown, Tim. “What We Can Learn from Barn Raisers.” Design Thinking: Thoughts by Tim Brown. Design Thinking, 16 January 2015. Web. 9 July 2015.
    2. Knapp, Jake. “The 8 Steps to Creating a Great Storyboard.” Co.Design. Fast Company & Inc., 21 Dec. 2013. Web. 9 July 2015.
    3. van der Lelie, Corrie. “The Value of Storyboards in the Product Design Process.” Journal of Personal and Ubiquitous Computing 10.203 (2006): 159–162. Web. 9 July 2015. [PDF].
    4. Millenson, Alisson. “Design Research 101: Prototyping Your Service with a Storyboard.” Peer Insight. Peer Insight, 31 May 2013. Web. 9 July 2015.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Examine** design thinking concepts and principles | **PO1, PO11** |
| **CO2** | **Find** the methods, processes, and tools of design thinking | **PO1, PO2** |
| **CO3** | **Apply** the Design Thinking approach and model to real world scenarios. | **PO1, PO2, PO4** |
| **CO4** | **Analyze** the role of primary and secondary research in the discovery stage of design thinking | **PO1, PO5** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information manage  ement systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| DGS11001 | Design Thinking | 3 | 2 | - | 1 | 1 | - | - | - | - | - | 1 | - | - | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: I Stream: CSE

PAPER TITLE: Design Thinking

PAPER CODE: DGS11001

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **List** the steps involved in Design Thinking. | **U** | **CO1** |
| 2. | **Estimate** the basic elements of Design Thinking. | **U** | **CO2** |
| ­­­ 3. | **Define** Napkin Pitch. | **R** | **CO3** |
| 4. | **What** is Assumption testing? | **R** | **CO4** |
| 5. | **Define** the principles of Ethnography. | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 4. | Briefly **explain** the importance of ethnography in design thinking? | **U** | **CO2** |
| 5. | **What** are the successive steps for concept development? | **Ap** | **CO3** |
| 6. | **Explain** the different types of concept development strategies. | **Ap** | **CO3** |
| 7. | **Explain** with Example: surface keys for Assumption Testing. | **Evaluate** | **CO4** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 8. | **Explain** in detail about importance of prototyping in Design Thinking. | **U** | **CO4** |
| 9. | **Name** an importance of involving stakeholders in developing new concepts and Plan for conducting experiments within short time and inexpensively. | **Create** | **CO3** |
| 10. | **Distinguish** between design thinking and visualization of a problem. | **An** | **CO1** |

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| **MTH11502** | Engineering Mathematics -II | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -60** | **3** | **1** | **0** | **4** |
| **Pre-requisites/Exposure** | **12th level Mathematics & Engineering Mathematics I** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

* + - 1. To help the student to understand the basic concepts of matrix theory with its uses in engineering science.
      2. To give emphasis about concepts of Eigen value and Eigen vector, vector space and linear transformation and enable students to apply these topics for analysing engineering problems.
      3. To help the student to understand the use of vector calculus in engineering.
      4. To give the students a perspective to learn about functions of complex variables, pole, and residues and their importance in advanced study of engineering science.
      5. To enable students to acquire the knowledge of different transformation techniques and their applications in engineering science.

**Course Outcomes:**

On completion of this course, the students will be able to

|  |  |
| --- | --- |
| CO1 | **Apply** the knowledge of matrix theory for finding solution of a related engineering problem |
| CO2 | **Illustrate** the Eigen value(s) and Eigen vector(s) of a matrix |
| CO3 | **Explain** the concept of vector space and linear transformation between the vector spaces |
| CO4 | **Build** the knowledge of vector calculus and apply it for solving related problems |
| CO5 | **Develop** the concept of complex variable and its application |
| CO6 | **Outline** the Fourier series representation of a function |
| CO7 | **Make use of** appropriate transformation technique for solving differential equation or difference equation |

**Course Description:**

For any engineering program, Mathematics is the backbone. With a sound knowledge in fundamental mathematics, an engineering student can become a very skillful engineer. In this course, the focus will be on learning Mathematics in depth, which will motivate students to grow their thinking ability in different fields of engineering. Students will be able to apply this knowledge to tackle almost all kinds of problems in engineering and science successfully. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities (Problem solving, presentation etc.).

**Course Content:**

**Unit- I 18 Lecture Hours**

**Linear Algebra:** Elementary row and column operations on a matrix, Rank, echelon form, normal form, Inverse of a matrix using elementary operations, solution of system of algebraic equation, consistency, Caley-Hamillton theorem, eigenvalues and eigenvectors, Symmetric and skew-symmetric matrices, orthogonal matrices, complex matrices, Hermitian and skew-Hermitian matrices, algebraic and geometric multiplicity, diagonalization, vector spaces, linear dependence of vectors, basis, linear transformations.

**Unit- II 14 Lecture Hours**

**Vector Calculus:** Ordinary Integrals of Vectors, Multiple integrals, Jacobian, Line, surface and volume integrals of Vector fields, Gauss’ divergence theorem, Green’s and Stokes Theorems and their applications.

**Complex Variables:** Limit, continuity, differentiability and analyticity of functions, Cauchy-Riemann equations, line integrals in complex plane, Cauchy s integral theorem, independence of path, existence of indefinite integral, Cauchy’s integral formula, derivatives of analytic functions, Taylor’s series, Laurent’s series, zeros and singularities, Residue theorem, evaluation of real integrals.

**Unit- III 10 Lecture Hours**

**Fourier Series:** Periodic functions, Definition of Fourier series, Euler's formulae, Dirichlet conditions, Change of interval, Even and odd functions, half range Fourier Sine & Cosine series.

**Unit-IV 18 Lecture Hours**

**Introduction to Transform Calculus:** Introduction to Laplace transform and its properties (without proof), Inverse Laplace transform, Definition of Fourier integrals, Fourier Sine & Cosine integrals, complex form of Fourier integral, Fourier sine & cosine transforms, inverse Fourier transform, introduction to Z- Transform and its properties, Inverse Z- Transform, Inverse Z- transform by partial fraction and residue methods.

**Text Books:**

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons
2. B.V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill
3. David C. Lay, Linear algebra and its application, (Latest edition), Pearson publication, New Delhi
4. B. S. Grewal, Higher Engineering Mathematics, Khanna Publications
5. C B Gupta, S R Singh, and Mukesh Kumar, Engineering Mathematics, Mc Graw Hill Publication
6. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, Narosa Publishing House

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| CO1 | **Apply** the knowledge of matrix theory for finding solution of a related engineering problem | **PO3, PO4** |
| CO2 | **Illustrate** the Eigen value(s) and Eigen vector(s) of a matrix | **PO4** |
| CO3 | **Explain** the concept of vector space and linear transformation between the vector spaces | **PO4, PO12** |
| CO4 | **Build** the knowledge of vector calculus and apply it for solving related problems | **PO1, PO7** |
| CO5 | **Develop** the concept of complex variable and its application | **PO2** |
| CO6 | **Outline** the Fourier series representation of a function | **PO1, PO3** |
| CO7 | **Make use of** appropriate transformation technique for solving differential equation or difference equation | **PO1, PO5, PO12** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| MTH11502 | Engineering Mathematics -II | 3 | 1 | 2 | 3 | 1 | - | 1 | - | - | - | - | 2 | - | - | - |

1 = weakly mapped

2 = moderately mapped

3 = strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: II Stream: CSE

PAPER TITLE: Engineering Mathematics -II

PAPER CODE: MTH11502

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 02

**Instruction for the Candidate:**

At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Estimate** the inverse -transform of the function | **Ap** | **CO07** |
| 2. | **Find** the polar form of. | **Ap** | **CO05** |
| ­­­ 3. | **What** is the Laplace transform of ? | **Ap** | **CO07** |
| 4. | **What** is the Fourier series representation for an odd functionin the interval? | **U** | **CO06** |
| 5. | If **Show** as a sum of a symmetric and skew symmetric matrices. | **Ap** | **CO01** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 4. | **Solve** Cayley-Hamilton theorem for. | **U, Ap** | **CO01 & CO02** |
| 5. | **Determine** the Fourier sine integral representation of  and hence evaluate. | **U** | **CO06** |
| 6. | **Define** Harmonic function. Prove that is a harmonic function. | **Ap** | **CO05** |
| 7. | **Find** the inverse Z-transform of, using partial fraction method. | **Ap** | **CO07** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 8. | (i) **Determine** the analytic function , if .  (ii) **Evaluate** the line integral along the line . **5+5** | **Ap** | **CO04 & CO05** |
| 9. | (i) **Evaluate** the integration using Residue theorem where  (ii) **Determine** the Laplace transform of the following function **5+5** | **U, Ap** | **CO05 & CO06** |
| 10. | (i) Let be the set of all ordered pairs of real numbers with vector addition **define** as  **Show** that the first five axioms for vector addition are satisfied. Clearly mention the zero vector and additive inverse.  (ii) **Summarize** the conditions for which the system  Admits (i) No solution (ii) Only one solution (iii) Infinitely many solution. **5+5** | **U** | **CO3** |

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| **GEE11001** | **Electrical and Electronics Technology** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Basic idea about basic mathematics** | | | | |
| **Co-requisites** | **Basic idea of semiconductor devices and electromagnetism** | | | | |

# Course Objectives:

1. To familiarize with passive components, active components and measuring instruments.
2. To familiarize the working of diodes, transistors, MOSFETS and integrated circuits.
3. To implement mini projects based on concept of electronics circuit concepts.
4. To understand d.c network theorems and apply these theorems to calculate the voltage, current and power for a given circuit.
5. To explain the concept of active power, reactive power, power factor, quality factor, steady state sinusoids.

# Course Outcomes:

On completion of this course, the students will be able to

CO1**. Apply** knowledge about different passive components used in electronic industry for common application.

CO2. **Illustrate** with the working of different active components to demonstrate basic electronic circuits.

CO3. **Design** circuits using passive and active components for strengthening fundamental idea about basic electronics.

CO4. **Find** the basic construction of measuring instruments used in electronic measurements

CO5. **Apply** the Network theorems to calculate the voltage, current and power for a given circuit.

CO6. **Explain** Active Power, Reactive Power, Power factor, Quality factor, average and effective values of Sinusoids, complex representation of impedances and draw the Phasor diagram.

CO7. **Illustrate** the three-phase power measurement.

CO8. **Explain** PN Junction Diode in Forward Biased, Reverse Biased Condition, Breakdown in PN Junction Diodes and Different Configurations of a Transistor and its Characteristics.

CO9. **Demonstrate** digital logic circuit and switching circuits using MOSFET.

# Catalog Description:

Present technology requires necessary knowledge of ELECTRONICS in most fields. Avionics, Autotropic, Agrotronics, Physics, Process Chemistry, Health Services, etc., already employ components or even whole systems based on Electronics. Thus, there is an increasing number of professionals in these and many other fields who need adequate knowledge and training. Taken this into account, ADAMAS has developed the Basic Electronics and Electricity Integrated Laboratory, capable of covering different levels of difficulty. It is based on a series of self-taught modules, each one referring to a specific area of Electronics.

# Course Content:

**Unit I: 7 lecture hours**

**D.C. Circuit Analysis and Network Theorems:** Concept of network, Active and passive elements, voltage and current sources, concept of linearity and linear network, unilateral and bilateral elements, R, Land C as linear elements, source transformation, Kirchoff's Law, mesh analysis and nodal analysis, star-delta transformation, network theorems: Thevenin’s theorem, Norton’s theorem, maximum power transfer theorem, network analysis with dependent sources.

# Unit II: 7 lecture hours

**Steady State Analysis of Single Phase A.C. Circuits:** Sinusoidal, square and triangular waveforms-average and effective value, form the peak factors, concept of phasor, phasor representation of sinusoidal voltage and current, analysis of series-parallel RLC circuits. Apparent, active and reactive powers, power factor, causes and problems of low power factor, power factor improvement, resonance in series and parallel circuits, bandwidth and quality factors.

# Unit III: 6 lecture hours

**Three Phase A. C. Circuits:** Its necessity and advantages, meaning of phase sequence, star and delta connections, balanced supply and balanced load, line and phase voltage/current relation, three phase power measurements, two wattmeter method.

**Unit IV: 6 lecture hours**

**Basics of Semi-Conductors and PN Junction:** Introduction; Carrier Concentrations- the Fermi Level; Electron and Hole Concentration at Equilibrium; Temperature Dependence of Carrier Concentration; Drift and diffusion current; The Hall Effect; Optical Absorption, Luminescence; PN

Junction Diode in Equilibrium Conditions; PN Junction Diode in Forward Biased and Reverse Biased Condition; Breakdown in PN Junction Diodes.

# Unit V: 6 lecture hours

**Bipolar Junction Transistors:** Introduction, Types: NPN and PNP; Current Components; Early Effect Ebber’s Moll Model; Different Configurations of a Transistor and its Characteristics; Transistor as an Amplifier (CE, CB, CC); Transistor as a Switch

# Unit VI: 6 lecture hours

**Field Effect Transistors:** Introduction, JFET and MOSFET, Realization of digital logic circuit using MOSFET (AND, OR, NOT etc.), Realization of switching circuit using MOSFET

# Unit VII: 7 lecture hours

# Electronics Instruments & Digital Electronics Fundamental:

Signal generator, Multimeter, operation of CRO and its application. Number systems, Conversions and codes, Logic gates and truth tables.

# Text Books:

1. Electronic Devices & Circuit Theory: Boyelstad & Nashelsky
2. Electronics Fundamental and application: D.Chattopadhyay and P C Rakshit
3. Electronic Principle: Albert Paul Malvino
4. Digital circuits and design by S Salivahanan and S Arivazhagan
5. V. N. Mittal and A. Mittal, *Basic Electrical Engineering*, Tata McGraw-Hill Publishing Company Ltd, 2006.

# Reference Books:

1. Electronic Circuits, Discrete and Integrated- Charles Belove and Donald L. Schilling
2. Principles of Electrical Engineering and Electronics- V K Mehta, Rohit Mehta, S Chand and Company, New Delhi
3. Solid State Electronic Devices- Ben G. Streetman and Sanjay Kumar Banerjee, PHI.
4. Fundamental of Digital Circuits by Anand Kumar 2nd Eddition,PHI LearningPal, Rajendra and Korlahalli, J.S. (2011) Essentials of Business Communication. Sultan Chand & Sons. ISBN: 9788180547294.
5. Theodore Wildi,*ElectricMachines, Drives and Power Systems*, Pearson, 2005.
6. Vincent Del Toro, *Electrical Engineering Fundamentals*, 2nd Ed., Prentice Hall India Learning Pvt. Ltd., 1989.
7. J. Millman, C. Halkias and C. D. Parikh, *Millman’s Integrated Electronics: Analog and Digital Circuits and Systems*, 2nd Ed., McGraw Hill Education, 2017.
8. D. P. Leach, A. P. Malvino and G. Saha, *Digital Principles and Applications*, 8th Ed., McGraw Hill Education, 2014.

# Modes of Evaluation: Quiz/Assignment/ Written Examination Scheme:

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped**  **Program Outcomes** |
| **CO1** | **Apply** knowledge about different passive components used in  electronic industry for common application. | **PO1, PO2, PO3, PO5, PO6, PO8, PO12** |
| **CO2** | **Illustrate** with the working of different active components to  demonstrate basic electronic circuits. | **PO1, PO2, PO3, PO5, PO6, PO9, PO10, PO11, PO12** |
| **CO3** | **Design** circuits using passive and active components for strengthening fundamental idea about basic electronics. | **PO1, PO4, PO5,**  **PO6, PO7, PO12** |
| **CO4** | **Describe** the basic construction of measuring instruments used  in electronic measurements | **PO1, PO2, PO3, PO5, PO6, PO7, PO12** |
| **CO5** | **Apply** the Network theorems to calculate the voltage, current  and power for a given circuit. | **PO1, PO7, PO12** |
| **CO6** | **Explain** Active Power, Reactive Power, Power factor, Quality  factor, average and effective values of Sinusoids, complex representation of impedances and draw the Phasor diagram | **PO2, PO3, PO6, PO7** |
| **CO7** | **Illustrate** the three-phase power measurement. | **PO1, PO2, PO3, PO5, PO6** |
| **CO8** | **Explain** PN Junction Diode in Forward Biased, Reverse Biased Condition, Breakdown in PN Junction Diodes and Different  Configurations of a Transistor and its Characteristics. | **PO4, PO3, PO6, PO7** |
| **CO9** | **Demonstrate** digital logic circuit and switching circuits using  MOSFET. | **PO1, PO3, PO6, PO7** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information manage  ement systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO 6 | PO7 | P O 8 | P O 9 | PO1 0 | P O 11 | P O 12 | PSO1 | PSO2 | PSO3 |
| GEE11001 | Electrical and Electronics Technology | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 3 | - | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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| --- | --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |  |
| **Course: GEE11001 – Electrical and Electronics Technology**  **Program: B.Tech. Stream: CSE Semester: II**  **Time: 03 hrs. Max. Marks: 40**  **Instructions:**  Attempt **Five Questions** compulsory from **Section A** (each carrying 1 marks); any **Three Questions** from **Section B** (each carrying 5 marks)**, any Two Questions** from **Section C** (each carrying 10 marks)**.** | | | | | |
| **SECTION A (Compulsory)** | | | | | |
| **1. a)** | In figure **what** is value of IC if β*dc* = 100. Neglect VBE  https://www.indiabix.com/_files/images/electronics-and-communication-engineering/analog-electronics/320-277-1.png | | **R** | **CO8** | |
| **b)** | **What** is the symbol of p channel depletion type MOSFET and pnp transistor? | | **R** | **CO9** | |
| **­c)** | **Find** the numbers: **i)** (53.625)10 = (?)2, **ii)** (A3B)16 = (?)10 | | **R** | **CO9** | |
| **d)** | **What** is susceptance? | | **R** | **CO6** | |
| **e)** | A load draws a current i(t) = 4 cos (100∏t + ) A when the applied voltage is v(t) = 120cos (100∏t -) V. **Find** the apparent power. | | **R** | **CO6** | |
| **f)** | Current through a passive element is I = sin 4t when the applied voltage across the element is V = cos 4t. **Identify** the passive element. | | **U** | **CO1** | |
| **SECTION B (Answer any Three Questions)** | | | | | |
| **2.** | **a)** Draw and **explain** the common base transistor circuit and output characteristics.  **b)** Define: **i)** Mass action law, **ii)** Mobility | | **U** | **CO2, CO8** | |
| **3.** | **a) Discuss** Early Effect in the transistor.  **b)** The Transistor has a base current IB=150µA, ICO= 10 µA and α =0.98. **Find** the collector current IC and emitter current IE  **c) What** isthe relation between Transconductance, Drain Resistance & Amplification Factor in JFET? | | **U** | **CO1, CO8** | |
| **4.** | **a) Explain** why is a transistor called a switch.  **b) Why** NAND gate is called universal gate? Design and implement an AND gate using NOR gate. | | **U** | **CO3, CO8, CO9** | |
| **5.** | **a) Define** the following:   1. Active Power. 2. Reactive Power.   **b) Explain** Norton’s Theorem. | | **U** | **CO6,**  **CO5** | |
| **6.** | **a) What** is selectivity?  **b) Why** series R-L-C circuit is called “Acceptor Circuit” at resonance? | | **R** | **CO6** | |
| **7.** | **Find** the current through the 10-ohm resistance in the following circuit. | | **Ap** | **CO5** | |
| **SECTION C (Answer any Two Questions)** | | | | | |
| **8.** | **a) Explain** the phenomenon of diffusion of current carriers in a semiconductor.  **b) What** arethe differences between metal, insulator & semiconductor?  **c)** In CE configuration, a silicon transistor with β = 100, Vcc = 6v, RC = 3kΩ and RB = 530kΩ. Draw the dc load line and **identify** the operating point. | | **Ap** | **CO1, CO2, CO8** | |
| **9.** | **a) What** are the differences between BJT & FET?  **b)** An n-type Silicon bar 0.1 cm long and 100 μm2 in cross-sectional area has a majority carrier concentration of 5×1020 /m3 and the carrier mobility is 0.13 m2/V-s at 300° k. If the charge of an electron is 1.6 ×10-19 C, then **identify** the resistance of the bar.  **c)**Explain the following terms:  **i)** Zener Breakdown  **ii)** Drain characteristics of FET | | **Ap** | **CO2, CO3, CO8** | |
| **10.** | **a) Identify** the Norton’s equivalent of the circuit shown in figure as seen from terminals a-b    **b) Identify** the value of RL for maximum power transfer in the circuit of figure. Find the maximum power. | | **Ap** | **CO5** | |
| **11.** | **a) Find** that the energy stored in the inductor is, EL = L(where, ‘L’ is the inductance and ‘i’ is the current through inductor)  **b) What** is resonance? Derive expression of resonance frequency for series R-L-C circuit.  **c) Define** the following with suitable example:  **i)** Unilateral Element.  **ii)** Bilateral Element.  d) **How** to measure three phase power using single wattmeter?  e) **What** is creeping in energy meter? | | **R** | **CO4,**  **CO7** | |

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| --- | --- | --- | --- | --- | --- |
| **MEE11002** | Engineering Mechanics | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours –60** | **3** | **1** | **0** | **4** |
| **Pre-requisites/Exposure** | **12th level Physics, Mathematics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1.To enable learners to solve force problems related to practical world.

2.To be able to determine the centroid, centre of gravity and moment of inertia.

3.To learn the effect of friction on equilibrium.

4.To learn kinematics, kinetics of particle and rigid body, related principles.

5.To introduce the concepts of Dynamic motion.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Apply** conditions of equilibrium of bodies subjected to forces

CO2. **Determine** the centroid, centre of gravity and moment of inertia of various one dimensional and two-dimensional objects

CO3. **Analyze** motion under the effect of dry friction

CO4. **Apply** the concept of virtual work for bodies in equilibrium

CO5. **Apply** the D’Alembert’s Principle for reducing the problem of kinetics to equivalent statics problem.

**Catalog Description:**

Engineering Mechanics. This is a basic first level course to learn rigid body mechanics covering both statics and dynamics. Statics covers free body diagrams, equilibrium of rigid bodies, analysis of trusses and beams, discussion on friction, virtual work and stability. Students will be expected to be familiar with engineering problems related to practical field.

**Course Content:**

**Module 1: 17 lecture hours**

**Basics of Statics and Concurrent Forces**

**Statics of Particles:** Force System: Force, classification & representation, force as a vector, composition and resolution of forces, principle of superposition and transmissibility of forces.

**Statics of Rigid bodies:** Equilibrium of coplanar force system, free body diagrams, determination of reactions, equilibrium of a body under three forces, Lami’s theorem. Moment of a force about a point and an axis, moment of coplanar force system, Varignan’s theorem.

**Module 2: 17 lecture hours**

**Parallel and Distributed Forces**

Parallel forces in a plane, Distributed Parallel forces in a plane, couple, resolution of a force into a force and a couple, moment of a couple.

**Centroid and Moment of Inertia:** Determination of centre of gravity, centre of mass and centroid by direct integration and by the method of composite bodies, area moment of inertia of composite plane figures and mass moment of inertia, radius of gyration, parallel axis theorem, Pappas theorems, polar moment of inertia.

**Module 3:**  **9 lecture hours**

**Friction** Introduction to wet and dry friction, laws of dry friction, cone of friction, block friction, ladder friction, wedge friction, application of friction in machines.

**Module 4:** **7 lecture hours**

**Virtual Work** Virtual displacement, principle of virtual work.

**Module 5: 10 lecture hours**

**Introduction to Dynamics** Laws of motion, Projectile motion, D’Alembert’s Principle, Work and energy, impulse and momentum, impact of bodies.

**Text Books:**

1. Engineering Mechanics [Vol-I & II] by Meriam&Kraige, 5th ed. – Wiley India

2. Engineering Mechanics by S.S. Bhavikatti and K.G. Rajashekarappa – New Age International

3. Mechanics of Solids by Crandall,Dahl and Sivakumar-MC Graw Hill ,5th Edition 2015,New Delhi

**Reference Books:**

1. Engineering Mechanics: Statics & Dynamics by I.H.Shames, 4th ed. – PHI

2. Engineering Mechanics by Timoshenko, Young and Rao, Revised 4th ed. – TMH

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Apply** conditions of equilibrium of bodies subjected to forces | **PO1,PO2** |
| **CO2** | **Determine** the centroid, center of gravity and moment of inertia of various one dimensional and two dimensional objects | **PO1,PO2** |
| **CO3** | **Analyze** motion under the effect of dry friction | **PO1,PO2** |
| **CO4** | **Apply** the concept of virtual work for bodies in equilibrium | **PO1,PO2** |
| **CO5** | **Apply** the D’Alembert’s Principle for reducing the problem of kinetics to equivalent statics problem. | **PO1,PO2** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information manageement systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| EME  41102 | Engineering Mechanics | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech Semester: II

Stream: CSE

PAPER TITLE: Engineering Mechanics PAPER CODE: MEE11002

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Explain** the Parallelogram Law of forces. | **U** | **CO1** |
| 2. | **Explain**:  Varignon’s principle of moments | **U** | **CO1** |
| ­­­ 3. | Compute the moment of inertia of the above area about axis K-K. | **R** | **CO2** |
| 4. | **Find** the centroid of an unequal angle section 100 mm × 80 mm × 20 mm. | **R** | **CO2** |
| 5. | **What** is friction? | **U** | **CO3** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 4. | a) **Explain** principle of transmissibility?  (b) **Find** out the reaction forces at support as shown in figure below using principle of virtual work. | **U** | **CO1** |
| 5. | (a) **Estimate** the moment of inertia of perpendicular axis theorem  (b) An I-section is made up of three rectangles as shown in Figure below. **Find** the moment of inertia of the section about the horizontal axis through the CG and parallel to the X-X axis. | **Ap** | **CO2** |
| 6. | (a) **Explain** Laws of friction?  (b) An effort of 200 N is required just to move a certain body up an inclined plane of angle 15° with the force acting parallel to the plane. If the angle of inclination of the plane is made 20° the effort required, again applied parallel to the plane, is found to be 230 N. **Find** the weight of the body and the coefficient of friction. | **Ap** | **CO3** |
| 7. | a) **Explain** principle of transmissibility?  (b)**Find** out the reaction forces at support as shown in figure below using principle of virtual work. | **U** | **CO1 /CO4** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 8. | An electric light fixture weighting 15 N hangs from a point C, by two strings AC and BC. The string AC is inclined at 60° to the horizontal and BC at 45° to the horizontal as shown in Figure. Using Lami’s theorem, **determine** the forces in the strings AC and BC. | **U** | **CO1** |
| 9. | A horizontal line PQRS is 12 m long, where PQ = QR = RS = 4 m. Forces of 1000 N, 1500 N, 1000 N and 500 N act at P, Q, R and S respectively with downward direction. The lines of action of these forces make angles of 90°, 60°, 45° and 30° respectively with PS. **Find** the magnitude, direction and position of the resultant force | **U** | **CO1** |
| 10. | Two blocks A and B of weights 1 kN and 2 kN respectively are in equilibrium position as shown in Figure 1. If the coefficient of friction between the two blocks as well as the block B and the floor is 0.3,**find** the force ‘P’ required to move the block B. (5) | **An** | **CO3** |

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| **EVS11107** | **Environmental Science** | **L** | **T** | **P** | **C** |
| **Version 1.1** | **Contact Hours –45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Basic physics, chemistry, mathematics of 10+2 level.** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To understand the intrinsic relation between humans and environment, our position in the ecosystem around us
2. To comprehend the significance of the biodiversity surrounding us.
3. To figure out the importance and need for energy resources, various sources of energy, renewable and non-renewable sources, conventional and unconventional sources.
4. To have basic concepts about sustainability, our dependence on nature and the consequences of overexploitation.
5. To enable students to appreciate the importance and how much we owe to the earth systems for our survival.
6. To have a basic concept about the types of pollution and mitigation procedures.
7. To have an overall idea about the environmental legal framework in our country and about the EIA and environmental audit procedures.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1: **Distinguish** between various types of ecosystems, ecosystem dynamics, perceive and appreciate the surrounding nature.

CO2: **Utilize** the intrinsic relation between humans and environment, our position in the ecosystem around us, and importance of biodiversity.

CO3: **Illustrate** the presence of various pollutants, their significance, and impacts, and develop the underlying concepts involved in various air pollution prevention and mitigation measures.

CO4: **Discuss** the basic science which can explain the phenomena occurring around us.

CO5: **Build** the in-depth knowledge about natural resources including energy resource.

CO6: **Illustrate** the legal framework in our country for safeguarding the environment including pollution prevention, control, management, and wildlife management.

**Catalog Description:**

To distinguish between various types of ecosystems, ecosystem dynamics, perceive and appreciate the surrounding nature and feel connected, develop the concept of innate relationship of humans and biodiversity, need for conservation and different conservation strategies. The students will be developed in a way so that they can spontaneously comprehend the importance of studying about the various air pollutants, their significance and impacts, and develop the underlying concepts involved in various air pollution prevention and mitigation measures, understand fundamental water chemistry, deduce the relationship between various water pollutants, and understand the principles of various water and wastewater treatment procedures. They will understand the routes of generation, classification, management and environmental significance of solid waste, apply the basic concepts of waste management in their daily lives, understand the need of the 5Rs of waste management, importance of waste minimization.

**Course Content:**

**Module 1: Basics of Environmental Sciences: (5 hrs)**

Definition, Scope and objectives, classification of environment, interrelationship between the components, ecology and ecosystem, structural and functional component of ecosystem, energy flow in an ecosystem, biogeochemical cycles, human impact on the environment, The IPAT equation, Ecological foot print, ecology and environment, ecosystem concept, energy flow in an ecosystem.

**Module 2: Energy Resources: (10 hrs)**

Concept of energy, SI Units of Work, Heat and Power, World energy use, Energy consumption pattern in India and U.S., Environmental aspects of energy utilization Renewable and non-renewable sources; Fossil fuel: types, use and environmental impacts, Solar energy: Solar Radiation – Passive and active solar systems – Flat Plate and Concentrating Collectors – Solar direct Thermal Application– Fundamentals of Solar Photo Voltaic Conversion- advantages and disadvantages of Solar Power generation, Solar energy status in India, Wind Energy: site selection, Wind turbine: basic working principle and types, Wind energy status in India, advantages and disadvantages of Wind Power generation, Hydroelectric power : How it is generated, advantages and disadvantages, Biomass energy: various types, generations of biofuel, Biomass direct combustion – Biomass gasifiers – Biogas plants – Digesters – Ethanol production – Bio diesel, Geothermal Energy: source, various methods of extraction: wet steam, dry steam and hot water flashed, advantages and disadvantages

**Module 3: Air Pollution and Control: (10 hrs)**

Classification of air pollutants, Criteria air pollutants and their impacts, Major global impacts of air pollution on man: Global warming, Ozone layer depletion, Acid rain; Air quality standards, Air pollution control methods, Methods of reducing air pollutants from IC engines, particulate pollutant and gaseous pollutant.

**Module 4: Water Pollution Fundamentals and Control Strategies: (5 hrs)**

Water quality: physical, chemical and biological characteristics, drinking water quality standard, effluent water quality, waste water sources and constituents, waste water treatment: preliminary treatment, primary treatment, secondary treatment, sedimentation, coagulation, floatation, aerobic and anaerobic biological treatment, activated sludge process, lagoons, trickling filters, rotating biological contractor.

**Module 5: Solid Waste Management: (5 hrs)**

Sources and generation of solid wastes, their characterization, chemical composition and classification. Different methods of disposal and management of solid wastes, Recycling of waste material. Waste minimization technologies.Hazardous Wastes Management and Handling Rules, 1989

**Module 6: Environmental Impact Assessment: (5 hrs)**

Introduction to Environmental Impact Analysis.Environmental Impact Statement and Environmental Management Plan.EIA guidelines 1994, Notification of Government of India.Impact Assessment Methodologies.Generalized approach to impact analysis.Procedure for reviewing Environmental impact analysis and statement. Guidelines for Environmental audit.

**Text Books:**

* + - 1. W.P. Cunningham and M. A. Cunningham, Principles of Environmental Science, 3rd Ed., McGraw-Hill Higher Education, 2005.
      2. Mackenzie Davis and David Cornwell, Introduction to Environmental Engineering (The McGraw-Hill Series in Civil and Environmental Engineering), 2ndEd., McGraw Hill Education, 2012.

**Reference Books:**

1. Gilbert M. Masters and Wendell P. Ela, Introduction to Environmental Engineering and Science, 3rd Ed., Prentice Hall India Learning Private Limited, 2008.

2. Metcalf and Eddy, Wastewater Engineering: Treatment and Reuse, 4thEd., McGraw Hill Education, 2002.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Distinguish** between various types of ecosystems, ecosystem dynamics, perceive and appreciate the surrounding nature. | **PO2, PO3, PO6, PO7, PO8** |
| **CO2** | **Utilize** the intrinsic relation between humans and environment, our position in the ecosystem around us, and importance of biodiversity. | **PO2, PO3, PO7, PO11, PSO2** |
| **CO3** | **Illustrate** the presence of various pollutants, their significance, and impacts, and develop the underlying concepts involved in various air pollution prevention and mitigation measures. | **PO2, PO6, PO7** |
| **CO4** | **Discuss** the basic science which can explain the phenomena occurring around us. | **PO1, PO3, PO6, PO7, PO11** |
| **CO5** | **Build** the in-depth knowledge about natural resources including energy resource. | **PO1, PO2, PO3, PO6, PO7, PSO2** |
| **CO6** | **Illustrate** the legal framework in our country for safeguarding the environment including pollution prevention, control, management, and wildlife management. | **PO6, PO7, PO8** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| EVS11107 | Environmental Science | 1 | 3 | 3 | - | - | 3 | 3 | 2 | - | - | 2 | 2 | - | 2 | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2021**

Name of the Program: B.Tech Semester: II Stream: ECE

PAPER TITLE: Environmental Science PAPER CODE: EVS11107

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 02

**Instruction for the Candidate:**

1.At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2.All parts of a Question should be answered consecutively. Each Answer should start from a

fresh page.

3.Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | Briefly **evaluate** what information about any ecosystem are conveyed by ecological pyramids? | **U** | **CO1** |
| 2. | **Analyse** how DO of a water body is related to eutrophication? | **U** | **CO3** |
| ­­­ 3. | **What** are the diverse applications of solar energy unlike other renewable energy resources? | **R** | **CO4** |
| 4. | **What** are the different types of wind turbine? | **R** | **CO4** |
| 5. | Mention few problems associated with large dams. | **R** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 4. | **What** are the adverse effects of open dumping of municipal solid wastes on environment? **How** does sanitary landfill differ from open dumping? (2.5+2.5 = 5) | **U** | **CO5** |
| 5. | **What** is electrostatic precipitator? **What** are the advantages of electrostatic precipitator? (2.5+2.5 = 5) | **U** | **CO3** |
| 6. | **Describe** the distribution of water resources. | **R** | **CO5** |
| 7. | **Estimate** a simple flowchart describing the steps that are followed in an EIA process in India. | **R** | **CO6** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 8. | **How** is photochemical smog formed? **What** are effects of photochemical smog? **Discuss** the factors affecting photochemical smog? (4+3+3=10) | **U** | **CO4** |
| 9. | **What** do you mean by BOD of water? **How** thermal pollution of water is linked to DO? A city discharges 1.25 m3/s of wastewater into a stream whose minimum rate of flow is 8.0 m3/s. The velocity of the stream is about 3.0 km/h. The temperature of the wastewater is 20°C and that of the stream is 15°C. The 20°C BOD5 of the wastewater is 250 mg/l and that of the stream is 2 mg/L. The wastewater contains no dissolved oxygen, but the stream is flowing with saturated DO concentration of 9.2 mg/L. Saturated DO at 15°C is 10.2 mg/L. At 20°C, deoxygenation constant (k1) is estimated to be 0.3 per day and reaeration constant (k2) is 0.7 per day. Determine the critical oxygen deficit and its location. Also estimate the 20°C BOD5 of a sample taken at the critical point. Use the temperature coefficients of 1.135 for k1 and 1.024 for k2. ( (2+2+6=10) | **Ap** | **CO3** |
| 10. | **What** is hazardous waste? Discuss the methods of hazardous waste management? What is composting? (2+6+2=10) | **U** | **CO3** |

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| --- | --- | --- | --- | --- | --- |
| **GEE12002** | **Electrical and Electronics Technology Lab** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours –45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Class 12th Level physics** | | | | |
| **Co-requisites** |  | | | | |

**Course Objectives:**

* 1. To study basic electronic components
  2. To observe characteristics of electronic devices
  3. To study basic electrical circuits

# Course Outcomes:

On completion of this course, the students will be able to

CO1**. Illustrate** different meters and instruments for measurement of electronic quantities and understand network theorems.

CO2. **Show** the characteristics of different semiconductor devices like diode, BJT, FET etc and carbon tungsten filament lamps experimentally.

CO3. **Design** and experiment with various application circuits using diodes

CO4. **Design** R-L-C circuits

CO5. **Construct** three phase circuits

# Catalog Description:

Present technology requires necessary knowledge of ELECTRONICS in most fields. Avionics, Autotronics, Agrotronics, Physics, Process Chemistry, Health Services, etc., already employ components or even whole systems based on Electronics. Thus, there is an increasing number of professionals in these and many other fields who need adequate knowledge and training. Taken this into account, ADAMAS has developed the Basic Electronics and Electricity Integrated Laboratory, capable of covering different levels of difficulty. It is based on a series of self-taught modules, each one referring to a specific area of Electronics.

# Course Content:

## List of experiments (Electrical Part):

1. Verification of Thevenin’s theorem and Norton’s theorem.
2. Verification of Superposition theorem.
3. Verification of Maximum power transfer theorem.
4. Study of R-L-C series circuit.
5. Study of R-L-C parallel circuit.
6. Performance study of fluorescent, LED, tungsten and carbon lamps.
7. Measurement of power in a three-phase circuit using two-wattmeter method.

## List of experiments (Electronics Part):

1. Familiarization of bread board and electronics elements such as R, L, C, diode, and BJT etc.
2. Familiarization of Function generator and measuring instruments such as CRO and multimeter.
3. Study the V-I characteristic of PN junction diode and find knee voltage.
4. Study the input and output characteristic of bipolar junction transistor (BJT): Common emitter (CE) configuration
5. Study the transfer and drain characteristic of junction field-effect transistor (JFET), hence determine the drain resistance, transconductance factor, amplification factor.
6. Study the transfer and drain characteristic of MOSFET, hence determine the drain resistance, transconductance factor, amplification factor.
7. Realization of digital logic circuit using MOSFET (AND, OR, NOT etc.).

# Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

|  |  |  |
| --- | --- | --- |
| **Components** | **Continuous Assessment** | **End Term** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping between COs and Pos** | | | | | | | | | | | | | | | | | | |
|  | | **Course Outcomes (COs)** | | | | | | | | | | | | | | **Mapped**  **Program Outcomes** | | |
| **CO1** | | **Illustrate** different meters and instruments for measurement of  electronic quantities and understand network theorems. | | | | | | | | | | | | | | **PO1** | | |
| **CO2** | | **Show** the characteristics of different semiconductor devices like diode, BJT, FET etc and carbon tungsten filament lamps experimentally. | | | | | | | | | | | | | | **PO3** | | |
| **CO3** | | **Design** and experiment with various application circuits using diodes. | | | | | | | | | | | | | | **PO3** | | |
| **CO4** | | **Design** R-L-C circuits | | | | | | | | | | | | | | **PO1** | | |
| **CO5** | | **Construct** three phase circuits | | | | | | | | | | | | | | **PO1** | | |
|  |  | | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information manage  ement systems. |
| Course Code | Course Title | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | | PSO2 | PSO3 |
| GEE12002 | Electrical and Electronics Technology Lab | | 3 | - | 2 | - | - | - | - | - | - | - | - | - | - | | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| **Course: GEE12002 – Electrical and Electronics Technology Lab**  **Program: B.Tech Stream: CSE Semester: II**  **Time: 03 hrs. Max. Marks: 40** | | | | |
| **SAMPLE QUESTIONS** | | | | |
| **1.** | **A)** Draw the forward V-I Characteristic curve of p-n junction diode with proper circuit connection and also **find** out the knee voltage.  **B) Explain** the mechanism of drift & diffusion of carriers. | | **U**  **R** | **CO3** |
| **2.** | **A)** Draw and **compare** the input characteristics of BJT with proper circuit connection (in common emitter configuration) with three different VCE values.  **B) What** are the differences between BJT & FET? Explain thermal runway | | **U**  **R** | **CO2** |
| **3.** | **A)** Draw and **compare** the output characteristics of BJT with proper circuit connection (in common emitter configuration) with three different IB values.  **B) What** do you mean by pinch-off voltage? Derive the relationship between α, β and γ. | | **U**  **R** | **CO2** |
| **4.** | **A)** Draw and **compare** the drain characteristics of FET with proper circuit connection with three different VGS values (0v, -1v & -2v).  **B) Define** the following terms of a FET with mathematical expressions:  **i)** Trans conductance (gm), **ii)** Drain resistance(rd). | | **U**  **R** | **CO2** |
| **5.** | **A) i) Estimate** the various resistance values using colour code and compare with measured values.  **ii) Measure** the forward & reverse resistance of various diodes.  **iii) Identify** the pnp & npn transistors and find out the different terminals.  **B) What** are the differences between intrinsic and extrinsic semiconductor? Write approximate value of cut-in voltage for Si and Ge diode. | | **Ap**  **U** | **CO1** |
| **6.** | **A) Show** the different signals (Sine, Square & Triangle) using function generator and measure the amplitude and frequency of each signal.  **B)** Draw and **explain** the common emitter transistor circuit and output characteristics. | | **U** | **CO2** |
| **7.** | **A)** **Show** Thevenin’s, Norton’s, Superposition and Maximum power transfer theorem.  **B)** **What** is load matching?  **C)** To **what** type of circuit Thevenin’s theorem is applicable?  **D) What** is the use of Thevenin’s theorem? | | **Ap**  **R**  **R** | **CO1** |
| **8.** | **A)** **Estimate** the resistance, inductance and capacitance for series and parallel RLC circuit using ammeter and voltmeter reading.  **B)** **Measure** power factor for RLC series circuit. | | **Ap**  **Ap** | **CO4** |
| **9.** | **A)** **What** is the nature (i.e. positive or negative) of the slop of the voltage vs. Resistance characteristics of Tungsten Filament Lamp? **Explain** it briefly.  **B)** **What** is the function of starter? What is the function of choke? | | **R** | **CO2** |
| **10.** | **A)** **How** many coils are there in a single in a single phase wattmeter?  **B)** **Which** type of wattmeter is generally used for measuring power in a.c. circuits?  **C)** **What** do you understand by phase sequence in reference to 3-phase circuits?  **D)** In a star connected 3-phase balanced load with neutral available, **how** many wattmeters are necessary to measure power? | | **R** | **CO5** |

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| **MEE12001** | Engineering Workshop | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours –45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **12th level Physics, Engineering Mechanics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

* + - 1. To develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude.
      2. To acquire skills in basic engineering practice
      3. To identify the hand tools and instruments
      4. To gain measuring skills
      5. To develop general machining skills in the students

**Course Outcomes:**

On completion of this course, the students will be able to

CO1 **Demonstrate** the basic operations in pattern and mould making

CO2 **Analyze** different metal fitting works

CO3 **Find** the basic forging and welding works

CO4 **Illustrate** the operations of machine tools

CO5 **Select** the appropriate tools required for specific operation

CO6 **Determine** the safety measures required to be taken while using the tools

**Catalog Description:**

Engineering Workshop is a place where students acquire knowledge on the operation of various processes involved in manufacturing and production. The Workshop Practice course makes students competent in handling practical work in engineering environment. Students will be expected to be familiar with engineering problems related to practical field.

**Course Content:**

|  |  |
| --- | --- |
| **List of Experiments (Any ten)** | |
| 1 | To make a single piece pattern from the given work piece and dimensions. |
| 2 | To make a double piece match pattern from the given dimensions. |
| 3 | To make a single piece cylindrical (solid) pattern from the given dimensions. |
| 4 | To make a cone from sheet metal as per given dimensions. |
| 5 | To make a frustum from sheet metal as per given dimensions. |
| 6 | To prepare a sand mold, given the single piece pattern and casting. |
| 7 | To prepare a sand mold, given the double piece match pattern and casting with different dimensions and shape |
| 8 | To make a square fitting from the given mild steel piece and the dimensions. |
| 9 | To make a square fitting from the given mild steel piece and the dimensions. |
| 10 | To make a single ‘V’ butt joint between two metal plates by using ARC welding. |
| 11 | To make a square butt joint between metal plates by using gas welding. |
| 12 | To perform various types of machining operations (cantering, facing and turning) on a given mild steel rod followed by the given dimensions. |
| 13 | To perform various types of machining operations (chamfering, grooving, thread cutting, and knurling) on a given mild steel rod followed by the given dimensions. |

**Reference Books:**

1. Workshop Technology by S.K. Garg, 3rd Edition, LP

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **ContiniousAssessment** | **End Term** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Demonstrate** the basic operations in pattern and mold making | **PO1,PO2,PO9 PSO1** |
| **CO2** | **Analyze** different metal fitting works | **PO1, PO9, PSO1** |
| **CO3** | **Find** the basic forging and welding works | **PO1, PO9, PSO1** |
| **CO4** | **Illustrate** the operations of machine tools | **PO1,PO2, PO9, PSO1** |
| **CO5** | **Select** the appropriate tools required for specific operation | **PO1, PO9, PSO1** |
| CO6 | **Determine** the safety measures required to be taken while using the tools | **PO1, PSO1** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information manageement systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| MEE12001 | Engineering Workshop | 3 | 2 | - | - | - | - | - | - | 3 | - | - | - | 3 | - | - |

1=weakly mapped,

2= moderately mapped,

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: II Stream: CSE

PAPER TITLE: Engineering Workshop PAPER CODE: MEE12001

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Explain** advantages and limitations of Gas welding. | **U** | **CO3** |
| 2. | **Design** the steps involved in making a mold | **U** | **CO1** |
| ­­­ 3. | **Show** the various types of pattern with neat sketch. | **R** | **CO1** |
| 4. | **Show** the specification of lathe machine. | **R** | **CO4** |
| 5. | **Explain** limitations of Gas welding. | **U** | **CO3** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 4. | **Show** the function of main parts of lathe machine. List some of the operation that can be done on the lathe machine and perform any one operation in lathe machine | **U** | **CO4** |
| 5. | To **design** a single piece cylindrical (solid) pattern from the given dimensions. | **Ap** | **CO1** |
| 6. | To **design** a square fitting from the given mild steel piece and the dimensions. | **Ap** | **CO2** |
| 7. | **Discuss** aboutTurning, Facing, Runner. | **U** | **CO4,CO5** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 8. | To **design** a single ‘V’ butt joint between two metal plates by using ARC welding. | **U** | **CO3** |
| 9. | **Show** the various types of allowance in molding operation. | **U** | **CO1** |

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| **ENG11044** | **Communication and Collaboration Skill -II** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours –30** | **0** | **0** | **2** | **1** |
| **Pre-requisites/Exposure** | **12th level English, Communication and Collaboration Skill-I** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To develop an understanding of the process of oral communication
2. To acquire critical thinking and analytical skills
3. To obtain a basic understanding of how communication is related to “being human”
4. Become more knowledgeable about audience centred speaking
5. To Improve listening, observational skills, and problem-solving capabilities.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1 **Utilize** Public speaking skills and develop confidence.

CO2 **Demonstrate** critical thinking skills, oral communication skills and leadership qualities.

CO3 **Find** creative thinking, willingness to work co-operatively and independently, and stress management.

**Catalog Description:**

Through Communication and Collaboration students will learn how to articulate and make and make an impact among the group members. They will also gain knowledge about formal and informal distinction. Through this course, students will learn about time management, conflict resolution, negotiation techniques, and how to capture attention of the audience.

**Course Content:**

|  |  |
| --- | --- |
| **List of Experiments (Any ten)** | |
| 1 | Individuals will be chosen + volunteers who will do ADA-TEDX talks on chosen subject of interest – current affairs / latest trends / technology / engineering / specific company. |
| 2 | Voting for the best speaker. |
| 3 | Group will present why they liked a specific speaker. Students will learn how to prepare, create impact and public speaking. |
| 4 | The groups will be given debate topics |
| 5 | They will be required to prepare. Everyone gets to speak on the topic for / against. |
| 6 | Audience gets to vote for winners. |
| 7 | Drama / Stand-up comedy topics will be chosen by students |
| 8 | They can pick from any source – movies, books etc. |
| 9 | Everyone in the groups must have a role to play/act. |
| 10 | The audience gets to vote for winners. |

**Text Books:**

* + - * 1. Stephen R Covey, Seven Habits of Highly Effective People, Free Press, 1989
        2. Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 1998
        3. Daniel Goleman, Emotional Intelligence, Bantam Book, 2006
        4. Innovation and Entrepreneurship (1985) by Peter F. Drucker.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Presentation/Assignment/ etc** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

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| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Utilize** Public speaking skills and develop confidence. | **P08,PO10,PSO1,PSO2** |
| **CO2** | **Demonstrate** critical thinking skills, oral communication skills and leadership qualities. | **PO9,PSO1,PSO2** |
| **CO3** | **Find** creative thinking, willingness to work co-operatively and independently, and stress management. | **PO2,PO9,PO10,PSO1,PSO2** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| ENG11044 | Communication and Collaboration Skill-II | - | 1 | - | - | - | - | - | 1 | 2 | 2 | - | - | 2 | 2 | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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| --- | --- | --- | --- |
| **Model Question Paper**  Image result for adamas university logo  **ADAMAS UNIVERSITY**  **SCHOOL OF ENGINEERING AND TECHNOLOGY**  **END-SEMESTER EXAMINATION: JULY 2020**  Name of the Program: B. Tech Stream: CSE Semester: II  PAPER TITLE: Communication and Collaboration Skill-II PAPER CODE: ENG11044  Maximum Marks: 40 Time duration: 3 hours  Total No of questions: 12 Total No of Pages: 01  **Instruction for the Candidate:**   1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. 2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. 3. Assumptions made if any, should be stated clearly at the beginning of your answer. | | | |
| **Section A** | | | |
| 1. | Q1. **Explain** in brief about the importance of your role which you have presented in Drama session.(5)  Q2.Do you think time management has a role to play in this module? **Explain** in brief (5)  Q3. **What** do you understand by the term collaboration? How have you applied this skill in your Drama? (5)  Q4. **What** do you understand by language of Interruption? Explain in brief. (5)  Fill in the blanks with correct form of verbs: (5)  1. He ................... completely. (recovers, recovered, has recovered)  2. Most probably he ..................... to school next week. (will come, would come, has come)  3. .Mark ........................... for jobs ever since he passed his examination in March. (has applied, has been applying, applied)  4. Last month he ….................... for an interview. (has appeared, appeared, was appearing)  5. . He ..................... for the results. (waits, is waiting, waited) | **U** | **CO2** |
|  | **SECTION B (**Attempt any **One Question)** |  | |
| 4. | Q1. **Compose** a paragraph about Technology and Unemployment. Do Technological advances contribute to higher unemployment rates. (120 – 150 words)  Q2. Is peer pressure harmful or beneficial to individuals? (120-150 words) | **U** | **CO3** |

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| **GEE14004** | Capstone Project -II | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours – 30** | **0** | **0** | **2** | **1** |
| **Pre-requisites/Exposure** | **Capstone Project-I** | | | | |
| **Co-requisites** |  | | | | |

**Course Objectives:**

1. To provide design experience to the students through team work.

2. To develop an understanding of various areas involved in any project.

3. To train students with various project dealing areas like feasibility, communications, planning, design, deployment and testing.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1 **Outline** of derivation of the dynamic equations of motion for quadrotors.

CO2 **Identify** appropriate motor and converter for EV applications.

CO3 **Summarize** the energy management system of smart cities.

**Catalog Description:**

A well-defined capstone experience is comprehensive in nature allowing for the assessment of a wide range of abilities. A capstone-based assessment method includes mapping project deliverables and other artifacts to specified learning outcomes, establishing a scoring rubric that defines performance criteria, collecting and analyzing data and reporting results. The main purpose of the capstone project is to simulate some knowledge acquired during their studies in previous semesters to manage complex projects based on real world or research.

**Course Content:**

**Unit I: 10 Lecture Hours**

**Geometry and Mechanics:** Transformations, Rotations, Euler Angles, Axis/Angle Representations for Rotations, Angular Velocity, Rigid-Body Displacements, Properties of Functions, Symbolic Calculations in Matlab, The atan2 Function, Eigenvalues and Eigenvectors of Matrices, Quaternions, Matrix Derivative, Skew-Symmetric Matrices and the Hat Operator, Formulation, Newton-Euler Equations, Principal Axes and Principal Moments of Inertia, Quadrotor Equations of Motion, State-Space Form, Getting Started With the First Programming Assignment.

**Unit II: 10 Lecture Hours**

**EV System, Parameters and Propulsion:**

**EV Configuration:** Fixed & variable gearing, single & multiple motor drive, In-wheel drives, Weight, size, force, energy & performance parameters.

**Electric Motor:** Choice of electric propulsion system, block diagram of EV propulsion system, concept of EV Motors, single motor and multi-motor configurations, fixed & variable geared transmission, In-wheel motor configuration, classification of EV motors, Electric motors used in current vehicle applications, Recent EV Motors, Comparison of Electirc Motors for EV applications. **Required Power Electronics & Control:** Comparison of EV power devices, introduction to power electronics converter, four quadrant DC chopper, three-pase full bridge voltage-fed inverter, soft switching EV converters, comparison of hard-switching and soft-switching converter, three-phase voltage-fed resonance dc link inverter, Basics of Microcontroller & Control Strategies.

**Unit III: 10 Lecture Hours**

**Smart Urban Energy System:** Energy infrastructure layer, energy services layer, planning, maintenance, operations, Emerging Information and communication Technology (ICT), Innovation stages and innovation in energy technologies, Energy Innovation: from Shale gas to solar power, Role of regulation and policies in smart energy technologies.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assesment** | **End Term** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Outline** of derivation of the dynamic equations of motion for quad rotors. | **PO1, PO3, PO4,PO5** |
| **CO2** | **Identify** appropriate motor and converter for EV applications. | **PO1, PO2, PO3, PO5** |
| **CO3** | **Summarize** the energy management system of smart cities. | **PO1, PO2, PO4,PO5** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO  10 | PO  11 | PO  12 | PSO  1 | PSO  2 | PSO3 |
| GEE14004 | Capstone  Project- II | 3 | 2 | 2 | 2 | 3 | - | - | - | - | - | - | - | - | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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| **IDP14001** | Interdisciplinary Project | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours – 45** | **0** | **0** | **5** | **3** |
| **Pre-requisites/Exposure** | **Knowledge of Basic English** | | | | |
| **Co-requisites** | **Knowledge of Basic Computer Skills** | | | | |

|  |  |
| --- | --- |
| Course Objectives | This course will develop a student’s knowledge of and appreciation for the   * interdisciplinary nature of knowledge and learning * importance and value of integrating knowledge and perspectives from multiple disciplines as a means to evaluating and understanding complex topics, problems, issues, phenomena, and events * competencies learned during the educational process and to apply these competencies in a real-world application |
| Course Outcomes | Upon successful completion of the course, students will be able to  CO1. Explain the unique advantages of integrative research and learning  CO2. Illustrate the fundamentals of research methods and practices of various academic disciplines  CO3. Demonstrate an understanding of current issues and concerns  CO4. Utilize the importance of ethics in research process  CO5. Illustrate the inter-disciplinary systems of research documentation |
| Typical Progress Roadmap | * After discussion with the Project Advisor(s), each student shall prepare an initial outline of their assigned project indicating the major sections of discussion, list the principal research sources for each section, and explain the overall objective of the project, including a justification of the interdisciplinary nature of the work. * Each student shall meet with the Project Advisor(s) regularly as per the weekly Time-Table. Other meetings may be scheduled at the discretion of the Project Advisor(s) at mutually agreed upon timings. * Typically, the progress will include a combination of  industrial and academic mentoring , self study sessions, case studies, trend studies, presentation by students,  interactive sessions, industrial  visits etc. * Regular submission of progress reports shall be required of each student-group as notified through the Project Advisor(s) from time to time. |
| Mode of Evaluation | Students will be evaluated by team participation and a team presentation at the end of the project. Interactive & continuous, task/assignment- based evaluation methodology will be applied for the course. |

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continous Assesment** | **End Term** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | Explain the unique advantages of integrative research and learning | **PO1, PO3, PO5, PSO1, PSO2** |
| **CO2** | Illustrate the fundamentals of research methods and practices of various academic disciplines | **PO1, PO2, PO3, PO4,PO5, PSO1, PSO2** |
| **CO3** | Demonstrate an understanding of current issues and concerns | **PO1, PO2, PO3, PO4,PO5, PSO1, PSO2** |
| **CO4** | Utilize the importance of ethics in research process | **PO1, PO3, PO5, PSO1, PSO2** |
| **CO5** | **Illustrate** the inter-disciplinary systems of research documentation | **PO1, PO2, PO3, PO4,PO5, PSO1, PSO2** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO  10 | PO  11 | PO  12 | PSO  1 | PSO  2 | PSO3 |
| IDP14001 | Interdisciplinary Project | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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| **SMA42111** | Engineering Mathematics –III (Probability Statistics and Numerical Methods) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours - 45** | **3** | **1** | **0** | **4** |
| **Pre-requisites/Exposure** | **Engineering Mathematics I and II** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To use the techniques of statistical analysis, which are commonly applied to understand and analyse business problems.
2. To enhance the fundamental knowledge of probability where the true essence of statistics lies.
3. To understand the calculation and interpretation of errors in numerical methods, and numerical solutions of nonlinear equations with one variable
4. To enable students, acquire concept of numerical integration and differentiation, numerical solution of ordinary and partial differential equations

**Course Outcomes:**

On completion of this course, the students will be able to

**CO1. Define** different measurements of statistical data and diagrammatic representation of

data.

**CO2. Illustrate** the basic concept of correlation and regression of bivariate data

**CO3. Classify** classical, statistical and axiomatic definition of probability and use Bay’s

theorem to measure happening of an event and compare discrete distribution, continuous

distribution of random variables with their fundamental properties.

**CO4. Find** the errors in numerical methods, and numerical solutions of nonlinear equations

with single variable.

**CO5**. **Define** finite differences, interpolation, numerical differentiation and integration and

solvethe ordinary differential equations by several numerical methods.

**CO6. Illustrate** the solution procedure of system of linear algebraic equations.

**Course Description:**

This course introduces several techniques of statistical analysis, which are commonly applied to understand and analyse business problems. The course deals with simple tools and techniques, which will help a student in data collection, presentation, and to understand the basic descriptive properties of the data. This course introduces the concept of bivariate data and their application in several areas.

Numerical analysis is the subject of study to find the numerical solutions of mathematical problems by computational methods. It studies the numerical solutions to the problems involving nonlinear equations, system of linear algebraic equations, interpolation and approximation, empirical laws for curve fitting, differences, integrals, ordinary and partial differential equations, finite differences, etc. Numerical methods are normally being used to find the solution to a problem whose analytical solution is difficult to achieve, thus it is felt that a study in applied sciences and engineering is essential and found wide applications in all areas of science and engineering.

**Course Content:**

**Module 1: 10 lecture hours**

**Statistics:** definition, scope and limitation, presentation of data, diagrammatic and graphical representation of data, measures of central tendency, mean, median and mode, geometric and harmonic mean and their limitations, Measure of variations, Range, Quartile, Variance, Standard deviation, Skewness, moment and Kurtosis.

**Correlation and Regression:** Introduction to Correlation analysis, Karl Pearson correlation coefficient, Rank Correlation, Regression Analysis, Fitting Straight Lines, Method of least square, regression coefficients, properties of regression coefficients and applications

**Module 2: 13 lecture hours**

**Probability:** Introduction, Probability of an event, additive rule & multiplication rule, conditional probability Bayes’ rule and applications.

**Probability Distributions:** Random variable, discrete and continuous probability distribution, Mathematical expectation, Variance of a random variable, Binomial, Hyper-geometric, Geometric, Poisson distribution, Uniform, Normal, Exponential Distribution.

**Test of hypothesis:** Introduction, type I and type II Error, one and two tailed test, test on a single mean when variance is known & variance is unknown. Test on two means, test on a single mean population and test on two populations, one and two sample test for variance, -Test for goodness of fit and test for independence.

**Module 3: 12 lecture hours**

**Numerical Methods:** Introduction, Concept of Errors, Bisection Method, False Position Method, Secant Method, Newton-Raphson Method, Successive Approximation Method, Discussion of Convergence, Interpolation and Extrapolation, Calculus of difference, Newton’s Forward Interpolation Formula and Backward Interpolation Formula, Lagrange’s method, Newton’s divided difference formula, Inverse Interpolation and its applications.

**Numerical differentiation and integration:** Differentiation formulae based on polynomial fit, trapezoidal, Simpson’s and Gaussian quadrature formulae.

**Module 4: 10 lecture hours**

**Solution of simultaneous linear equations and ordinary differential equations:** Gauss elimination method, pivoting, ill conditioned equations, Gauss Seidel and Gauss Jacobi iterative methods, Taylor series and Euler methods, Modified Euler method, error analysis, Runge-Kutta method.

**Text Books**:

1.S.C. Gupta and V K Kapoor; Fundamentals of Mathematical Statistics, S Chand & Sons

2.T. Veerarajan, T Ramachandran; Numerical Methods.

**Reference Books:**

1.Manish Goyal; Numerical methods and Statistical Techniques using ‘C’, Laxmi Publications pvt. Ltd

2.S Dey and S Gupta; Numerical Methods, Tata McGraw-Hill Education, 2013

3.B.S. Grewal; Numerical methods in engineering and science, 42 Edition, Khanna Publishers

**Modes of Examination: Assignment/Quiz/Project/Presentation/Written Exam**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)**

**Mapping between COs, POs and PSOs**

|  |  |  |
| --- | --- | --- |
| **Course Outcomes (COs)** | | **Mapped POs and PSOs** |
| CO1 | **Define** different measurements of statistical data and diagrammatic representation of data. | **PO2,PO12,PSO2** |
| CO2 | **Illustrate** the basic concept of correlation and regression of bivariate data | **PO1,PO2,PSO1** |
| CO3 | **Classify** classical, statistical and axiomatic definition of probability and use Bayes’ theorem to measure happening of an event, and compare discrete distribution and continuous distribution of random variables with their fundamental properties. | **PO3,PO12,PSO2** |
| CO4 | **Find** the errors in numerical methods, and numerical solutions of nonlinear equations with single variable. | **PO2,PO3,PO5,PSO1,**  **PSO2, PSO3** |
| CO5 | **Define** finite differences, interpolation, numerical differentiation and integration and solvethe ordinary differential equations by several numerical methods. | **PO1,PO2,PO5,PSO2, PSO3** |
| CO6 | **Illustrate** the solution procedure of system of linear algebraic equations. | **PO2,PO3,PO5,PSO2, PSO3** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| SMA42111 | Probability, Statistics and Numerical Methods | 2 | 3 | 2 | - | 3 | - | - | - | - | - | - | 3 | 2 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |  |
| **Course: Engineering Mathematics –III (Probability Statistics and Numerical Methods) (SMA42111)**  **Program: B.Tech Stream: CSE Semester: III**  **Time: 03 hrs. Max. Marks:40**  **Instructions:**  Attempt any three questions from **Section A** (each carrying 4 marks); any **Two Questions** from **Section B** (each carrying 10 marks)**. Section C** is Compulsory (carrying 8 marks)**.** | | | | | |
| **Section A** ( attempt any **Three** Questions) | | | | | |
| 1. | The average salary of male employees in a firm was Rs. 5200 and that of females was Rs. 4200. The average salary of all employees was Rs. 5000. **Find** the percentage of male and female employees. | | **R** | **CO1** | |
| 2. | The population of a certain town is shown in the following table   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Year | 1951 | 1961 | 1971 | 1981 | 1991 | | Population | 19.96 | 36.65 | 58.81 | 77.21 | 94.61 |   **Find** that the rate of growth of population in the year 1981. | | **R** | **CO5** | |
| ­­­ 3. | The distribution function F(x) of a random variate X is defined as follows    **Find** the value of the constants A, B, C, D given that and . | | **[U** | **CO3** | |
| 4. | a) **Find** the number of significant figures in  given its relative error as.  b)Three approximate value of the number  are given as 0.30, 0.33 and 0.34. **Which** of these three is the best approximation? | | **R** | **CO4** | |
|  | **SECTION B (**Attempt any **Two** Questions) | |  | | |
| 4. | a) **Find** the real root of equation by the Regula-falsi method correct to three decimal places.  b) The coefficient of correlation between the ages of husbands and wives in a community was found to be +0.8, the average of husbands’ age was 25 years and that of wives age 22 years. Their standard deviations were 4 and 5 years respectively. **Find** with the help of regression equations:   1. the expected age of husband when wife’s age is 21 years, and 2. the expected age wife of when husband’s age is 33 years. | | **R** | **CO4**  **CO2** | |
| 5. | **Compare** the solution of following system of equations obtaining by Gauss-Jacobi and Gauss-Seidal methods**.** | | **U** | **CO3** | |
| 6. | a) **Show** that the correlation coefficient for the following data is 0.6:   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | ***x*** | 10 | 14 | 18 | 22 | 26 | 30 | | ***y*** | 18 | 12 | 24 | 6 | 30 | 36 |     b) **Show** that mean and variance of a Poisson distribution is same. | | **U** | **CO4** | |
|  | **SECTION C (**Attempt any **One** Question) | |  | | |
| 7. | Use 4th order Runge-Kutta method to **solve** the initial value problem  with, at, andcorrect up to four places of decimal point. | | **Ap** | **CO5** | |
| 8. | i) **Find** the value of the integral using (a) Trapezoidal rule, (b) Simpson’s 1/3rd rule and (c) Simpson’s 3/8th rule taking, hence estimate the error in each rule. | | **R** | **CO5** | |

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| **HEC42180** | HSS – IV (Economics for Engineers) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours –45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **12th level Mathematics** | | | | |
| **Co-requisites** |  | | | | |

**Course Objectives:**

1. Prepare engineering students to function in the business and management side of

professional engineering practice.

2.Help students in general to analyse, understand and explain the past, present economic

conditions of the country.

3.To forecast the future course of changes and development through their knowledge of

policies and programmes set by the governments and other development agencies.

4.Evaluate the economic theories, cost concepts and pricing policies.

5.Apply the concepts of financial management for project appraisal.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Illustrate** the basic economic concepts and make economic analyses in the decision

making.

CO2. **Apply** principals of economics to analyse the behaviour of consumers and producers in

a well- functioning economy and also in case of market failures.

CO3. **Develop** the ability to account for time value of money using factors and formulas,

estimate annual and future worth comparisons for cash flows.

CO4. **Illustrate** how factor market works, identify the manpower and resources management,

need of credit/finance for initiating and accelerating projects.

**Catalog Description:**

This paper introduces students to the terminology and analytic principles used in microeconomics, which is broadly defined as the study of markets, and to the application of these conceptual tools to several policy issues. As the design and manufacturing process become more complex, an engineer is required to make decisions that involve money more than ever before. The competent and successful engineer at present must have an improved understanding of the principles of economics. This paper is concerned the analysis of individual behaviors and market structure, and systematic evaluation of the benefits and costs of projects.

**Course Content:**

**Module 1: Basic Concepts of Economics: 10 lecture hours**

Introduction to the Literature of Microeconomics centering around Decision Making at Individual Level. Some Fundamental Concepts: Maximization, Equilibrium and Efficiency.

**Module 2: Theories of Economics: 12 lecture hours**

The Theory of Consumer Choice and Demand, the Theory of Supply, market equilibrium, market structure, market failure and environmental issues, Game Theory, concept of yield and Theories of Term Structure, the Theory of Asset Pricing, decision-making under uncertainty: risk and insurance.

**Module 3: Sustainability Study of a Project: 5 lecture hours**

Budget plan, estimation of the project cost, prices, fees and cost recovery, financing of recurrent costs, sustainability of the activities generated by the project.

**Module 4: Economic Feasibility Study: 12 lecture hours**

Problem of pricing under oligopoly, problem of market stagnation, problem of volatility in open economy, problem of global meltdown, problem of financing a project.

**Module 5: Project Report: 6 lecture hours**

Facets of project viability – commercial, technical, financial, outline of a model project report, a real life case study.

**Text Books:**

1. R. Panneersalvam, *Engineering Economics*, 2nd Ed., Prentice Hall of India, 2014.
2. James Riggs, *Engineering Economics*, 4th Ed., McGraw Hill Education, 2004.

**Reference Books:**

1. Donald G. Newnan, Ted G. Eschenbach and Jerome P. Lavelle, *Engineering Economic Analysis*, 13th Ed., Oxford University Press, 2017.
2. Chan S. Park, *Contemporary Engineering Economics*, 6th Ed., Pearson, 2015.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Illustrate** the basic economic concepts and make economic analyses in the decision making. | **PO2, PO3, PO6, PO12, PSO1. PSO3** |
| **CO2** | **Apply** principals of economics to analyze the behaviour of consumers and producers in a well-functioning economy and also in case of market failures. | **PO3, PO4, PO6, PO12, PSO1. PSO3** |
| **CO3** | **Develop** the ability to account for time value of money using engineering economy factors and formulas, estimate annual and future worth comparisons for cash flows. | **PO3, PO4, PO11, PO12** |
| **CO4** | **Illustrate** how factor market works, identify the manpower and resources management, need of credit/finance for initiating and accelerating projects. | **PO2, PO3, PO11** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| HEC42180 | HSS–IV (Economics for Engineers) | - | 2 | 3 | 2 | - | 2 | - | - | - | - | 2 | 3 | 2 |  | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |  |
| Course: HSS – IV (Economics for Engineers) **Program: B.Tech. Stream: CSE Semester: III**  **Time: 03 hrs. Max. Marks: 40**  **Instructions:**  Attempt any four questions from **Section A** (each carrying 5 marks); any **Two Questions** from **Section B** (each carrying 6 marks)**,** any **One Question** from **Section C** (carrying 8 marks)**.** | | | | | |
| **Section A (**Attempt any **Four Questions) (5x4=20)** | | | | | |
| 1. | **Explain** what do you mean by Opportunity cost? | | **U** | **CO1** | |
| 2. | **What** do you mean by Income elasticity of demand? Explain with diagram | | **U** | **CO2** | |
| ­­­ 3. | State and **explain** the features of Perfect Competition. | | **R** | **CO2** | |
| 4. | **What** are the properties of Indifference Curves (ICs)? | | **R** | **CO1** | |
| 5. | **What** is Marginal Rate of Substitution? | | **U** | **CO1** | |
| 6. | **Explain** Risk and Liquidity in Asset Market. | | **An** | **CO3** | |
|  | **SECTION B (**Attempt any **Two Questions) (6x2=12)** | |  | | |
| 7. | **Define** equilibrium. Suppose there has been good rains and as a result supply of tomatoes have increased in the market. How will your equilibrium change? | | **U** | **CO1** | |
| 8. | **How** can you derive relationship between price and quantity demanded using  Indifference Curve analysis? | | **Ap** | **CO1** | |
| 9. | **Explain** the characteristics of infrastructure assets that differentiate them from other assets. | | **U** | **CO4** | |
|  | **SECTION C (**Attempt any **One Question) (8x1=8)** | |  | | |
| 10. | **Assume** due to rise in price of foodgrains, there has been a panic hoarding on the part of the people and that has led to excess demand of foodgrains. How will the demand for foodgrains change? What will be the new equilibrium price and quantity? Explain your answer diagrammatically. | | **Ap** | **CO1** | |
| 11. | **Estimate** various cost concepts. Establish the cost-output relationship in the short run with suitable diagram | | **An** | **CO3** | |

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| **CSE11003** | **Data Structures and Algorithms (Prof. Core -I)** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Basic concept of programming** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Define** the concept of Dynamic memory management, data types, and algorithms.

CO2. **Illustrate** advantages and disadvantages of specific algorithms and data structures.

CO3. **Solve** bugs in program, recognize needed basic operations with data structures.

CO4. **Interpret** algorithms and data structures in terms of time and memory complexity of

basic operations.

CO5. **Compare** the computational efficiency of the principal algorithms for sorting, searching,

and hashing.

**Catalog Description:**

Study of advanced programming topics focused on logical structures of data as well as the design, implementation and analysis of algorithms operating on these structures. Students will gain the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms.

**Course Content:**

**Unit I: 9 lecture hours**

**Searching:** Linear Search and Binary Search Techniques and their complexity analysis.

**Unit II: 9 lecture hours**

**Stacks and Queues:** ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

**Introduction:** Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off.

**Arrays:** Array Definition: 1D array and 2D array, Different array operations: Insertion, deletion, traversing etc.; Algorithms for various operations and Complexity Analysis,

**Unit III: 9 lecture hours**

**Linked Lists:** Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis.

**Unit IV: 9 lecture hours**

**Graph:** Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

**Unit V: 9 lecture hours**

**Sorting and Hashing**: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods, Hashing.

**Trees:** Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis. Applications of Binary Trees. B Tree, B+ Tree: definitions, algorithms and analysis.

**Text Books:**

1. Fundamentals of Data Structures, Illustrated Edition by Ellis Horowitz, SartajSahni and Computer Science Press.

2. Introduction To Algorithms, [Thomas H.Cormen](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Thomas+H..+Cormen%22), [Thomas H Cormen](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Thomas+H+Cormen%22), [Charles E Leiserson](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Charles+E+Leiserson%22), [Ronald L Rivest](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Ronald+L+Rivest%22), Clifford Stein.

**Reference Books:**

1. Algorithms, Data Structures, and Problem Solving with C++, Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company.

2. How to Solve it by Computer, 2nd Impression by R. G. Dromey, Pearson Education.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **CO1** | **Define** the concept of Dynamic memory management, data types, and algorithms. | **PO1, PO2, PO3, PO12 PSO1, PSO3** |
| **CO2** | **Illustrate** advantages and disadvantages of specific algorithms and data structures. | **PO2, PO3, PSO1** |
| **CO3** | **Solve** bugs in program, recognize needed basic operations with data structures. | **PO1, PO2, PSO1, PSO2** |
| **CO4** | **Interpret** algorithms and data structures in terms of time and memory complexity of basic operations. | **PO3, PSO1, PO12 PSO3** |
| **CO5** | **Compare** the computational efficiency of the principal algorithms for sorting, searching, and hashing. | **PO3, PO12 PSO1, PSO2, PSO3** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11003 | Data Structures and Algorithms | 2 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 2 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: III Stream: CSE

PAPER TITLE: Data Structures and Algorithms PAPER CODE: CSE11003

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **What** are the characteristics of an Algorithm? | **R** | **CO1** |
| 2. | **What** are elementary data representation? Also explain classification of data structure. | **R** | **CO1** |
| ­­­ 3. | **What** are the type of complexities? | **R** | **CO4** |
| 4. | **What** will be the address of 5th element in a floating-point array representation? The array is specified as Percentage [16]. The base address of the array is 1058. | **R** | **CO1** |
| 5. | **Construct** an AVL tree with five arbitrary elements. | **Ap** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | a) **Explain** row major and column major representation of an array?  b) **Develop** an algorithm to delete element from a QUEUE. **[2 + 3]** | **U** | **CO1** |
| 7. | a) **What** is the difference between iteration and recursion? How dynamic runtime array can be created.  b) **Develop** an algorithm to convert and infix expression to its prefix expression. **[2 + 3]** | **R, Ap** | **CO1,**  **CO3** |
| 8. | a) **Define** Ø with suitable graph and example.  b) **Solve** the postfix expression 5 2 \* 3 4 + 5 2 \* \* + using stack. **[2 + 3]** | **R, Ap** | **CO4,**  **CO3** |
| 9. | **Prove** that for any nonempty binary tree, if n0 represent the number of leaf nodes and n2 be the number of nodes of degree 2, then n0 = n2 + 1. | **Eva** | **CO3** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | i) **Build** a C function to implement pop operation in a stack by using an array.  ii) **Build** a C function to insert an element into a linear queue by using a singly linked list.  iii) **Find** an equivalent infix expression of the following postfix expression by using stack:  A B + C \* D E - - F G + ^ **[3 + 3 + 4]** | **Ap, Ap,**  **R** | **CO3** |
| 11. | i) **Construct** the binary tree whose in-order and pre-order traversal sequence of nodes are given below:  In-order: E A C K F H D B G  Pre-order: F A E K C D H G B    ii) **Build** a recursive C function to insert an element in a binary search tree.  iii**) Prove** that the number of odd degree vertices in a graph is always even. **[4 + 3 + 3]** | **Ap, Ap, Eva** | **CO3,CO4** |
| 12. | i) **Build** an AVL tree with the following keys in the order given below:  I, J, K, C, B, F, D, G, E  Clearly mention different rotations used and balance factor of each node.  ii) **Construct** a B-Tree of order 3 from the following lists of data items:  42, 12, 30, 32, 10, 16, 20, 22, 34, 36, 38, 14, 24, 28  **[5 + 5]** | **Ap, Ap** | **CO2, CO3** |

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| **CSE11004** | Switching Circuit and Logic Design | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Fundamental of Logic gate** | | | | |
| **Co-requisites** | **Digital Electronics** | | | | |

**Course Objectives:**

1. To introduce an overview of logic families.

2. To develop students for building k-map.

3. To provide the students a detailed analysis of sequential circuit.

4. To introduce the students to formalize with ASM chart.

**Course Outcomes:**

On completion of this course, the students will be able to

**CO1. Understand** and construct the basic design principles of logic gate.

**CO2. Understand** the different fabrication techniques used in Bipolar, CMOS and PLA.

**CO3. Formaliz**e with mealy and Moore machine.

**CO4. Construct** ROM design.

**Catalog Description:**

The world of electronics is a lot easier to understand if we start by dividing it into two distinct categories: the “analog” world and the “digital” world. The analog world generally refers to any natural phenomenon that varies its own properties over a period of time. Take the outside temperature, for example. We notice that it changes rather slowly throughout the day, and at any instant we can measure how hot or cold it really is by using a simple thermometer.

The same changing properties can be observed, measured, and recorded in other natural phenomenon such as barometric pressure, wind speed, solar radiation, etc. If you were to record and graph each of the above events over a 24 hour period, you would notice one similar characteristic: the physical properties of each phenomenon change over time.

**Course Content:**

**Unit I: 7 lecture hours**

**(Switching Circuits):**Logic families: TTL, nMOS, CMOS, dynamic CMOS and pass transistor logic (PTL) circuits, inverters and other logic gates, area, power and delay characteristics, concepts of fan-in, fan-out and noise margin.

**Unit II: 10 lecture hours**

**(Switching theory):** Switching algebra, logic gates, switching functions, truth tables and switching expressions, minimization of completely and incompletely specified switching functions, Karnaugh map and Quine-McCluskey method, multiple output minimization, representation and manipulation of functions using BDD's, two-level and multi-level logic circuit synthesis.

**Unit III: 7 lecture hours**

**Combinational logic circuits:** Realization of Boolean functions using NAND/NOR gates, Decoders, multiplexers. logic design using ROMs, PLAs and FPGAs. Case studies, fault diagnosis of combinational circuits

**Unit IV: 15 lecture hours**

**Sequential circuits:** Clocks, flip-flops, latches, counters and shift registers, finite-state machine model, Mealy and Moore machines, synthesis of synchronous sequential circuits, Conversion of Mealy m/c to Moore m/c and vice-versa, minimization and state assignment, Incompletely specified m/c’s, asynchronous sequential circuit synthesis.

**UNITV: 6 lecture hours**

**ASM charts:** Representation of sequential circuits using ASM charts, synthesis of output and next state functions, data path control path partition-based design

**Text Books:**

1.H. Taub and D. Schilling, Digital Integrated Electronics, McGraw-Hill.

**Reference Books:**

1.Z. Kohavi, Switching and Finite Automata Theory, Tata McGraw-Hill

2.Randy H. Katz and Gaetano Borriello, Contemporary Logic Design, Prentice Hall of India

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**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Understand** and construct the basic design principles of logic gate. | **PO1,PO2,PO3,PSO1** |
| **CO2** | **Understand** the different fabrication techniques used in Bipolar, CMOS and PLA. | **PO1,PO3,PSO2,PSO3** |
| **CO3** | **Formalize** with mealy and Moore machine. | **PO1,PO12, PSO1,PSO3** |
| **CO4** | **Construct** ROM design. | **PO1,PO3,PO2,PSO1** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11004 | Switching circuit and logic design | 3 | 2 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 2 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

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| **Name:**  **Enrolment No:** | |  | | |
| ADAMAS UNIVERSITYSCHOOL OF ENGINEERING AND TECHNOLOGYEND-SEMESTER EXAMINATIONName of the Program: B.Tech Semester: IIICode- CSE11004 Stream- CSETime: 03 Hrs.Paper title– Switching Circuit and Logic Design Total pages- 1Max. Marks: 40 Total no. of questions- 12Instructions:Attempt All Questions from Section A (Each Carrying 1 Marks); any Three Questions fromSection B (Each Carrying 5 Marks). Any Two Questions from Section C (Each Carrying 10 Marks ).1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.2. Assumptions made if any, should be stated clearly at the beginning of your answer. 3. **All parts of a Question should be answered consecutively** | | | | |
| **SECTION A (Answer All questions) (5 x 1 = 5)** | | | | |
| 1. | **List** the different logic gates? | | **U** | **CO3** |
| 2. | **Explain** switching algebra and switching function. | | **U** | **CO1** |
| ­­­ 3. | **Define** logic design using ROM? | | **R** | **CO2** |
| 4. | **Elucidate** the essential components of multi level component of logic synthesis. | | **R** | **CO4** |
| 5. | **What** is ROM logic? | | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** | |  | |
| 1. | **Describe** about mealy and Moore machine? | | **U** | **CO4** |
| 2. | **Examine** flip-flop and their use in real life? | | **Ap** | **CO2** |
| 3. | **Elucidate** the factors influencing on C-MOS delay. | | **Ap** | **CO3** |
| 4. | **Explain** in detail about bi-polar S-RAM cell transistor. | | **U** | **CO2** |
|  | **SECTION C (**Attempt any **Two Questions) (2 x 10 = 20)** | |  | |
| 1. | **Build** a synchronous Modulo-10 up/down counter using T FFs. | | **Ap** | **CO4** |
| 2. | **Explain** BCD to excess-3 code conversion in PLA. | | **U** | **CO4** |
| 3. | **Compare** between Karnaugh map and Quine- McCluskey method and write the advantage of K-map over the Quine-McCluskey method. | | **U** | **CO1** |

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| **CSE11005** | Formal Languages and Automata Theory | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Discrete Mathematics, Programming Concepts** | | | | |
| **Co-requisites** | **Algorithms** | | | | |

**Course Objectives:**

1. Introduce concepts in automata theory and theory of computation
2. Identify different formal language classes and their relationships
3. Design grammars and recognizers for different formal languages
4. Prove or disprove theorems in automata theory using its properties
5. Determine the decidability and intractability of computational problems

**Course Outcomes:**

On completion of this course, the students will be able to

**CO1. Define** the basic concepts in formal language theory, grammars, automata theory,

computability theory, and complexity theory.

**CO2. Demonstrate** abstract models of computing, including deterministic (DFA), non-

deterministic (NFA), Push Down Automata (PDA) and Turing (TM) machine models and

their power to recognize the languages.

**CO3. Prove** and disprove theorems establishing key properties of formal languages and automata.

**CO4. Acquire** a fundamental understanding of core concepts relating to the theory of computation

and computational models including (but not limited to) decidability and intractability.

**CO5. Solve** fundamental problems related to Computational Model.

**Catalog Description:**

This course will provide a foundation to the “Theory of Computation”. The student will realize that the sometimes chaotic technology oriented world of computers has a very elegant mathematical basis to it. This basis is deeply rooted in mathematics developed before the days of modern computers. Our study will lead to some interesting implications concerning the theoretical limits of computing. On the practical side, this course is a background for a course on compilers. Topics covered in this course include: mathematical prerequisites, finite state machines (automata), concept of a language and grammars, deterministic and non-deterministic accepters, regular expressions and languages, context-free languages, normal/canonical forms, pushdown automata, Turing machines, context sensitive languages, recursive and recursively enumerable languages. Each of the language classes has two points of view: a class of automata defining the language, and a class of grammars defining the language. This dual approach to defining languages, will finally lead to the Chomsky hierarchy of languages. We shall observe that the Turing Machine not only serves to define a language class, but also a mathematical model for computation itself and defines the theoretical limits of computation.

**Course Content:**

**Unit I: 9 lecture hours**

**Regular Languages and finite Automata:** Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages, Regular language, Regular expressions, Deterministic finite automata (DFA), Deterministic finite automata (DFA) and equivalence with regular expressions, NFA and equivalence with DFA, Regular grammars and equivalence with finite automata

**Unit II: 9 lecture hours**

**Context Free Grammar**

Properties of regular languages, Pumping lemma for regular languages, Problem solving using pumping lemma, Minimization of finite automata, Context-free grammars (CFG), Context-free language (CFL), Chomsky normal forms, Greibach normal forms

**Unit III: 9 lecture hours**

**Pushdown Automata**

Nondeterministic pushdown automata (NPDA), NPDA and equivalence with CFG, Parse trees, Ambiguity in CFG, Pumping lemma for context-free languages, Deterministic pushdown automata, Deterministic CFLs, Closure properties of CFLs.

**Unit IV:**

**Context Sensitive Grammar 9 lecture hours**

Context-sensitive grammars (CSG), Context-sensitive Languages, Linear bounded automata, Linear bounded automata and equivalence with CSG, The basic model for Turing machines (TM), Turing-recognizable (recursively enumerable) languages, Turing-decidable (recursive) languages, Closure properties of recursively enumerable and recursive languages, Context-sensitive grammars (CSG) and Languages, Linear bounded automata

**Unit V: 9 lecture hours**

**Turing Machine**

Linear bounded automata and equivalence with CSG, The basic model for Turing machines (TM), Turing-recognizable (recursively enumerable) languages And Turing-decidable (recursive) languages, Closure properties of recursively enumerable and recursive languages, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, Unrestricted grammars and equivalence with Turing machines, Church-Turing thesis, universal Turing machine, Rice's theorem, undecidable problems about languages.

**Text Books:**

1. Introduction to the Theory of Computation, 3rd Edition, Michael Sipser, Cengage Learning.
2. Introduction to Automata Theory, Languages, and Computation, 3rd Edition, John E. Hopcroft Rajeev Motwani and Jeffrey D. Ullman, Pearson Education.

**Reference Books:**

1. Introduction to Computability, Illustrated Edition by Frederick C. Hennie, Addison-Wesley.
2. The Theory of Computation, EE Edition by Bernard M. Moret, Pearson Education Asia.
3. Introduction to Languages and the Theory of Computation, Illustrated Edition by John C.Martin, Tata McGraw Hill.
4. Automata and Computability, Undergraduate Texts in Computer Science, 2002 Reprint Edition by Dexter C. Kozen, Springer.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

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| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

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| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Define** the basic concepts in formal language theory, grammars, automata theory, computability theory, and complexity theory. | **PO1,PO2,PO3,PO12,PSO1, PSO2, PSO3** |
| **CO2** | **Demonstrate** abstract models of computing, including deterministic (DFA), non-deterministic (NFA), Push Down Automata (PDA) and Turing (TM) machine models and their power to recognize the languages. | **PO1,PO2,PO3,PO12,PSO1, PSO2, PSO3** |
| **CO3** | **Prove** and disprove theorems establishing key properties of formal languages and automata. | **PO1,PO2,PO3,PO12,PSO2, PSO3** |
| **CO4** | **Acquire** a fundamental understanding of core concepts relating to the theory of computation and computational models including (but not limited to) decidability and intractability. | **PO3,PO12,PSO2, PSO3** |
| **CO5** | **Solve** fundamental problems related to Computational Model. | **PO1,PO2,PO12,PSO1, PSO2, PSO3** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11005 | Formal Language And Automata Theory | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

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| **Name:**  **Enrolment No:** | |  | | |
| **ADAMAS UNIVERSITY**  **SCHOOL OF ENGINEERING AND TECHNOLOGY**  **END-SEMESTER EXAMINATION**  **Name of the Program: B.Tech Semester: V**  **Code- CSE11005 Stream- CSE Time: 03 Hrs.**  **Paper title– Formal Language & Automata Theory Total pages- 2**  **Max. Marks: 40 Total no. of questions- 12**    **Instructions:**  Attempt All Questions from **Section A** (Each Carrying 1 Marks); any **Three Questions** from **Section B** (Each Carrying 5 Marks)**.** Any **Two Questions from Section C** (Each Carrying 10 Marks)**.**  1. **At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.**  2. **Assumptions made if any, should be stated clearly at the beginning of your answer.**  3. **All parts of a Question should be answered consecutively.** | | | | |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | | |
| 1. | **Explain** DeMorgan’s Law | | **R** | **CO1** |
| 2. | **What** do you understand by formal language? | | **R** | **CO1** |
| ­­­ 3. | **What** do you understand by ‘**proper subset**’ and ‘**subset**’? | | **R** | **CO2** |
| 4. | **What** do mean by grammar and when it is regular. | | **R** | **CO1** |
| 5. | **Define** Finite Automaton? | | **R** | **CO1** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** | |  | |
| 6. | **State** & explain the closure properties of regular language. | | **C** | **CO2** |
| 7. | **State** a DFA that accepts the language L over Σ={a,b} such that number a’s and b’s is divisible by 2 and 3 respectively. Construct the homomorphic image of L provided Γ ={0,1}, h(a)= “0” & h(b)= “1” | | **Ap, R** | **CO2** |
| 8. | **Construct** the state diagram of the deterministic finite automaton of a binary adder. | | **U** | **CO3** |
| 9. | **State** the difference between DFA and PDA. | | **U** | **CO2** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** | |  | |
| 10. | **Construct** a Turing Machine which accepts the language } , for ∑ = {a,b,c} & ┌ = {a,b,c,X,Y,Z,} also state the Turing configuration for the string ‘aabbbcccccc ’. | | **C** | **CO3** |
| 11. | **Construct** the DFA over Σ={a,b} for L3= L1υL2 , where L1={ω| Ƞa(ω)mod 3 >Ƞb(ω)mod 3}& L2= {ω| every strings holds either “101” as a substring or “000” as a substring} | | **C** | **CO3** |
| 12. | **State** the transition functions of a language L={ambmcndn| m,n>0}, if accepted by deterministic pushdown automata. | | **C** | **CO3** |

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| **CSE11006** | Engineering Science Course (Introduction to Python) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **H. Sc. level Computer Knowledge or Basic Computer Skills** | | | | |
| **Co-requisites** | **-** | | | | |

**Course Objectives:**

1. To provide an introduction to the Python programming language.

2. To introduce students with an introduction to programming, I/O, and visualization using the Python programming language.

3. To develop Python programming for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Classify** the fundamental Python syntax and semantics and show the use of Python

control flow statements.

CO2. **Demonstrate** the methods to create and manipulate Python programs by utilizing the data

structures like lists, dictionaries, tuples, sets and strings.

CO3. **Develop** proficiency in the handling of functions.

CO4. **Identify** the Object-Oriented Programming concepts such as encapsulation, inheritance and

polymorphism as used in Python.

CO5. **Find** the commonly used operations to handle run time error or Exception

CO6. **Summarize** how to handle large data file with the help of various file handling methods.

**Catalog Description:**

The goal of this course is to provide an introduction to Python. The course will discuss topics necessary for the participant to be able to create and execute Python programs. The lectures and presentations are designed to provide knowledge and experiences to students that serve as a foundation for continued learning of presented areas.

Upon the successful completion of this course, the student will be able to:

* Install and run the Python interpreter
* Create and execute Python programs
* Understand the concepts of file I/O
* Read data from a text file using Python
* Acquire knowledge about Object Oriented Skills in Python

All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

**Course Content:**

**Unit-I 12 Lecture Hours**

**Introduction to Python:** Introduction to Python, Python variables, expressions, statements, Variables, Keywords, Operators & operands, Expressions, Statements, Order of operations, String operations, Comments, Keyboard input, Example programs, Functions- Type conversion function, Math functions, Composition of functions, Defining own function, parameters, arguments, Importing functions, Example programs

**Unit II: 8 Lecture Hours**

**Conditions & Iterations: Conditions-** Modulus operator, Boolean expression, Logical operators, if, ifelse, if-elif-else, Nested conditions, Example programs,

**Iteration-** while, for, break, continue, Nested loop, Example programs

**Unit III: 13 Lecture Hours**

**Recursion, Strings, List, Dictionaries, Tuples: Recursion-** Python recursion, Examples of recursive functions, Recursion error, Advantages & disadvantages of recursion

**Strings-** Accessing values in string, Updating strings, Slicing strings, String methods – upper(), find(), lower(), capitalize(), count(), join(), len(), isalnum(), isalpha(), isdigit(), islower(), isnumeric(), isspace(), isupper() max(), min(), replace(), split(), Example programs

**List-** Introduction, Traversal, Operations, Slice, Methods, Delete element, Difference between lists and strings, Example program

**Dictionaries-** Introduction, Brief idea of dictionaries & lists

**Tuples-** Introduction, Brief idea of lists & tuples, Brief idea of dictionaries & tuples

**Unit IV: 10 Lecture Hours**

**I/O & File:** Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data from a File, Additional File Methods, Using Pipes as Data Streams

**Classes & Objects:** Creating class, Instance objects, Accessing attributes, Built in class attributes, destroying objects, Inheritance, Method overriding, Overloading methods, Overloading operators, Data hiding, Example program

**Unit V: 2 Lecture Hours**

**Python Exceptions** Exception handling: assert statement, Except clause - with no exceptions and multiple exceptions, Try - finally, raising exceptions, user-defined exceptions.

**Text Books:**

1. Introducing Python- Modern Computing in Simple Packages – Bill Lubanovic, O„Reilly Publication
2. Beginning Python: From Novice to Professional, Magnus Lie Hetland, Apress
3. Programming In Python, Dr. Pooja Sharma, BPB

**Reference Books:**

1. Beginning Programming with Python for Dummies Paperback – 2015 by John Paul Mueller
2. Python Programming - Using Problem Solving Approach, Reema Thareja, OXFORD UNIVERSITY PRESS

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Class Assessment** | **Mid Term** | **End Term** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and Pos** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Classify** the fundamental Python syntax and semantics and show the use of Python control flow statements. | **PO1, PO12, PSO2** |
| **CO2** | **Demonstrate** the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples, sets and strings . | **PO1, PO2, PO3, PO12, PSO1, PSO2** |
| **CO3** | **Develop** proficiency in the handling of functions. | **PO1, PO2, PO3, PO4, PO11, PO12, PSO2** |
| **CO4** | **Identify** the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python. | **PO1, PO2, PO3, PO12, PSO2** |
| **CO5** | **Find** the commonly used operations to handle run time error or Exception | **PO1, PO2, PO3, PO4, PO11, PO12, PSO2** |
| **CO6** | **Summarize** how to handle large data file with the help of various file handling methods | **PO1, PO2, PO4, PO12, PSO2** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11006 | Engineering Science Course (Introduction to Python) | 3 | 3 | 3 | 2 | - | - | - | - | - | - | 2 | 3 | 2 | 3 | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

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| **Name:**  **Enrolment No:** | |  | |
| **ADAMAS UNIVERSITY**  **SCHOOL OF ENGINEERING AND TECHNOLOGY**  **END-SEMESTER EXAMINATION**  **Name of the Program: B.Tech Semester: III**  **Code- CSE11006 Stream- CSE**  **Time: 03 Hrs.**  **Paper title– Engineering Science Course (Introduction to Python) Total pages- 1**  **Max. Marks: 40 Total no. of questions- 12**  **Instructions:**  Attempt All Questions from **Section A** (Each Carrying 1 Marks); any **Three Questions** from **Section B** (Each Carrying 5 Marks). **Any Two Questions from Section C** (Each Carrying 10 Marks).  **1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.**  **2. Assumptions made if any, should be stated clearly at the beginning of your answer.**  **3. All parts of a Question should be answered consecutively.** | | | |
| **Section A (**Answer **All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Explain** the Identifiers, Keywords and Variables in Python programming language with examples. | **U** | **CO1** |
| 2. | **List** the basic data types available in Python with examples. | **R** | **CO1** |
| ­­­3. | **Summarize** the difference between set and list datatype. | **U** | **CO1** |
| 4. | **Solve** how slicing operator used on string datatype. | **Ap** | **CO2** |
| 5. | **Why** strings are immutable with an example. | **R** | **CO2** |
| **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** | | | |
| 6. | **Apply** Python program to find the GCD of two positive numbers. | **Ap** | **CO1** |
| 7. | **Identity** whether the given string is a Palindrome or not using slicing. | **Ap** | **CO2** |
| 8. | **Show** the various file opening mode in Python language. | **U** | **CO6** |
| 9. | **Explain** with Example: i) try catch block ii) function calling | **U** | **CO3, CO5** |
| **SECTION C (**Attempt Any **Two Questions) (2 x 10 = 20)** | | | |
| 10. | **Solve** Pythonic code to sort a sequence of names according to their alphabetical order without using sort () function. | **Ap** | **CO2** |
| 11. | Consider a Rectangle Class and Create Two Rectangle Objects. **Solve** Python program to Check Whether the Area of the First Rectangle is Greater than Second by Overloading > Operator. | **Ap** | **CO4** |
| 12. | **Summarize** the advantage of functions in Python. **Show** the scope and lifetimes of Global & Local variables. | **U**  **R** | **CO3** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CSE12007** | **Data Structures and Algorithms Lab** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Basic concept of programming** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

The objective of the course is to teach programming (with an emphasis on problem solving) and introduce elementary data structures. The student should, at a rudimentary level, be able to prove correctness (loop invariants, conditioning, etc).

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Explain** asymptotic performance of the algorithms.

CO2. **Illustrate** Linear data structures and their applications such as Stacks, Queues and Linked Lists

CO3. **Solve** and understand Non-Linear Data Structures and their Applications such as Trees and

Graphs

CO4. **Interpret** searching and sorting algorithms.

**Course Description:**

Data Structures (also called Data Structures and Algorithms in some places) is a core course in all computer science undergraduate curricula. The course is the basis for understanding several data structures and also algorithms that operate on them. The course forms the foundation for almost all computer science subjects: compilers, operating systems, databases, AI and software engineering.

**Course Content:**

**List of Programs:**

1. Write a menu based C program to insert a node at the beginning, after a specified position, at the end of a singly linked list.
2. Write a menu based C program to delete a node from the beginning, from a specified position, from the end of a singly linked list.
3. Write a menu based C program to display the data part of the nodes in reverse order, reverse the list and sort the elements of a singly linked list.
4. Write a menu based C program to insert a node at the beginning, after a specified position, at the end of a doubly linked list.
5. Write a menu based python program to delete a node from the beginning, from a specified position, from the end of a doubly linked list.
6. Write a menu based C program to display the data part of the nodes in reverse order, reverse the list and sort the elements of a doubly linked list.
7. Write a menu based C program to insert, delete and display operation of a linear queue by using singly linked list.
8. Write a menu based C program to insert, delete and display operation of a linear queue by using an array.
9. Write a menu based C program to implement push, pop and display operation of a linear queue by using singly linked list.
10. Write a menu based C program to implement push, pop and display operation of a linear queue by using an array.
11. Write a menu based C program to implement insert, delete and display operation of a circular queue by using an array.
12. Write a menu based C program to implement insert, delete and traverse operation of a binary search tree using doubly linked list.
13. Write a menu based C program to implement linear search, binary search and interpolation search algorithm.
14. Write a menu based C program to implement bubble sort, selection sort, and quick sort, merge sort, insertion sort, heap sort and radix sort algorithm.
15. Implement Tree Traversals, BFS, Graph Traversal, Shortest path and some topics on Spanning Tree using C.

**Text Books:**

1. Fundamentals of Data Structures”, Illustrated Edition by Ellis Horowitz, SartajSahni and Computer Science Press.

2. Introduction To Algorithms”, [Thomas H.Cormen](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Thomas+H..+Cormen%22), [Thomas H Cormen](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Thomas+H+Cormen%22), [Charles E Leiserson](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Charles+E+Leiserson%22), [Ronald L Rivest](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Ronald+L+Rivest%22), Clifford Stein.

**Reference Books:**

1. Algorithms, Data Structures, and Problem Solving with C++, Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company.

2. How to Solve it by Computer, 2nd Impression by R. G. Dromey, Pearson Education.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO-1** | **Explain** asymptotic performance of the algorithms. | **PO1, PO2, PSO2, PSO3** |
| **CO-2** | **Illustrate** Linear data structures and their applications such as Stacks, Queues and Lists | **PO1, PO2, PO3, PO4, PSO1, PSO2, PSO3** |
| **CO-3** | **Solve** and understand Non-Linear Data Structures and their Applications such as Trees and Graphs | **PO1, PO2, PO3, PO4, PSO1, PSO2, PSO3** |
| **CO-4** | **Interpret** searching and sorting algorithms | **PO1, PO2, PO3, PSO1, PSO2, PSO3** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12007 | Data Structures and Algorithms Lab | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: III Stream: CSE

PAPER TITLE: Data Structures and Algorithms Lab (Prof. Core-I Lab)

PAPER CODE: CSE12007

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 5 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 8 = 40)** | | | |
| 1. | **Develop** a C program to reverse a singly linked list. | **Ap** | **CO1** |
| 2. | **Develop** a C program to insert an element in a circular queue by using an array. | **Ap** | **CO1** |
| ­­­ 3. | **Develop** a C program to delete a node from a doubly linked list. | **Ap** | **CO3** |
| 4. | **Develop** a C program to insert an element in a stack by using a singly linked list. | **Ap** | **CO1** |
| 5. | **Develop** a C program to insert a node at the end of a doubly linked list. | **Ap** | **CO4** |

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| **GEE14005** | Capstone Project -III | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours –30** | **0** | **0** | **2** | **1** |
| **Pre-requisites/Exposure** | **Capstone Project -II** | | | | |
| **Co-requisites** |  | | | | |

**Course Objectives:**

1. To provide design experience to the students through team work.
2. To develop an understanding of various areas involved in any project.
3. To train students with various project dealing areas like feasibility, communications, planning, design, deployment and testing.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Interpret** linear controllers’ construction for the planar and three-dimensional dynamic models of the quadrotor.

CO2. **Interpret** battery, battery indication system for EV applications.

CO3. **Illustrate** about the implementation of STS components.

**Catalog Description:**

A well-defined capstone experience is comprehensive in nature allowing for the assessment of a wide range of abilities. A capstone-based assessment method includes mapping project deliverables and other artifacts to specified learning outcomes, establishing a scoring rubric that defines performance criteria, collecting and analyzing data and reporting results. The main purpose of the capstone project is to simulate some knowledge acquired during their studies in previous semesters to manage complex projects based on real world or research.

**Course Content**

**Unit I: 10 Lecture Hours**

**Planning and Control of Aerial Robotics:** 2-D Quadrotor Control, 3-D Quadrotor Control, Time, Motion, and Trajectories, Motion Planning for Quadrotors, Minimum Velocity Trajectories from the Euler-Lagrange Equations, Supplementary Material: Solving for Coefficients of Minimum Jerk Trajectories, Minimum Velocity Trajectories, Linearization of Quadrotor Equations of Motion.

**Unit II: 10 Lecture Hours**

**EV Motor Drive & HEV (Hybrid Electric Vehicle):** Type of wound-field DC Motor, Torque speed characteristics, DC-DC Converter, Two quadrant DC Chopper, two quadrants zero voltage transition converter-fed dc motor drive, speed control of DC Motor, Induction Motor Drive: Three Phase Inverter Based Induction Motor Drive, Equal Area PWM, Three Phase Auxiliary resonant snubbers (ARS), Inverter Type (ZVC & ZCS), Single Phase ARS Inverter Topology, Speed Control of Induction Motor, FOC, Adaptive Control, Model Reference Adaptive Control (MARS), Sliding mode Control, Configuration of HEV (Series, Parallel, Series-parallel &Complex), Power Flow control, Examples, Power flow control in all HEV configurations, Examples of HEV system performance.

**Unit III: 10 Lecture Hours**

**Smart Transportation System (STS):** Fundamentals of ITS, Sensor Technology and data requirements of STS, services covered by STS, advanced traffic management system, Advanced Traveler Information systems (ATIS), Commercial Vehicle Operations (CVO), Advanced Vehicle Control systems (AVCS), Advanced Public Transportation systems (APTS), Advanced Rural Transportation systems (ARTS), Regional and Project STS architecture; Concept of operations; STS Models and Evaluation Methods; Planning and human factor issues for STS, Case studies on deployment planning and system design and operation; STS and safety, STS and security, STS as a technology deployment program, research, development and business models, STS planning, STS application

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continuous Assessment** | **End Term** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Interpret** linear controllers’ construction for the planar and three-dimensional dynamic models of the quadrotor. | **PO1, PO2, PO3, PO4,PO5, PO9, PSO1** |
| **CO2** | **Interpret** battery, battery indication system for EV applications. | **PO1, PO2, PO3, PO4,PO5, PO9, PSO2** |
| **CO3** | **Illustrate** about the implementation of STS components. | **PO1, PO2, PO3, PO4,PO5, PO9, PSO3** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO  10 | PO  11 | PO  12 | PSO  1 | PSO  2 | PSO3 |
| GEE14005 | Capstone  Project- III | 3 | 3 | 3 | 3 | 3 | - | - | - | 3 | -- | - | - | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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| --- | --- | --- | --- | --- | --- |
| **SOC14100** | Community Service | **L** | **T** | **P** | **C** |
| **Version 1.0** |  | **0** | **0** | **0** | **1** |
| **Pre-requisites/Exposure** | **Basic knowledge of English and computer applications such as Internet Explorer and MS Office** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To involve the students in working within specific communities to engage them into essential internal social structures.

2. To involve passionate students to help struggling and marginalized groups to achieve a sense of self-respect and develop confidence in each other.

3. To develop a hands-on approach for real-world experience.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Identify** the indispensable and relevant social issues of Indian as well as global context.

CO2. **Construct** a questionnaire schedule, plan and execute field work.

CO3. **Create** a report after serving the social issue.

**Catalog Description:**

To prepare students for ethical decision making guided by empathy, care, values and principles course on Community Service has rich potentiality. In this course the focus will be on developing psychosomatic skill, intellectual ability, leadership ability and collaboration with others along with problem solving attitude. This course includes specific activities like identifying and defining a social issue, preparing a plan for field work, collecting photographs and testimonies from the marginalized section of the society and serving the issue with utmost care. Classes will be conducted by lecture as well as power point presentation as per requirement. Students will strongly grab the basic problems of the society via field work and discussions with the course coordinator.

**Course Content:**

**Unit-I**

Introduction to the course. A brief on social issues facing the society with both global and Indian examples.

**Unit II:**

Minimum 24 hours of field work on a social issue and helping the marginalized / affected community / cause with photographs and testimonies.

**Unit III:**

Submission of individual reflection on the social service rendered.

The benefits that accrue to the students are

A.) Subjective

1. Psychosomatic benefits: Volunteering increases overall life satisfaction and also helps to relive stress and acts as an anti-depressant.
2. Intellectual benefits: Enhances knowledge through new experiences, and develops

communication skills.

1. Career benefits: Enhances career prospects by acquisition of work-related skills, builds good

references for employers and provides a forum to network with future potential employers. It also The experience allows gained helps students to take up leadership positions. Letters of recommendation can also be easily sought. Research shows that students who indulge in volunteer word perform better in studies as it invigorates their passion for learning

1. Personal benefits: Real world skills like leadership, problem-solving, collaboration with others, time management and communication skills, learn patience and empathy.
2. Connect learning to real world and enables deeper and lifelong learning.

B.) Community

1. Collective benefits: Strong interpersonal bonds are created, and leads to increased civic and

social awareness and responsibility.

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**Text Books:**

1. Tadevosyan, Gohar & Schoenhuth, Michael. Participatory Research Approach : Principles, Challenges and Perspectives. http://ysu.am/files/01G\_Tadevosyan\_M\_Schoenhuth.pdf
2. Bergold, Jarg & Thomas Stefan. Participatory Research Methods: A Methodological Approach in Motion http://www.qualitative-research.net/index.php/fqs/article/view/1801/3334

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continuous Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Identify** the indispensable and relevant social issues of Indian as well as global context. | **PO6, PO7** |
| **CO2** | **Construct** a questionnaire schedule, plan and execute field work. | **PO8, PO9, PO10** |
| **CO3** | **Create** a report after serving the social issue. | **PO2** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| SOC14100 | Community Service | - | 2 | - | - | - | 2 | 2 | 2 | 2 | 2 |  |  | - | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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| **EIC11001** | Venture Ideation | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -30** | **2** | **0** | **0** | **2** |
| **Pre-requisites/Exposure** | **Basic knowledge of English and computer applications such as Internet Explorer and MS Office** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To help the students understand the way to be an Entrepreneur

2. To identify the right business opportunity

3. To empower students to perform a technical feasibility study and thereby developing a prototype

4. To help students in identifying their customers using primary and secondary research methods.

5. To expose students to various factors of market and competition with the help of market feasibility study, forecasting techniques, business model canvass and insights about financial statements.

6. To prepare students with finalizing their entrepreneurial Portfolio

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Build** personal capacity in the context of the entrepreneurial process

CO2. **Construct** characteristics of successful entrepreneurs and entrepreneurial forms and processes

CO3. **Apply** resources, research and tools for Entrepreneurial ventures

CO4. **Analyze** and apply opportunity identification techniques, feasibility terminology, processes and

models

CO5. **Develop** Ideation and planning documents for entrepreneurial venture

**Catalog Description:**

Over the last decade, the core of our economy has been transitioning from one of industrial might, large monolithic corporations and mass production towards one of networks, flexible enterprises comprising many smaller units and unique value. This new economy is based on innovation originating in creativity and design; it is also disrupting long-standing and established employment patterns and bringing to the fore the importance of entrepreneurship. This core unit will bring together creativity, design and entrepreneurship at the conceptual and more practical level. It aims to explore the nature, determinants and consequences of creativity, design and entrepreneurship as well as the interaction between them.

**Course Content:**

**Unit 1. 6 Lecturer hours**

**Introduction**

Preview of the Course, Introduction to the Course, Guest Lecture with U.S. Secretary of Commerce Penny Pritzker – Meaning of Innovation, Entrepreneurial opportunities, Factors influencing the feasibility of an innovation, Innovation strategy: technology-push or market-pull, Product-market fit, How to develop a business model, Walkthrough of the business model canvas, Welcome to Innovation for Entrepreneurs: From Idea to Marketplace**.**

**Unit 2. 8 Lecturer hours**

**Customer Discovery and Validation**

Customer types, Customer archetypes, Customer segments and business models, Customer segments, value propositions, product features, value mapping, interviewing customer, insights of your customers.

**Unit 3: 8 Lecturer hours**

**Product Understanding and Marketing.**

Customer value, The DNA of customer-centricity, Crossing the chasm, Qualitative and quantitative marketing research, importance and methods of market segmentation, Focusing on the target market, Beyond the chasm, Strategic implications of beyond the chasm, E-commerce: The internet as a selling platform.

**Unit 4. 8 Lecturer hours**

**Prototyping and Testing.**

Planning for prototyping, Rapid prototyping and development, Lean start-up MVPs, choosing a wire framing/UX prototyping tool, Anatomy of an experience map, what you'll learn from user testing, Analytics and insight, Troubleshooting your customer discovery, Levels of a product/service.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | Assess personal capacity in the context of the entrepreneurial process | **PO6, PO11** |
| **CO2** | Assess characteristics of successful entrepreneurs and entrepreneurial forms and processes | **PO6, PO11** |
| **CO3** | Apply resources, research and tools for Entrepreneurial ventures. | **PO6, PO8, PO11** |
| **CO4** | Analyze and apply opportunity identification techniques, feasibility terminology, processes and models | **PO6, PO8, PO11, PSO3** |
| **CO5** | Develop Ideation and planning documents for entrepreneurial venture | **PO6, PO8, PO11, PSO3** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| EIC11001 | Venture Ideation | - | - | - | - | - | 3 | 2 | 3 | - | - | 3 | - | - | - | 2 |

1=weakly mapped

2= moderately mapped

**3=strongly mapped**

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| --- | --- | --- | --- | --- | --- |
| **SMA42112** | Operations Research | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **12th level Mathematics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To develop an in-depth understanding of basic number theory, combinatorics, Graphs and Trees, mathematical logic.

2. Students should be able to demonstrate application using the above mathematical tools in computer science related courses.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Define** the fundamental knowledge to state the mathematical skills in Logic and allied fields.

CO2. **Define** the fundamental knowledge to state the mathematical skills in basic number theory.

CO3. **Demonstrate** basic concepts of Poset and Lattice including combinatorics.

CO4. **Develop** the advance concept of graph theory in various mathematical fields.

**Course Description:**

For any program related to Computer Science Discrete study of Mathematics is very much important. The purpose of this course is to understand and use (abstract) discrete structures and advance algebraic structure that are backbones of computer science. In particular, this course is meant to introduce logic, proofs, sets, relations, functions, counting, recurrence relation and graphs, with an emphasis on applications in computer science.

**Course Content:**

**Unit I: 12 lecture hours**

Introduction-Statements and Notation, Connectives, Tautologies, Statement logic, Equivalence, Implications, Normal forms, The Theory of Inference for the Statement Calculus. Boolean algebra, Boolean Functions, Representation and Minimization of Boolean Functions.

**Unit II: 10 lecture hours**

Principles of Mathematical Induction: The Well-Ordering Principle, Recursive definition, Integers: The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic.

**Unit III: 10 lecture hours**

Lattice and Poset: Partially Ordered Relations, Lattices as Posets, Hasse Diagram, Properties of Lattices.

Combinatorics: Sets, Diagonalization and the Pigeonhole Principle, Multinomial theorem, principle of inclusion exclusion.

**Unit IV: 13 lecture hours**

Graph: Basic Concepts of Graph Theory, Planar and Complete graph, Matrix representation of Graphs, Graph Isomorphism, Euler and Hamilton Paths, Shortest Path algorithms, cut set, basic concept of Graph colouring and its applications.

Tree: Properties of trees, distance and centres in tree, Spanning trees, Spanning tree algorithms.

**Text Books:**

1. Kenneth H. Rosen,Discrete Mathematics and its Applications, Tata McGraw - Hill.

2. V Somasundaram, Discrete Mathematics with Graph Theory and Combinatory, Tata McGraw- Hill.

**Reference Books**

1. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press.

2. Discrete Mathematics for Computer Science”, Illustrated Edition, Kenneth Bogart, Clifford Stein,

Robert L. Drysdale, Key College Publishing.

**Modes of Examination: Assignment/Quiz/Project/Presentation/Written Exam**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid term** | **Continious Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)**

**Mapping between COs, POs and PSOs**

|  |  |  |
| --- | --- | --- |
| **Course Outcomes (COs)** | | **Mapped POs and PSOs** |
| **CO-1** | **Define** the fundamental knowledge to state the mathematical skills in Logic and allied fields. | **PO1,PO2,PSO2** |
| **CO-2** | **Define** the fundamental knowledge to state the mathematical skills in basic number theory. | **PO1,PO2,PSO1** |
| **CO-3** | **Demonstrate** basic concepts of Poset and Lattice including combinatorics. | **PO1,PO5,PSO1,PSO2** |
| **CO-4** | **Develop** the advance concept of graph theory in various mathematical fields. | **PO1,PO2,PSO2** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| SMA42112 | Operations Research | 3 | 3 |  | - | 3- | - | - | - | - | - | - | 3 | 2 | 3 | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech Semester: IV Stream: CSE

PAPER TITLE: Operations Research PAPER CODE: SMA42112

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **How** many vertices does a regular graph of degree 4 with 10 edges have? | **AP** | **CO4** |
| 2. | **Find** whether () is a tautology or contradiction. | **R** | **CO1** |
| ­­­ 3. | **Find** the minimal remainder of 416 with respect to 37. | **R** | **CO2** |
| 4. | **What** is the complement of 25 in the lattice {1,5,25,125} with respect to division? | **U** | **CO3** |
| 5. | **Find** whether () is a tautology or contradiction. | **R** | **CO1** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Show** that is a valid conclusion from the premises:  . | **R** | **CO1** |
| 7. | **Show** that there exists infinitely many primes. | **R** | **CO2** |
| 8. | **Explain** that every finite lattice L is bounded. | **U** | **CO3** |
| 9. | **Show** that a graph is a tree if and only if it is minimally connected. | **AP** | **CO4** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | i) **Show** that cube of any integer is of the form 9p, 9p+1, 9p+8.  ii) A computer company receives 50 applicants for the job of programmers. Among them 30 knew ORACLE and 28 knew JAVA and 8 did not know any of the language. **How** many of them knew both the language? 5+5 | **R**  **U** | **CO2**  **CO3** |
| 11. | i) **Find** the CNF of , without using truth table.  ii) **Illustrate** the fact that every finite non empty poset can be a totally ordered set. 5+5 | **R**  **U** | **CO1**  **CO3** |
| 12. | i**) What** is the validity of the argument:  If I pass B.Tech with high YGPA, I will be assured of a good job. If I am assured of a good job then my father will be happy. My father is not happy. Therefore I do not pass with high YGPA.  ii) **Show** that the following mathematical statement P() : is true by principle of mathematical induction. 5+5 | **R**    **R** | **CO1**    **CO2** |

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| --- | --- | --- | --- | --- | --- |
| **CSE11008** | Design & Analysis of Algorithms | **L** | **T** | **P** | **C** |
| **Version 2.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Basic knowledge of data structure and programming** | | | | |
| **Co-requisites** | **Knowledge of Basic Computer Organization** | | | | |

**Course Objectives:**

1. To introduce problem solving approach through design.

2. To develop students to analyse the existing algorithms and approach for improvement.

3. To introduce the students a perspective to different design and analysis approach for algorithm(s) to solve a problem.

4. To develop students to select optimal solution to a problem by choosing the most appropriate algorithmic method.

**Course Outcomes:**

On completion of this course, the students will be able to

**CO1. Understand** the basics about algorithms and learn how to analyse and design

algorithms

**CO2. Choose** brute force, divide and conquer, dynamic programming and greedy

techniques methods to solve computing problems

**CO3. Understand** the approach for solving problems using iterative method.

**CO4. Describe** the solution of complex problems using backtracking, branch and bound

techniques.

**CO5. Classify** the different Computability classes of P, NP, NP-complete and NP-hard.

**Catalog Description:**

Algorithmic study is a core part of Computer Science. This study caters to all possible applicable areas of Computer Science. This study includes observation, design, analysis and conclusion. Various types of algorithms have different notion of implementation according to their cost (in terms their time and space complexity). This study also includes refinement of one algorithm as per the applicability to real problems. Categorization of algorithms according to different method of design also includes in this course. It also compares the same algorithm using different algorithm design methods. For example, Knapsack problem can be solved in Greedy approach and Dynamic approach, both are optimization method. This course enables the students to think analytically while applying, designing an algorithm to solve a specific problem.

**Course Content:**

**Unit I: 8 lecture hours**

**Introduction:** Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters’ theorem.

**Unit II: 10 lecture hours**

**Fundamental Algorithmic Strategies:** Brute-Force, Greedy, Dynamic Programming, Branch-and-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving. Heuristics – characteristics and their application domains, case studies on real-life problems.

**Unit III: 10 lecture hours**

**Graph and Tree Algorithms:** Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm, case studies on real-life problems.

**Unit IV: 9 lecture hours**

**Tractable and Intractable Problems:** Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook’s theorem, Standard NP-complete problems and Reduction techniques.

**Unit V: 8 lecture hours**

**Advanced Topics:** Approximation algorithms, Randomized algorithms, Class of problems beyond NP – P SPACE, Case studies on real-life problems for selecting appropriate algorithms, Case studies on real-life problems for selecting appropriate algorithms

**Text Books:**

1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald

L Rivest And Clifford Stein, MIT Press/ Mcgraw-Hill.

2. Fundamentals of Algorithms – E. Horowitz Et Al.

**Reference Books:**

1. Algorithm Design, 1ST Edition, Jon Kleinberg and Évatardos, Pearson.

2. Algorithm Design: Foundations, Analysis, And Internet Examples, Second Edition, Michael T Goodrich And Roberto Tamassia, Wiley.

3. Algorithms -- A Creative Approach, 3RD Edition, Udimanber, Addison-Wesley, Reading, MA.

**Modes of Evaluation: Quiz/Assignment/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid term** | **Continious Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Understand** the basics about algorithms and learn how to analyse and design algorithms. | **PO1,PO2,PO3,PO5** |
| **CO2** | **Choose** brute force, divide and conquer, dynamic programming and greedy techniques methods to solve computing problems. | **PO1,PO3,PO12,PSO1,PSO3** |
| **CO3** | **Understand** the approach for solving problems using iterative method. | **PO2,PO3,PO5,PO12,PSO3** |
| **CO4** | **Describe** the solution of complex problems using backtracking, branch and bound techniques. | **PO4,PO5,PSO2,PSO3** |
| **CO5** | **Classify** the different Computability classes of P, NP, NP-complete and NP-hard. | **PO5,PO12,PO4** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using | The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, lifelong learning and a zest for higher studies and also to act as a good citizen by inculcating in them moral values & ethics. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11008 | Design & Analysis of Algorithms | 3 | 2 | 3 | 2 |  | - | - | - | - | - | - | 3 | 2 | 2 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| ADAMAS UNIVERSITYSCHOOL OF ENGINEERING AND TECHNOLOGYEND-SEMESTER EXAMINATIONName of the Program: B.Tech Semester: IVCode- CSE11008 Stream- CSETime: 03 Hrs.Paper title– Design & Analysis of Algorithm Total pages- 1Max. Marks: 40 Total no. of questions- 12Instructions:Attempt All Questions from Section A (Each Carrying 1 Marks); any Three Questions fromSection B (Each Carrying 5 Marks). Any Two Questions from Section C (Each Carrying 10 Marks ).1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.2. Assumptions made if any, should be stated clearly at the beginning of your answer. 3. **All parts of a Question should be answered consecutively** | | | | |
| **SECTION A (Answer All questions)** | | | | |
| 1. | **Identify** the number of minimum spanning tree of a complete graph having 5 vertices. | | **Ap** | **CO4** |
| 2. | **Enumerate** the number of sequences for Chain Multiplication of 5 matrices. | | **U** | **CO4** |
| ­­­ 3. | **Define** tight asymptotic bound. | | **R** | **CO1** |
| 4. | **What** will be the appropriate representation for T(n) = 3n2 + n log(n) | | **R** | **CO1** |
| 5. | **Which** algorithmic approach is used by Prim’s algorithm. | | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions)** | |  | |
| 1. | **What** is the significance of ‘n0’ in defining any Asymptotic notation. Justify your answer.    f(n)  g(n)      n=n0 | | **U** | **CO1** |
| 2. | **Solve** the following recurrence relations to find out the complexity:  a) T(n) = 2 T(n/4) + √n log2(n) solve using Master’s Theorem  b) T(n) = T(n/3) + T(2n/3) + Θ(n) solve using Recursion Tree | | **Ap** | **CO2** |
| 3. | **Define** the basic concepts of backtracking with the help of neat flow diagram showing  “Dead End” and “Success”. Hence, solve 4-Queens and 8-Queens problem using the above Approach. | | **U** | **CO3** |
| 4. | **Explain** circuit satisfiability. Prove that circuit satisfiability is in NP | | **U** | **CO5** |
|  | **SECTION C (**Attempt any **Two Questions)** | |  | |
| 1. | **Compare** Dynamic Approach from Divide & Conquer? Find out Minimum number of scalar multiplication required to multiply the following chain of matrices: A1 (5X15) , A2 (15X10), A3 (10X5), A4 (5X25) | | **Ap** | **CO2** |
| 2. | **Discuss** the amortized analysis of an aggregate method. Also give the procedural steps for the computation of an optimal parenthesization of a matrix-chain product whose dimensions are: A(10X20); B(20X50); C(50X1); D(1X100) | | **Create** | **CO4** |
| 3. | **Build** the basic properties of Greedy Approach to solve any problem? Solve activity Selection problem for the following data using Greedy method:   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Start time | 1 | 2 | 2 | 6 | 8 | 10 | 12 | 14 | | Finish time | 6 | 5 | 4 | 9 | 15 | 14 | 16 | 18 | | | **Ap** | **CO2** |

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| **CSE11009** | **Object Oriented Programming** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Basic concept of programming** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

Students will be motivated to solve the problems in engineering using the concepts of object-oriented programming.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Define** Abstraction in all forms and in a holistic way

CO2. **Illustrate** object oriented modelling techniques like classes and Instances modelling techniques

CO3. **Solve** programs using standard design patterns

CO4. **Interpret** fundamentals of object-oriented programming in Java, including defining

Classes, invoking methods, using class libraries, etc.

CO5. **Construct** programming solutions with exception handling and multi-threading concept

CO6. **Solve** GUI program with proper event handling techniques

**Catalog Description:**

This course investigates object-oriented methods including object-oriented programming methodologies and techniques. Current methodology is emphasized. The use of object-oriented features such as encapsulation, information hiding, inheritance and polymorphism is reinforced by class assignments and programming exercises. The importance of multi-threading and exception handling is introduced in this course.

**Course Content:**

**Unit I: 09 lecture hours**

**OOP Concepts -** Data Abstraction, Encapsulation, Inheritance, Benefits of Inheritance, Polymorphism, Classes and Objects, Procedural and OOP Paradigms. Introduction To Java, Data Types, Variables & Constants, Scope & Life Time Of Variables, Precedence Of Operator, Expressions, Type Casting, Enumerated Types, Block Scope, Control Flow, Conditional Statements, Loops, Break & Continue Statements, Arrays, Console Input/Output, Formatting Output, Constructors Methods, Parameter Passing, Static Fields & Methods, Access Control, “This” Reference, Method Overloading, Recursion, Garbage Collection, Building Strings, String Class.

**Unit II: 09 lecture hours**

**Inheritance -** Hierarchical Inheritance: Super And Sub Classes, Member Accessing Rules, Super Keyword, And Preventing Inheritance: Final Classes And Methods, Object Class And Its Methods.

**Polymorphism -** Dynamic Binding, Method Overriding, Abstract Classes and Methods

**Interfaces -** Interfaces and Abstract Classes, Definition, Implementation, Accessing Implementations by Interface References, Extending Interfaces.

**Inner Classes -** Usage, Local, Anonymous and Static Inner Classes, Examples.

**Packages -** Definition, Creation And Accessing A Package, Understanding CLASSPATH, Importing Packages.

**Unit III: 09 lecture hours**

**Exception Handling -** Dealing With Errors, Advantages Of Exception Handling, The Classification - Exception Hierarchy, Checked And Unchecked Exceptions, Try, Catch, Throw, Throws And Finally, Exceptions-Throwing, Exception Specification, Built In Exceptions, Creating Exception Sub Classes.

**Multithreading -** Difference Between Multiple Processes And Multiple Threads, Thread States, Creating And Interrupting Threads, Thread Priorities, Synchronizing Threads, Inter-Thread Communication, Procedure Consumer Pattern.

**Unit IV: 09 lecture hours**

**Collection Framework -** Introduction, Generics and Common Use Of Collection Classes, Array List, Vector, Hash Table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, Calendars And Properties.

**Files -** Streams - Byte Streams, Character Streams, Text Input/Output, Binary Input/Output, Random Access of File Operations, File Management.

**Connecting To Database –** JDBC / ODBC Type 1 To 4 Drivers, Connection And Handling Databases With JDBC.

**Unit V: 09 lecture hours**

**GUI Programming -**The AWT Class Hierarchy, Introduction To Swing, Swing Vs, AWT, Hierarchy Of Swing Components, Containers - Jframe, Japplet, Jdialog, Jpanel, Overview Of Swing Components: Jbutton, Jlabel, Jtextfield, Jtextarea, Swing Applications, Layout Management - Types - Border, Grid And Flow

**Event Handling -** Events, Sources, Classes, Listeners, Event Sources And Listeners, Delegation Event Model, Examples. Handling Mouse Events, Adapter Classes.

**Applets -** Inheritance Hierarchy For Applets, Differences Between Applets And Applications, Life Cycle, Passing Parameters To Applets, Applet Security Issues.

**Text Books:**

1. Java Fundamentals - A Comprehensive Introduction, Illustrated Edition By Daleskrien, Herbert Schildt, Mcgraw-Hill Education.

**Reference Books:**

1. Java For Programmers, 2nd Edition By Paul Deitel And Harvey Deitel, Pearson Education.
2. Thinking In Java, Low Price Edition By Bruce Eckel, Pearson Education

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid term** | **Continious Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO-1** | **Define** Abstraction in all forms and in a holistic way | **PO1, PSO1** |
| **CO-2** | **Illustrate** object oriented modelling techniques like classes and Instances modelling techniques | **PO1, PO2, PO3, PSO2, PS03** |
| **CO-3** | **Solve** programs using standard design patterns | **PO1, PO2, PO3, PSO1** |
| **CO-4** | **Interpret** fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc. | **PO1, PO2, PSO1** |
| **CO-5** | **Construct** programming solutions with exception handling and multi-threading concept | **PO1, PO12, PO3, PSO1, PSO3** |
| **CO-6** | **Solve** GUI program with proper event handling techniques | **PO1, PO2, PO3, PSO1, PSO3** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11009 | Object Oriented Programming | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: IV Stream: CSE

PAPER TITLE: Object Oriented Programming PAPER CODE: CSE11009

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 02

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **What** is the difference between suspending and stopping a thread? | **R** | **CO5** |
| 2. | **Compare** between init ( ) and start ( ) methods? | **U** | **CO4** |
| ­­­ 3. | **Name** some of the most common types of exceptions that might occur in java. | **R** | **CO5** |
| 4. | **Tell** the name of various sections of a web page. | **R** | **CO6** |
| 5. | **Explain** the arguments used in the method drawRoundRect ( ). | **U** | **CO6** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | a) **Define** constructor with a suitable example.  b) **Develop** a java program to implement the concept of nesting of methods. **[2 + 3]** | **R, Ap** | **CO3, CO4** |
|  |  |  |  |
| 7. | a) **What** is method overloading?  b) **Develop** a java program to implement the concept of method overloading. **[2 + 3]** | **R, Ap** | **CO3, CO4** |
| 8. | a) **What** is multiple inheritance?  b) **Develop** a java program to implement the concept of multiple inheritance. **[2 + 3]** | **R, Ap** | **CO3, CO4** |
| 9. | a) **What** do you mean by exception handling mechanism?  b) **Develop** a java program to implement the concept of method overriding. **[2 + 3]** | **R, Ap** | **CO3, CO4** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | i) **Define** an exception called “NoMatchException” that is thrown when a string is not equal to “India”. Write a java program that uses this exception.  ii) **Why** do applet classes need to be declared as public.  iii) **Illustrate** the different stages in the life cycle of a thread with a suitable block diagram. **[4 + 2 + 4]** | **R, U** | **CO1, CO5,CO6** |
| 11. | i) **Illustrate** the three ways of drawing polygons.  ii) **Build** an applet to draw a circle inside a square.  iii) **Explain** the three different ways by which a running thread may relinquish its control to another thread. **[3 + 4 + 3]** | **U, Ap** | **CO5,CO6** |
| 12. | i) **Develop** a java program to use the yield ( ), stop ( ) and sleep ( ) methods of a thread.  ii) **Build** an applet that receives three numeric values as input from the user and then displays the sum and average of the three on the screen. Write a HTML page and test the applet. **[4 + 6]** | **Ap** | **CO5, CO6** |

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| **CSE11010** | Software Engineering | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Software/Hardware evolution at basic level** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To help the student to acquire knowledge of software evolution process.

2. To enable students modelling software project with appropriate metric and precision at workplace.

3. To give the students a perspective to software design process variables by exposing them to software specification document; and also, to enrich their software testing ability.

4. To enable students, acquire testing and quality assessment of model required for their profession.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1.**Interpret** the impact of software engineering.

CO2.**Communicate** with proper software model paradigm to pupils.

CO3. **Enhancement** of software metric engineering application in industry.

CO4. **Effectively** analyse testing and maintenance of software project.

CO5. **Illustrate** software metric analysis for an effective model.

**Catalog Description:**

There is a growing need for talented software developers across every industry. As technology advances, the ability to build quality software while considering design, development, security, and maintenance is sought after amongst all kinds of companies, from finance and banking to healthcare and national security.

Software Engineering applies the knowledge and theoretical understanding gained through computer science to building high-quality software products. As a maturing discipline, software is becoming more and more important in our everyday lives. Our software development and engineering professional program is Pace University’s response to the tremendous growth of the software development industry.

**Course Content:**

**Unit I: 9 lecture hours**

Software - Evolving role of it, a crisis on the Horizon and its Myths, Software process models: linear sequential model, prototyping model, RAD model, Evolutionary model, Formal methods model, Component based development, fourth generation techniques, Software development and requirement analysis using Agile, Scrum framework.

**Unit II: 10 lecture hours**

Management spectrum, people, problem, process, project and few Critical approach,

**Software Process and project metrics:** Measure, Metrics and Indicators, Process and Project Domain related metrics, Software Measurement, Reconciling of Different, Metrics Approaches, Software quality metrics, Validation management, **Software project planning:** Observations on estimation, Objectives of Project planning.

**Unit III: 8 lecture hours**

Resources: Software project estimation, Empirical models for estimation, Automated estimation tools, Risk management and Software risks: Identification, Risk projection, safety risks and hazards; RMMM plans, Risk management

**Unit IV: 9 lecture hours**

**Project scheduling and tracking:** Definition of task set and task network, Scheduling, earned value analysis, Tracking of Errors, Project planning, **Software quality assurance:** Concepts of Software Quality, Quality movement, Review of software quality assurance, Software reliability, Software quality metrics (MTTF, MTTR, MTBF ETC.)

**Unit V: 9 lecture hours**

S**oftware configuration management:** Object identification in software configuration, Configuring audit-SCM standards, **Analysis concepts and principles:** Requirement analysis, Software prototyping, Specification Review Analysis modeling, Data modeling, Functional modeling, Behavioral modeling, **Software design, Software testing techniques:** White box and black box testing, Software testing strategies - Unit testing, Integrating testing, System testing.

**Text Books:**

1. Software Engineering: A practitioner's approach, 8th Edition, Roger S. Pressman, McGraw Hill

2. An integrated approach to Software Engineering, Springer/Narosa Edition, Pankaj Jalote.

**Reference Books:**

* + - 1. Fundamentals of Software Engineering, 4th Edition, Rajib Mall, Prentice Hall, India.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid term** | **Continious Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Interpret** the impact of software engineering. | **PO1, PO11,PO10** |
| **CO2** | Communicate with proper software model paradigm to pupils. | **PO1, PO2, PO5, , PSO1, PSO2** |
| **CO3** | Enhancement of software metric engineering application in industry. | **PO1, PO5, PO12, PSO2** |
| **CO4** | Effectively analyse testing and maintenance of software project. | **PO1, PO6, PO8, PO9, PO12, PSO3** |
| **CO5** | **Illustrate** software modelling Structure and software metric Procedures to the Project. | **PO1, PO6, PO8, PO9, PO12, PSO2** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11010 | Software Engineering | 3 | 2 |  |  | 2 | 2 |  |  |  |  |  | 3 | 2 | 3 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: IV Stream: CSE

PAPER TITLE: Software Engineering PAPER CODE: CSE11010

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **List** the steps involved in Software development life cycle? Write a note on it. | **U** | **CO1** |
| 2. | **Enumerate** the basic elements of Software requirement specification. | **U** | **CO2** |
| ­­­ 3. | **Define** Data coupling. | **R** | **CO3** |
| 4. | **What** is Software configuration management? | **R** | **CO4** |
| 5. | **Give** the principles of functional cohesion. | **U** | **CO4** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Describe** the stages of evolutionary model? | **U** | **CO1** |
| 7. | **Examine** the essential phases of iterative water fall model then what is the expected performance over traditional water fall model? | **Ap** | **CO2** |
| 8. | **Elucidate** the Black box testing and White box testing with suitable example. | **Ap** | **CO3** |
| 9. | **Classify** Scrum and agile application briefly explain it with proper example? | **U** | **CO4 /CO2** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Explain** in detail about V-model from end user point of view how it is useful in project design. | **U** | **CO4** |
| 11. | **Compare** a Project estimation technique and estimation issues in project progress line.?Explain with a Case Study | **U** | **CO4** |
| 12. | **Classify** features of the factors i) Product metric, ii) Function point metric? | **U** | **CO5** |

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| **CSE11011** | Computer Architecture | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Prerequisites/Exposure** | **Digital Electronics, Microprocessor** | | | | |
| **Co-requisites** | **Programming Concepts** | | | | |

**Course Objectives:**

To study the basic organization and architecture of digital computers (CPU, memory, I/O, software). Discussions will include digital logic and microprogramming. Such knowledge leads to better understanding and utilization of digital computers, and can be used in the design and application of computer systems or as foundation for more advanced computer-related studies.

**Course Outcomes:**

On completion of this course, the students will be able to

**CO1. Define** functional block of a computer and relate data representation.

**CO2. Explain** and understand memory hierarchy design, memory access time formula,

performance improvement techniques, and trade-offs.

**CO3. Illustrate** pipelined execution, parallel processing and principles of scalable performances.

**CO4. Analyze** the concepts of memory utilization in a computer system.

**CO5. Define** the implementation of parallel processors and Analyze the synchronization

techniques

**Catalog Description:**

The architecture of computer systems and associated software. Topics include addressing modes, interrupt systems, input/output systems, external memory systems, assemblers, loaders, multiprogramming, performance evaluation, and data security.

**Course Content:**

**Unit I: 12 lecture hours**

**Functional blocks of a computer:** CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs.

**Data representation:** signed number representation, fixed and floating-point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-and-add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic.

**Unit II: 10 lecture hours**

**Introduction** to x86 architecture.

**CPU control unit design:** hardwired and micro-programmed design approaches, Case study – design of a simple hypothetical CPU.

**Memory system design:** semiconductor memory technologies, memory organization.

**Peripheral devices and their characteristics:** Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB

**Unit III: 8 lecture hours**

**Pipelining:** Basic concepts of pipelining, throughput and speedup, pipeline hazards.

**Unit IV: 8 lecture hours**

**Memory organization:** Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.

**Unit V: 7 lecture hours**

**Parallel Processors:** Introduction to parallel processors, parallel computer models, principles of scalable performances, multiprocessors and multicomputer, message passing mechanism, scalable & Multithreaded dataflow architecture, Concurrent access to memory and cache coherency and synchronization techniques, GPU Processors.

**Text Books:**

1.Computer Organization and Design: The Hardware/Software Interface, 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.

2.Computer Organization and Embedded Systems, 6th Edition by Carl Hamacher, McGraw Hill Higher Education.

**Reference Books:**

1.Computer Architecture and Organization, 3rd Edition by John P. Hayes, WCB/McGraw-Hill

2.Computer Organization and Architecture: Designing for Performance, 10th Edition by William Stallings, Pearson Education.

3.Computer System Design and Architecture, 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Components** | **Attendance** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **10** | **30** | **20** | **40** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Define** functional block of a computer and relate data representation. | **PO1,PO3,PO6,PO12,PSO1,PSO3** |
| **CO2** | **Explain** and understand memory hierarchy design, memory access time formula, performance improvement techniques, and trade-offs. | **PO1,PO3,PO6,PO12,PSO1,PSO3** |
| **CO3** | **Illustrate** pipelined execution, parallel processing and principles of scalable performances. | **PO1,PO3,PO6,PO12,PSO1,PSO3,PSO2** |
| **CO4** | **Analyze** the concepts of memory utilization in a computer system.**Define** the implementation of parallel processors and Analyze the synchronization techniques | **PO1,PO3,PO5,PO6,PO12,PSO1,PSO3** |
| **CO5** | **Define** the implementation of parallel processors and **Analyze** the synchronization techniques | **PO1,PO3,PO5,PO6,PO12,PSO1,PSO3** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop , test and manage complex software and information management systems |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11011 | Computer Architecture | 3 |  | 3 | - | 2 | 3 | - | - | - | - | - | 3 | 3 | 2 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| **ADAMAS UNIVERSITY**  **SCHOOL OF ENGINEERING AND TECHNOLOGY**  **END-SEMESTER EXAMINATION**  **Name of the Program: B.Tech Semester: IV**  **Code- CSE11011 Stream- CSE**  **Time: 03 Hrs.**  **Paper title– Computer Architecture Total pages- 2**  **Max. Marks: 40 Total no. of questions- 12**  **Instructions:**  Attempt All Questions from **Section A** (Each Carrying 1 Marks); any **Three Questions** from **Section B** (Each Carrying 5 Marks)**.** Any **Two Questions from Section C** (Each Carrying 10 Marks)**.**  1. **At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.**  2. **Assumptions made if any, should be stated clearly at the beginning of your answer.**  3. **All parts of a Question should be answered consecutively.** | | | | |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | | |
| 1. | **What** is an Instruction? | | **R** | **CO1** |
| 2. | **What** is an Instruction? | | **R** | **CO1** |
| ­­­ 3. | **What** do you understand by byte addressable memory ? | | **R** | **CO2** |
| 4. | **What** is a processor clock? | | **R** | **CO1** |
| 5. | **What** do you understand by RTN? | | **R** | **CO1** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** | |  | |
| 6. | Let us assume that a complete execution of a program requires the execution of 100 machine language instruction. Some instructions may be executed more than once when they are inside loop, So we can assume that the average no of steps needed to execute one basic instruction is 7, such that each and every basic step completes in 1 clock cycle. If a 10 Hz – processor is used then **calculate** time required by the processor to execute the program. What is an Interrupt? What is branching? | | **C** | **CO2** |
| 7. | **Discuss** the properties of memory hierarchy with diagram? Discuss LRU & FIFO page replacement policies with example If the memory block requests are in the order then which algorithm will result less page faults  3, 5, 2, 8, 0, 6, 3, 9, 16, 20, 17, 25, 18, 30, 24, 2, 63, 5, 82, 17, 24 | | **Ap, R** | **CO2** |
| 8. | **Explain** clearly, the register-indirect, the indexed and the base register with indexed addressing modes. Next, point out the exact difference between the three.. | | **U** | **CO3** |
| 9. | **Draw** the schematic diagram of hardware needed to implement “shift-subtract” restoring division technique (positive integers); next, give a step by step illustration of the above division technique with dividend D = (1000)2 and divisor M = (0011). | | **U** | **CO2** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** | |  | |
| 10. | **State** the algorithm designed to overcome the disadvantage of Booths multiplication algorithm along with the flowchart. Represent each and every step of the proposed algorithm for multiplying 7 and (-2). | | **C** | **CO3** |
| 11 | The main memory of a system has a word length of 32-bits & is both word and byte addressable. The system has a 16 bit address bus. The lowest numbered byte in a word occupies bits 0 through 7. The byte number of lowest numbered byte in a word is the byte address for that word. Both bytes and words are numbered starting from 0. Now, find the following:  Byte address of the 9th memory word  Word address of the 9th byte  Word address of the word containing byte with byte address = 34  Number of words in this byte addressable memory | | **C** | **CO3** |
| 12. | **Discuss** the properties of memory hierarchy with diagram? Write a short note on Indexed & Indirect memory addressing scheme. | | **C** | **CO3** |

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| --- | --- | --- | --- | --- | --- |
| **PSG11021** | Human Values and Professional Ethics | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Basic human ethics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Value based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

**Course Outcomes:**

On the successful completion of the course, students will be able to

CO1. **Explain** the morals, values, ethics, and the law and to explore how they impact professional practice;

1. **Develop** an increased personal understanding of issues related to ethics.
2. **Develop** an increased personal understanding of issues related the law
3. **Analyze** one’s own ethical decision-making processes.
4. **Plan** guidelines for enhancing one’s ability to generate ethical behavior and solutions to conflicts arising in the practice.

**Catalog Description:**

This course offers an introduction to graph theory, with an emphasis on applications and modelling. Graph theory is a study of graphs, trees and networks. Topics that will be discussed include Euler formula, Hamilton paths, planar graphs and coloring problem; the use of trees in sorting and prefix codes; useful algorithms on networks such as shortest path algorithm, minimal spanning tree algorithm and min-flow max-cut algorithm.

**Course Content:**

**Unit I: 9 lecture hours**

**Ethics, morals and values**: The meaning of ethics, morals and values, The relevance of ethics, morals and values in the promotion of scientific temper, Theories of right action, Kohlberg’s and Gilligan’s theory of moral development, Ethical theories and their applications.

**Unit II: 9 lecture hours**

**Ethics in Engineering Practice and Research:** Overview of engineering ethics, Rights and obligations in engineering, The NPSE, IEEE and ECI codes, Violation of codes and their consequences, Conflicts of interest, Whistle blowing, Whistle blowing cases.

**Unit III: 9 lecture hours**

**Sustainable Engineering and Sustainable Development:** Meaning of sustainable engineering, Principles of sustainable engineering, Safety and risk assessment, Sustainable development, Sustainable engineering v. engineering negligence.

**Unit IV: 9 lecture hours**

**Engineering Negligence:** The elements of engineering negligence, The standard duty of care, Liability in negligence cases, Defenses Negligence Cases (Engineering, medical and others).

**Unit V: 9 lecture hours**

**Rights and obligations of Engineers under Various Indian Laws:** The Indian adjuratory system, Constitutional laws governing engineering professionals, Contractual obligations of engineers Environment protection laws, Arbitration and conciliation laws, Intellectual property laws, Information technology laws.

**Text Books:**

1.AroraVibha, AroraKunwar, Laws for Engineers, Central Law Publications, 1st Edition, 2017.

2.Fledderman Charles B., Engineering Ethics, Pearson Education Inc., 4th Edition, 2012

3.Govindarajan M., Natarajan S., Senthilkumar V. S., Engineering Ethics Includes Human Values, PHI Learning Private Limited, 1st Edition, 2010

**Reference Books:**

1.Govindarajan M., Natarajan S., Senthilkumar V. S., Professional Ethics and Human Values, PHI Learning Private Limited, 1st Edition, 2017.

2.Harris Charles E., Jr., Pritchard Michael S., Rabins Michael J., Engineering Ethics, Wadsworth Cengage Learning, 4th Edition, 2009

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Components** | **Attendance** | **Class Assessment** | **Mid Term** | **End Term** |
| **Weightage (%)** | **10** | **30** | **20** | **40** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** the morals, values, ethics, and the law and to explore how they impact professional practice | **PO2, PO7, PO8** |
| **CO2** | **Develop** an increased personal understanding of issues related to ethics. | **PO8, PO3, PO4** |
| **CO3** | **Develop** an increased personal understanding of issues related the law. | **PO2, PSO3** |
| **CO4** | **Analyze** one’s own ethical decision-making processes. | **PO11, PO12** |
| **CO5** | **Plan** guidelines for enhancing one’s ability to generate ethical behavior and solutions to conflicts arising in the practice. | **PSO1, PSO2** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| PSG11021 | Human Values and Professional Ethics | - | 2 |  | - | - | - | 3 | 2 | - | - | 2 | 3 | 2 | 2 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |  |
| Course: PSG11021- Human Values and Professional Ethics **Program: B.Tech. in Computer Science and Engineering Semester: IV**  **Time: 03 hrs. Max. Marks:40**  **Instructions:**  Attempt all questions from **Section A** (each carrying 1 marks); any Three Questions from **Section B** (each carrying 5 marks) any two questions from **Section C** (each carrying 10 marks). | | | | | |
| **SECTION A (Attempt all the questions) (5x1=5)** | | | | | |
| 1. | **Define** the criteria required for a profession? | | **R** | **CO1** | |
| 2. | **What** are the models of a professional society? | | **U** | **CO2** | |
| ­­­ 3. | **Which** chapter of the Constitution of India, lays down fundamental duties? | | **U&R** | **CO2** | |
| 4. | **How** many fundamental duties are there in the Constitution of India? | | **R** | **CO1, CO2** | |
| 5. | **What** are the 5 human values? | | **U** | **CO1, CO2** | |
|  | **SECTION B (**Attempt any **Two Questions)** | |  | | |
| 6. | **What** does the term “due care” mean? | | **U** | **CO3** | |
| 7. | **Explain** the fundamental duty relating to protection of women. | | **U** | **CO2, CO6** | |
| 8. | **Which** fundamental duty gives emphasis on individual and national growth? | | **An** | **CO5** | |
| 9. | **Discuss** on caring and sharing. | |  |  | |
|  | **SECTION C is Compulsory** | |  | | |
| 10. | **When** looking at confidentiality, explain what it is and when can it be breached? | | **An & R** | **CO4,**  **CO1, CO2** | |
| 11. | **Define** the relevance of fundamental duties in the today’s India? | | **R & U** | **CO5** | |
| 12. | **What** are Human values? Explain briefly. | | **R & U** | **CO3** | |

|  |  |  |  |  |  |
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| **SMA42211** | Numerical Techniques Lab | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Theory of numerical Techniques** | | | | |
| **Co-requisites** | **C- Programming** | | | | |

**Course Objectives:**

To provide students a hands-on experience of solving numerical problems using computer programming language.

**Course Outcomes:**

On completion of this course, the students will be able to

**CO1. Find** real roots of algebraic and transcendental equations using Bisection method, Regula-Falsi

method and Newton Raphson method.

**CO2. Solve** system of linear equations using direct method and iteration method.

**CO3. Illustrate** several methods of finite differences to obtain interpolating and extrapolating values

from a set of data using.

**CO4. Classify** Trapezoidal rule and Simpson’s 1/3rd rule to obtain the value of an integral with finite

limit.

**CO5. Utilize** Euler method, Runge-Kutta to obtain the solution to ordinary differential equations with

initial conditions.

**Catalog Description:**

This course introduces basic concepts of solving numerical problems using computer programing language. All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

**Course Content:**

List of experiments

Write and execute C-code for the following programs:

|  |  |
| --- | --- |
| Sl. No. | Name of the experiment |
| 1 | To find real roots of algebraic and transcendental equations using Bisection method. |
| 2 | To find real roots of algebraic and transcendental equations using Regula-Falsi method. |
| 3 | To find real roots of algebraic and transcendental equations using Newton Raphson method. |
| 4 | To find solution of system of simultaneous algebraic equations using Gauss elimination method. |
| 5 | To find solution of system of simultaneous algebraic equations using Gauss-Seidal iterative method. |
| 6 | To find interpolating values using Newton’s Forward interpolation formula. |
| 7 | To find interpolating values using Newton’s Backward interpolation formula. |
| 8 | To find interpolating values using Lagrange’s interpolation formula. |
| 9 | To evaluate integral value of a given function using Trapezoidal rule for numerical integration |
| 10 | To evaluate integral value of a given function using Simpson’s 1/3rd rule for numerical integration |
| 11 | To find numerical Solution of ordinary differential equation using Euler’s method. |
| 12 | To find numerical Solution of ordinary differential equation using 4th order Runge-Kutta method. |

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Find** real roots of algebraic and transcendental equations using Bisection method, Regula-Falsi method and Newton Raphson method. | **PO1, PO5, PO6, PO7, PSO1, PSO2** |
| **CO2** | **Solve** system of linear equations using direct method and iteration method. | **PO1, PO5, PO6, PO7, PSO1, PSO2** |
| **CO3** | **Illustrate** several methods of finite differences to obtain interpolating and extrapolating values from a set of data using. | **PO1, PO5, PO6, PO7, PSO1, PSO2** |
| **CO4** | **Classify** Trapezoidal rule and Simpson’s 1/3rd rule to obtain the value of an integral with finite limit. | **PO1, PO5, PO6, PO7, PSO1, PSO2** |
| **CO5** | **Utilize** Euler method, Runge-Kutta to obtain the solution to ordinary differential equations with initial conditions. | **PO1, PO5, PO6, PO7, PSO1, PSO2** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | | PO9 | PO10 | PO11 | PO12 | PSO1 | | PSO2 | PSO3 |
| SMA42211 | Numerical Techniques Lab | 3 | - | - | - | 3 | 3 | 3 | | - | - | - | - | - | 3 | | 3 | - |

1=weakly mapped 2= moderately mapped 3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech Semester: IV Stream: CSE

PAPER TITLE: Numerical Techniques Lab PAPER CODE: SMA42211

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

|  |  |  |
| --- | --- | --- |
| **(Answer any four questions) (4 X 10 = 40)**  **Write a C-program to** | | |
| 1 | **Find** real roots of algebraic and transcendental equations using Bisection method. | **R** |
| 2 | **Find** real roots of algebraic and transcendental equations using Regula-Falsi method. | **R** |
| 3 | **Find** real roots of algebraic and transcendental equations using Newton Raphson method. | **R** |
| 4 | **Find** solution of system of simultaneous algebraic equations using Gauss elimination method. | **AP** |
| 5 | **Find** solution of system of simultaneous algebraic equations using Gauss-Seidal iterative method. | **AP** |
| 6 | **Find** interpolated values using Newton’s Forward interpolation formula. | **U** |
| 7 | **Find** interpolated values using Newton’s Backward interpolation formula. | **U** |
| 8 | **Find** interpolated values using Lagrange’s interpolation formula. | **U** |

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| **CSE12012** | Design & Analysis of Algorithm Lab | **L** | **T** | **P** | **C** |
| **Version 2.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Programming and Data structures and High Level programming Language like C, Java and Python anyone.** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To develop a problem and design the solution for the problem.

2. To design and implement efficient algorithms for a specified application.

3. To provide the ability to identify and apply the suitable algorithm for the given real world problem

**Course Outcomes:**

On completion of this course, the students will be able to

1. **Identify** the problem given and design the algorithm using various algorithm

design techniques.

1. **Implement** various algorithms in a high level language
2. **Analyze** the performance of various algorithms.
3. **Compare** the performance of different algorithms for same problem.

**Catalog Description:**

Algorithmic study is a core part of Computer Science. This study caters to all possible applicable areas of Computer Science. This study includes observation, design, analysis and conclusion. Various types of algorithms have different notion of implementation according to their cost (in terms their time and space complexity). This study also includes refinement of one algorithm as per the applicability to real problems. Categorization of algorithms according to different method of design also includes in this course. It also compares the same algorithm using different algorithm design methods. For example, Knapsack problem can be solved in Greedy approach and Dynamic approach, both are optimization method. This course enables the students to think analytically while applying, designing an algorithm to solve a specific problem.

**Course Content:**

**Experiment 1:**

Implementation based on Divide and Conquer: Binary Search using Divide and Conquer approach, Quick sort and Merge Sort

**Experiment 2:**

Implementation based on Dynamic Programming : Implement all pair of Shortest path for a graph ( Floyed-Warshall Algorithm ), Dijkstra’s , Bellman Ford Algorithm and Implement Traveling Salesman Problem

**Experiment 3:**

Implementation based on Brunch and Bound :Implement 15 Puzzle Problem

**Experiment 4:**

Implementation based on Backtracking :Implement 8 Queen problem, Graph Coloring Problem, Hamiltonian Problem

**Experiment 5:**

Implementation based on Greedy method**:** Knapsack Problem and Job sequencing with deadlines, Minimum Cost Spanning Tree by Prim's Algorithm and Minimum Cost Spanning Tree by Kruskal's Algorithm

**Experiment 6:**

Implementation based on Graph Traversal Algorithm**:** Implement Breadth First Search (BFS) and Implement Depth First Search (DFS)

**Text Books:**

1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L RivestAnd Clifford Stein, MIT Press/Mcgraw-Hill.

2 Fundamentals of Algorithms – E. Horowitz Et Al.

**Reference Books:**

1. Algorithm Design, 1ST Edition, Jon Kleinberg and Évatardos, Pearson.

2. Algorithm Design: Foundations, Analysis, And Internet Examples, Second Edition, Michael T Goodrich And Roberto Tamassia, Wiley.

3. Algorithms -- A Creative Approach, 3RD Edition, Udimanber, Addison-Wesley, Reading, MA.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

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| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Identify** the problem given and design the algorithm using various algorithm design techniques. | **PO1,PO2,PS01,PSO2,PS03** |
| **CO2** | **Implement** various algorithms in a high level language | **PO1,PO3, PS01,PSO2** |
| **CO3** | **Analyze** the performance of various algorithms. | **PO2,PO3,PO5 PSO2,PS03** |
| **CO4** | **Compare** the performance of different algorithms for same problem. | **PO2,PO4,PO3,PO5** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12012 | Design & Analysis of Algorithm Lab | 2 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | 2 | 3 | 3 |

1=weakly mapped

2=moderately mapped

3=strongly mapped

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| **Name:**  **Enrolment No:** | |  | | |
| ADAMAS UNIVERSITYSCHOOL OF ENGINEERING AND TECHNOLOGYEND-SEMESTER EXAMINATIONName of the Program: B.Tech Semester: IVCode- CSE12012 Stream- CSETime: 03 Hrs.Paper title– Design & Analysis of Algorithm Lab Total pages- 1Max. Marks: 40 Total no. of questions- 5Instructions:Attempt All Questions from Section A (Each Carrying 1 Marks); any Three Questions fromSection B (Each Carrying 5 Marks). Any Two Questions from Section C (Each Carrying 10 Marks)1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.2. Assumptions made if any, should be stated clearly at the beginning of your answer. 3. **All parts of a Question should be answered consecutively** | | | | |
| **SECTION A (Answer All questions)(5 X 8=40)** | | | | |
| 1. | **Develop** Binary Search using Divide and Conquer approach. | | **Ap** | **CO4** |
| 2. | **Experiment with** the number of sequences for Chain Multiplication of 5 matrices. | | **Ap** | **CO4** |
| ­­­ 3. | **Develop** Minimum Cost Spanning Tree by Prim's Algorithm and Minimum Cost Spanning Tree by Kruskal's Algorithm. | | **Ap** | **CO1** |
| 4. | **Compare** the performance and analyze the best case of Quick sort and Merge Sort | | **R** | **CO3** |
| 5. | **Define** greedyalgorithmic. Implement Knapsack Problem using greedy algorithm. | | **R** | **CO1** |

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| **CSE12013** | **Object Oriented Programming Lab** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Basic concept of programming** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling, functions and object oriented approaches.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Define** classes, objects, members of a class and the relationships among them needed for a

finding the solution to specific problem.

CO2. **Illustrate** object oriented modelling techniques like classes and Instances modelling techniques

CO3**. Solve** programs using standard design patterns.

CO4. **Interpret** fundamentals of object-oriented programming in Java, including defining

Classes, invoking methods, using class libraries, etc.

CO5. **Construct** programming solutions with exception handling and multi-threading concept

CO6. **Solve** GUI program with proper event handling techniques.

**Catalog Description:**

This course investigates object-oriented methods including object-oriented programming methodologies and techniques. Current methodology is emphasized. The use of object-oriented features such as encapsulation, information hiding, inheritance and polymorphism is reinforced by class assignments and programming exercises. The importance of multi-threading and exception handling is introduced in this course.

**Course Content:**

**List of Programs:**

**Experiment 1:**

Assignments based on class, constructor.

**Experiment 2:**

Assignments based on overloading.

**Experiment 3:**

Assignments based on inheritance, overriding.

**Experiment 4:**

Assignments based on wrapper class, arrays.

**Experiment 5:**

Assignments based on developing interfaces- multiple inheritances, extending interfaces

**Experiment 6:**

Assignments based on creating and accessing packages

**Experiment 7:**

Assignments based on multithreaded programming

**Experiment 8:**

Assignments based on applet programming

**Text Books:**

1**.**Java Fundamentals - A Comprehensive Introduction, Illustrated Edition By Daleskrien, Herbert

Schildt, Mcgraw-Hill Education.

**Reference Books:**

1**.**Java For Programmers, 2nd Edition By Paul Deitel And Harvey Deitel, Pearson Education.

2.Thinking In Java”, Low Price Edition By Bruce Eckel, Pearson Education

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

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| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

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| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO-1** | **Define** classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem | **PO1, PSO1** |
| **CO-2** | **Illustrate** object oriented modelling techniques like classes and Instances modelling techniques | **PO1, PO2, PO3, PSO1, PS03** |
| **CO-3** | **Solve** programs using standard design patterns. | **PO1, PO2, PO5, PSO1** |
| **CO-4** | **Interpret** fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc. | **PO1, PO2, PSO1** |
| **CO-5** | **Construct** programming solutions with exception handling and multi-threading concept | **PO1, PO2, PO3, PSO1, PSO3** |
| **CO-6** | **Solve** GUI program with proper event handling techniques | **PO1, PO2, PO3, PSO1, PSO3** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12013 | Object Oriented Programming Lab | 3 | 3 | 3 | - | 3 | - | - | - | - | - | - | - | 3 | - | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: IV Stream: CSE

PAPER TITLE: Object Oriented Programming Lab PAPER CODE: CSE12013

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 5 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

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| **Section A (Answer All the Questions) (5 x 8 = 40)** | | | |
| 1. | **Develop** a java program to implement the concept of method overloading. | **Ap** | **CO2, CO3** |
| 2. | **Develop** a java program to implement the concept of method overriding. | **Ap** | **CO2, CO3** |
| ­­­ 3. | **Develop** a java program to implement the concept of nesting of methods. | **Ap** | **CO1, CO3** |
| 4. | **Develop** a java program to implement multiple inheritance. | **Ap** | **CO2, CO3** |
| 5. | **Develop** a java program to implement the concept of multithreaded programming. | **Ap** | **CO2, CO5** |

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| **GEE14006** | Capstone Project -IV | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours – 30** | **0** | **0** | **2** | **1** |
| **Pre-requisites/Exposure** | **Capstone Project -III** | | | | |
| **Co-requisites** |  | | | | |

**Course Objectives:**

1. To provide design experience to the students through team work.
2. To develop an understanding of various areas involved in any project.
3. To train students with various project dealing areas like feasibility, communications, planning, design, deployment and testing.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Explain** how to enable quadrotors to perform more agile manoeuvres and to operate autonomously in teams.

CO2. **Develop** battery charger for an EV.

CO3. **Utilize** concept of various smart materials in the design of smart structure.

**Catalog Description:**

A well-defined capstone experience is comprehensive in nature allowing for the assessment of a wide range of abilities. A capstone-based assessment method includes mapping project deliverables and other artifacts to specified learning outcomes, establishing a scoring rubric that defines performance criteria, collecting and analyzing data and reporting results. The main purpose of the capstone project is to simulate some knowledge acquired during their studies in previous semesters to manage complex projects based on real world or research.

**Course Content:**

**Unit I: 10 Lecture Hours**

**Advanced Topics:** Sensing and Estimation, Nonlinear Control, Control of Multiple Robots, Adjourn, Supplementary Material: Introduction to the Motion Capture System.

**Unit II: 10 Lecture Hours**

**Energy Sources & Charging:** Different Batteries and Ultra capacitors, Battery characteristics (Discharging &Charging), Battery Chargers: Conductive (Basic charger circuits, Microprocessor based charger circuit. Arrangement of an off-board conductive charger, Standard power levels of conductive chargers, Inductive (Principle of inductive charging, Soft-switching power converter for inductive charging), Battery indication methods,

**Charging Infrastructure:** Domestic Charging Infrastructure, Public Charging Infrastructure, Normal Charging Station, Occasional Charging Station, Fast Charging Station, Battery Swapping Station, Move-and- charge zone.

**Unit III: 10 Lecture Hours**

**Smart Structure:** Self-Sensing Piezoelectric Transducers, Energy Harvesting Materials, Autophagous Materials, Self- Healing Polymers, Intelligent System Design, Emergent System **Design Smart Actuator:** Modeling Piezoelectric Actuators, Amplified Piezo Actuation – Internal and External Amplifications, Magnetostrictive Actuation, Joule Effect, Wiedemann Effect, Magnetovolume Effect, Magnetostrictive Mini Actuators, IPMC and Polymeric Actuators, Shape Memory Actuators, Active Vibration Control, Active Shape Control, Passive Vibration Control, Hybrid Vibration Control.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

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| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

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| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** how to enable quadrotors to perform more agile manoeuvres and to operate autonomously in teams. | **PO1, PO3, PO5,PO6,PO9,PO12,PSO1** |
| **CO2** | **Develop** battery charger for an EV. | **PO1, PO3, PO5,PO6,PO9, PO12, PSO2** |
| **CO3** | **Utilize** concept of various smart materials in the design of smart structure. | **PO1, PO3, PO5,PO6,PO9, PO12, PSO3** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO  10 | PO  11 | PO  12 | PSO1 | PSO2 | PSO3 |
| GEE14006 | Capstone  Project -IV | 3 | - | 3 |  | 3 | 2 | - | - | 3 |  | - | 3 | -2 | 2- | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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| **CSE11014** | Compiler Design | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Formal Languages and Automata Theory, Discrete Mathematics, Programming Concepts** | | | | |
| **Co-requisites** | **Algorithms** | | | | |

**Course Objectives:**

1. The aim of this module is to show how to apply the theory of language translation introduced in the prerequisite courses to build compilers and interpreters
2. These techniques can also be employed in wider areas of application, whenever we need a syntax-directed analysis of symbolic expressions and languages and their translation into a lower-level description. They have multiple applications for man-machine interaction, including verification and program analysis.
3. In addition to the exposition of techniques for compilation, the course will also discuss various aspects of the run-time environment into which the high-level code is translated. This will provide deeper insights into the more advanced semantics aspects of programming languages, such as recursion, dynamic memory allocation, types and their inferences, object orientation, concurrency and multi-threading.

**Course Outcomes:**

On completion of this course, the students will be able to

1. **Interpret** the major phases of a compiler and understand the knowledge of Lex tool & YAAC tool
2. **Develop** the parsers and experiment the knowledge of different parsers design without automated tools
3. **Construct** the intermediate code representations and generation
4. **Apply** for various optimization techniques for dataflow analysis

**Catalog Description:**

The main objective of this course is to introduce the major concept areas of language translation and compiler design and to develop an awareness of the function and complexity of modern compilers. This course is a study of the theory and practice required for the design and implementation of interpreters and compilers for programming languages

**Course Content:**

**Unit I: 9 lecture hours**

Introduction: Phases of compilation and overview, Grouping of Phases

Lexical Analysis: Regular language, finite automata, regular expression, from regular expression to finite automata, scanner generator (lex, flex).

**Unit II: 8 lecture hours**

Parsing: Context-free language and grammar, push-down automata, LL(1) grammar and top-down parsing, operator grammar, LR(O), SLR(1), LR(1), LALR(1) grammars and bottom-up parsing, ambiguity and LR parsing, LALR(1) parser generator (yacc, bison)

**Unit III: 8 lecture hours**

Semantic Analysis: Attribute grammar, syntax directed definition, evaluation and flow of attribute in a syntax tree. Type systems. Symbol Table: Its structure, symbol attributes and management

**Unit IV: 12 Lecture hours**

Run-time environment: Procedure activation, parameter passing, value return, memory allocation, and scope. Intermediate Code Generation: Translation of different language features, different types of

intermediate forms.

**Unit V: 8 lecture hours**

**Code Improvement (optimization):** Analysis: control-flow, data-flow dependence etc.; Code improvement local optimization, global optimization, loop optimization, peep-hole optimization etc. Architecture dependent code improvement: instruction scheduling (for pipeline), loop optimization (for cache memory) etc. Register allocation and target code generation.

**Text Books:**

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, Compilers: Principles, Techniques and Tools, Addison-Wesley.

**Reference Books:**

1. Michael L. Scott, Programming Language Pragmatics, Elsevier
2. Randy Allen and Ken Kennedy, Optimizing Compilers for Modern Architectures, Elsevier

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

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| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

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| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Interpret** the major phases of compilation and to understand the knowledge of Lex tool & YAAC tool | **PO1,PO2, PO3,PO12,PSO2,PSO3** |
| **CO2** | **Develop**  the parsers and experiment the knowledge of different parsers design without automated tools | **PO1,PO2,PO12,PSO2,PSO3** |
| **CO3** | **Construct**  the intermediate code representations and generation | **PO1,PO2, PO12,PSO2,PSO3** |
| **CO4** | **Apply**  for various optimization techniques for dataflow analysis | **PO1,PO2, PO3,PO12,PSO2,PSO3** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11014 | Compiler Design | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 3 | - | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| **ADAMAS UNIVERSITY**  **SCHOOL OF ENGINEERING AND TECHNOLOGY**  **END-SEMESTER EXAMINATION**  **Name of the Program: B.Tech Semester: V**  **Code- CSE11014 Stream- CSE Time: 03 Hrs.**  **Paper title– Compiler Design Total pages- 2**  **Max. Marks: 40 Total no. of questions- 12**  **Instructions:**  Attempt All Questions from **Section A** (Each Carrying 1 Marks); any **Three Questions** from **Section B** (Each Carrying 5 Marks)**.** Any **Two Questions from Section C** (Each Carrying 10 Marks)**.**  1. **At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.**  2. **Assumptions made if any, should be stated clearly at the beginning of your answer.**  3. **All parts of a Question should be answered consecutively.** | | | | |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | | |
| 1. | **What** do you understand by Scope of a Variable . | | **R** | **CO1** |
| 2. | **What** is a Handle ? | | **R** | **CO1** |
| ­­­ 3. | **What** do you understand by ‘L-attributed’ SDD . | | **R** | **CO2** |
| 4. | **What** is Parameter Passing ? | | **R** | **CO1** |
| 5. | **What** do you understand by language processor | | **R** | **CO1** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** | |  | |
| 6 | **Construct** a DFA that accepts all strings of ‘a’ and ‘b’ . Such that number of ‘a’s is divisible by 2 and number of ‘b’s is divisible by 3 . | | **C** | **CO2** |
| 7 | **State** the generalized working principle of LR parsers. | | **Ap, R** | **CO2** |
| 8 | **Explain** with example the parser stack Implementation of Postfix SDT. | | **U** | **CO3** |
| 9 | **Explain** briefly the role of Lexical Analyser | | **U** | **CO2** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** | |  | |
| 10 | **Construct** the predictive parsing table for the grammar given below :  E→+TE’|ε  T→\*FT’|ε  F→(E)|id  And also conclude whether this grammar is LL(1). | | **C** | **CO3** |
| 11 | **Construct** the grammars for the given Languages –   * + 1. . | | **C** | **CO3** |
| 12. | **Construct** the LR(1) item sets and the corresponding CLR parsing table for the augmented grammar given below:  Also conclude how CLR parser resolves the conflicts. | | **C** | **CO3** |

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| **CSE11015** | Database Management Systems | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Set Theory, Knowledge of programming language.** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To understand database concepts, applications, data models, schemas and instances.

2. To implement the relational database design and data modelling using entity-relationship (ER) model.

3. To demonstrate the use of constraints and relational algebra operations.

4. To be able to use SQL in querying the database.

5. To demonstrate Normalization process.

6. To learn the new emerging Technologies and Applications in database.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Describe** the characteristics of database and the architecture of Database system.

CO2. **Model** the elements used in Entity- Relationship diagram.

CO3**. Summarize** relational model concept and illustrate the relational constraints.

CO4**. Build** Structured Query Language (SQL) and apply to query a database.

CO5**. Define** normalization for relational databases.

**Catalog Description:**

Databases form the backbone of all applications today – tightly or loosely coupled, intranet or internet based, financial, social, administrative, and so on. Database Management Systems (DBMS) based on relational and other models have long formed the basis for such databases. Consequently, Oracle, Microsoft SQL Server, Sybase etc. have emerged as leading commercial systems while MySQL, PostgreSQL etc. lead in open source and free domain.

While DBMS’s differ in the details, they share a common set of models, design paradigms and a Structured Query Language (SQL). In this background the course examines data structures, file organizations, concepts and principles of DBMS’s, data analysis, database design, data modeling, database management, data & query optimization, and database implementation. More specifically, the course introduces relational data models; entity-relationship modeling, SQL, data normalization, and database design. Further it introduces query coding practices using MySQL (or any other open system) through various assignments. Design of simple multi-tier client / server architectures based and Web-based database applications is also introduced.

**Course Content:**

**Unit I: 8 lecture hours**

Database system architecture: Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML).

Data models: Entity-relationship model, network model, relational and object-oriented data models, integrity constraints, data manipulation operations.

ER models: Entity Set, Relation Ship Set, Cardinality Properties, Type of Entities, Type of Keys, Aggregation, Specialization and Generalization.

**Unit II: 9 lecture hours**

**Relational query languages:** Relational algebra, Fundamental Operations, Additional Operations. Select, Project, Cartesian Product, UNION, Set difference, Rename. Types of joining operations, Division, Intersection, Aggregate. Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server.

**Unit III: 10 lecture hours**

Relational database design: Integrity Constraint, Domain Constrain, Referential Integrity, Functional Dependencies, Closure of Set, Cover and Canonical Cover, Types of Anomalies, Armstrong's axioms, Extended Armstrong's axioms, Assertions and Demons.

Data Base Decomposition: Domain and data dependency, Normal forms: 1NF, 2 NF, 3 NF, BCNF, Dependency preservation, Lossless design.

**Unit IV: 9 lecture hours**

Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.

Storage strategies: Indices, B-trees, B+-trees, hashing, File System, Disk Organization, Physical Storage, Buffer management.

**Unit V: 9 lecture hours**

Transaction processing: Failure, Recovery from Failure, Different States of Transaction, Transaction Isolation, ACID property, Serializability of scheduling, Multi-version and optimistic Concurrency Control schemes.

Concurrency control: Locking and timestamp-based schedulers, 2-Phase Locking Protocol, Dead Lock,

Database Security: Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.

Advanced topics: Distributed databases, Data warehousing and data mining.

**Text Books:**

1. “Database System Concepts”, 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill

2. “Principles of Database and Knowledge – Base Systems”, Vol 1 by J. D. Ullman, Computer Science Press.

**Reference Books:**

1. “Fundamentals of Database Systems”, 5th Edition by R. Elmasri and S. Navathe, Pearson Education

2. “Foundations of Databases”, Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Describe** the characteristics of database and the architecture of Database system. | **PO1, PO12, PO11, PSO1** |
| **CO2** | **Model** the elements used in Entity- Relationship diagram. | **PO1, PO3, PO5** |
| **CO3** | **Summarize** relational model concept and illustrate the relational constraints. | **PO1, PO5, P12, PSO3** |
| **CO4** | **Build** Structured Query Language (SQL) and apply to query a database. | **PO5,PO11 PSO1** |
| **CO5** | **Define** normalization for relational databases. | **PO3, PO4, PSO1, PSO2** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11015 | Database Management Systems | 3 |  | 3 |  | 2 | - | - | - | - | - | 3 | 2 | 3 | 2 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: V Stream: CSE

PAPER TITLE: Database Management Systems

PAPER CODE: CSE11015

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 02

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Explain** the Update anomalies with proper example? | **U** | **CO1** |
| 2. | **Define** is FD with example? | **R** | **CO5** |
| ­­­ 3. | **Explain** 2-phase locking protocol with proper diagram? | **U** | **CO4** |
| 4. | **Explain** Conflict serializability with proper example? | **U** | **CO3** |
| 5. | **Explain** View serializability with proper example? | **U** | **CO3** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Define** the symbolswith proper example? | **R** | **CO1** |
| 7. | **What are the** different type of OUTER JOINS with proper example? | **R** | **CO1** |
| 8. | **Describe** Armstrong's Axioms with example? | **U** | **CO1** |
| 9. | **Develop** an E-R diagram for a car insurance company with proper symbols and cardinality properties. A person can own many cars, a car can meet with many accidents, the driver of the car may or may not be the owner of the car while meeting with the accident. | **AP** | **CO2** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | a) **What is** the highest NF of each of the following relations?  i) R1 ( J, K, L ) with FDs are J → K, J → L, K → L  ii) R2 ( J, K, L, M ) with FDs are J → KL, LM → K  b) **Explain** ACID Properties with proper example. 5+5 | **R**  **U** | **CO5,CO4** |
| 11. | i). Consider the following schema:  Book(acc no, yr\_pub, title)  User(card no, bname, baddress)  Borrow(acc no, doi, card\_ no)  where acc\_ no is accession number, yr\_pub is year of publication, bname is borrower name, baddress is borrower address, doi is date of issue. **Build** the following queries on the table. (In SQL)  (a) Find the accession number whose year of publication is 1985.  (b) Display the title of the book which has been borrowed by "Vijoy"  (c) Find the borrower name who lives in same city as "Vijoy"  (d) Find the borrower name and address who had issue book on 14-05-1988  (e) Find the name of the books which had been supplied by “XYZ” supplier. | **AP** | **CO4** |
| 12. | **Explain** Deadlock recovery techniques? **Explain** Deadlock Prevention techniques?  5+5 | **U** | **CO2** |

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| **CSE11016** | Operating System | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Computer Organization, Basic Data Structure(list, tree, graph)** | | | | |
| **Co-requisites** | **High level programming Language** | | | | |

**Course Objectives:**

1. To introduce the main components of an OS & their function.

2. To develop the process management and scheduling.

3. To provide various issues in Inter Process Communication (IPC) and the role of OS in IPC.

4. To understand the concepts and implementation Memory management policies and virtual memory.

5. To develop the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS.

6. To provide the need for special purpose operating system with the advent of new emerging technologies.

**Course Outcomes:**

On completion of this course, the students will be able to

**CO1. Describe** and explain the fundamental components of a computer operating system.

**CO2. Define**, restate, discuss, and explain the policies for scheduling, deadlocks, memory

Management, synchronization, system calls, and file systems.

**CO3. Evaluate** the requirement for process synchronization and coordination handled by operating

system.

**CO4. Design** and construct the following OS components: System calls, Schedulers, Memory

management systems, Virtual Memory and Paging systems.

**CO5. Identify** use and evaluate the storage management policies with respect to different storage

management technologies. 6. Identify the need to create the special purpose operating system.

**CO6. Identify** the need to create the special purpose operating system.

**Catalog Description:**

This course will introduce the core concept of operating system such as system abstractions, mechanisms, and their implementations. The core of the course contains concurrent programming (threads and synchronization), inter process communication, and an introduction to distributed operating systems. The course is split into four sections: (1) Introduction, (2) Process and Thread Management, (3) Resource Management and Memory Management, and (4) I/O hardware and File Management. The course will consist of assigned reading, weekly lectures, a midterm and final term exam, and a sequence of programming assignments. The goal of the readings and lectures is to introduce the core concepts. The goal of the programming assignments is to give students some exposure to operating system code. Students are expected to read the assigned materials prior to each class, and to participate in in-class discussions.

**Course Content:**

**Unit I: 8 lecture hours**

**Introduction:** Concept of Operating Systems, Generations of Operating systems, Types of  
Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic,  
Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and  
WINDOWS Operating System

**Unit II: 12 lecture hours**

**Processes:** Definition, Process Relationship, Different states of a Process, Process State  
transitions, Process Control Block (PCB), Context switching.

**Thread:** Definition, Various states, Benefits of threads, Types of threads, Concept of  
multithreads,  
**Process Scheduling**: Foundation and Scheduling objectives, Types of Schedulers, Scheduling  
criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time;  
Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor  
scheduling: Types and performance evaluation..

**Unit III: 4 lecture hours**

Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion,  
Hardware Solution, Strict Alternation , Peterson’s Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader’s &Writer Problem, Dinning Philosopher Problem etc.

**Unit IV: 7 lecture hours**

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock  
Prevention, and Deadlock Avoidance: banker’s algorithm, Deadlock detection and Recovery.

**Unit V: 8 lecture hours**

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition – Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging.

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU)and Least Recently used (LRU).

**Unit VI: 6 lecture hours**

I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms  
File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table),efficiency and performance.

**Text Books:**

1.Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.

2.Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.

**Reference Books:**

1.Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing.

2.Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley.

3.Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India.

4.Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates.

**Modes of Evaluation: Quiz/Assignment/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | Describe and explain the fundamental components of a computer operating system | **PO1,PO3,PO5,PSO2,PSO3** |
| **CO2** | Define, restate, discuss, and explain the policies for scheduling, deadlocks, memory management, synchronization, system calls, and file systems. | **PO1,PO3,PO5,PSO1,PS03** |
| **CO3** | Evaluate the requirement for process synchronization and coordination handled by operating system. | **PO1,PO3,PO4,PSO1,PSO2** |
| **CO4** | Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems | **PO4,PO3,PO5,PS01,PSO2** |
| **CO5** | Identify use and evaluate the storage management policies with respect to different storage management technologies. | **PO1,PO3,PO2,PO4,PSO3** |
| **CO6** | Identify the need to create the special purpose operating system. | **PO2,PO3,PSO1,PSO2,PSO3** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using | The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, lifelong learning and a zest for higher studies and also to act as a good citizen by inculcating in them moral values & ethics. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11016 | Operating System | 3 | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| ADAMAS UNIVERSITYSCHOOL OF ENGINEERING AND TECHNOLOGYEND-SEMESTER EXAMINATIONName of the Program: B.Tech Semester: VCode- CSE11016 Stream- CSETime: 03 Hrs.Paper title– Operating System Total pages- 1Max. Marks: 40 Total no. of questions- 12Instructions:Attempt All Questions from Section A (Each Carrying 1 Marks); any Three Questions fromSection B (Each Carrying 5 Marks). Any Two Questions from Section C (Each Carrying 10 Marks).1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.2. Assumptions made if any, should be stated clearly at the beginning of your answer. 3. **All parts of a Question should be answered consecutively** | | | | |
| **SECTION A (Answer All questions)** | | | | |
| 1. | **List** the different types of queue used in scheduling algorithm. | | **U** | **CO1** |
| 2. | **Explain** hit ratio in paging technique. | | **U** | **CO2** |
| ­­­ 3. | **Define** zombie process. | | **R** | **CO3** |
| 4. | **What** is dispatcher? | | **R** | **CO4** |
| 5. | **Give** example of round robin scheduling. | | **U** | **CO5** |
|  | **SECTION B (**Attempt any **Three Questions)** | |  | |
| 1. | **Explain** various states of a process with the help of a state transition diagram. | | **U** | **CO1** |
| 2. | **When** internal fragmentation occurs explain with an example. | | **R** | **CO2** |
| 3. | **Demonstrate** critical section Problem. Explain all the requirements of critical-section problem. | | **U** | **CO3** |
| 4. | **Why** “Message passing is time consuming as compared to shared memory”? | | **R** | **CO4 /CO5** |
|  | **SECTION C (**Attempt any **Two Questions)** | |  | |
| 1. | **Build**  Gantt chart for Non-preemptive Priority-based and FCFS scheduling of the following processes:   |  |  |  |  | | --- | --- | --- | --- | | Process | Priority | Arrival Time | Burst Time | | P1 | 4 | 0 | 7 | | P2 | 3 | 1 | 4 | | P3 | 1 | 3 | 3 | | P4 | 2 | 4 | 2 |     Calculate Average waiting time and turnaround time. | | **Ap** | **CO4** |
| 2. | **a) Define** critical section Problem. Explain all the requirements of critical-section problem.  **b)** **What** is Semaphore? How can semaphore be used to achieve mutual exclusion? | | **R** | **CO4** |
| 3. | **a) Explain** the necessary and sufficient conditions for the occurrence of deadlock.  b) **Plan** the following state of a system.   |  |  |  |  | | --- | --- | --- | --- | | **Process** | **Allocation** | **Max. Demand** | **Available** | | P1 | 3 1 1 | 6 4 3 | 3 2 3 | | P2 | 1 0 4 | 3 0 6 | | P3 | 3 2 0 | 7 6 1 |  1. What is the content of Need Matrix?   Is the System is in safe state or in unsafe state using Banker’s algorithm. | | **U** | **CO5** |

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| --- | --- | --- | --- | --- | --- |
| **CSE11017** | Applied Graph Theory (Prof. Elective -I) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Data Structures** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To understand and apply the fundamental concepts in graph theory.
2. To apply graph theory-based tools in solving practical problems.
3. To improve the proof writing skills.
4. To state the theorems and prove formally using various techniques.
5. To understand various graphs algorithms and analyse them.

**Course Outcomes:**

On the successful completion of the course, students will be able to

1. **Understand** the different distance measures in graphs. Define the special types of graphs – complete graph, regular graph, bipartite graph and their properties.
2. **Discuss** the properties of trees, Arboricity, vertex and edge connectivity, auto-morphism groups, reconstruction problem and Mengers theorem.
3. **Distinguish** between Eulerian and Hamiltonian Graphs. Demonstrate Euler's theorem, Kuratowski's theorem, Colouring of planar graphs, Crossing number and thickness.
4. **Explain** Query processing and optimization. Analyze the storage strategies
5. **Differentiate** among the matching factors, decomposition and domination in graph theory.

**Catalog Description:**

This course is aimed to cover a variety of different problems in Graph Theory with an emphasis on applications and modelling. Graph theory is a study of graphs, trees and networks. In this course students will come across a number of theorems and proofs. Theorems will be stated and proved formally using various techniques. Topics that will be discussed include Euler formula, Hamilton paths, planar graphs and coloring problem; the use of trees in sorting and prefix codes; useful algorithms on networks such as shortest path algorithm, minimal spanning tree algorithm and min-flow max-cut algorithm.

**Course Content**

**Unit I: 8 lecture hours**

**Basics:** Graph – definition; Degree sequences, Different distance measures in graphs, Special types of graphs – complete graph, regular graph, bipartite graph and their properties.

**Unit II: 9 lecture hours**

**Structure and Symmetry:** Cut vertices, bridges and blocks, auto-morphism groups,

reconstruction problem. Trees and Connectivity:Properties of trees, Arboricity, vertex and edge connectivity, Mengers theorem .

**Unit III: 10 lecture hours**

**Eulerian and Hamiltonian Graphs:** Characterization of Eulerian graphs, Sufficient Conditions for Hamiltonian graphs. Colouring and Planar Graphs:Vertex and edge colouring, perfect graphs, planar graphs, Euler's theorem, Kuratowski's theorem, Colouring of planar graphs, Crossing number and thickness.

**Unit IV: 9 lecture hours**

**Query processing and optimization:** Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms. Storage strategies:Indices, B-trees, B+-trees, hashing, File System, Disk Organization, Physical Storage, Buffer management.

**Unit V: 9 lecture hours**

Vert Matching, factors, decomposition and domination. External Graph Theory: Turan's theorem, Ramsay's theorem, Szemeredi's regularity lemma and their applications.

**Text Books:**

1. Graph Theory, J. A. Bondy and U. S. R. Murthy, Sringer Verlag, 2008.

2**.** Introduction to Graph Theory, D. B. West, PHI, 2004.

**Reference Books:**

1. Graph Theory, R. Diestel, Sringer Verlag, 2003.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Illustrate** the different distance measures in graphs. Define the special types of graphs – complete graph, regular graph, bipartite graph and their properties. | **PO1, PO2** |
| **CO2** | **Explain** the properties of trees, Arboricity, vertex and edge connectivity, auto-morphism groups, reconstruction problem and Mengers theorem. | **PO2, PO3** |
| **CO3** | **Distinguish** between Eulerian and Hamiltonian Graphs. Demonstrate Euler's theorem, Kuratowski's theorem, Colouring of planar graphs, Crossing number and thickness. | **PO3, PSO3** |
| **CO4** | **Explain** Query processing and optimization. Analyze the storage strategies. | **PO4, PSO1, PSO3** |
| **CO5** | **Contrast** among the matching factors, decomposition and domination in graph theory. | **PO12, PSO2** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11017 | Applied Graph Theory(Prof. Elective -I) | 3 | 2 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION**

Name of the Program: B. Tech Semester: V Stream: CSE

PAPER TITLE: Applied Graph Theory (Prof. Elective -I) PAPER CODE: CSE11017

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Define** cut vertex. | **R** | **CO1** |
| 2. | **Explain** Acyclic graph. | **U** | **CO2** |
| ­­­ 3. | **Define** Perfect matching. | **U&R** | **CO3** |
| 4. | **Explain** Cycle Decomposition. | **R** | **CO4** |
| 5. | **Define** forest. | **U** | **CO5** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | a) **Differentiate** between Hamiltonian path and Euler path? Explain with example.  b) **Find** the Hamiltonian path of the following graph.    c) **Find** the Euler circuit of the following graph. | **Ap** | **CO3. CO4** |
| 7. | **Define** Edge colouring with example. What is Edge Chromatic number of a graph? | **U & An** | **CO2, CO6** |
| 8. | **Find** the Edge Chromatic number of a graph. | **R & U** | **CO3** |
| 9. | **Explain** matching and maximal matching. | **An** | **CO5** |
|  | **SECTION C(Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **What** is Hamiltonian Graph? Explain Hamiltonian Path and Circuit with example. | **An & R** | **CO4,**  **CO2** |
| 11. | **Elaborate** Kuratowski’s Graph. **Explain** with example. | **R & U** | **CO5** |
| 12. | Suppose that in a group of 5 people: A, B, C, D, and E, the following pairs of people are acquainted with each other.  A and C  A and D  B and C  C and D  C and E  a) **Draw** a graph G to represent this situation.  b) **List** the vertex set, and the edge set, using set notation. Show sets V and E for the vertices and edges, respectively, in G = {V, E}.  c)**Draw** an adjacency matrix for G. | **An & R** | **CO4,**  **CO1, CO2** |

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| **CSE11018** | Communication Network (Prof. Elective -I) | **L** | **T** | **P** | **C** |
| **Version v 2.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Fundamentals of Communication** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To introduce students with fundamentals of computer network.

2. To provide students with transmission media and data communication.

3. To develop students with addressing techniques and protocols.

4. To introduce students with file transfer protocols and concepts of secured data

communication technique.

**Course Outcomes:**

On completion of this course, the students will be able to

**CO1. Explain** key networking concepts, principles, design issues and techniques at all

protocol layers.

**CO2. Contrast** between different types of networks (e.g., wide area networks vs. local area

Networks, wired vs. wireless) in terms of their characteristics and protocols used.

**CO3. Describe** different types of networked applications and what underlying network protocols

are needed to meet their diverse requirements.

**CO4. Distinguish** between control and data planes in computer networks, and their corresponding

architectures in real-world networks (including the Internet).

**CO5. Interpret** reliable transport protocols and networked system architectures via

implementation using Socket APIs, measurement and analysis.

**Catalog Description:**

In this course, students will study architectures, protocols, and layers in computer networks and develop client-server applications. Topics include the OSI and TCP/IP models, transmission fundamentals, flow and error control, switching and routing, network and transport layer protocols, local and wide-area networks, wireless networks, client-server models, and network security. Students will extend course topics via programming assignments, library assignments and other requirements.

**Course Content:**

**Unit I:**

**6 lecture hours**

**Introduction to computer communication**

Transmission modes - serial and parallel transmission, asynchronous, synchronous, simplex, half duplex, full duplex communication. Switching: circuit switching and packet switching;

Networks: Network criteria, physical structures, network models, categories of networks, Interconnection of Networks: Internetwork

Network models: Layered tasks, OSI model, Layers in OSI model, TCP/IP protocol suite

**Unit II:**

**10 lecture hours**

**Physical and Data link Layers**

Physical Layer: Guided and unguided transmission media (Co-axial cable, UTP,STP, Fiber optic cable)

Data Link Layer: Framing, Flow control (stop and wait, sliding window flow control)

Error control, Error detection (check sum, CRC), Bit stuffing, HDLC; Media access control: Ethernet (802.3), CSMA/CD, Logical link control, Wireless LAN (802.11), CSMA/CA

**Unit III:**

**14 lecture hours**

Network Layer Logical addressing: IPv4 & IPV6; Address Resolution protocols (ARP, RARP), Subnetting, Classless Routing (CIDR), ICMP, IGMP, DHCP, Virtual LAN, Networking devices( Hubs, Bridges & Switches); Routing: Routing and Forwarding, Static routing and Dynamic routing ;

Routing Algorithms: Distance vector routing algorithm, Link state routing (Dijkstra’s algorithm)

Routing Protocols: Routing Information protocol (RIP), Open Shortest Path First (OSPF), Border Gateway Protocol (BGP), MPLS.

**Unit IV:**

**9 lecture hours**

 Transport Layer –UDP, TCP ; Congestion Control & Quality of Service – Data traffic, Congestion, Congestion Control, QoS and Flow Characteristics

Application Layer – DNS, Remote Logging (Telnet), SMTP, FTP, WWW, HTTP, POP3, MIME, SNMP

**Unit V:**

**6 lecture hours**

**Security in Computer Communication**

Introduction to information system security, common attacks; Security at Application Layer (E-MAIL, PGP and S/MIME). Security at Transport Layer (SSL and TLS); Security at Network Layer (IPSec); Defence and counter measures: Firewalls and their types. DMZ, Limitations of firewalls, Intrusion Detection Systems -Host based, Network based, and Hybrid IDSs

**Text Books:**

1. Data Communications and Networking- Behrouz A. Forouzan-McGraw-Hill 2007, fourth Edition

2. Computer Networking -Top Down Approach- James F. Kurose and Keith W. Ross-- Pearson 2013, sixth Edition.

**Reference Books:**

1. Larry Peterson and Bruce S Davie: Computer Network- A System Approach, 4/e, Elsevier India, 2011

2. Computer Networks (5th Edition) – Andrew S. Tanenbaum, Pearson 2011

3. AchyutS. Godbole, Data Communication and Networking, 2e, McGraw Hill Education

New Delhi, 2011

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

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| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** key networking concepts, principles, design issues and techniques at all protocol layers. | **PO1, PO2,PO3,PO10** |
| **CO2** | **Contrast** between different types of networks (e.g., wide area networks vs. local area networks, wired vs. wireless) in terms of their characteristics and protocols used. | **PO3, PO4** |
| **CO3** | **Describe** different types of networked applications and what underlying network protocols are needed to meet their diverse requirements. | **PO1,PO2, PO3,PO6,PO10** |
| **CO4** | **Distinguish** between control and data planes in computer networks, and their corresponding architectures in real-world networks (including the Internet). | **PO1,PO2, PSO1** |
| **CO5** | **Interpret** reliable transport protocols and networked system architectures via implementation using Socket APIs, measurement and analysis. | **PO1,PO3, PSO2,PO6,PO10, PSO3** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11018 | Communication Network | 3 | 3 | 3 | 3 | - | 2 | - | - | - | 3 | - | - | 3 | 3 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

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| **Name:**  **Enrolment No:** | |  | | |
| ADAMAS UNIVERSITYSCHOOL OF ENGINEERING AND TECHNOLOGYEND-SEMESTER EXAMINATIONName of the Program: B.Tech Semester: VCode- CSE11018 Stream- CSETime: 03 Hrs.Paper title– Communication Network (Prof. Elective -I) Total pages- 1Max. Marks: 40 Total no. of questions- 12Instructions:Attempt All Questions from Section A (Each Carrying 1 Marks); any Three Questions fromSection B (Each Carrying 5 Marks). Any Two Questions from Section C (Each Carrying 10 Marks ).1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.2. Assumptions made if any, should be stated clearly at the beginning of your answer. 3. **All parts of a Question should be answered consecutively** | | | | |
| **SECTION A (Answer All questions)** | | | | |
| 1. | **List** the total number of TCP/IP layers. | | **U** | **CO1** |
| 2. | **What** is the mail transfer protocol used in the internet. | | **R** | **CO3** |
| ­­­ 3. | **Define** fiber loss. | | **R** | **CO3** |
| 4. | **What** causes mode coupling. | | **R** | **CO4** |
| 5. | **Give** expression for the effective number of modes guided by a curved multi mode fiber. | | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions)** | |  | |
| 1. | **Why** an application such as POP is needed for electronic message. | | **U** | **CO3** |
| 2. | **List** key advantages and disadvantages of stop-and-wait ARQ technique. | | **U** | **CO2** |
| 3. | **Explain** the responsibilities of data link layer. | | **U** | **CO3** |
| 4. | **Compare** between TCP and UDP. | | **U** | **CO4** |
|  | **SECTION C (**Attempt any **Two Questions)** | |  | |
| 1. | **Construct** the block diagram and explain the functionalities of different OSI layers | | **Ap** | **CO1** |
| 2. | What Network Services Does an Application need? Difference between TCP and UDP network protocol. | | **R** | **CO3** |
| 3. | **What** is meant by congestion? What two new TCP sender state variables are used in TCP congestion control? What is the purpose of each of this state variable? State some advantages of Wireless LANs. | | **R** | **CO5** |

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| **CSE11019** | Big Data Analytics (Prof. Elective -I) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Knowledge on Programming Language (Java preferably), Practice of SQL (queries and sub queries), Exposure to Linux Environment.** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To understand the Big Data Platform and its Use cases
2. To provide an overview of Apache Hadoop
3. To provide HDFS Concepts and Interfacing with HDFS
4. To understand Map Reduce Jobs
5. To provide hands on Hadoop Eco System
6. To apply analytics on Structured, Unstructured Data.
7. To exposure to Data Analytics with R.

**Course Outcomes:**

On the successful completion of the course, students will be able to

CO1. **Identify** Big Data and its Business Implications.

CO2. **List** the components of Hadoop and Hadoop Eco-System

CO3. **Outline** and Process Data on Distributed File System

CO4. **Plan** Job Execution in Hadoop Environment

CO5. **Develop** Big Data Solutions using Hadoop Eco System

CO6. **Illustrate** Infosphere Big Insights Big Data Recommendations.

CO7. **Experiment with** Machine Learning Techniques using R.

**Catalog Description:**

Big Data Analytics provides a basic introduction to big data and corresponding quantitative research methods. The objective of the course is to familiarize students with big data analysis as a tool for addressing substantive research questions. The course begins with a basic introduction to big data and discusses what the analysis of these data entails, as well as associated technical, conceptual and ethical challenges. Strength and limitations of big data research are discussed in depth using real-world examples. Students then engage in case study exercises in which small groups of students develop and present a big data concept for a specific real-world case. This includes practical exercises to familiarize students with the format of big data. It also provides a first hands-on experience in handling and analyzing large, complex data structures. The block course is designed as a primer for anyone interested in attaining a basic understanding of what big data analysis entails.

**Course Content:**

**Unit I:**

**9 lecture hours**

INTRODUCTION TO BIG DATA

Big Data Definition, Characteristic Features, Structure, Applications - Big Data vs Traditional Data - Risks of Big Data - Challenges of Conventional Systems - Web Data – Evolution of Analytic Scalability - Evolution of Analytic Processes, Tools and methods - Analysis vs Reporting - Modern Data Analytic Tools.

**Unit II:**

**9 lecture hours**

HADOOP FRAMEWORK

Distributed File Systems - Transparencies - Large-Scale File System Organization – Master-Slave/Master-Worker Architecture– HDFS concepts – MapReduce Execution, Algorithms using MapReduce, Matrix-Vector Multiplication – Hadoop YARN.

**Unit III:**

**10 lecture hours**

DATA ANALYSIS

Statistical Methods: Regression modelling, Classification: SVM & Kernel Methods - Rule Mining - Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods, Predictive Analytics – Data analysis using R.

**Unit IV:**

**8 lecture hours**

MINING DATA STREAMS

Stream Data Model and Architecture - Sampling data in a stream - Mining Data Streams and Mining Time-Series data - Real Time Analytics Platform (RTAP) Applications - Real Time Sentiment Analysis, OLAP, Data warehousing concepts.

**Unit V:**

**9 lecture hours**

Introduction to NoSQL – Aggregate Data Models – Hbase: Data Model and Implementations –. Cassandra: Data Model – Hadoop Integration. Pig Models developing and testing Pig Latin scripts. Hive Data Types and File Formats – HiveQL Data Definition – HiveQL Data Manipulation – HiveQL Queries.

**Text Books:**

1. Michael Berthold, David J. Hand, ―Intelligent Data Analysis, Springer, Second Edition, 2007

2. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.

**Reference Books:**

1. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", 2013.

2. Bill Franks, ―Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics‖, Wiley and SAS Business Series, 2012.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
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| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Identify** Big Data and its Business Implications. | **PO1, PO2** |
| **CO2** | **List** the components of Hadoop and Hadoop Eco-System. | **PO1, PO2, PO5, PSO3** |
| **CO3** | **Outline** and Process Data on Distributed File System. | **PO1, PO2, PO4, PSO1** |
| **CO4** | **Plan** Job Execution in Hadoop Environment. | **PO2,PSO1** |
| **CO5** | **Develop** Big Data Solutions using Hadoop Eco System. | **PO1, PO3** |
| **CO6** | **Illustrate** Infosphere BigInsights Big Data Recommendations. | **PO1, PO3, PSO2** |
| **CO7** | **Experiment with** Machine Learning Techniques using R. | **PO1, PO3, PSO3** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11019 | Big Data Analytics | 3 | 2 | 2 | 3 | 3 | - | - | - | - | - | - | - | 2 | 3 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: V Stream: CSE

PAPER TITLE: Big Data Analytics (Prof. Elective -I)

PAPER CODE: CSE11019

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 11 Total No of Pages: 02

**Instruction for the Candidate:**

1.At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2.All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3.Assumptions made if any, should be stated clearly at the beginning of your answer.

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| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 X 1 = 5)** | | | |
| 1. | **What** is Zookeeper? | **R** | **CO5** |
| 2. | **What** do you mean by HiveQL Data Definition Language? | **R** | **CO6** |
| ­­­ 3. | **What** is Big Data? | **R** | **CO1** |
| 4. | **Explain** how big data processing differs from distributed processing? | **U** | **CO1** |
| 5. | **List** various application of big data? | **R** | **CO1** |
| **Section B (**Attempt any **Three Questions) (3 X 5 = 15)** | | | |
| 6. | **Explain** core architecture of Hadoop with suitable block diagram? **Describe** role of each component in detail? | **U** | **CO3** |
| 7. | **Construct** Avro data serialization technique in MapReduce? **Explain** following commands with syntax and at least one example of each. (1) copyFromLocal (2) showing the content of outputfile? | **R & U** | **CO2 , CO3** |
| 8. | With proper examples **compare** structured, unstructured and semi-structured data? **Describ** how type of data affects data serialization? | **U** | **CO7** |
| 9. | **Explain** working of Hive with proper steps and diagram? | **U** | **CO5** |
| **Section C (**Answer Any **Two Questions) (2 X 10 = 20)** | | | |
| 10. | **Explain** any three HiveQL DDL command with its syntax and example? **Explain** Metastore in Hive?(U) | **U** | **CO6** |
| 11. | **Identify** the areas where Big data analytics can be useful for a smart city? Write a short note on NoSQL databases? | **Ap & R** | **CO5** |
| 12. | **Compare** “Shuffle & Sort” phase and “Reducer Phase” in MapReduce? Write Map Reduce steps for counting sum of numbers in the input text file(s)? Also write the commands to compile and run the code? | **U** | **CO4** |

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| **CSE12020** | Compiler Design Lab | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **C Programming Language** | | | | |
| **Co-requisites** | **Algorithms** | | | | |

**Course Objectives:**

1. To implement Lexical Analyzer using Lex tool &Syntax Analyzer or parser using YACC Tool
2. To implement NFA and DFA from a given regular expression
3. To implement front end of the compiler by means of generating Intermediate codes.

**Course Outcomes:**

On completion of this course, the students will be able to

1. **Design** Lexical analyzer for given language using C and LEX tools.
2. **Design** and convert BNF rules into YACC form to generate various parsers
3. **Generate** machine code from the intermediate code forms
4. I**mplement** Symbol table

**Catalog Description:**

The main objective of this course is to introduce the major concept areas of language translation and compiler design and to develop an awareness of the function and complexity of modern compilers. This course is a study of the theory and practice required for the design and implementation of interpreters and compilers for programming languages

**Course Content:**

**Experiment 1:**

Implement lexical analyser using JLex, flex or other lexical analyzer generating tools. Practice

of Lex/Yacc of Compiler writing.

**Experiment 2:**

Implement syntax analysis using context free grammar, Pushdown automata.

**Experiment 3:**

Demonstrate different types of parsing technique for example LL (1), LALR, operator

precedence parsing and recursive descent parsing.

**Experiment 4:**

Implementation of program semantic rules to generate syntax tree

**Experiment 5:**

Implementation of program semantic rules to calculate the value of expression that

takes an expression with digits, + and \*.

**Experiment 6:**

Generation of machine code from abstract syntax tree generated by the parser.

**Text Books:**

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, Compilers: Principles, Techniques and Tools, Addison-Wesley.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

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| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Design** Lexical analyzer for given language using C and LEX tools. | **PO1,PO12,PSO1** |
| **CO2** | **Design** and convert BNF rules into YACC form to generate various parsers | **PO1,PO12.PO5,PSO2** |
| **CO3** | **Generate** machine code from the intermediate code forms | **PO1,PO3,PO5,PO12,PSO3** |
| **CO4** | **Implement** Symbol table | **PO1,PO12,PO3,PSO3** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12020 | Compiler Design Lab | 3 | - | 2 | - | 2 | - | - | - | - | - | - | 3 | 2 | 3 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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| **Name:**  **Enrolment No:** | |  | | |
| **ADAMAS UNIVERSITY**  **SCHOOL OF ENGINEERING AND TECHNOLOGY**  **END-SEMESTER EXAMINATION**  **Name of the Program: B.Tech Semester: V**  **Code- CSE12020 Stream- CSE Time: 03 Hrs.**  **Paper title– Compiler Design Lab Total pages- 1**  **Max. Marks: 40 Total no. of questions- 5**    **Instructions:**  Attempt Any two Questions  1. **At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.**  2. **Assumptions made if any, should be stated clearly at the beginning of your answer.**  3. **All parts of a Question should be answered consecutively.** | | | | |
| Answer Any Two | | | | |
| 1. | **Construct** a C program to calculate the FIRST and FOLLOW set of a grammar | | **C** | **CO1** |
| ­­­ 2. | **Construct** a LEX programs that accepts   * + 1. Any string beginning with ‘abb’ and ending with ‘ccd’.   Particular strings with 0 and 1 such that if the string in binary converted to decimal suppose ‘x’ and perform x mod 5 = 0. | | **C** | **CO2** |
| 3. | **Construct** a LEX program to count the number of character , word , spaces , lines in a  file. | | **C** | **CO1** |
| 4. | **Construct** a YACC program to evaluate an arithmetic expression involving operating  **+, -, \*, / . (division error should be considered).** | | **C** | **CO1** |
| 5. | **Construct** a LEX program to count comment lines and remove comment lines from a given C program. | | **C** | **CO1** |

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| **CSE12021** | Database Management Systems Lab | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Set Theory, Knowledge of programming language.** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To explain basic database concepts, applications, data models, schemas and instances.

2. To demonstrate the use of constraints and relational algebra operations.

3. To describe the basics of SQL and construct queries using SQL.

4. To emphasize the importance of normalization in databases.

5. To facilitate students in Database design

6. To familiarize issues of concurrency control and transaction management.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Organize** the basic concepts of Database Systems and Applications.

CO2. **Construct** the basics of SQL and construct queries using SQL in database creation

interaction.

CO3. **Define** a commercial relational database system (Oracle, MySQL) by writing SQL

using the system.

**Catalog Description:**

This course introduces the core principles and techniques required in the design and implementation of database systems. This introductory application-oriented course covers the relational database systems RDBMS - the predominant system for business scientific and engineering applications at present. It includes Entity-Relational model, Normalization, Relational model, Relational algebra, and data access queries as well as an introduction to SQL. It also covers essential DBMS concepts such as: Transaction Processing, Concurrency Control and Recovery. It also provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications.

**Course Content:**

**Experiment 1:**

Familiarization of structured query language.

**Experiment 2:**

Table Creation.

**Experiment 3:**

Insertion, Updation, Deletion of tuples.

**Experiment 4:**

Executing different queries based on different functions.

**Experiment 5:**

Performing joining operations.

**Experiment 6:**

Nested Queries.

**Experiment 7:**

Use of aggregate functions.

**Experiment 8:**

Use of group functions.

**Experiment 9:**

Use of order by functions.

**Experiment 10:**

Arithmetic operations.

**Experiment 11:**

Trigger using SQL.

**Experiment 12:**

Introduction to PL/SQL.

**Experiment 13:**

Report generation of various queries.

**Experiment 14:**

Merging Data Bases with front end using ODBC connection.

**Experiment 15:**

SQL Injection on a non-harmful test page.

**Text Books:**

1. Database System Concepts, 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill

2. Principles of Database and Knowledge – Base Systems, Vol 1 by J. D. Ullman, Computer Science Press.

**Reference Books:**

1.Fundamentals of Database Systems, 5th Edition by R. Elmasri and S. Navathe, Pearson Education

2.Foundations of Databases, Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (Pos)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | Organize the basic concepts of Database Systems and Applications. | **PO1, PO12,PSO3** |
| **CO2** | Construct the basics of SQL and construct queries using SQL in database creation interaction. | **PO1, PO3, PSO2** |
| **CO3** | Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system. | **PO2, PO3, PO4, PSO1** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, lifelong learning and a zest for higher studies and also to act as a good citizen by inculcating in them moral values & ethics. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12021 | Database Management Systems Lab | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | 2 | 2 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: V Stream: CSE

PAPER TITLE: Database Management Systems Lab

PAPER CODE: CSE12021

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 5 Total No of Pages: 02

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

1. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
2. Assumptions made if any, should be stated clearly at the beginning of your answer.

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| **Part A (1X 20=20)** | | | |
| Q1. | 1. **Table: *Customer***  |  |  |  | | --- | --- | --- | | **Column Name** | **Format** | **Remarks** | | **Customer\_ID** | **Varchar(3)** | **Primary Key** | | **Last\_Name** | **Char(20)** |  | | **First\_Name** | **Char(20)** | **Not Null** | | **Area** | **Varchar(30)** |  | | **Phone\_No** | **Number(10)** |  |      1. **Table: *Movie\_Gallery***  |  |  |  | | --- | --- | --- | | **Column Name** | **Format** | **Remarks** | | **Movie\_No** | **Varchar(3)** | **Primary Key** | | **Movie\_Title** | **Char(20)** | **Not Null** | | **Movie\_Type** | **Char(10)** | **Not Null** | | **Movie\_Rating** | **Number(05)** |  | | **CD\_Rack\_No** | **Number(05)** |  |  1. **Table: *Invoice\_Details***  |  |  |  | | --- | --- | --- | | **Column Name** | **Format** | **Remarks** | | **Invoice\_No** | **Varchar(3)** | **Primary Key** | | **Movie\_No** | **Char(20)** | **Foreign Key(Table 2)** | | **Customer\_ID** | **Varchar(3)** | **Foreign Key(Table 1)** | | **Issue\_Date** | **Date** |  | | **Return\_Date** | **Date** |  |   **Please enter at least 15 values for each table. Please follow your query before entering your values.** | **R** | **CO1, CO2** |
| **Part-B (4X5=20)** | | | |
| Q2. | Create a SQL query to find out the names of all the customers. | **U** | **CO2** |
| Q3. | Change the return date of invoice number ‘I08’ to 23/02/2018. | **R** | **CO3** |
| Q4. | Write a SQL query to influence the Movies Price by 15% where the price is more than 150/- and show the query as “New\_Price”. | **AP** | **CO2** |
| Q5. | Select the First name of the customers where customers last name does not exist in your table. | **R** | **CO2** |

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| **CSE12022** | Operating System Lab | **L** | **T** | **P** | **C** |
| **Version 2.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Problem Solving using C** | | | | |
| **Co-requisites** | **Linux operating System** | | | | |

**Course Objectives:**

1. To introduce students with the architecture of Unix OS.

2. To provide necessary skills for developing and debugging programs in UNIX environment. 3. Strengthen the ability to identify and apply the suitable algorithm for the given real world problem

**Course Outcomes:**

On completion of this course, the students will be able to

CO1**. Identify** Unix commands and shell programming Implement various algorithms in a

high level language

CO2. **Build** ‘C’ program for process and file system management using system calls

CO3**. Choose** the best CPU scheduling algorithm for a given problem instance

CO4. **Identify** the performance of various page replacement algorithms

CO5**. Develop** algorithm for deadlock avoidance, detection and file allocation strategies.

**Catalog Description:**

Operating systems are the core part of every computing device to run any type of software. The increasing use of computing devices in all areas of life, lead to a variety of operating systems. As all operating systems share common principles. These principles are important for computer science students in their understanding of programming languages and software built on top of operating systems. The Operating System Laboratory, OS Lab is a course that will teach students about principles of operating systems using a constructivist approach and problem-oriented learning.

**Course Content:**

**Experiment 1:**

Basics of UNIX Commands

**Experiment 2:**

Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close.

**Experiment 3:**

Write programs using the I/O System calls of UNIX operating system (open, read, write, etc).

**Experiment 4:**

Given the list of processes, their CPU burst times. Display/print the Gantt chart for FCFS scheduling algorithm. Compute and print the average waiting time and average turnaround time

**Experiment 5:**

Given the list of processes, their CPU burst times and arrival times. Display the Gantt chart for SJF scheduling algorithm. Compute and print the average waiting time and average turnaround time.

**Experiment 6:**

Given the list of processes, their CPU burst times and time quantum. Display the Gantt chart for Round robin scheduling algorithm. Compute and print the average waiting time and average turnaround time.

**Experiment 7:**

Given the list of processes, their CPU burst times and arrival times. Display the Gantt chart for Priority scheduling algorithm. Compute and print the average waiting time and average turnaround time.

**Experiment 8:**

Develop application using Inter-Process Communication (using shared memory, pipes or message queues).

**Experiment 9:**

Implement the Producer-Consumer problem using semaphores (using UNIX system calls)

**Experiment 10:**

Implement Memory management schemes like paging and segmentation.

**Experiment 11:**

Implement Memory allocation schemes like First fit, Best fit and Worst fit.

**Experiment 12:**

Implementation based on Graph Traversal Algorithm**:** Implement Breadth First Search (BFS) and Implement Depth First Search (DFS)

**Text Books:**

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.

2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.

**Reference Books:**

1. Universal Command Guide: For Operating Systems–April 15, 2002 ,byGuy Lotgering

2. The Easy Guide to Operating Systems, Larry Miller, 2012. Michael

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Identify** Unix commands and shell programming Implement various algorithms in a high level language | **PO1,PO2,PO3, PSO3** |
| **CO2** | **Build** ‘C’ program for process and file system management using system calls | **PO1,PO5,PS02** |
| **CO3** | **Choose** the best CPU scheduling algorithm for a given problem instance | **PO2,PO3** |
| **CO4** | **Identify** the performance of various page replacement algorithms. | **PO2,PO4,PS02** |
| **CO5** | **Develop** algorithm for deadlock avoidance, detection and file allocation strategies | **PO2,PO3, PSO1,** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12022 | Operating Systems Lab | 2 | 3 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | 2 | 3 |

1=weakly mapped

2=moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| ADAMAS UNIVERSITYSCHOOL OF ENGINEERING AND TECHNOLOGYEND-SEMESTER EXAMINATIONName of the Program: B.Tech Semester: VCode- CSE12022 Stream- CSETime: 03 Hrs.Paper title– Operating System Lab Total pages- 1Max. Marks: 40 Total no. of questions- 5Instructions:Attempt All Questions from Section A (Each Carrying 1 Marks); any Three Questions fromSection B (Each Carrying 5 Marks). Any Two Questions from Section C (Each Carrying 10 Marks)1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.2. Assumptions made if any, should be stated clearly at the beginning of your answer. 3. **All parts of a Question should be answered consecutively** | | | | |
| **SECTION A (Answer All questions)(8 x 5=40)** | | | | |
| 1. | **Demonstrate** the priority-based non-preemptive CPU scheduling algorithms to find turnaround time and waiting time. | | **U** | **CO3** |
| 2. | **Develop** a shell script which will fork a child process. The child process will be another script instead of the same script of calling process. First one is the script, which will be parent process. | | **Ap** | **CO1** |
| ­­­ 3. | **Define** deadlock. Show deadlock detection using Banker’s algorithm. | | **R** | **CO5** |
| 4. | **Demonstrate** fork ( ), execlp ( ), wait ( ) and exit ( ) system call. | | **U** | **CO2** |
| 5. | **What** is paging. Demonstrate FIFO paging algorithm. | | **R** | **CO4** |

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| **GEE14007** | Capstone Project -V | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours – 30** | **0** | **0** | **2** | **1** |
| **Pre-requisites/Exposure** | **Capstone Project -I to IV** | | | | |
| **Co-requisites** |  | | | | |

**Course Objectives:**

1. To provide design experience to the students through team work.
2. To develop an understanding of various areas involved in any project.
3. To train students with various project dealing areas like feasibility, communications, planning, design, deployment and testing.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Recall** the basic knowledge and skills integrated in the course as whole.

CO2. **Illustrate** and prepare students for life-long learning with academic and professional pursuits

CO3. **Construct** and design task and carrying it to completion within a specific time.

CO4. **Evaluate** student based on their performance in learning new technologies and concept.

CO5. **Build** projects based on knowledge gained in pervious capstone ideas.

**Catalog Description:**

A well-defined capstone experience is comprehensive in nature allowing for the assessment of a wide range of abilities. A capstone-based assessment method includes mapping project deliverables and other artifacts to specified learning outcomes, establishing a scoring rubric that defines performance criteria, collecting and analyzing data and reporting results. The main purpose of the capstone project is to simulate some knowledge acquired during their studies in previous semesters to manage complex projects based on real world or research.

**Course Content:**

**Unit 1: Make Meaning of learning:**

The students will apply their personal reflection and critical thinking to the relation between the program's expectations as derived from its program learning outcomes and their individualized learning.

**Unit 2: Synthesis and Integration of Individualized Learning:**

This step consolidates individualized learning, integrating and synthesizing it into a final form.

**Unit 3: Communication of the Synthesis:**

The capstone learning process culminates in a communication of what has been learned.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Recall** the basic knowledge and skills integrated in the course as whole. | **PO10, PO3, PO5, PO7, PO9, PO11, PO12** |
| **CO2** | **Illustrate** and prepare students for life-long learning with academic and professional pursuits | **PO10, PO3, PO5, PO7, PO9, PO11, PO12** |
| **CO3** | **Construct** and design task and carrying it to completion within a specific time. | **PO10, PO3, PO5, PO7, PO9, PO10, PO11, PO12** |
| **CO4** | **Evaluate** student based on their performance in learning new technologies and concept. | **PO10, PO3, PO5, PO7, PO8, PO9, PO11, PO12** |
| **CO5** | **Build** projects based on knowledge gained in pervious capstone ideas. | **PO10, PO3, PO5, PO7, PO9, PO10, PO11, PO12** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO  10 | PO  11 | PO  12 | PSO  1 | PSO  2 | PSO3 |
| GEE14007 | Capstone  Project- V |  | - | 3 | - | 3 | - | 3 | - | 3 | 2 | 3 |  | 3 | - | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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| **CSE11023** | Computer Networks (Prof. Core- XI) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Computer Fundamentals** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. Become familiar with fundamentals of computer network.

2. Become familiar with transmission media and data communication.

3. Become familiar with addressing techniques and protocols.

4. Become familiar with file transfer protocols, and concepts of secured data communication technique.

**Course Outcomes:**

On the successful completion of the course, students will be able to

1. **Explain** key networking concepts, principles, design issues and techniques at all protocol layers.
2. **Contrast** between different types of networks (e.g., wide area networks vs. local area networks, wired vs. wireless) in terms of their characteristics and protocols used.
3. **Describe** different types of networked applications and what underlying network protocols are needed to meet their diverse requirements.
4. **Distinguish** between control and data planes in computer networks, and their corresponding architectures in real-world networks (including the Internet).
5. **Illustrate** reliable transport protocols and networked system architectures via implementation using Socket APIs, measurement and analysis.

**Catalog Description:**

In this course, students will study architectures, protocols, and layers in computer networks and develop client-server applications. Topics include the OSI and TCP/IP models, transmission fundamentals, flow and error control, switching and routing, network and transport layer protocols, local and wide-area networks, wireless networks, client-server models, and network security. Students will extend course topics via programming assignments, library assignments and other requirements.

**Course Content:**

**Unit I:**

**5 lecture hours**

What Is the Internet?, Network Edge, Network Core, Delay, Loss, and Throughput in Packet-Switched Networks, Protocol Layers and Their Service Models, Networks Under Attack.

**Unit II:**

**8 lecture hours**

Principles of Network Applications, Web and HTTP, Electronic mail in Internet, DNS—The Internet’s Directory Service, Peer-to-Peer Applications.

**Unit III:**

**9 lecture hours**

Introduction and Transport-Layer Services, Multiplexing and De-multiplexing, Connectionless Transport: UDP, Connection-Oriented Transport: TCP, Principles of Congestion Control, TCP Congestion Control

**Unit IV:**

**9 lecture hours**

 Introduction, Virtual Circuit and Datagram Networks, Internet Protocol (IP): Forwarding and Addressing in the Internet, Routing Algorithms, Routing in the Internet, Routing in the Internet, Broadcast and Multicast Routing

**Unit V:**

**9 lecture hours**

Introduction to the Link Layer, Error-Detection and -Correction Techniques, Multiple Access Links and Protocols, Switched Local Area Networks, Link Virtualization.

**Unit VI:**

**3 lecture hours**

What Is Network Security? Principles of Cryptography

**Unit VII:**

**2 lecture hours**

What Is Network Management? Internet-Standard Management Framework

**Text Books:**

1. Computer Networking -Top Down Approach- James F. Kurose and Keith W. Ross-- Pearson 2013, sixth Edition

2.Data Communications and Networking- Behrouz A. Forouzan-McGraw-Hill 2007, fourth Edition.

**Reference Books:**

1. Data Networks- DimitriBertsekas and Robert Gallager- Prentice Hall, 1992
2. Computer Networks (5th Edition) – Andrew S. Tanenbaum, Pearson 2011

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** key networking concepts, principles, design issues and techniques at all protocol layers. | **PO1, PO2** |
| **CO2** | **Contrast** between different types of networks (e.g., wide area networks vs. local area networks, wired vs. wireless) in terms of their characteristics and protocols used. | **PO3, PO4. PO6** |
| **CO3** | **Describe** different types of networked applications and what underlying network protocols are needed to meet their diverse requirements. | **PO2, PO3, PO4** |
| **CO4** | **Distinguish** between control and data planes in computer networks, and their corresponding architectures in real-world networks (including the Internet). | **PO2, PO4, PSO1** |
| **CO5** | **Illustrate** reliable transport protocols and networked system architectures via implementation using Socket APIs, measurement and analysis. | **PO12, PSO2, PSO3** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11023 | Computer Networks | 2 | 3 | 2 | 3 | - | 3 | - | - | - | - | - | - | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION**

Name of the Program: B. Tech Semester: VI Stream: CSE

PAPER TITLE: Computer Networks PAPER CODE: CSE11023

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **SECTION A (Attempt all questions)** | | | |
| 1. | **List** the role of sender, receiver and transmission media during data communication. | **R** | **CO1** |
| 2. | **Explain** the basic elements of Quality System | **U** | **CO2** |
| ­­­ 3. | **Define** the name of all the layers of TCP/IP protocol. | **U&R** | **CO4** |
| 4. | **What** is Network Topology? | **R** | **CO3** |
| 5. | **List** the role of transmission media during data communication. | **U** | **CO5** |
|  | **SECTION B (**Attempt any **Three Questions)** |  | |
| 6. | **Describe** in details all the LAN Topologies with respective diagrams. | **Ap** | **CO3** |
| 7. | **Explain** Leaky Bucket Algorithm in details. | **U & C** | **CO2** |
| 8. | **Explain** in details the general concept of Stop and Wait Flow Control mechanism with suitable diagram. | **An** | **CO5** |
| 9. | **What** Briefly state the difference between Pure ALOHA and Slotted ALOHA. | **U & C** | **CO2** |
|  | **SECTION C (Answer any Two Questions)** |  | |
| 10. | **Explain** with suitable diagram the layer to layer message communication between sender and receiver using OSI model. | **E & R** | **CO4,**  **CO1, CO2** |
| 11. | **Define** Error. Explain Single bit Error and Burst Error with suitable diagrams. | **R & U** | **CO5** |
| 12. | **Explain** Two Dimensional Parity Check for Error Detection with appropriate diagram. | **E & R** | **CO2** |

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| **CSE11024** | Artificial Intelligence and Machine Learning (Prof. Core- XII) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Basics of Algorithm, Linear Algebra, Probability, and Statistics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To help the student to acquire knowledge of basics of artificial intelligent computing.

2. To enable students to gain basic knowledge of machine learning.

3. To incorporate the evolutionary computational knowledge.

4. To enable students to acquire various problem solving, learning, and planning ability.

5. To enable students to apply machine learning models to solve real-life problems.

**Course Outcomes:**

On completion of this course, the students will be able to

**CO1.** Define solution according to real problem, apply search proper strategies for a particular

problem, and construct logical propositions to conclude a proof statement.

**CO2.** Construct and differentiate plan for specific problem solution using various planning strategies.

**CO3.** Implement predictive and classification model using regression method.

**CO4.** Design and deploy Multilayer Artificial Neural Network using backpropagation algorithm for different dataset, probabilistic model using conditional probability (Baye’s Theorem).

**CO5.** Construct SVM for linearly and non-linearly (kernel method) separable data. Generate Ability to select best features from the dataset using PCA.

**Catalog Description:**

There is a growing need for talented machine learning/data scientist developers across every industry. As technology advances, the ability to build quality machine learning driven software while considering design, development, security, and maintenance is sought after amongst all kinds of companies, from finance and banking to healthcare and national security.

Machine Learning applies the knowledge and theoretical understanding gained through computer science to building high-quality intelligent software products. As a maturing discipline, Artificial Intelligence is becoming more and more important in our everyday lives. Our software development and engineering professional program is University’s response to the tremendous growth of the software development industry.

**Course Content:**

**Unit I: 10 lecture hours**

**Module 1:**

Introduction, Agents, Problem formulation, Uninformed search strategies, Heuristics, Informed search strategies, Satisfying constraints

Logical agents, Propositional logic, Inference rules, First-order logic, Inferences in first order logic

**Unit II: 8 lecture hours**

Planning with state-space search, Partial-order planning, planning graphs, Planning and acting in the real world Forward and backward chaining, Unification, Resolution

**Unit III: 9 lecture hours**

**Introduction:** Overview of machine learning, related areas, applications, software tools, course objectives.

**Regression:** Linear Regression, Polynomial Regression, Gradient Descent, Logistic Regression, Case Study on Logistic Regression

**Unit IV: 9 lecture hours**

**Neural networks**: the perceptron algorithm, various activation functions and their differentiability, multilayer perceptron, back-propagation, nonlinear regression, multiclass discrimination, training procedures, Case Study

Bayesian Learning, Decision Tree

**Unit V: 9 lecture hours**

**Support vector machines**: Functional and geometric margins, optimum margin classifier, constrained optimization, Lagrange multipliers, KKT conditions, soft margins, kernels.

**Dimensionality Reduction:** Feature Selection, Principle Component Analysis (PCA).

**Text Books:**

1. Artificial Intelligence – A Modern Approach, Second Edition, S. Russel and P. Norvig Pearson Education, 2003.

2.Artificial Intelligence, Ritch& Knight, TMH

3.Machine Learning, 1st Edition, Tom M. Mitchell, McGraw-Hill Series In Computer Science

4.Neural Networks and Learning Machines, 3rd Edition, Simon O. Haykin, Prentice Hall

5.Introduction to Machine Learning, 2nd Edition, Ethem Alpaydın, The MIT Press

**Reference Books:**

1. Artificial Intelligence; Structures for Complex Problem Solving, Fourth edition, G. Lugar, Pearson Education, 2002

2.Artificial Intelligence: A New Synthesis, Nils J. Nilsson, Morgan Kaufmann Publishing, Inc., Year 1998

3.“INTRODUCTIONTOMACHINE LEARNING”, 2005 Edition, Nils J Nillsson, Morgan Kaufmann

4.“Foundations of Machine Learning”, 2012 Edition, Mehryar Mohri, Afshin Rostamezadeh, Ameet Talwalkar, The MIT Press

5.“Python Data Science Handbook Essential Tools for Working with Data”, 1st Edition, Jake Vander Plas, O’Reilly

**Modes of Evaluation: Quiz/Assignment/Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | Define solution according to real problem, apply search proper strategies for a particular problem, and construct logical propositions to conclude a proof statement. | **PO1, PO2, PSO3** |
| **CO2** | Construct and differentiate plan for specific problem solution using various planning strategies. | **PO1, PO3** |
| **CO3** | Implement predictive and classification model using regression method. | **PO3, PO4** |
| **CO4** | Design and deploy Multilayer Artificial Neural Network using back propagation algorithm for different dataset, probabilistic model using conditional probability (Baye’s Theorem). | **PO1, PO5, PSO1** |
| **CO5** | Construct SVM for linearly and non-linearly (kernel method) separable data. Generate Ability to select best features from the dataset using PCA. | **PO2, PO5, PSO1, PSO2** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11024 | Artificial Intelligence and Machine Learning | 3 | 2 | 2 | 3 | 2 | - | - | - | - | - | - | - | 2 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VI Stream: CSE

PAPER TITLE: Artificial Intelligence and Machine Learning (Prof. Core- XII)

PAPER CODE: CSE11024

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **What** is Heuristic value? **R** | **1** | **CO1** |
| 2. | **How** do you symbolize existential quantifiers? R | **1** | **CO2** |
| ­­­3. | **State** if Bayesian Learning is parametric model or not? R | **1** | **CO2** |
| 4. | In **which** category of clustering K-Means clustering belong to? R | **1** | **CO4** |
| 5. | In PCA **which** concept of mathematics is used? R | **1** | **CO3** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | Express **what** is ridge in context of Hill-Climbing algorithm? R | **5** | **CO2** |
| 7. | **Explain** the theme of Backtracking search for CSP. U | **5** | **CO2** |
| 8. | **What** is maximum margin classifier? Explain what are Support vectors in SVM. R | **2+3** | **CO3** |
| 9. | **Describe** the process of PCA. How PCA helps reducing the size of the dataset? R | **5** | **CO4** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Define** problem solving agents and list its algorithms. R **Why** problem formulation must follow goal Formulation? R | **10** | **CO2** |
| 11. | **Write** short notes on: - i) Bias ii) Variance. **Explain** using Simple Linear Regression R | **5+5** | **CO1** |
| 12. | Cluster the dataset using K-Means clustering into 4 clusters. **Find out** the inter-cluster dissimilarity and intra-cluster similarity. R | **5+5** | **CO4** |

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| **CSE11025** | **High Performance Computer Architecture (Prof. Elective -II)** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Computer Architecture & Operating Systems** | | | | |
| **Co-requisites** | **Algorithms** | | | | |

**Course Objectives:**

1. Provide systematic and comprehensive treatment of the hardware and the software high performance techniques involved in current day computing.

2. Introduce the fundamentals of high-performance computing with the graphics processing units and many integrated cores using their architectures and corresponding programming environments.

3. Introduce the learner to fundamental and advanced parallel algorithms through the GPU and MIC programming environments

4. Provide systematic and comprehensive treatment of the components in the pipeline that extract instruction level parallelism.

5. Provide a strong foundation on memory hierarchy design and trade-offs in both uniprocessor and multiprocessors.

6. Illustrate the cache coherence and consistency problems in multiprocessors, and their existing solutions.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Design**, formulate, solve and implement high performance versions of standard single threaded

algorithms

CO2. **Demonstrate** the architectural features in the GPU and MIC hardware accelarators.

CO3. **Design** programs to extract maximum performance in a multicore, shared memory execution

environment processor.

CO4. **Design** and deploy large scale parallel programs on tightly coupled parallel systems using the

message passing paradigm.

**Catalog Description:**

Confidently discuss key ideas and elements of modern computer architectures, including branch prediction, out-of-order execution, cache optimizations, multi-level caches, memory, storage, reliability/availability, multi-core processors, cache coherence and consistency, and long-term and recent trends in computer architecture.

**Course Content:**

**Unit I: 5 lecture hours**

Introduction: Review of basic computer architecture, Quantitative techniques in

Computer design, measuring and reporting performance. CISC and RISC processors.

**Unit II: 10 lecture hours**

**Pipelining:** Basic concepts, instruction and arithmetic pipeline, data hazards, control hazards, and structural hazards, techniques for handling hazards. Exception handling. Pipeline optimization techniques. Compiler techniques for improving performance. Hierarchical memory technology: Inclusion, Locality properties; Cache memory organizations, Techniques for reducing cache misses; Virtual memory organization, Mapping and management techniques, Memory replacement policies.

**Unit III: 12 lecture hours**

**Instruction-level parallelism:** Basic Concepts, Techniques for increasing ILP, Dynamic scheduling (Tomasulo's Algorithm), Reorder buffer and instruction commit, Branch prediction and advanced instruction delivery, Speculative execution. Superscalar, Super pipelined and VLIW processor architectures. Array and vector processors

**Unit IV: 10 lecture hours**

**Multiprocessor architecture:** Taxonomy of parallel architectures. Centralized shared memory Architecture. Synchronization, Memory consistency, Interconnection networks. Distributed shared memory architecture. Model of memory consistency, Cache coherency, Multiprocessing snooping protocol, Multiprocessing directory protocol. Cluster computers.

**Unit IV: 8 lecture hours**

**Non von Neumann architectures:** Data flow computers, Reduction computer

Architectures, Systolic architectures. Multicore Architectures.

**Text Books:**

1. “Computer Architecture: A Quantitative Approach”, John L. Hennessy and David A. Patterson, Morgan Kaufmann.“Computer Architecture: A Quantitative Approach”, John L. Hennessy and David A. Patterson, Morgan Kaufmann.
2. “Modern Processor Design: Fundamentals of Superscalar Processors”, John Paul Shen and Mikko H. Lipasti, Tata McGraw-Hill.

**Reference Books:**

1. “Computer Architecture: Pipelined and Parallel Processor Design”, M. J. Flynn, Narosa

Publishing.

1. “Advanced Computer Architecture: Parallelism, Scalability, Programmability”, Kai Hwang, McGraw-Hill.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Design**, formulate, solve and implement high performance versions of standard single threaded algorithms | **PO1,PO2,PO3,PO5,PO6,PO12,PSO1,PSO2** |
| **CO2** | **Demonstrate** the architectural features in the GPU and MIC hardware accelarators. | **PO1,PO2,PO3,PO5,PO6,PO12,PSO3** |
| **CO3** | **Design** programs to extract maximum performance in a multicore, shared memory execution environment processor. | **PO1,PO3,PO5,PO12,PSO3** |
| **CO4** | **Design** and deploy large scale parallel programs on tightly coupled parallel systems using the message passing paradigm. | **PO1,PO3,PO5,PO12** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11025 | High Performance Computer Architecture (Prof. Elective -II) | 3 | 2 | 3 | - | 3 | 2 | - | - | - | - | - | 3 | 3 | 2 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| **ADAMAS UNIVERSITY**  **SCHOOL OF ENGINEERING AND TECHNOLOGY**  **END-SEMESTER EXAMINATION**  **Name of the Program: B.Tech Semester: VI**  **Code- CSE11025 Stream- CSE Time: 03 Hrs.**  **Paper title– High Performance Computer Architecture (Prof. Elective -II) Total Pages -2**  **Max. Marks: 40 Total no. of questions- 12**  **Instructions:**  Attempt All Questions from **Section A** (Each Carrying 1 Marks); any **Three Questions** from **Section B** (Each Carrying 5 Marks)**.** Any **Two Questions from Section C** (Each Carrying 10 Marks)**.**  1. **At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.**  2. **Assumptions made if any, should be stated clearly at the beginning of your answer.**  3. **All parts of a Question should be answered consecutively.** | | | | |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | | |
| 1. | **What** do you understand by parallel processing? | | **R** | **CO1** |
| 2. | **What** is an array processor? | | **R** | **CO1** |
| ­­­ 3. | **Explain** what is pipeline computer? | | **U** | **CO2** |
| 4. | **What** are the different types of associative memory organization? | | **R** | **CO1** |
| 5. | **What** is semaphore? How is it useful? | | **R** | **CO1** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** | | | |
| 6. | **Explain** Scatter and gather operation and how it is different for one to all Broadcast and All to one reduction. Explain All to all broadcast on linear array , Mesh and Hypercube Topologies | | **U** | **CO2** |
| 7. | **State** and Explain Basic working Principle of Super scalar Processor. Define Latency and Bandwidth of memory and explain its impact on system Performance | | **Ap, R** | **CO2** |
| 8. | **Explain** with suitable diagram SIMD , MIMD architectures. Describe Uniform memory Access and Non-Uniform Memory access with diagrammatic representation | | **U** | **CO3** |
| 9. | **State** and Explain Basic working Principle of Super scalar Processor b) Define Latency and Bandwidth of memory and explain its impact on system Performance | | **Ap, R** | **CO2** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** | | | |
| 10 | **Explain** Static and dynamic mapping Techniques for Load Balancing. What are characteristics of tasks and interactions | | **U** | **CO3** |
| 11 | **Explain** any three decomposition techniques with suitable example . Define following terms – Granularity , Task dependency graph , Task Interaction Graph Degree of concurrency | | **U** | **CO3** |
| 12 | **Explain** Broadcast and Reduction example for multiplying matrix with a vector. Explain Prefix Sum operation for an eight node hypercube | | **U** | **CO3** |

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| **CSE11026** | Pattern Recognition (Prof. Elective -II) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Algebra, Probability, and Statistics** | | | | |
| **Co-requisites** | **Basics of Machine Learning** | | | | |

**Course Objectives:**

1.To equip students with basic mathematical and statistical techniques commonly used in pattern recognition.

2.To introduce students to a variety of pattern recognition algorithms.

3.Enable students to apply machine learning concepts in real life problems.

4.To enable students acquire structure and written expression required for their profession.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Explain** a variety of pattern classification, structural pattern recognition, and pattern classifier combination techniques.

CO2**. Compare** and parameterize different learning algorithms.

CO3. **Summarize** research in the pattern recognition area verbally and in writing.

CO4. **Apply** performance evaluation methods for pattern recognition, and critique comparisons of techniques made in the research literature.

CO5**. Implement** simple pattern classifiers, classifier combinations, and structural pattern recognizers.

**Catalog Description:**

Pattern recognition is the process of recognizing patterns by using machine learning algorithm. Pattern recognition can be defined as the classification of data based on knowledge already gained or on statistical information extracted from patterns and/or their representation. One of the important aspects of the pattern recognition is its application potential. For example, Speech recognition, speaker identification, multimedia document recognition (MDR), automatic medical diagnosis. In a typical pattern recognition application, the raw data is processed and converted into a form that is amenable for a machine to use. Pattern recognition involves classification and cluster of patterns.

**Course Content:**

**Unit I:**

**6 lecture hours**

**Introduction:** Paradigms for pattern recognition, Statistical and Syntactic pattern Recognition, Soft and Hard computing schemes for pattern recognition. Statistical Pattern Recognition: Patterns and classes, Supervised, Semi-supervised, and Unsupervised classification.

**Unit II:**

**8 lecture hours**

**Representation:** Vector space representation of patterns and classes, patterns and Classes as strings, Tree-based representations, Frequent item sets for representing classes and clusters, Patterns and classes as logical formulas.

**Unit III:**

**8 lecture hours**

**Proximity Measures:** Dissimilarity measures, metrics, similarity measures, Edit Distance, Hausdorff metric between point sets, Kernel functions, Contextual and conceptual similarity between points.

**Unit IV:**

**10 lecture hours**

Dimensionality Reduction: Feature selection: Branch and bound, Sequential feature election, Feature extraction: Fisher's linear discriminant, Principal components as features; Nearest Neighbour Classifiers: Nearest neighbour classifier, Soft nearest neighbour classifiers, Efficient algorithms for nearest neighbour classification, K-Nearest Neighbour classifier, minimal distance classifier, condensed nearest neighbour classifier and its modifications.

**Unit V:**

**8 lecture hours**

**Bayes Classifier:** Bayes classifier, naïve Bayes classifier, Bayesian Network, Belief network, Decision Trees Axis parallel and oblique decision trees, Learning decision trees, Information gain and Impurity measures.

**Linear Discriminant Functions**: Characterization of the decision boundary,

Weight vector and bias, Learning the discriminant function, Perceptron’s; Support Vector Machines Maximizing the margin, Training support vector machines, Kernel functions.

**Unit VI:**

**5 lecture hours**

**Clustering:** Clustering process, Clustering algorithms, and Clustering large datasets.

**Combination of Classifiers:** AdaBoost for classification, Combination of Homogeneous classifiers, Schemes for combining classifiers.

**Text Books:**

1.Pattern Recognition Principles, Julius T. Tou, Rafael C. González, Addison-Wesley Pub. Co., 1974.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** a variety of pattern classification, structural pattern recognition, and pattern classifier combination techniques. | **PO1, PSO1** |
| **CO2** | **Compare** and parameterize different learning algorithms. | **PO1, PO2** |
| **CO3** | **Summarize** research in the pattern recognition area verbally and in writing. | **PO2, PO4,PSO3** |
| **CO4** | **Apply** performance evaluation methods for pattern recognition, and critique comparisons of techniques made in the research literature. | **PO1, PO5, PSO2** |
| **CO5** | **Implement** simple pattern classifiers, classifier combinations, and structural pattern recognizers. | **PO1, PO3** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11026 | Pattern Recognition | 3 | 2 | 2 | 2 | 3 | - | - | - | - | - | - | - | 3 | 2 | 3- |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VI Stream: CSE

PAPER TITLE: Pattern recognition (Prof. Elective -II) PAPER CODE: CSE11026

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Which** algorithm is used for solving temporal probabilistic reasoning? R | **1** | **CO1** |
| 2. | **How** does the state of the process is described in HMM? R | **1** | **CO3** |
| ­­­3. | **State** if Bayesian is a heuristic or probabilistic classifier? R | **1** | **CO5** |
| 4. | In **which** category of clustering K-Means clustering belong to? R | **1** | **CO5** |
| 5. | In PCA **which** concept of mathematics is used? R | **1** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Compare** supervised and unsupervised pattern recognition. U | **5** | **CO1** |
| 7. | **What** is maximum margin classifier? R **Explain** what are Support vectors in SVM. U | **5** | **CO5** |
| 8. | **Define** Pattern recognition. **State** various applications of pattern recognition. R | **5** | **CO2** |
| 9. | **Define** within-class scatter matrix & between-class scatter matrix. **Discuss** the discriminate analysis for 2-class problem. R | **5** | **CO3** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Derive** the weight update rule for a single hidden layer in backpropagation. Ap | **10** | **CO5** |
| 11. | **Write** short notes on: - i) Bias ii) Variance. Explain using Simple Linear Regression. R | **10** | **CO4** |
| 12. | Cluster the dataset using K-Means clustering into 4 clusters. **Find out** the inter-cluster dissimilarity and intra-cluster similarity. R | **10** | **CO5** |

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| **CSE11027** | Computational Geometry | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Algorithm Design, Data Structure** | | | | |
| **Co-requisites** | **Knowledge in graphics** | | | | |

**Course Objectives:**

1. To acquire knowledge regarding the fundamental structures and techniques in computational geometry

2. To strengthen students’ ability in designing algorithms and its analysis.

3. To train students to use geometric structures and techniques to solve simple or moderately difficult problems.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Recall** the functionality and correctness of the covered algorithms and data structures.

CO2**. Illustrate** basic concepts of geometrical problems.

CO3**. Construct** various algorithmic paradigms which help students to improve their algorithmic

skills

CO4**. Demonstrate** complex geometrical problems using various computational techniques.

CO5. **Apply** geometric techniques to real-world problems in graphics.

**Catalog Description:**

Computational Geometry is a mathematical field that involves students to the essentials of Computational Geometry and presents an in-depth study of the fundamental geometric structures and techniques used in this field. Topics to be covered include geometric searching, convex hulls, proximity computations, intersections, arrangement and duality, visibility graph, and other special topics. Applications to problems from other fields such as Wireless and Mobile Computing, Computer Graphics, Computer Vision, Databases, Robotics, and VLSI design.

**Course Content:**

**Unit I:**

**7 lecture hours**

Introduction, Visibility Problems, 2D Maxima, Line Sweep Method, Segment Intersection Problem

**Unit II:**

**10 lecture hours**

Line Sweep: Rectangle Union, Convex Hull, Quick Hull, More Convex Hull Algorithms, Intersection of Half Planes and Duality, Lower Bounds, Planar Point Location, Point Location and Triangulation, Triangulation of Arbitrary Polygon.

**Unit III:**

**8 lecture hours**

Voronoi Diagrams- Properties and applications in the plane. Voronoi Diagram Construction, Proofs of properties related to vertices and edges of voronoi Diagrams. Algorithm for constructing voronoi diagram. Delaunay Triangulation.

**Unit IV:**

**8 lecture hours**

Quick sort and Backward Analysis, Generalized RIC, Arrangements, Zone Theorem and Application, Levels.

**Unit V:**

**12 lecture hours**

Range Searching : Introduction, Orthogonal Range searching, Priority Search Trees, Non - Orthogonal Range Searching, Half - Plane Range Query, Well Separated Partitioning, Quad trees, Epsilon –WSPD Construction of Epsilon – WSPD, Epsilon - WSPD to Geometric Spanner.

Epsilon-Nets & VC Dimension, Geometric Set Cover, Geometric Set Cover (with Bounded VC Dimension).Shape Representation, Shape Comparison.

**Text Books:**

1. M. de Berg, M. van Kreveld, M. Overmars, and O. Schwarzkopf. [Computational Geometry: Algorithms and Applications](http://www.cs.ruu.nl/geobook/)*.* Springer-Verlag, 3rd edition, 2008

**Reference Books:**

1.Preparata, Franco P., Shamos, Michael -Computational Geometry: An Introduction, Springer-Verlag New York,1st edition, 1986

2.KetanMulmuley: Computational Geometry: An Introduction through Randomized Algorithms

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Recall** the functionality and correctness of the covered algorithms and data structures. | **PO1, PO2, PO4** |
| **CO2** | **Illustrate** basic concepts of geometrical problems. | **PO1, PO2, PO3, PO4, PO5,** |
| **CO3** | **Construct** various algorithmic paradigms which help students to improve their algorithmic skills | **PO1, PO2,**  **PO3, PO4, PSO1, PSO2, PSO3** |
| **CO4** | **Demonstrate** complex geometrical problems using various computational techniques | **PO1, PO2, PO3,**  **PO4, PSO1, PSO2, PSO3** |
| **CO5** | **Apply** geometric techniques to real-world problems in graphics. | **PO1, PO2, PO3, PO6**  **PSO1, PSO2, PSO3** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO  3 |
| CSE11027 | Computational Geometry (Prof. Elective -II) | 3 | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | 3 | 3 | 3 |

1=weakly mapped 2=moderately mapped 3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |  |
| ADAMAS UNIVERSITYSCHOOL OF ENGINEERING AND TECHNOLOGYEND-SEMESTER EXAMINATIONName of the Program: B. Tech Semester: VICode- CSE11027 Stream- CSETime: 03 Hrs.Paper Title– Computational Geometry (Prof. Elective -II) Total Page -1Max. Marks: 40 Total no. of questions- 12Instructions:Attempt All Questions from Section A (Each Carrying 1 Marks); any Three Questions fromSection B (Each Carrying 5 Marks). Any Two Questions from Section C (Each Carrying10 Marks).1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.2. Assumptions made if any, should be stated clearly at the beginning of your answer. 3. **All parts of a Question should be answered consecutively** | | | | | |
| **SECTION A (Answer All questions)** | | | | | |
| 1. | **What** is a vector? Justify the statement **“Adding two vectors and multiplying a vector by a scalar is done component-wise.”** | | **U** | **CO1** | |
| 2. | **What** is Computational Geometry? State a typical problem in Computational Geometry. | | **U** | **CO2** | |
| ­­­ 3. | **What** are Strengths of Computational Geometry? | | **U** | **CO3** | |
| 4. | **Explain** Convex Hulls. What do you mean by boundedness? | | **An** | **CO4** | |
| 5. | **List** some application domain of computational geometry. | | **R** | **CO5** | |
|  | **SECTION B (**Attempt any **Three Questions)** | |  | | |
| 6. | **Explain** plane sweep algorithm? What are three basic elements that are maintained at any time in any plane-sweep algorithm? | | **U** | **CO1** | |
| 7. | a) [**What**](https://www.researchgate.net/post/How_to_find_the_most_suitable_dimensional_reduction_method_for_a_data_set)are limitations of Computational Geometry?  b**) Write** algorithm for constructing Voronoi diagrams. | | **U** | **CO2** | |
| 8. | a) **What** is Sampling.  b) **Define** the ɛ Nets.  c) “The V C dimension of (X , R) is the cardinality of the largest subset A ⊂ X shattered by R. If sets of arbitrarily large size can be shattered, then VC dim is ∞.”State examples to support the definition. | | **U** | **CO3** | |
| 9. | Let E be an unsorted set of n segments that are the edges of a convex polygon. Describe an *O(n log n)* algorithm that computes from *E* a list containing all vertices of the polygon, sorted in clockwise order. | |  |  | |
|  | **SECTION C (**Attempt any **Two Questions)** | |  | | |
| 10. | Consider the following alternative approach to compute the convex hull of a set of points in the plane: We start with the rightmost point. This is the first point p1 of the convex hull. Now imagine that we start with a vertical line and rotate it clockwise until in hits another point p2. This is the second point on the convex hull. We continue rotating the line but this time around p2 until we hit a point p3. In this way we continue until we reach p1 again.   1. Give a pseudocode for this algorithm. 2. **What** degenerate cases can occur and how can we with them? 3. **What** problems might occur when we deal with inexact floating point arithmetic? | | **An** | **CO2**  **CO4** | |
| 11. | **Explain** the concept of Line segment intersection. | | **R** | **CO4** | |
| 12. | **Explain** VC Dimension of Hyperplanes. | | **R** | **CO5** | |

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| **CSE11028** | Artificial Intelligence (Open Elective -I) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Fundamentals of computer science, Operating system** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1.To provide the most fundamental knowledge of AI.

2.To make a computer that can learn, plan, and solve problems autonomously.

3.To give the students a perspective on the main research topics in AI i.e. problem solving, reasoning, planning, etc.

4.To enable students to acquire knowledge on some basic search algorithms for problem solving; knowledge representation and reasoning; pattern recognition; fuzzy logic; and neural networks.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1**. Define** Artificial Intelligence and its approach.

CO2. **Describe** propositional logic and inference engine.

CO3**. Execute** Planning with state-space search.

CO4**. Construct** Bayesian networks and other temporal models.

CO5. **Explain** the types of Learning.

**Catalog Description:**

Artificial intelligence (AI) is a research field that studies how to realize the intelligent human behaviors on a computer. The ultimate goal of AI is to make a computer that can learn, plan, and solve problems autonomously. The main research topics in AI include: problem solving, reasoning, planning, natural language understanding, computer vision, automatic programming, machine learning, and so on. Of course, these topics are closely related with each other. For example, the knowledge acquired through learning can be used both for problem solving and for reasoning. In fact, the skill for problem solving itself should be acquired through learning. Also, methods for problem solving are useful both for reasoning and planning. Further, both natural language understanding and computer vision can be solved using methods developed in the field of pattern recognition. In this course, we will study the most fundamental knowledge for understanding AI. We will introduce some basic search algorithms for problem solving; knowledge representation and reasoning; pattern recognition; fuzzy logic; and neural networks.

**Course Content:**

**Unit I:**

**10 lecture hours**

Introduction, Agents, Problem formulation, Uninformed search strategies, Heuristics, Informed search strategies, Satisfying constraints. Logical agents, Propositional logic, Inference rules, First-order logic, Inferences in first order logic, Forward and backward chaining, Unification, Resolution.

**Unit II:**

**8 lecture hours**

Planning with state-space search, Partial-order planning, Planning graphs, Planning and acting in the real world, Forward and backward chaining, Unification, Resolution

**Unit III:**

**9 lecture hours**

**Introduction:** Overview of machine learning, related areas, applications, software tools, course objectives. **Regression:** Linear Regression, Polynomial Regression, Gradient Descent, Logistic Regression, Case Study on Logistic Regression

**Unit IV:**

**9 lecture hours**

**Neural networks**: the perceptron algorithm, various activation functions and their differentiability, multilayer perceptrons, back-propagation, nonlinear regression, multiclass discrimination, training procedures, Case Study Bayesian Learning, Decision Tree.

**Unit V:**

**9 lecture hours**

**Support vector machines**: Functional and geometric margins, optimum margin classifier, constrained optimization, Lagrange multipliers, KKT conditions, soft margins, kernels. **Dimensionality Reduction:** Feature Selection, Principle Component Analysis (PCA).

**Text Books:**

1.Artificial Intelligence – A Modern Approach, Second Edition, S. Russel and P. Norvig Pearson Education, 2003.

2.Machine Learning, 1st Edition, Tom M. Mitchell, McGraw-Hill Series. In Computer Science

3.Neural Networks and Learning Machines, 3rd Edition, Simon O. Haykin, Prentice Hall

4.Introduction to Machine Learning, 2nd Edition, Ethem Alpaydın, The MIT Press.

**Reference Books:**

1.Computational Intelligence: a logical approach”, David Poole, Alan Mack worth, Randy Goebel, First edition; Oxford University Press, 2004

2.Artificial Intelligence: Structures and Strategies for complex problem solving”, Fourth Edition, G. Luger, Pearson Education, 2002.

3.Minsky, Marvin. "Society of Mind: a response to four reviews." Artificial Intelligence 48.3 (1991): 371-396.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Define** Artificial Intelligence and its approach. | **PO2. PO6** |
| **CO2** | **Describe** propositional logic and inference engine. | **PO3, PO4, PO7,PSO1** |
| **CO3** | **Execute** Planning with state-space search. | **PO4, PO12** |
| **CO4** | **Construct** Bayesian networks and other temporal models. | **PO12, PSO2, PSO3** |
| **CO5** | **Explain** the types of Learning. | **PSO2, PSO3** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11028 | Artificial Intelligence |  | 3 | 3 | 2 | - | 3 | 3 | - | - | - | - | 2 | 3 | 2 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION**

Name of the Program: B. Tech Semester: VI Stream: CSE

PAPER TITLE: Artificial Intelligence (Open Elective -I) PAPER CODE: CSE11028

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | What is turing test? | **R** | **CO1** |
| 2. | **Where** are Rewards and Penalty applied? | **U** | **CO2** |
| ­­­ 3. | **What** is ID3 Algorithm? | **U&R** | **CO4** |
| 4. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ starts from Known Facts to find New Facts. | **R** | **CO3** |
| 5. | **What** are AI neural networks? | **R** | **CO5** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Discuss** Problem Solving Technique of Artificial Intelligence in step wise manner | **Ap** | **CO3** |
| 7. | **State** the comparison Supervised Learning, Unsupervised Learning and Reinforcement Learning. | **U** | **CO2** |
| 8. | **Explain** A\* Searching Algorithm with suitable example. | **An** | **CO5** |
| 9. | **What** is TensorFlow? | **U** | **CO4** |
|  | **SECTION C(Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Define** Inference Engine. Explain Forward Chaining and Backward Chaining with separate examples. | **E & R** | **CO4,**  **CO1, CO2** |
| 11. | **Explain** First Order Markov Chain and Second Order Markov Chain with suitable examples | **R & U** | **CO5** |
| 12. | **List** some disadvantages related to linear models. | **U** | **CO2** |

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| **CSE11027** | Computational Geometry (Open Elective -I) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Algorithm Design, Data Structure** | | | | |
| **Co-requisites** | **Knowledge in graphics** | | | | |

**Course Objectives:**

1.To acquire knowledge regarding the fundamental structures and techniques in computational geometry

2.To strengthen students’ ability in designing algorithms and its analysis.

3.To train students to use geometric structures and techniques to solve simple or moderately difficult problems.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Recall** the functionality and correctness of the covered algorithms and data structures.

CO2. **Illustrate** basic concepts of geometrical problems.

CO3**. Construct** various algorithmic paradigms which help students to improve their algorithmic

skills

CO4**. Demonstrate** complex geometrical problems using various computational techniques.

CO5. **Apply** geometric techniques to real-world problems in graphics.

**Catalog Description:**

Computational Geometry is a mathematical field that involves students to the essentials of Computational Geometry and presents an in-depth study of the fundamental geometric structures and techniques used in this field. Topics to be covered include geometric searching, convex hulls, proximity computations, intersections, arrangement and duality, visibility graph, and other special topics. Applications to problems from other fields such as Wireless and Mobile Computing, Computer Graphics, Computer Vision, Databases, Robotics, and VLSI design.

**Course Content:**

**Unit I:**

**7 lecture hours**

Introduction ,Visibility Problems,2D Maxima, Line Sweep Method, Segment Intersection Problem

**Unit II:**

**10 lecture hours**

Line Sweep: Rectangle Union, Convex Hull, Quick Hull, More Convex Hull Algorithms, Intersection of Half Planes and Duality, Lower Bounds, Planar Point Location, Point Location and Triangulation, Triangulation of Arbitrary Polygon.

**Unit III:**

**8 lecture hours**

Voronoi Diagrams- Properties and applications in the plane.Voronoi Diagram Construction, Proofs of properties related to vertices and edges of voronoi Diagrams. Algorithm for constructing voronoi diagram. Delaunay Triangulation.

**Unit IV:**

**8 lecture hours**

Quick sort and Backward Analysis, Generalized RIC, Arrangements, Zone Theorem and Application, Levels.

**Unit V:**

**12 lecture hours**

Range Searching : Introduction, Orthogonal Range searching, Priority Search Trees, Non - Orthogonal Range Searching, Half - Plane Range Query, Well Separated Partitioning, Quad trees, Epsilon –WSPD Construction of Epsilon – WSPD, Epsilon - WSPD to Geometric Spanner.

Epsilon-Nets & VC Dimension, Geometric Set Cover, Geometric Set Cover (with Bounded VC Dimension).Shape Representation, Shape Comparison.

**Text Books:**

1. M. de Berg, M. van Kreveld, M. Overmars, and O. Schwarzkopf. [Computational Geometry: Algorithms and Applications](http://www.cs.ruu.nl/geobook/)*.* Springer-Verlag, 3rd edition, 2008

**Reference Books:**

1. Preparata, Franco P., Shamos, Michael -Computational Geometry: An Introduction, Springer-Verlag New York,1st edition, 1986

2. KetanMulmuley: Computational Geometry: An Introduction through Randomized Algorithms

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Recall** the functionality and correctness of the covered algorithms and data structures. | **PO1, PO2, PO4** |
| **CO2** | **Illustrate** basic concepts of geometrical problems. | **PO1, PO2, PO3, PO4,PO5,** |
| **CO3** | **Construct** various algorithmic paradigms which help students to improve their algorithmic skills | **PO1, PO2,**  **PO3, PO4, PSO1, PSO2, PSO3** |
| **CO4** | **Demonstrate** complex geometrical problems using various computational techniques | **PO1, PO2, PO3,**  **PO4, PSO1, PSO2, PSO3** |
| **CO5** | **Apply** geometric techniques to real-world problems in graphics. | **PO1, PO2, PO3, PO6**  **PSO1, PSO2, PSO3** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO  3 |
| CSE11027 | Computational Geometry (Open Elective -I) | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 3 | 3 | 3 |

1=weakly mapped

2=moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |  |
| ADAMAS UNIVERSITYSCHOOL OF ENGINEERING AND TECHNOLOGYEND-SEMESTER EXAMINATIONName of the Program: B. Tech Semester: VICode- CSE11027 Stream- CSETime: 03 Hrs.Paper title– Computational Geometry (Open Elective -I) Total pages- 1Max. Marks: 40 Total no. of questions- 12Instructions:Attempt All Questions from Section A (Each Carrying 1 Marks); any Three Questions fromSection B (Each Carrying 5 Marks). Any Two Questions from Section C (Each Carrying10 Marks).1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.2. Assumptions made if any, should be stated clearly at the beginning of your answer. 3. **All parts of a Question should be answered consecutively** | | | | | |
| **SECTION A (Answer All questions)** | | | | | |
| 1. | **What** is a vector? Justify the statement **“Adding two vectors and multiplying a vector by a scalar is done component-wise.”** | | **U** | **CO1** | |
| 2. | **What** is Computational Geometry? State a typical problem in Computational Geometry. | | **U** | **CO2** | |
| ­­­ 3. | **What** are Strengths of Computational Geometry? | | **U** | **CO3** | |
| 4. | **Explain** Convex Hulls. What do you mean by boundedness? | | **An** | **CO4** | |
| 5. | **List** some application domain of computational geometry. | | **R** | **CO5** | |
|  | **SECTION B (**Attempt any **Three Questions)** | |  | | |
| 6. | **Explain** plane sweep algorithm? What are three basic elements that are maintained at any time in any plane-sweep algorithm? | | **U** | **CO1** | |
| 7. | a) **What** are limitations of Computational Geometry?  b**) Write** algorithm for constructing Voronoi diagrams. | | **U** | **CO2** | |
| 8. | a) **What** is Sampling?  b) **Define** the ɛ Nets.  c) “The V C dimension of (X , R) is the cardinality of the largest subset A ⊂ X shattered by R. If sets of arbitrarily large size can be shattered, then VC dim is ∞.”State examples to support the definition. | | **U** | **CO3** | |
| 9. | Let E be an unsorted set of n segments that are the edges of a convex polygon. Describe an *O(n log n)* algorithm that computes from *E* a list containing all vertices of the polygon, sorted in clockwise order. | |  |  | |
|  | **SECTION C (**Attempt any **Two Questions)** | |  | | |
| 10. | Consider the following alternative approach to compute the convex hull of a set of points in the plane: We start with the rightmost point. This is the first point p1 of the convex hull. Now imagine that we start with a vertical line and rotate it clockwise until in hits another point p2. This is the second point on the convex hull. We continue rotating the line but this time around p2 until we hit a point p3. In this way we continue until we reach p1 again.   1. Give a pseudo code for this algorithm. 2. **What** degenerate cases can occur and how can we with them? 3. **What** problems might occur when we deal with inexact floating point arithmetic? | | **An** | **CO2**  **CO4** | |
| 11. | **Explain** the concept of Line segment intersection. | | **R** | **CO4** | |
| 12. | **Explain** VC Dimension of Hyper planes. | | **R** | **CO5** | |

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| **CSE12029** | Computer Networks Lab | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Basic Computer knowledge, C** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To become familiar with fundamentals of computer network.
2. To become familiar with transmission media and data communication.
3. To become familiar with addressing techniques and protocols.
4. To become familiar with file transfer protocols, and concepts of secured data communication technique.

**Course Outcomes:**

On the successful completion of this course, the students will be able to

**CO1. Analye** the different types of Network cables and Practically implement the cross-wired cable and straight through cable using clamping tool.

**CO2. Analyse** Network device in details and connect the computers in local area network.

**CO3. Explain** the basic network command and network configuration commands.

**CO4. Construct** a network topology using packet tracer software.

**CO5. Construct** a network using distance and link state vector routing protocol.

**Catalog Description:**

This course provides students with hand-on training regarding the design, troubleshooting, modelling and evaluation of computer networks. In this course students are going to experiment in a real test-bed networking environment, and learn about network design and troubleshooting topics and tools such as: network addressing, address resolution protocol (ARP), basic troubleshooting tools (eg. Ping, ICMP), IP routing (eg. RIP), route discovery (eg. Traceroute), TCP and UDP, IP fragmentation and many other. Student will also be introduced to the network modelling and simulation, and they will have the opportunity to build some simple networking models using the tool and perform simulations that will help them evaluate their design approaches and expected network performances.

**Course Content:**

**Experiment No. 1:**

Configuring, testing and measuring Network devices and parameters/policies; Network

management experiments. Exercises in Network programming.

**Experiment No.2:**

Implementation of Topologies: Star, Bus, Ring.

**Experiment No.3:**

NIC Installation & Configuration: Familiarization with Networking cables (CAT5, UTP)

Connectors (RJ45, T-connector), Hubs and Switches.

**Experiment No.4:**

Implementation based on TCP/UDP Socket: Multicast & Broadcast Sockets

**Experiment No.5:**

Implementation based on Data Link Layer Error Detection Mechanism (Cyclic Redundancy Check) and Data Link Layer Flow Control Mechanism (Stop & Wait, Sliding Window).

**Text Books:**

1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw-Hill.

2. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall

India.

1. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International

Edition.

**Reference Books:**

1. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of

India.

2. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of

America

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Analyze** the different types of Network cables and Practically implement the cross-wired cable and straight through cable using clamping tool. | **PO1, PO2, PO6** |
| **CO2** | **Analyze** Network device in details and connect the computers in local area network. | **PO2, PO3, PO5, PSO1** |
| **CO3** | **Explain** the basic network command and network configuration commands. | **PO2, PO4, PSO2** |
| **CO4** | **Construct** a network topology using packet tracer software. | **PO4, PO9, PSO1** |
| **CO5** | **Construct** a network using distance and link state vector routing protocol. | **PO3, PSO2, PSO3** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12029 | Computer Networks Lab | 3 | 3 | 2 | 2 | 3 | 3 | - | - | 3 | - | - | - | 2 | 2 | 1 |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VI Stream: CSE

PAPER TITLE: Computer Networks Lab (Prof. Core- XI Lab)

PAPER CODE: CSE12029

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 5 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 8 = 40)** | | | |
| 1. | Write a program to **determine** the class of IP address. Please note that user will provide input of the entire IP address as a single string. | **AP** | **CO2** |
| 2. | Write a program to **develop** Stop And Wait ARQ to manage the following situations -  a. Frame Lost. b. ACK Lost. c. Frame and ACK both Lost. d. Frame and ACK both send successfully. | **AP** | **CO3** |
| ­­­ 3. | Write a menu driven program to **develop** Pure ALOHA and Slotted ALOHA mechanism as per the user choice. | **U** | **CO4** |
| 4. | Write a menu driven program to **develop** CSMA protocol (i.e. Non persistent CSMA, 1 persistent CSMA and p persistent CSMA) mechanism as per the user choice. | **AP** | **CO5** |
| 5. | **Develop** based on Data Link Layer Error Detection Mechanism (Cyclic Redundancy Check) and Data Link Layer Flow Control Mechanism (Stop & Wait, Sliding Window). | **An** | **CO4** |

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| **CSE12030** | Artificial Intelligence and Machine Learning Lab (Prof. Core- XII Lab) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Data Structure and Python Basics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To help students gain practical insights of AI Algorithm through functional programming.

2. To enable students, communicate with clarity and precision of ML Algorithm.

3. To give the students a perspective enhancement of present system.

4. To enable students to make a comparative study and further improvement.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1**. Interpret** and Evaluate different search strategies using Prolog.

CO2. **Execute** and Memorize and different various libraries and the most frequently used functions, methods, constants required for the implementation of any machine learning.

CO3. **Apply** and Appraise Linear and Logistic Regression and Classify using K-NN for smaller dataset.

CO4. **Implement** clustering algorithm and judge the appropriate clustering method for a particular dataset. Also, to design Artificial Neural Network for different dataset and to classify for multiclass datasets.

CO5. **Implement** Decision Tree and Naïve Bayes classifier, Design Linear SVM and appraise.

**Catalog Description:**

Every laboratory course brings an open world to a student. It helps the most in exploring and innovating. In Artificial Intelligence and Machine Learning Lab all experiments are given based on real-life problems. Through this kind of practice students become more analytic more inclined to practical thinking. Also, this course brings inquisitiveness to the students. This course is a rationale to the advance courses such as Artificial Neural Network and Deep Learning”, “Soft Computing”, etc. First Part of this course is the implementation of some important Artificial intelligence aspects such as Agents, Knowledge Representation and Planning. The later part implements all major Machine Learning algorithms with the online datasets.

**Course Content:**

**Experiments:**

1. Implementation of search strategies (Informed/Heuristics) in PROLOG/C/PYTHON
2. Introduction to various libraries and the most frequently used functions, methods, constants required for the implementation of any machine learning algorithm.
3. Loading of Dataset. Splitting into Test and Train set using Pandas. Visualizing DataSet using MatplotLib.
4. Implementation of Regression:
   1. Linear
   2. Logistic
5. Implementation of K-Nearest Neighbour (KNN).
6. Implementation of K-Means Clustering.
7. Implementation of various weight update methods of Artificial Neural Network using CIFAR10/MNIST Dataset.
8. Implementation of Decision Tree algorithm
9. Implementation of Linear Separator (Linear SVM).

**Text Books:**

1. “Python Data Science Handbook Essential Tools for Working with Data”, 1st Edition,

Jake Vander Plas, O’Reilly

2. Prolog Programming for Artificial Intelligence (4th Edition) (International Computer

Science Series): Bratko, Ivan

**Reference Books**

1. “Foundations of Machine Learning”, 2012 Edition, Mehryar Mohri, Afshin Rostamezadeh, Ameet Talwalkar, The MIT Press

**Modes of Evaluation: Quiz/Assignment/Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Interpret** and Evaluate different search strategies using Prolog | **PO4, PO1** |
| **CO2** | **Execute** and Memorize and different various libraries and the most frequently used functions, methods, constants required for the implementation of any machine learning | **PO1, PO2, PSO1** |
| **CO3** | **Apply** and Appraise Linear and Logistic Regression and Classify using K-NN for smaller dataset. | **PO1, PO3, PSO1** |
| **CO4** | **Implement** clustering algorithm and judge the appropriate clustering method for a particular dataset. Also, to design Artificial Neural Network for different dataset and to classify for multiclass datasets | **PO3, PO5, PSO2** |
| **CO5** | **Implement** Decision Tree and Naïve Bayes classifier, Design Linear SVM and appraise. | **PO3, PO5, PSO2** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12030 | Artificial Intelligence and Machine Learning Lab (Prof. Core- XII Lab) | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VI Stream: CSE

PAPER TITLE: Artificial Intelligence and Machine Learning Lab (Prof. Core- XII Lab)

PAPER CODE: CSE12030

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 5 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 8 = 40)** | | | |
| 1. 4. | **Implement** Backpropagation Algorithm using Python (only basic libraries are to be used) on IRIS dataset. Dataset will be given. | **Ap** | **CO4** |
| 1. 5. | **Implement** Ridge Regression using Python (only basic libraries are to be used). | **Ap** | **CO3** |
| 1. 6. | **Write** a program to detect cancerous cell in FNAC images using Python. Use SVM as a classifier. | **U** | **CO5** |
| 1. 7. | Describe the process of PCA. **How** PCA helps reducing the size of the dataset? | **R** | **CO4** |
| 1. 8. | **Define** problem solving agents and list its algorithms. R **Why** problem formulation must follow goal Formulation? | **R** | **CO2** |

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| **CSE12031** | **High Performance Computer Architecture Lab (Prof. Elective –II Lab)** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Computer Architecture & Operating Systems** | | | | |
| **Co-requisites** | **Algorithms** | | | | |

**Course Objectives:**

To study the basic organization and architecture of digital computers (CPU, memory, I/O, software). Discussions will include digital logic and microprogramming. Such knowledge leads to better understanding and utilization of digital computers, and can be used in the design and application of computer systems or as foundation for more advanced computer-related studies.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1:  **Write** VHDL & Verilog programs.

CO2:  **Design** Logic circuit & ALU

**Catalog Description:**

The architecture of computer systems and associated software. Topics include addressing modes, interrupt systems, input/output systems, external memory systems, assemblers, loaders, multiprogramming, performance evaluation, and data security.

**Course Content:**

**Experiment 1:**

Implementation based on basic Logic Gates (AND, OR, NOT, NAND, NOR, XOR, XNOR)

**Experiment 2:**

Implementation based on Half adder and Full adder (using data flow, behavioral, structural modeling)

**Experiment 3:**

Implementation based on Half subtractor and Full subtractor (using data flow, behavioral, structural modeling)

**Experiment 4:**

Implementation based on Full adder using two half adders and Full subtractor using two half subtractors

**Experiment 5:**

Implementation based on multiplexer, demultiplexer, Encoder and Decoder

**Experiment 6:**

Implementation based on D Flip Flop, SR Flip Flop, JK Flip Flop, T Flip Flop

**Experiment 7:**

Implementation based on 4 Bit Register (using Structural modeling)

**Experiment 8:**

Implementation based on 4 Bit Comparator (using Behavioral modeling)

**Experiment 9:**

Implementation based on 4 Bit ALU

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** | **Total** |
| **Weightage (%)** | **50** | **50** | **100** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Write** VHDL & Verilog programs. | **PO1,PO3,PSO1,PO12,PSO1,PSO2** |
| **CO2** | **Design** Logic circuit & ALU . | **PO5,PO12,PSO1,PSO3** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop , test and manage complex software and information management systems |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12031 | HPCA LAB | 3 | - | 3 | - | 3 | - | - | - | - | - | - | 2 | 3 | 2 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| **ADAMAS UNIVERSITY**  **SCHOOL OF ENGINEERING AND TECHNOLOGY**  **END-SEMESTER EXAMINATION**  **Name of the Program: B.Tech Semester: VI**  **Code- CSE12031 Stream- CSE Time: 03 Hrs.**  **Paper title– High Performance Computer Architecture Lab (Prof. Elective –II Lab) Total pages- 1**  **Max. Marks: 40 Total no. of questions- 5**    **Instructions:**  Attempt Any two Questions  1. **At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.**  2. **Assumptions made if any, should be stated clearly at the beginning of your answer.**  3. **All parts of a Question should be answered consecutively.** | | | | |
| Answer Any Two | | | | |
| 1. | **Construct** a VHDL program implementation based on Full adder using two half adders and Full subtractor using two half subtractors | | **C** | **CO1** |
| 2. | **Construct** a VHDL program Implementation based on Half adder and Full adder (using data flow, behavioral, structural modeling) | | **C** | **CO1** |
| ­­­ 3. | **Construct** a VHDL program Implementation based on D Flip Flop, SR Flip Flop, JK Flip Flop, T Flip Flop | | **C** | **CO2** |
| 4. | **Construct** a VHDL program Implementation based on multiplexer, demultiplexer, Encoder and Decoder | | **C** | **CO1** |
| 5. | **Construct** a VHDL program **Implementation based on 4 Bit ALU** | | **C** | **CO1** |

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| **CSE12032** | Pattern Recognition Lab (Prof. Elective –II Lab) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Algebra, Probability, and Statistics** | | | | |
| **Co-requisites** | **Basics of Machine Learning** | | | | |

**Course Objectives:**

1. To equip students with basic mathematical and statistical techniques commonly used in pattern recognition.

2. To introduce students to a variety of pattern recognition algorithms.

3. Enable students to apply machine learning concepts in real life problems.

4. To enable students, acquire structure and written expression required for their profession.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Explain** a variety of pattern classification, structural pattern recognition, and pattern classifier

combination techniques.

CO2. **Compare** and parameterize different learning algorithms.

CO3. **Summarize** research in the pattern recognition area verbally and in writing.

CO4. **Apply** performance evaluation methods for pattern recognition, and critique comparisons of techniques made in the research literature.

CO5. **Implement** simple pattern classifiers, classifier combinations, and structural pattern recognizers.

**Catalog Description:**

Pattern recognition is the process of recognizing patterns by using machine learning algorithm. Pattern recognition can be defined as the classification of data based on knowledge already gained or on statistical information extracted from patterns and/or their representation. One of the important aspects of the pattern recognition is its application potential. For example, Speech recognition, speaker identification, multimedia document recognition (MDR), automatic medical diagnosis. In a typical pattern recognition application, the raw data is processed and converted into a form that is amenable for a machine to use. Pattern recognition involves classification and cluster of patterns.

**Course Content:**

**Unit I:**

Simulation of various Statistical measurements using Python.

**Unit II:**

Implementation of vector and tensor representation of data and classes using Python.

**Unit III:**

**Unsupervised feature extraction –** PCA, LDA, SVD, EVD.

**Unit IV:**

**Clustering –** K-Means, Fuzzy C-Means, K-Medoids, Agglomerative, Spectral Clustering, DBScan, Cluster validity index

**Unit V:**

**Expectation maximization.**

**Unit VI:**

**Supervised –** K-NN, Artificial Neural Network, Simulated Annealing, Genetic Algorithm, Particle Swarm Optimization.

**Text Books:**

1.Pattern Recognition Principles, Julius T. Tou, Rafael C. González, Addison-Wesley

Pub. Co., 1974.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | Explain a variety of pattern classification, structural pattern recognition, and pattern classifier combination techniques. | **PO1, PSO1** |
| **CO2** | Compare and parameterize different learning algorithms. | **PO1, PO2** |
| **CO3** | Summarize research in the pattern recognition area verbally and in writing. | **PO2, PO4** |
| **CO4** | Apply performance evaluation methods for pattern recognition, and critique comparisons of techniques made in the research literature. | **PO1, PO5, PSO2** |
| **CO5** | Implement simple pattern classifiers, classifier combinations, and structural pattern recognizers. | **PO1, PO3** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12032 | Pattern Recognition (Prof. Elective –II Lab) | 3 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VI Stream: CSE

PAPER TITLE: Pattern recognition Lab (Prof. Elective –II Lab) PAPER CODE: CSE12032

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 5 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 8 = 40)** | | | |
|  | **Implement** PCA over MNIST. | **Ap** | **CO1** |
|  | **Implement** FCM over features obtained in Q1. | **Ap** | **CO5** |
|  | **Implement** DB-Index of FCM. | **Ap** | **CO2** |
|  | **Implement** GA. | **Ap** | **CO5** |
|  | **Implement** KNN. | **Ap** | **CO4** |

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| **CSE12033** | Computational Geometry Lab (Prof. Elective –II Lab) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours-45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Algorithm Design, Data Structure** | | | | |
| **Co-requisites** | **Knowledge in graphics** | | | | |

**Course Objectives:**

1.To acquire knowledge regarding the fundamental structures and techniques in computational geometry

2.To strengthen students’ ability in designing algorithms and its analysis.

3.To train students to use geometric structures and techniques to solve simple or moderately difficult problems.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Recall** the functionality and correctness of the covered algorithms and data structures.

CO2. **Illustrate** basic concepts of geometrical problems.

CO3. **Construct** various algorithmic paradigms which help students to improve their algorithmic

skills

**Catalog Description:**

Computational Geometry is a mathematical field that involves students to the essentials of Computational Geometry and presents an in-depth study of the fundamental geometric structures and techniques used in this field. Topics to be covered include geometric searching, convex hulls, proximity computations, intersections, arrangement and duality, visibility graph, and other special topics. Applications to problems from other fields such as Wireless and Mobile Computing, Computer Graphics, Computer Vision, Databases, Robotics, and VLSI design.

**List of Experiments:**

**Experiment 1:**

Implement the concept of multiplicatively weighted Voronoi Diagrams.

**Experiment 2:**

Implement the concept of backward analysis in quicksort.

**Experiment 3:**

Implement the concept of line segmentation using any language.

**Experiment 4:**

Detect the circles present in any circle-based images.

**Experiment 5:**

Find the exact sign of 2×2 and 3×3 integer matrix determinants.

**Experiment 6:**

Using convex hull program computer Voronoi diagram; the cells of a Voronoi diagram

are the regions of space closest to one of the given points.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Recall** the functionality and correctness of the covered algorithms and data structures. | **PO1, PO2, PO3, PO4** |
| **CO2** | **Illustrate** basic concepts of geometrical problems. | **PO1,PO2,PO3,PO4,PO5,** |
| **CO3** | **Construct** various algorithmic paradigms which help students to improve their algorithmic skills | **PO1, PO2,**  **PO3, PO4, PSO1, PSO2** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12033 | Computational Geometry Lab(Prof. Elective –II Lab) | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 3 | 3 | 3  - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| ADAMAS UNIVERSITYSCHOOL OF ENGINEERING AND TECHNOLOGYEND-SEMESTER EXAMINATIONName of the Program: B. Tech Semester: VICode- CSE12033 Stream- CSETime: 03 Hrs.Paper title– Computational Geometry Lab (Prof. Elective –II Lab) Total pages- 1Max. Marks: 40 Total no. of questions- 12Instructions:Attempt All Questions1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.2. Assumptions made if any, should be stated clearly at the beginning of your answer. 3. **All parts of a Question should be answered consecutively** | | | | |
|  | | | | |
| 1. | Implement the concept of line segmentation to classify an image. | | **Ap** | **CO1** |
| 2. | Using convex hull program computer Voronoi diagram; the cells of a Voronoi diagram are the regions of space closest to one of the given points | | **Ap** | **CO2** |
| ­­­ 3. | Implement the concept of backward analysis in quicksort. | | **Ap** | **CO3** |

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| --- | --- | --- | --- | --- | --- |
| **CSE15034** | Technical Seminar | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Knowledge on Computer domain** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To **develop** skills in doing literature survey, technical presentation and report preparation.

2. To **enable** project identification and execution of preliminary works on final semester project

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Identify** the advanced technologies and globalization

CO2. **Develop** communication and representation skills towards becoming a good team leader and

manager

CO3. **Plan** for lifelong learning towards industry readiness

CO4. **Build** the ability to identify an engineering problem, analyze it and propose a work plan to

solve it.

**Catalog Description:**

The course involves presentation and report submission by every student. Reference search and technical writing skills along with effective presentation skills are focused. The course strengthens the research attributes including literature survey.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Identify** the advanced technologies and globalization | **PO1, PO2, PO3, PSO2** |
| **CO2** | **Develop** communication and representation skills towards becoming a good team leader and manager | **PO4,PO5 PSO2** |
| **CO3** | **Plan** for lifelong learning towards industry readiness | **PO12, PSO2** |
| **CO4** | **Build** the ability to identify an engineering problem, analyze it and propose a work plan to solve it. | **PO2, PO3, PO4, PO5, PO6, PSO2** |

1=weakly mapped

2= moderately mapped

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE15034 | Technical Seminar | 3 | 2 | 2 | 3 | 3 | 2 | - | -- |  |  | - |  | - | 3 | - |

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| **MBA43144** | HSSM –V (Industrial Management) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours – 45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **12th level Mathematics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objective:**

1. To enable students to understand operational complexities of a business.
2. To enable students to conceptualize the process, functions and theories of management.
3. To enable students to provide knowledge about quality control processes.
4. To enable students to conceptualize different strategies relating to people management

**Course Outcome:**

At the end of the course, the student will be able to:

|  |  |
| --- | --- |
| CO1 | **Illustrate** the concepts related to operations management. |
| CO2 | **Demonstrate** skills to perform operation planning and control. |
| CO3 | **Define** and analyze the importance of Quality control procedures. |
| CO4 | **Illustrate** different maintenance functions need to be taken and their implications in an industry. |
| CO5 | **Illustrate** the concepts of MIS and implications of the same in business functions. |
| CO6 | **Evaluate** importance of HRM and its implications in staffing which aids to growth of business. |

**Course Description:**

The purpose of this course is to provide an understanding of the theories and principles of modern management and encourage the course participants to make an appreciation of these principles in relation to their own experiences and selected managerial case studies.

The aims of the course is to understand the basic principles of management, and the four major functions of managers e.g. planning, organizing, leading and controlling and how managers actually operate. Students will be required to think critically and strategically about management theories and issues which will enable them to develop their decision-making and analytical skills. They will be involved in application exercises and case studies which will assist them to develop graduate attributes.

**Course Content:**

**Module 1: Classification and Importance of Operations Management [10 Lecture Hours]**

Operations Management in corporate profitability & competitiveness; Operations strategy; Types & characteristics of manufacturing systems & service systems.

**Module 2: Operations Planning and Control [10 Lecture Hours]**

Forecasting for operations; Inventory planning & control; Materials requirement planning; Planning production in aggregate terms; Operations scheduling;

**Module 3: Quality Assurance** **[5 Lecture Hours]**

The quality assurance system; choice of process and reliability; control of quality.

**Module 4: Maintenance Function** **[5 Lecture Hours]**

Preventive maintenance; Overhaul and replacement.

**Module 5: Management Information System** **[10 Lecture Hours]**

Need & structure of MIS; Data Processing Systems; Data Sources & Management.

**Module 6: Human Resource Management [5 Lecture Hours]**

Concept and evolution; Manpower planning; recruitment and selection; Motivating personnel; Leadership

**Text Books:**

1. Yadav, Shashi Kant, Textbook of Industrial Management. Discovery Publishing Pvt. Ltd. ISBN-10: 8183568424 ISBN-13: 978-8183568425.

2. Khanna, O. P., Industrial Engineering and Management, Dhanpat Rai Publications, ISBN-10: 818992835X; ISBN-13: 978-8189928353

**Reference Books:**

1. Modern Production / Operations Management by Buffa & Sarin, 8th Ed., John Wiley
2. Operations Management by Russell & Taylor (Wiley India Pvt. Ltd.
3. Management Information Systems by Larry Long (Prentice Hall)
4. Enterprise Resource Planning by A. Leon (TMH)
5. Human Resource Management by C. B. Gupta (Sultan Chand).

**Modes of Examination: Assignment/Quiz/Project/Presentation/Written Exam**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Illustrate** the concepts related to operations management. | **PO1, PO6** |
| **CO2** | **Demonstrate** skills to perform operation planning and control. | **PO2, PO4, PO6, PO7** |
| **CO3** | **Define** and analyze the importance of Quality control procedures. | **PO2, PO4, PO5, PO6, PO7** |
| **CO4** | **Illustrate** different maintenance functions need to be taken and their implications in an industry. | **PO3, PO5, PO6, ,PSO1** |
| **CO5** | **Illustrate** the concepts of MIS and implications of the same in business functions. | **PO7, PO5, PO6, , PSO2** |
| **CO6** | **Evaluate** importance of HRM and its implications in staffing which aids to growth of business. | **PO8, PO4, PO6, ,PSO3** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | An ability to apply analytical knowledge, and modern hardware and software tools to design and implement complex systems in the areas related to Electronics and Communication systems | An ability to develop their problem-solving skills and assess social, environmental issues with ethics and manage different projects in multidisciplinary areas. | | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | | PSO3 |
| MBA43144 | HSSM –V (Industrial Management) | 3 | 2 | 3 | 3 |  | 3 | 2 |  |  | - | - | - | 2 | 2 | 2 | |

1=weakly mapped 2= moderately mapped 3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| Course: MBA43144 – HSSM –V (Industrial Management) **Program: B. Tech Time: 03 Hrs. Semester: VII Max. Marks: 40**  **Instructions:**  Attempt **Five** questions from **Section A** (each carrying 1 marks); any **Three Questions** from **Section B** (each carrying 5 marks)**. Section C** is Compulsory (carrying 10 marks)**.** | | | | |
| **SECTION A (Answer any Three Questions)** | | | | |
| 1. | **Define** productivity. | | **R** | **CO1** |
| 2. | **How** Inventory Control can be used effectively? | | **R** | **CO2** |
| 3. | **Define** TQM. | | **R** | **CO3** |
| 4. | **Explain** the need for maintenance. | | **U** | **CO4** |
| 5. | **Define** Recruitment. | | **R** | **CO6** |
|  | **SECTION B (Attempt any** **Three Questions)** | |  | |
| 6. | **Analyze** in brief the importance of Material Requirement Planning. | | **Ap** | **CO2** |
| 7. | **Differentiate** between Data and Information | | **Ap** | **CO5** |
| 8. | **Explain** the importance of Quality Management System. | | **U** | **CO3** |
|  | **Elaborate** the importance of Operations Scheduling. | | **U** | **CO1** |
|  | **SECTION C is Compulsory** | |  | |
| 9. | a) **Define** Manpower Planning.  b) **Explain** the steps involved in Manpower Planning process | | **R** | **CO6** |
|  | a) **Define** Quality Circle.  b) **Explain** the concept of Six Sigma in business process improvement. | | **R** | **CO4** |

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| **CSE11035** | Image Processing (Prof. Elective -III) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours- 45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Basic knowledge of image and pixels** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To describe and explain basic principles of digital image processing.

2. To design and implement algorithms that perform basic image processing (e.g. noise removal and image enhancement).

3. To design and implement algorithms for advanced image analysis (e.g. image compression, image segmentation).

4. To assess the performance of image processing algorithms and systems.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Interpret** the need for image transforms different types of image transforms and their properties.

CO2. **Develop** any image processing application and explain different techniques employed for the enhancement of images.

CO3.**Explain** different causes for image degradation and overview of image restoration techniques.

CO4.**Illustrate**  the  need  for  image  compression  and  to  learn  the  spatial  and  frequency  domain techniques of image compression, along with steps of video processing.

**Catalog Description:**

This course provides an introduction to basic concepts, methodologies and algorithms of digital image processing focusing on the following two major problems concerned with digital images: (1) image enhancement and restoration for easier interpretation of images, and (2) image analysis and object recognition. Some of the image processing techniques (e.g., spatial domain and frequency domain methods) will also be studied in this course. The primary goal of this course is to lay a solid foundation for students to study advanced image analysis topics such as computer vision systems, biomedical image analysis, and multimedia processing & retrieval.

**Course Content:**

**Unit I:**

**8 lecture hours**

**Fundamentals of Image processing and Image Transforms:**

Basic steps of Image processing system sampling and quantization of an Image: Basic relationship between pixels Image Transforms: 2D Discrete Fourier Transform, Discrete Cosine Transform (DCT), Discrete Wavelet transforms.

**Unit II:**

**15 lecture hours**

**Image Processing Techniques:** Image Enhancement, Spatial Domain methods: Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial filters, Sharpening Spatial filters, Frequency Domain methods - Basics of filtering in frequency domain, image smoothing, image sharpening, selective filtering Image Segmentation: Segmentation concepts, point, line and Edge detection, Thresholding, region based segmentation.

**Unit III:**

**10 lecture hours**

**Image Compression:** Image compression fundamentals: coding Redundancy, spatial and temporal redundancy. Compression models: Lossy and Lossless, Huffman coding, Arithmetic coding, LZW coding, run length coding, Bit Plane coding, transform coding, predictive coding , wavelet coding, JPEG standards.

**Unit IV:**

**12 lecture hours**

**Basic Steps of Video Processing:** Analog video, Digital Video, Time varying Image Formation models, 3D motion models, Geometric Image formation, Photometric Image formation, sampling of video signals, filtering operations.

**2-D Motion Estimation:** Optical flow, general methodologies, pixel based motion estimation, Block matching algorithm, Mesh based motion Estimation, global Motion Estimation, Region based motion estimation, multi resolution motion estimation. Waveform based coding, Block based transform coding, predictive coding, Application of motion estimation in video coding.

**Text Books:**

1. “Digital Image Processing”, Gonzaleze and Woods, 3 rdedition , Pearson.

2. “Handbook of image and video processing”, Bovik, Alan C. Academic press, 2010.

**Reference Books:**

1. “Digital video Processing”, M. Tekalp, Prentice Hall International.

2. “Fundamentals of Digital Image Processing A Practical Approach with Examples in Matlab”, Chris Solomon, Toby Breckon, John Wiley & Sons.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Interpret** the need for image transforms different types of image transforms and their properties. | **PO1,PO2,PO4** |
| **CO2** | **Develop** any image processing application and explain different techniques employed for the enhancement of images. | **PO1,PO2,PO4,PSO3** |
| **CO3** | **Explain** different causes for image degradation and overview of image restoration techniques. | **PO1,PO2,PO4,PO3,PSO3** |
| **CO4** | **Illustrate** theneedfor image  compression  and  to  learn  the  spatial  and  frequency  domain techniques of image compression, along with steps of video processing. | **PO1,PO2,PO4,PO3,PSO1,PSO2** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11035 | Image Processing (Prof. Elective- III) | 3 | 3 | 2 | 3 | - |  | - | - | - | - | - | - | 3 | 3 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VII Stream: CSE

PAPER TITLE: Image Processing (Prof. Elective- III) PAPER CODE: CSE11035

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Define** an image. | **R** | **CO1** |
| 2. | **What** is simultaneous contrast? | **R** | **CO2** |
| ­­­ 3. | **Define** maximum filter and minimum filter. | **R** | **CO3** |
| 4. | **Define** sampling. | **R** | **CO4** |
| 5. | **What** is image compression? | **R** | **CO4** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Explain** Discrete wavelet transform. | **U** | **CO1** |
| 7. | **Examine** the objective of image enhancement technique. | **An** | **CO2** |
| 8. | **Explain** Image restoration. Mention two areas where image restoration process can be applied. | **U** | **CO3** |
| 9. | **Explain** some basic morphological algorithms. | **U** | **CO4** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Explain** the various components of a general purpose image processing system. | **U** | **CO1** |
| 11 | **Explain** a lossless predictive coding model used for image compression. | **U** | **CO4** |
| 12. | **Explain** some of the basic relationships that exist between pixels in a digital image. | **U** | **CO1** |

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| **CSE11036** | **Cloud Computing (Prof. Elective- III)** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **DBMS, Java, Python** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To explain the evolving computer model called cloud computing.

2. To introduce the various levels of services that can be achieved by cloud.

3. To describe the security aspects in cloud.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Ability** to constructa model with reduced implementation and maintenance costs.

CO2. **How** to provide Flexible and scalable infrastructures.

CO3. Making an **outline** for availability of high-performance applications to small/ medium-sized businesses.

CO4. **Plan** for a faster implementation to market.

CO5. **Experiment with** different case studies, which will help to understand more of practice of cloud computing in the market.

**Catalog Description:**

The course presents a top-down view of cloud computing, from applications and administration to programming and infrastructure. Its main focus is on parallel programming techniques for cloud computing and large scale distributed systems which form the cloud infrastructure. The topics include: overview of cloud computing, cloud systems, parallel processing in the cloud, distributed storage systems, virtualization, security in the cloud, and multicore operating systems. Students will study state-of-the-art solutions for cloud computing developed by Google, Amazon, Microsoft, Yahoo, VMWare, etc. Students will also apply what they learn in one programming assignment and one project executed over Amazon Web Services.

**Course Content:**

**Unit I:**

**9 lecture hours**

Module 1: Introduction Definition and evolution of Cloud Computing; Enabling Technologies, Service and Deployment Models Popular Cloud Stacks and Use Cases; Benefits, Risks, and Challenges of Cloud Computing Economic Models and SLAs. Topics in Cloud Security; Common cloud providers and their associated cloud stacks and popular cloud use case scenarios.

**Unit II:**

**12 lecture hours**

Module 2: Cloud Infrastructure: Historical Perspective of Data Centers; Datacenter Components: IT Equipment and Facilities; Design Considerations: Requirements, Power, Efficiency, & Redundancy, Power calculations, PUE (Power usage effectiveness) and Challenges in Cloud Data Centres; Cloud Management and Cloud Software Deployment Considerations.

**Unit III:**

**10 lecture hours**

Module 3: Virtualization (CPU, Memory, I/O); Case Study: Amazon EC2; Software Defined Networks (SDN); Software Defined Storage (SDS)

**Unit IV:**

**9 lecture hours**

Module 4: Cloud Storage Introduction to Storage Systems; Cloud Storage Concepts Distributed File Systems (HDFS, Ceph FS); Cloud Databases (HBase, MongoDB, Cassandra, DynamoDB) ; Cloud Object Storage (Amazon S3, OpenStack Swift, Ceph)

**Unit V:**

**5 lecture hours**

Module 5: Programming Models Distributed Programming for the Cloud; Data-Parallel Analytics with Hadoop; MapReduce (YARN); Iterative Data-Parallel Analytics with Apache Spark ; Graph-Parallel Analytics with GraphLab 2.0 (PowerGraph)

**Text Books:**

1. Enterprise Cloud Computing - Technology, Architecture, Applications, GautamShroff, Cambridge University Press, 2010

2. Cloud Computing: Principles and Paradigms, Editors: RajkumarBuyya, James Broberg, Andrzej M. Goscinski, Wiley,2011

**Reference Books:**

1. Cloud Computing: Concepts and Practices, Naresh Kumar Sehgal, Pramod Chandra P. Bhatt, Springer 2018.

2. AWS System Administration: Best Practices for Sysadmins in the Amazon Cloud, Federico Lucifredi and Mike Ryan, "O'Reilly Media, Inc, 2018.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Mid Term** | **Class Assessment** | **End Term** |
| **Weightage (%)** | **20** | **30** | **50** |

**Relationship between the Course Outcomes (Cos) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | Ability to **construct** a model with reduced implementation and maintenance costs. | **PO1,PSO1** |
| **CO2** | **How** to provide Flexible and scalable infrastructures. | **PO1, PO2, PO4, PSO1** |
| **CO3** | Making an **outline** for availability of high-performance applications to small/ medium-sized businesses. | **PO1,PO5, PSO3** |
| **CO4** | **Plan** for a faster implementation to market. | **PO3, PO12** |
| **CO5** | **Experiment with** different case studies, which will help to understand more of practice of cloud computing in the market. | **PO2, PO12,PSO2** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11036 | Cloud Computing (Prof. Elective- III) | 3 | 2 | 3 | 3 | 3 | - | - | - | - | - | - | 2 | 2 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VII Stream: CSE

PAPER TITLE: Cloud Computing (Prof. Elective- III) PAPER CODE: CSE11036

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 11 Total No of Pages: 02

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **List** down the properties of cloud computing. | **R** | **CO2** |
| 2. | **State** the advantages of cloud service deployment | **U** | **CO3** |
| ­­­ 3. | **Define** virtualization. | **R** | **CO1** |
| 4. | **How** will you implement storage virtualization at the server level? | **R** | **CO3** |
| 5. | **What** is the use of Google file system? | **R** | **CO5** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | With a neat diagram, **explain** the architecture of OpenStack system. | **U** | **CO4** |
| 7. | **Identify** security challenges in cloud computing. | **AP** | **CO1** |
| 8. | **Describe** Server virtualization. | **U** | **CO3** |
| 9. | **Compare:** Public. Private and Hybrid clouds with examples. | **U** | **CO5** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Explain** the service models of distributed and cloud computing in detail. | **U** | **CO5** |
| 11. | **Define** different methods of resource provisioning and platform deployment in detail with a neat diagram. | **R** | **CO2** |
| 12. | **Explain** the architecture and working principle of MapReduce. | **U** | **CO3** |

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| **CSE11037** | Information Retrieval (Prof. Elective- III) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Pattern Recognition, Natural language processing** | | | | |
| **Co-requisites** | **Machine Learning** | | | | |

**Course Objectives:**

1. 1.Present the basic concepts in information retrieval and more advanc techniques of multimodal based information systems.
2. Understand the underlined problems related to IR.
3. Acquired the necessary experience to design, and implement real applications using Information Retrieval systems.
4. To enable students to acquire knowledge on vector space model and Computing Scores in a Complete Search System.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Discuss** various techniques to retrieve information.

CO2. **Explain** the various pre-processing techniques like stop words removal, stemming, etc

CO3. **Explain** the Index Construction and the Index Compression Statistical properties

CO4. **Demonstrate** the concepts of vector space to implement in various digital information environments and Computing Scores in a Complete Search System.

CO5. **Evaluation** in Information Retrieval.

**Catalog Description:**

Information retrieval is the process through which a computer system can respond to a user's query for text-based information on a specific topic. IR was one of the first and remains one of the most important problems in the domain of natural language processing (NLP). Web search is the application of information retrieval techniques to the largest corpus of text anywhere — the web — and it is the context where many people interact with IR systems most frequently.

**Course Content:**

**Unit I:**

**5 lecture hours**

Introduction: Basics of Information Retrieval and Introduction to Search Engines; Boolean

Retrieval: Boolean queries, Building simple indexes, Processing Boolean queries

**Unit II:**

**10 lecture hours**

Term Vocabulary and Posting Lists: Choosing document units, Selection of terms, Stop word elimination, Stemming and lemmatization, Skip lists, Positional postings and Phrase queries; Dictionaries and Tolerant Retrieval: Data structures for dictionaries, Wildcard queries, Permuterm and K-gram indexes, Spelling correction, Phonetic correction.

**Unit III:**

**8 lecture hours**

Index Construction – Single pass scheme, Distributed indexing, Map Reduce, Dynamic indexing; Index Compression Statistical properties of terms, Zipf's law, Heap's law, Dictionary compression, Postings file compression, Variable byte codes, Gamma codes.

**Unit IV:**

**12 lecture hours**

Vector Space Model – Parametric and zone indexes, Learning weights, Term frequency and weighting, Tf-Idf weighting, Vector space model for scoring, variant tf-idf functions. Computing Scores in a Complete Search System – Efficient scoring Inexact retrieval, Champion lists, Impact ordering, Cluster pruning, Tiered indexes, Query term proximity, Vector space scoring and query operations.

**Unit V:**

**10 lecture hours**

Evaluation in Information Retrieval: Standard test collections, unranked retrieval sets, Ranked retrieval results, Assessing relevance, User utility, Precision and Recall, Relevance feedback, Rocchio algorithm, Probabilistic relevance feedback, Evaluation of relevance feedback.

**Text Books:**

1. “An Introduction to Information Retrieval”, C. D. Manning, P. Raghavan, H. Schutze, Cambridge University Press, 2009.

**Reference Books:**

1. “Modern Information Retrieval”, R. Baeza and B. Ribeiro-Neto, Pearson Education, 1999.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Discuss** various techniques to retrieve information. | **PSO1. PO2** |
| **CO2** | **Describe** the various preprocessing techniques like stop words removal, stemming, etc. | **PO3, PO4, PS03** |
| **CO3** | **Explain** the Index Construction and the Index Compression Statistical properties | **PO4, PO5, PO6** |
| **CO4** | **Demonstrate** the concepts of vector space to implement in various digital information environments and Computing Scores in a Complete Search System. | **PO2, PS01, PS02** |
| **CO5** | **Evaluation** in Information Retrieval. | **PO7, PS02, PS03** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11037 | Information Retrieval (Prof. Elective- III) |  | 2 | 2 | 2 | 3 | 3 | 3 | - | - | - | - |  | 3 | 2 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION**

Name of the Program: B. Tech Semester: VII Stream: CSE

PAPER TITLE: Information Retrieval PAPER CODE: CSE11037

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **SECTION A (Attempt any two)** | | | |
| 1. | **Explain** Stemming. | **R** | **CO1** |
| 2. | **Explain** Document Indexing. | **U** | **CO2** |
| ­­­ 3. | **Explain** Query Processing in Information Retrieval. | **U&R** | **CO3** |
| 4. | **Explain** the difference between Binary Tree and B Tree. | **R** | **CO1, CO2** |
| 5. | **What** is conflation? | **U** | **CO4** |
|  | **SECTION B (**Attempt any **Two Questions)** |  | |
| 6. | **What** are the applications of Information Retrieval? | **Ap** | **CO3** |
| 7. | **Explain** Query Processing in Information Retrieval with suitable example. | **U & C** | **CO4** |
| 8. | **Explain** the difference between Binary Tree and B Tree. | **An** | **CO5** |
| 9. | **Explain** the type of natural language technology used in information retrieval. | **U** | **CO2** |
|  | **SECTION C is Compulsory** |  | |
| 10. | **Explain** Term Frequency in Information Retrieval with suitable example. | **E & R** | **CO4,**  **CO1, CO2** |
| 11. | **Explain** Boolean Model of Information Retrieval with pseudo code and example. | **R & U** | **CO5** |
| 12. | **Define** Zipf’s law. | **U** | **CO3** |

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| **CSE11038** | Computer Graphics (Prof. Elective- III) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Basic knowledge of Computer system** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.

2. To learn the basic principles of 3-dimensional computer graphics.

3. To provide an understanding of how to scan convert the basic geometrical primitives, how to  
transform the shapes to fit them as per the picture definition.

4. To provide an understanding of mapping from a world coordinates to device coordinates,  
clipping, and projections.

5. To provide an understanding of curve representation and hidden surfaces along with the different colour models.

**Course Outcomes:**

On completion of this course, the students will be able to

**CO1. Explain** software & hardware properties of graphics systems in general and detailed rasterization

algorithms for line, circle, ellipse & polygons in particular.

**CO2. Illustrate** how to do ‘cut-paste’ operation on pictures using 2D clipping and generate

modified/edited pictures using 2D/3D geometric transformation & parallel and perspective

projection as needed.

**CO3. Explain** the general extension for 3D surfaces and also with basic colour models, such as RGB,

CMY, YIQ, HSV.

**CO4. Classify** the hidden surfaces algorithms.

**CO5.Define** fractals and other self-similar features of objects and ray tracing models.

**Catalog Description:**

Computer Graphics refers to the representation and manipulation of image data by a computer. It is the sub-field of computer science which studies methods for digitally synthesizing and manipulating visual content. Students get an overview of two-dimensional transformation and viewing. Students get an exposure to three-dimensional geometry and representation of 3D objects. Students learn about the curve concept which is essential as not all objects in real life have flat surface. Students learn the different algorithms for hidden surface removal and about different color models.

**Course Content:**

**Unit I:**

**8 lecture hours**

Primitive Output Design: Algorithms for Line, Circle and Ellipse drawing; Attributes of output primitives: Two-dimensional Geometric transformation, 2D viewing: Line, Polygon, Curve and Text clipping algorithms.

**Unit II:**

**\9 lecture hours**

Parallel and Perspective projections, three dimensional object representation, Polygons, Curved lines, Splines, Quadric Surfaces, Data set visualization, 3D transformations and viewing, Identification of visible surface.

**Unit III:**

**10 lecture hours**

Different Color Models – RGB, CMY, YIQ, HSV; General Computer Animation, Raster, Key-frame, Graphics programming using OPENGL, Graphics primitives, Drawing three dimensional objects and scenes.

**Unit IV:**

**8 lecture hours**

Fundamentals of Shading model, Flat and Smooth shading, Adding texture on faces, Adding shadow of an object, Building camera in a program, Creating shaded objects, Rendering texture and Drawing Shadows.

**Unit V:**

**10 lecture hours**

Self-similarity and Fractals, Random Fractals, Piano curves, Image creation by iterative functions, Mandelbrot sets, Julia Sets, Overview of Ray Tracing, Ray intersection, Adding Surface texture, Transparency and Reflections, Boolean operations on Objects.

**Text Books:**

1. Computer Graphics with Open GL, 4th Edition, Donald D. Hearn, M. Pauline Baker, Warren Carithers, Pearson Education

2. Computer Graphics using OPENGL, Third Edition,F.S. Hill, Pearson Education.

**Reference Books:**

1.Computer Graphics- Principles and Practice, Third Edition,[John F. Hughes](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22John+F.+Hughes%22), [AndriesHYPERLINK "https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Andries+Van+Dam%22" Van Dam](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Andries+Van+Dam%22), [James D. Foley](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22James+D.+Foley%22), [Steven K. HYPERLINK "https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Steven+K.+Feiner%22"Feiner](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Steven+K.+Feiner%22), Addison-Wesley

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** software & hardware properties of graphics systems in general and detailed rasterization algorithms for line, circle, ellipse & polygons in particular. | **PO1,PO2,PO4,PO3** |
| **CO2** | **Illustrate** how to do ‘cut-paste’ operation on pictures using 2D clipping and generate modified/edited pictures using 2D/3D geometric transformation & parallel and perspective projection as needed | **PO3,PO5, PSO1,PSO2** |
| **CO3** | **Explain** the general extension for 3D surfaces and also with basic colour models, such as RGB, CMY, YIQ, HSV. | **PO1,PO2,PO4** |
| **CO4** | **Classify** the hidden surfaces algorithms | **PO1,PO2,PO4, PSO3** |
| **CO5** | **Define** fractals and other self-similar features of objects and ray tracing models. | **PO1,PO2,PO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11038 | Computer Graphics(Prof. Elective- III) | 3 | 3 | 2 | 3 | 3 | - | - | - | - | - | - | **-** | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VII Stream: CSE

PAPER TITLE: Computer Graphics (Prof. Elective- III) PAPER CODE: CSE11038

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **What** is pixel? | **R** | **CO1** |
| 2. | **Define** ray tracing | **R** | **CO5** |
| ­­­ 3. | **What** is2D scaling? | **R** | **CO2** |
| 4. | **What** is Back face detection? | **R** | **CO4** |
| 5. | **What** iscolor model? | **R** | **CO3** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Describe** the DDA line drawing algorithm. | **U** | **CO1** |
| 7. | **Explain** the different types of clipping techniques. | **U** | **CO2** |
| 8. | **Explain** the significance of fractals. | **U** | **CO5** |
| 9. | **Explain** the difference between RGB and CMY color model. | **U** | **CO3** |
|  | **SECTION C(Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Explain** in detail about 3D object representation. | **U** | **CO4** |
| 11. | **Write** short notes on Hidden surface problem. | **U** | **CO4** |
| 12. | **Distinguish** between parallel and perspective projection. | **An** | **CO5** |

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| **CSE11039** | Artificial Neural Network and Deep Learning (Prof. Elective- III) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Introduction to probability theory, linear algebra or statistics** | | | | |
| **Co-requisites** | **Python, prior knowledge of some machine learning algorithms and data structures is very useful.** | | | | |

**Course Objectives:**

1.To understand the motivation for different neural network architectures and select the appropriate architecture for a given problem

2.To understand what are the major categories of models (such as CNNs and RNNs), and when they should be applied

3.To apply backpropagation algorithm for calculating weight gradients in a feed forward neural network

**Course Outcomes:**

On completion of this course, the students will be able to

CO1**. Recall** basics on Artificial Intelligence and Neural Network

CO2. **Illustrate** ANN learning, Error correction learning, Memory-based learning, Hebbian

learning, Competitive learning and Boltzmann learning

CO3**. Apply** deep learning algorithms and solve real world problems.

CO4. **Choose** deep learning algorithms which are more appropriate for various types of learning

tasks in various domains.

CO5. **Identify** the results and performance of the algorithms.

**Catalog Description:**

Artificial Neural Networks are programs that write themselves when given an objective, some training data, and abundant computing power. Recently, these programs have brought about a wide array of future-like innovations, such as self-driving cars, face recognition, and human-like speech generators. This course offers you an introduction to Deep Artificial Neural Networks (i.e. “Deep Learning”). With focus on both theory and practice, we cover models for various applications, how they are trained and tested, and how they can be deployed in real world applications.

**Course Content:**

**Unit I:**

**10 lecture hours**

**Introduction:** what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks

**Learning Process:** Error Correction learning, Memory based learning, Hebbian learning, Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process

**Unit II:**

**5 lecture hours**

**Single Layer Perceptron’s:** Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception –convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment.

**Multilayer Perceptron:** Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection.

**Unit III:**

**10 lecture hours**

**Back Propagation:** Back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning.

**Self- Organization Maps:** Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification, Hierarchal Vector quantilizer, contexmel Maps.

**Neuro Dynamics:** Dynamical systems, stability of equilibrium states, attractors, neuro-dynamical models, manipulation of attractors’ as a recurrent network paradigm

**Unit IV:**

**15 lecture hours**

**Deep Learning:** Recent developments in deep neural networks, Limiting the size of the weights, Using noise as a regularize, The ups and down of back propagation, Introduction to full Bayesian approach, The Bayesian interpretation of weight decay, Mackay's quick and dirty method of setting weight costs.

**Convolutional Neural Networks:** Invariance, stability. Variability models (deformation model, stochastic model), Scattering networks Group Formalism, Supervised Learning: classification, Properties of CNN representations: inevitability, stability, invariance, covariance/invariance: capsules and related models, Connections with other models: dictionary learning, LISTA, other tasks: localization, regression, Embedding (DrLim), inverse problems, Extensions to non-euclidean domains, Dynamical systems: RNNs, LSTM.

**Deep Unsupervised Learning:** Autoencoders (standard, Denoising, contractive, etc), Variational Autoencoders, Adversarial Generative Networks, Maximum Entropy Distributions.

**Unit V:**

**5 lecture hours**

**Advance Topics:** Non-convex optimization for deep network, Stochastic optimization, Attention and Memory Models, Open Problems.

**Text Books:**

1. Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2nd

Edition 2004.

2. Deep Learning, Ian Goodfellow, Yoshua Bengio, and Aaron Courville, MIT press, 2016.

**Reference Books:**

1. Artificial neural networks, B. Vegnanarayana Prentice Hall of India P Ltd, 2005.

2. Neural networks in Computer intelligence, Li Min Fu, TMH, 2003.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Recall** basics on Artificial Intelligence and Neural Network | **PO1, PO2, PSO1, PSO2, PSO3** |
| **CO2** | **Illustrate** ANN learning, Error correction learning, Memory-based learning, Hebbian learning, Competitive learning and Boltzmann learning | **PO1, PO2, PO3, PO4, PO5, PSO1, PSO2, PSO3** |
| **CO3** | **Apply** deep learning algorithms and solve real world problems. | **PO1, PO2,**  **PO3, PO4, PO5, PSO1, PSO2, PSO3** |
| **CO4** | **Choose** deep learning algorithms which are more appropriate for various types of learning tasks in various domains. | **PO1, PO2, PO3,**  **PO4, PO5, PSO1, PSO2, PSO3** |
| **CO5** | **Evaluate** and interpret the results and performance of the algorithms. | **PO1, PO2, PO3, PO4** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11039 | Artificial Neural Network and Deep Learning (Prof. Elective- III) | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 |

1=weakly mapped 2=moderately mapped 3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| ADAMAS UNIVERSITYSCHOOL OF ENGINEERING AND TECHNOLOGYEND-SEMESTER EXAMINATIONName of the Program: B. Tech Semester: VIICode- CSE11039 Stream- CSETime: 03 Hrs.Paper title– Artificial Neural Network and Deep Learning (Prof. Elective -III) Total pages- 1Max. Marks: 40 Total no. of questions- 12Instructions:Attempt All Questions from Section A (Each Carrying 1 Marks); any Three Questions fromSection B (Each Carrying 5 Marks). Any Two Questions from Section C (Each Carrying10 Marks).1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.2. Assumptions made if any, should be stated clearly at the beginning of your answer. 3. **All parts of a Question should be answered consecutively** | | | | |
| **SECTION A (Answer All questions)** | | | | |
| 1. | **What** is neural network? Explain about multilayer perceptron model. | | **R** | **CO1** |
| 2. | **What** is the role of activation functions in neural network? Name the concept and briefly explain” Function is a measure to evaluate how good your model’s performance is” | | **R** | **CO2** |
| ­­­ 3. | **What** do you understand by back propagation? | | **R** | **CO3** |
| 4. | **What** is the difference between a feed forward neural network and recurrent neural network? | | **R** | **CO4** |
| 5. | **What** is an auto-encoder? | | **R** | **CO5** |
|  | **SECTION B (**Attempt any **Three Questions)** | |  | |
| 6. | a) **What** are Hyperparameters?  b) **What** will happen if the learning rate is too slow or too high? | | **R** | **CO1** |
| 7. | a) What are Softmax and ReLU functions?  b) **Explain** gradient descent. | | **R** | **CO2** |
| 8. | a) **Explain** Bayesian Classifier. Identify working of Bayesian Classifier for a Gaussian Environment?  b) **Briefly describe** learning process in form of error correction, memory based, Hebbian? | | **R** | **CO3** |
| 9. | **Explain** the concept of overfitting in case of neural networks. | | **R** | **CO4/CO5** |
|  | **SECTION C (**Attempt any **Two Questions)** | |  | |
| 10. | Consider the unit shown on Figure 1.  Diagram  Description automatically generated  Suppose that the weights corresponding to the three inputs have the following values:  w1 = 2  w2 = −4  w3 = 1  and the activation of the unit is given by the step-function:  ϕ(v) = 1 if v ≥0    0 otherwise  **Solve** and Find the output value y of the unit for each of the following input patterns: Pattern P1 P2 P3 P4  x1 1 0 1 1  x2 0 1 0 1  x3 0 1 1 1 | | **Ap** | **CO1**  **CO2** |
| 11. | **Explain** various type of learning. Why deep learning has more advantage over traditional machine learning? | | **R** | **CO3** |
| 12. | **Explain** principle of forward propagation and back propagation algorithm in case of deep learning. | | **R** | **CO4** |

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| **CSE11040** | **Cryptography & Cyber Security (Prof. Elective -IV)** | **L** | **T** | **P** | **C** |
| **Version 3.1** | **Contact hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Computer Network, Engineering Mathematics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To understand basics of Cryptography and Network Security.
2. To be able to secure a message over insecure channel by various means.
3. To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
4. To understand various protocols for cyber security to protect against the threats in the cyber space.

**Course Outcomes:**

On completion of this course, the students will be able to

1. **Define** the basics of OSI security model and Classical Encryption Technique.
2. **Understand** and identify the application of Public Key Encryption Techniques and practices.
3. **Demonstrate** the application of Data Authentication and Authorization.

CO4. **Examine** the basics concept of Network Security and Web Security.

CO5. **Appraise** the recent threats and attacks against the technical world and design some effective prevention scheme.

**Catalog Description:**

Effective network communication is an integral part of technical life. Cyber Security and Cryptography is a process of securing the data communication, all the algorithms, messages etc. In this course you will learn the inner workings of cryptographic systems and how to correctly use them in real-world applications. The course begins with a detailed discussion of how two parties who have a shared secret key can communicate securely when a powerful adversary eavesdrops and tampers with traffic. We will examine many deployed protocols and analyze mistakes in existing systems. The second half of the course discusses public-key techniques that let two parties generate a shared secret key. Throughout the course participants will be exposed to many exciting open problems in the field and work on fun (optional) programming projects. In the course cybersecurity we will cover more advanced security tasks such as zero-day vulnerability, privacy mechanisms, and other forms of encryption.

**Course Content:**

**Unit I:**

**10 lecture hours**

**Classical Encryption Techniques:** Symmetric Cipher - Substitution Techniques, Transposition Techniques; Rotor Machines, Steganography, Block Cipher and Data Encryption Standard (DES), Strength of DES, Cryptanalysis - Differential and Linear model. Symmetric Ciphers -Triple DES, Blowfish; Confidentiality using Conventional Encryption - Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random Number Generation.

**Unit II:**

**9 lecture hours**

Public Key Encryption, Digital Signatures, Prime Number Format’s and Euler’s Theorems, Primality testing. Public Key Cryptography and RSA - Principles of Public Key Cryptosystems, RSA Algorithm, Key Management, Diffie-Hellman Key Exchange.

**Unit III:**

**10 lecture hours**

Authentication Protocol, Message Authentication, Authentication Requirements,

Authentication Functions, Message Authentication Codes, Message Digest - MD5, Digital Signatures and Authentication Protocols.

**Unit IV:**

**10 lecture hours**

**Network Security:** Authentication Applications - Kerberos, X.509 Directory Authentication Service; Electronic Mail Security: Pretty Good Privacy, IP Security-Overview, Architecture, Authentication Header, Encapsulation Security Payload

**Web Security:** Basic requirements, Secure Sockets Layer and Transport Layer security, Secure Electronic Transaction

**Unit V:**

**6 lecture hours**

**System Security:** Intruders, Malicious Software, Viruses and Related Threats, Counter Measures, Firewalls and their Design Principles.

Cross Site Scripting Attack, SQL Injection Spoofing and Sniffing

**Text Books:**

1. “Cryptography and Network Security”, William Stallings, 4th Edition, Pearson Education/PHI, 2006.
2. “Network Security: Private Communication in Public World”, Charlie Kaufman, RadiaPerman, Mike Speciner, 2nd Edition, Pearson Education, 2011.

**Reference Books:**

1. “Cryptography and Network Security”, Atulkahate, TMH, 2003.
2. “Cyber Security”, Nina Godbole, WILEY, 2003.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Define** the basics of OSI security model and Classical Encryption Technique. | **PO1, PO2** |
| **CO2** | **Understand** and identify the application of Public Key Encryption Techniques and practices. | **PO2** |
| **CO3** | **Demonstrate** the application of Data Authentication and Authorization. | **PO1, PO5** |
| **CO4** | **Examine** the basics concept of Network Security and Web Security. | **PO1, PO2, PO3** |
| **CO5** | **Appraise** the recent threats and attacks against the technical world and design some effective prevention scheme. | **PO5, PSO3** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11040 | Cryptography & Cyber Security(Prof. Elective -IV) | 3 | 3 | 3 | - | 3 | - | - | - | - | - | - | **3** | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech Semester: VII Stream: CSE

PAPER TITLE: Cryptography & Cyber Security (Prof. Elective -IV)

PAPER CODE: CSE11040

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Describe** the Threat and Vulnerability with examples. | **U** | **CO1** |
| 2. | **Explain** the about Private key and Public Key with examples. | **Evaluate** | **CO1** |
| 3. | **Describe** the difference Sniffing and Spoofing | **U** | **CO1** |
| 4. | **Explain** the nature of Virus. | **Evaluate** | **CO2** |
| 5. | **Describe** why Ceaser Cipher is mono alphabetic. | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Write** the algorithm of RSA. | **Ap** | **CO1** |
| 7. | **Examine** whether the AES is better than DES or not. | **Ap** | **CO2** |
| 8. | **Describe** the various malware in details. | **U** | **CO3** |
| 9. | **Describe** with Example: i) XSS attack ii) Sql injection | **U** | **CO4** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Write** the steps to solve the following equation:  i. x= 1 mod 5  ii. x= 2 mod 7  iii. x= 3 mod 9  iv. x= 4 mod 11 | **Ap** | **CO2** |
| 11. | **Write** the steps of Diffie Hellman Key Exchange Algorithm with Example. | **Ap** | **CO4** |
| 12. | **Describe** the advantage of Public Key Encryption over Symmetric Key Encryption. **Describe** Firewalls and their Design Principles. | **U** | **CO3** |

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| **CSE11041** | Internet of Things (Prof. Elective -IV) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Basics of Microprocessor/Microcontroller** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To give a brief overview of IoT.

2. To enable Basic, 1G and 2G, 3G, 3.5G, 4G (LTE) and 5G precision at workplace.

3. To give the students a perspective to smart objects, Network Convergence, IoT-Standard and Characteristic.

4. To enable students, study the structure of Extensible Messaging and Presence Protocol (XMPP), Advanced Message Queuing Protocol (AMQP for their profession.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Interpret** the Architecture of IoT, Security issues, Opportunities for IoT

CO2. **Effectively** analyse Concept of wireless sensor network

CO3. **Explore** Network Convergence, IoT-Standard and Characteristic.

CO4. **Precise** analysis of Sensor network architecture,

CO5. **Apply** IoT Taxonomy, System Model.

**Catalog Description:**

The Internet of Things (IoT), as a new growth engine of the information and communications technology industry, has sparked global enthusiasm. However, academic deliberation has concentrated on technological aspects, discounting the multifaceted nature of IoT. Therefore, we reviewed non-technical and technical domain to examine the current status of IoT discourse and applied analytic hierarchy process models to assess the priorities for future IoT research.

**Course Content:**

**Unit I:**

**2 lecture hours**

Introduction: What is IoT and the connected world?

Architecture of IoT, Security issues, Opportunities for IoT

**Unit II:**

**4 lecture hours**

**Wireless Communication**

Wireless Communication –Basic, 1G and 2G, 3G, 3.5G, 4G (LTE) and 5G

**Unit III:**

**2 lecture hours**

**Wireless Sensor Networks**

Concept of wireless sensor network, Chronology of sensor node, Senor network architecture,

Taxonomy, System Model.

**Unit IV:**

**6 lecture hours**

**Architecture**

IoT built from smart objects, Network Convergence, IoT-Standard and Characteristic,

Outline of Architecture, Opportunities in IoT, Architectural Components and its mapping into protocols.

**Unit V:**

**8 lecture hours**

**Wireless Standards**

What are Wireless Standards? Network and Device Layer Protocol, Routing Protocol for Low Power and Lossy Networks (RPL), 6LowPAN, IEEE 802.15.4, Bluetooth Low Energy (BLE), LTE.

**Unit VI:**

**10 lecture hours**

**Middleware layer Protocol**

multicast DNS (mDNS), DNS Service Discovery (DNS-SD)

**Application Layer Protocol**

Constrained Application Protocol (CoAP), Message Queuing Telemetry Transport (MQTT),

Extensible Messaging and Presence Protocol (XMPP), Advanced Message Queuing Protocol (AMQP).

**Unit VII:**

**13 lecture hours**

**Localization, Data Storage (Big Data), Web of Things (WoT) and Security**

Localization:

Localization algorithms, Indoor localization, Localization for mobile systems, Applications,

Data Storage (Big Data): Managing high rate sensor data, Processing data streams, Data consistency in an intermittently connected or disconnected environment, Identifying outliers and anomalies.

Security: Why is security for IoT so hard? Threat models; Defensive strategies and examples

**Applications**

Smart health; Home automation; Location tracking

**Text Books:**

1. Internet of Things (IoT): Technologies, Applications, Challenges and Solutions- BK Tripathy (Editor), J Anuradha (Editor), CRC press, 2018

2. The Internet of Things, S. Greengard, MIT Press, 2015, 1st Edition

**Reference Books:**

1.Ala Al-Fuqaha et al., "Internet of Things: A Survey on Enabling Technologies, Protocols, and Applications", IEEE Communication Surveys & Tutorials, Vol. 17, No. 4, Fourth Quarter 2015, pp 2347-76

2.S. M. RIAZUL ISLAM et al., "The Internet of Things for Health Care: A Comprehensive Survey", IEEE Access, Jun 2015, pp678-08

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Interpret** the Architecture of IoT, Security issues, Opportunities for IoT. | **PO1, PO11,PO10,PO7** |
| **CO2** | **Effectively** analyse Concept of wireless sensor network. | **PO1,PO2, PO3, PSO1,PO10** |
| **CO3** | **Explore** Network Convergence, IoT-Standard and Characteristic. | **PO1, PO2, PO3, PO4, PO5, PO11, PSO1, PSO2,PO12** |
| **CO4** | **Precise** analysis of Sensor network architecture. | **PO1, PO6, PO8, PO9, PO12, PSO2** |
| **CO5** | **Apply** IoT Taxonomy, System Model. | **PO1, PO6, PO8, PO9, PO12, PSO3,PSO2** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11041 | Internet of Things(Prof. Elective- IV) | 3 | 2 | 3 |  |  | 3 |  | 3 |  |  |  | 2 | 2 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech, Semester: VII Stream: CSE

PAPER TITLE: Internet of Things (Prof. Elective -IV) PAPER CODE: CSE11041

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **List** the steps involved in Architecture of IoT | **U** | **CO1** |
| 2. | **Enumerate** the basic elements of wireless sensor network | **U** | **CO2** |
| ­­­ 3. | **Define** Extensible Messaging and Presence Protocol (XMPP), | **R** | **CO3** |
| 4. | **What** is multicast DNS (mDNS),? | **R** | **CO4** |
| 5. | **Give** the principles of Localization for mobile systems. | **U** | **CO3** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Describe** the characteristics of Constrained Application Protocol (CoAP), Message Queuing Telemetry Transport (MQTT),  . | **U** | **CO1** |
| 7. | **Examine** Why is security for IoT so hard? And **its Inference** with your own example. | **U** | **CO1, CO2** |
| 8. | **Classify** the factors influencing IoT security. | **U** | **CO3** |
| 9. | **Explain** with Example: i) Smart healthcare ii) Reliability Coefficient of smart city. | **R** | **CO4 /CO5** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Explain** in detail about Home automation. | **U** | **CO4** |
| 11. | **What is** a Quality Control Plan for the Managing high-rate sensor data, Processing data streams? | **R** | **CO4** |
| 12. | **Compare** Data consistency in an intermittently connected or disconnected environment. | **U** | **CO5** |

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| **CSE11042** | 5G Wireless Communication (Prof. Elective -IV) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Computer Networking** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To introduce the concepts of cellular fundamentals and to make the students understand the spectral efficiency involved in the working of mobile and base stations.
2. To develop a clear insight into radio propagation and fading effects in cellular communication.
3. To discuss different types of multiplexing in cellular communication
4. To discuss the different types of wireless mobile communication systems
5. To introduce and discuss about 5G wireless Communication

**Course Outcomes**

On the successful completion of the course, students will be able to

CO1. **Learn to model** radio signal propagation issues and its impact on communication system performance.

CO2. **Interpret** the multiple access schemes based on reservation and random access methods. Explain the concepts of Wi-Fi.

CO3. **Describe** the fundamentals of cellular communication and its related services as GSM and UMTS.

CO4. **Describe** the concepts of Packet switching cellular system.

CO5. **Understand** the concept of mobility management and WPAN

**Catalog Description:**

This course addresses the fundamentals of wireless communication and provides an overview of existing and emerging wireless communications networks including 5g wireless communication. It covers radio propagation and fading models, fundamentals of cellular communications, multiple access technologies, and various wireless networks, including past and future generation networks.

**Course Content:**

**Unit I: 8 lecture hours**

Overview of 5G Networks: An Overview of 5G Requirements, Spectrum Analysis and Regulations for 5G, Spectrum Sharing for 5G.

**Unit II: 10 lecture hours**

Transmission Massive MIMO Communications, Millimeter-Wave Mobile Communications, New Multicarrier Modulations for 5G, Full-Duplex Wireless Communications for 5G.

**Unit III: 9 lecture hours**

Design Techniques for 5G Networks: Generalized Frequency Division Multiplexing, Device-to-Device Communications over 5G Systems, M2M Communications in 5G.

**Unit IV: 9 lecture hours**

Ultra-Dense Network Architecture and Technologies for 5G, 5G RAN Architecture: C-RAN with NGFI, User-Centric Wireless Network for 5G, Energy Harvesting Based Green Heterogeneous Wireless Access for 5G, Resource Management in Sustainable Green HetNets, Resource Allocation for Cooperative D2D Communication Networks.

**Unit V: 9 lecture hours**

Applications for 5G Networks: Fog Computing and Its Applications in 5G, 5G Vehicular Networking Architecture, Communications Protocol Design for 5G Vehicular Networks, Shaping 5G for the Tactile Internet

**Text Books:**

1. 5G Mobile and Wireless Communications Technology- Edited by AfifOsseiran, Jose F. Monserrat, Patrick Marsch, Cambridge University Press, 2016

2. Fundamentals of 5G mobile networks- Edited by Jonathan Rodriguez, 2015 John Wiley

**Reference Books:**

1. 5G System Design- Edited by Patrick Marsch, ÖmerBulakçI, Olav Queseth, Mauro Boldi, 2018 John Wiley

2. 5G Mobile Communications - Edited by Wei Xiang • KanZhengXuemin (Sherman) Shen, Springer 2017.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Learn to model** radio signal propagation issues and its impact on communication system performance. | **PO1, PO2** |
| **CO2** | **Interpret** the multiple access schemes based on reservation and random access methods. Explain the concepts of Wi-Fi. | **PO1, PO4, PO5, PSO3** |
| **CO3** | **Describe** the fundamentals of cellular communication and its related services as GSM and UMTS. | **PO12, PSO1, PSO2** |
| **CO4** | **Describe** the concepts of Packet switching cellular system. | **PO4, PSO2** |
| **CO5** | **Understand** the concept of mobility management and WPAN | **PO1, PO3, PO5, PSO3** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11042 | 5G Wireless Communication (Prof. Elective- IV) | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | 3 | 3 | 2 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VII Stream: CSE

PAPER TITLE: 5G Wireless Communication (Prof. Elective -IV) PAPER CODE: CSE11041

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 10 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

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| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **List** the different types of propagation mechanisms. | **R** | **CO1** |
| 2. | **Illustrate** the friis free space equation. | **U** | **CO2** |
| ­­­ 3. | **State** Snells Law. | **R** | **CO2** |
| 4. | **Define** coherence bandwidth. | **R** | **CO3** |
| 5. | **Examine** the features of scattering? And why it happens? | **Ap** | **CO5** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 4. | **Relate** the signal propagation against free space attenuation and reflection. | **R** | **CO1** |
| 5. | **Examine** the following cases and infer whether the tworay model could be applied ,and justify your answer?   1. h1=35m , hr =3m, d=250m 2. h1=30m , hr =1.5m, d=450m | **Ap** | **CO2** |
| 6. | **How** do you explain fading effects due to multipath time delay spread and fading effects due to Doppler spread? | **R** | **CO4** |
| 7. | **Explain** 5G cellular network architecture. | **R** | **CO5** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 8. | **Discuss** about the system capacity of cellular system. | **R** | **CO3** |
| 9. | **Explain** the different features of multi access technique used in various wireless mobile communication. | **U** | **CO2** |
| 10. | **What is** interference and system capacity and explain in detail with a diagram? | **R** | **CO4** |

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| **CSE11043** | Machine Learning (Open Elective -II) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Data Structure, Discrete Structure** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To help the student to acquire knowledge of basics of artificial intelligent computing.

2. To enable students to gain basic knowledge of machine learning.

3. To incorporate the evolutionary computational knowledge.

4. To enable students to acquire various problem solving, learning, and planning ability.

5. To enable students to apply machine learning models to solve real-life problems.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1**. Identify** and discuss the Mathematical Preliminaries for Machine Learning.

CO2. **Discuss** about Supervised Learning and identify or recognize the different algorithms falling under this category.

CO3. **Discuss** about Unsupervised Learning and solve different algorithms falling under this category.

CO4. **Identify** the Learning Theory by sketching the various Ensemble Methods of Machine Learning.

CO5**. Interpret** the basic ideas of Bayesian Learning and try to implement some model which is based on it.

**Catalog Description:**

There is a growing need for talented machine learning/data scientist developers across every industry. As technology advances, the ability to build quality machine learning driven software while considering design, development, security, and maintenance is sought after amongst all kinds of companies, from finance and banking to healthcare and national security.

Machine Learning applies the knowledge and theoretical understanding gained through computer science to building high-quality intelligent software products. As a maturing discipline, Artificial Intelligence is becoming more and more important in our everyday lives. Our software development and engineering professional program is University’s response to the tremendous growth of the software development industry.

**Course Content:**

**Unit I:**

**9 lecture hours**

Mathematical Preliminaries for Machine Learning: Basic over view of Linear Algebra, Intercepts and Slope, Probability, Random Variable, Matrix Theory, Vectors, Optimization, Multivariate Normal Distribution, Multivariate Calculus, Brief Introduction on MATLAB/Python.

**Unit II:**

**9 lecture hours**

Supervised Learning: Learning by Computing Distances: Distance from Means and Nearest Neighbours; Learning by Asking Questions: Decision Tree based Classification and Regression, Linear Regression: optimization and gradient descent; Logistic Regression: K-Nearest Neighbour Classifier; Naïve Bayes Classifier; Support Vector Machines: Linear case and Non-linear case; Random Forest Classifier.

**Unit III:**

**9 lecture hours**

Unsupervised Learning: Uses of Unsupervised Learning; Data Clustering: K-means and Kernel K-means; Linear Dimensionality Reduction: Principal Component Analysis, Multiple Discriminant Analysis; Nonlinear Dimensionality Reduction via Kernel PCA; Matrix Factorization and Matrix Completion; Introduction to Generative Models; Generative Models for Clustering: GMM and Intro to EM; Expectation Maximization and Generative Models for Dimensionality Reduction.

**Unit IV:**

**9 lecture hours**

**Learning Theory:** Introduction to Learning Theory, VC Dimension; Ensemble Methods: Boosting: Basic, Illustrations and Equations; Boosting versus Bagging; Semi-supervised Learning.

**Unit V:**

**9 lecture hours**

Bayesian Classifier, Belief Network, Probabilistic Graphical Model: Bayesian Network Representations and Semantics; Decision Making under uncertainty; Knowledge Engineering;

**Text Books:**

1. Machine Learning, T.M. McGraw-Hill, Tom M. Mitchell, McGraw-Hill, 1997

2. Pattern Recognition and Machine Learning, C. Bishop, Springer, 2006.

3. Pattern Classification, R. Duda, E. Hart, and D. Stork, Willey-Interscience, 2000.

4. Machine learning: a probabilistic perspective, Kevin R. Murphy, MIT Press, 2012.

**Reference Books:**

1. Machine Learning, E. Alpaydin, MIT Press, 2010.

2. Introduction to statistical pattern recognition, K. Fukunaga, Academic press, 2013.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Identify** and discuss the Mathematical Preliminaries for Machine Learning. | **PO2, PSO1** |
| **CO2** | **Discuss** about Supervised Learning and identify or recognize the different algorithms falling under this category. | **PO1, PO2, PO3** |
| **CO3** | **Discuss** about Unsupervised Learning and solve different algorithms falling under this category. | **PO1, PO4, PSO1** |
| **CO4** | **Identify** the Learning Theory by sketching the various Ensemble Methods of Machine Learning. | **PO1, PO5, PSO1** |
| **CO5** | **Interpret** the basic ideas of Bayesian Learning and try to implement some model which is based on it. | **PO1, PO4, PSO1** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop , test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11043 | Machine Learning (Open Elective -II) | 3 | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | - | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VII Stream: CSE

PAPER TITLE: Machine Learning (Open Elective -II) PAPER CODE: CSE11043

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **What** is Heuristic value? **R** | **U** | **CO1** |
| 2. | **How** do you symbolize existential quantifiers? R | **U** | **CO2** |
| ­­­3. | **State** if Bayesian Learning is parametric model or not? R | **U** | **CO5** |
| 4. | In **which** category of clustering K-Means clustering belong to? R | **R** | **CO4** |
| 5. | In PCA **which** concept of mathematics is used? R | **R** | **CO3** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 4. | Express **what** is ridge in context of Hill-Climbing algorithm? R | **R** | **CO2** |
| 5. | **Explain** the theme of Backtracking search for CSP. U | **U** | **CO4** |
| 6. | **What** is maximum margin classifier? Explain what Support vectors in SVM are. R | **R** | **CO3** |
| 7. | **Describe** the process of PCA. How PCA helps reducing the size of the dataset? R | **U** | **CO4** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 8. | **Derive** the weight update rule for a single hidden layer in back propagation. Ap | **Ap** | **CO2** |
| 9. | **Write** short notes on: - i) Bias ii) Variance. **Explain** using Simple Linear Regression R | **U** | **CO1** |
| 10. | Cluster the dataset using K-Means clustering into 4 clusters. **Find** out the inter-cluster dissimilarity and intra-cluster similarity. R | **Ap** | **CO4** |

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| --- | --- | --- | --- | --- | --- |
| **CSE11041** | Internet of Things (Open Elective -III) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Basics of Microprocessor/Microcontroller** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To give a brief overview of IoT.

2. To enable Basic, 1G and 2G, 3G, 3.5G, 4G (LTE) and 5G precision at workplace.

3. Give the students a perspective to smart objects, Network Convergence, IoT-Standard and Characteristic.

4. To enable students, study the structure of Extensible Messaging and Presence Protocol (XMPP), Advanced Message Queuing Protocol (AMQP for their profession.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Interpret** the Architecture of IoT, Security issues, Opportunities for IoT

CO2. **Effectively** analyse Concept of wireless sensor network

CO3. **Explore** Network Convergence, IoT-Standard and Characteristic.

CO4. **Precise** analysis of Sensor network architecture,

CO5. **Apply** IoT Taxonomy, System Model.

**Catalog Description:**

The Internet of Things (IoT), as a new growth engine of the information and communications technology industry, has sparked global enthusiasm. However, academic deliberation has concentrated on technological aspects, discounting the multifaceted nature of IoT. Therefore, we reviewed non-technical and technical domain to examine the current status of IoT discourse and applied analytic hierarchy process models to assess the priorities for future IoT research.

**Course Content:**

**Unit I:**

**2 lecture hours**

Introduction: What is IoT and the connected world?

Architecture of IoT, Security issues, Opportunities for IoT

**Unit II:**

**4 lecture hours**

**Wireless Communication**

Wireless Communication –Basic, 1G and 2G, 3G, 3.5G, 4G (LTE) and 5G

**Unit III:**

**2 lecture hours**

**Wireless Sensor Networks**

Concept of wireless sensor network, Chronology of sensor node, Senor network architecture,

Taxonomy, System Model.

**Unit IV:**

**6 lecture hours**

**Architecture**

IoT built from smart objects, Network Convergence, IoT-Standard and Characteristic,

Outline of Architecture, Opportunities in IoT, Architectural Components and its mapping into protocols.

**Unit V:**

**8 lecture hours**

**Wireless Standards**

What are Wireless Standards? Network and Device Layer Protocol, Routing Protocol for Low Power and Lossy Networks (RPL), 6LowPAN, IEEE 802.15.4, Bluetooth Low Energy (BLE), LTE.

**Unit VI:**

**10 lecture hours**

**Middleware layer Protocol**

multicast DNS (mDNS), DNS Service Discovery (DNS-SD)

**Application Layer Protocol**

Constrained Application Protocol (CoAP), Message Queuing Telemetry Transport (MQTT),

Extensible Messaging and Presence Protocol (XMPP), Advanced Message Queuing Protocol (AMQP).

**Unit VII:**

**13 lecture hours**

**Localization, Data Storage (Big Data), Web of Things (WoT) and Security**

Localization:

Localization algorithms, Indoor localization, Localization for mobile systems, Applications,

Data Storage (Big Data): Managing high rate sensor data, Processing data streams, Data consistency in an intermittently connected or disconnected environment, Identifying outliers and anomalies.

Security: Why is security for IoT so hard? Threat models; Defensive strategies and examples

**Applications**

Smart health; Home automation; Location tracking

**Text Books:**

1. Internet of Things (IoT): Technologies, Applications, Challenges and Solutions- BK Tripathy (Editor), J Anuradha (Editor), CRC press, 2018

2. The Internet of Things, S. Greengard, MIT Press, 2015, 1st Edition

**Reference Books:**

1. Ala Al-Fuqaha et al., "Internet of Things: A Survey on Enabling Technologies, Protocols, and Applications", IEEE Communication Surveys & Tutorials, Vol. 17, No. 4, Fourth Quarter 2015, pp 2347-76

2. S. M. RIAZUL ISLAM et al., "The Internet of Things for Health Care: A Comprehensive Survey", IEEE Access, Jun 2015, pp678-08

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Interpret** the Architecture of IoT, Security issues, Opportunities for IoT. | **PO1, PO11,PO10,PO7** |
| **CO2** | **Effectively** analyse Concept of wireless sensor network. | **PO1,PO2, PO3, PSO1,PO10** |
| **CO3** | **Explore** Network Convergence, IoT-Standard and Characteristic. | **PO1, PO2, PO3, PO4, PO5, PO11, PSO1, PSO2,PO12** |
| **CO4** | **Precise** analysis of Sensor network architecture. | **PO1, PO6, PO8, PO9, PO12, PSO2,PO12** |
| **CO5** | **Apply** IoT Taxonomy, System Model. | **PO1, PO6, PO8, PO9, PO12, PSO3,PSO2** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE11041 | Internet of Things (Open Elective- III) | 3 | 2 | 3 |  |  | 3 |  | 3 |  |  |  | 2 | 2 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech, Semester: VII Stream: CSE

PAPER TITLE: Internet of Things (Open Elective- III) PAPER CODE: CSE11041

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **List** the steps involved in Architecture of IoT | **U** | **CO1** |
| 2. | **Enumerate** the basic elements of wireless sensor network | **U** | **CO2** |
| ­­­ 3. | **Define** Extensible Messaging and Presence Protocol (XMPP), | **R** | **CO3** |
| 4. | **What** is multicast DNS (mDNS),? | **R** | **CO4** |
| 5. | **Give** the principles of Localization for mobile systems. | **U** | **CO3** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Describe** the characteristics of Constrained Application Protocol (CoAP), Message Queuing Telemetry Transport (MQTT),  . | **U** | **CO1** |
| 7. | **Examine** Why is security for IoT so hard? And **its Inference** with your own example. | **U** | **CO1, CO2** |
| 8. | **Classify** the factors influencing IoT security. | **U** | **CO3** |
| 9. | **Explain** with Example: i) Smart healthcare ii) Reliability Coefficient of smart city. | **R** | **CO4 /CO5** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Explain** in detail about Home automation. | **U** | **CO4** |
| 11. | **What is** a Quality Control Plan for the Managing high-rate sensor data, Processing data streams? | **R** | **CO4** |
| 12. | **Compare** Data consistency in an intermittently connected or disconnected environment. | **U** | **CO5** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CSE12044** | Image Processing Lab (Prof. Elective- III Lab) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Basic knowledge of image and computer graphics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To help the student to understand the Fundamentals of Digital image and its processing.

2. To perform the image enhancement technique for the improvement of pictorial information for human perception i.e. enhancing the quality of the image so that the image will have a better look

3. To apply the concepts of image segmentation and compression using which a graduate will be able to remove the redundancy pixels and transmit the image using less bandwidth.

4. To describe object detection and recognition technique learning which a graduate will be able to understand the fundamentals of digital signal processing with particular emphasis on problems in biomedical research and clinical medicine.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Interpret** the fundamentals of Digital image and its processing.

CO2. **Apply** the image enhancement for improving quality of picture.

CO3**. Apply** image segmentation and compression to remove redundant pixels.

CO4. **Describe** the object detection and recognition.

**Catalog Description:**

This course provides an introduction to basic concepts, methodologies and algorithms of digital image processing focusing on the following two major problems concerned with digital images: (1) image enhancement and restoration for easier interpretation of images, and (2) image analysis and object recognition. Some of the image processing techniques (e.g., spatial domain and frequency domain methods) will also be studied in this course. The primary goal of this course is to lay a solid foundation for students to study advanced image analysis topics such as computer vision systems, biomedical image analysis, and multimedia processing & retrieval.

**Course Content:**

**List of experiments:**

Write and execute in MATLAB for the following programs:

**Experiments:**

|  |  |
| --- | --- |
| 1 | Implement the noise reduction for various types of noise |
| 2 | Implement the histogram equalization method |
| 3 | Restore the original images from the inputs given in lab |
| 4 | Extract the gradient parts from the input image. |
| 5 | Extract the rice objects from the input image. |
| 6 | Separate the two types of blobs in the input image. |
| 7 | Detecting a Cell Using Image Segmentation |
| 8 | Cell counting |
| 9 | Detecting Cars in a Video of Traffic |
| 10 | Edge detection: Sobel, Prewitt, Canny and Laplacian |

**Text Books:**

1. Digital Image Processing, Gonzaleze and Woods, 3 rdedition , Pearson.

2. Handbook of image and video processing, Bovik, Alan C. Academic press, 2010.

**Reference Books:**

1. Digital video Processing, M. Tekalp, Prentice Hall International.

2. Fundamentals of Digital Image Processing A Practical Approach with Examples in Matlab, Chris Solomon, Toby Breckon, John Wiley & Sons.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Interpret** the fundamentals of Digital image and its processing. | **PO1,PO2,PO4,PO5** |
| **CO2** | **Apply** the image enhancement for improving quality of picture. | **PO1,PO2,PO3,PO5,PSO3** |
| **CO3** | **Apply** image segmentation and compression to remove redundant pixels. | **PO1,PO2,PO4,PSO3** |
| **CO4** | **Describe** the object detection and recognition. | **PO3,PO5,PSO1,PSO2** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12044 | Image Processing Lab (Prof. Elective- III Lab) | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | **-** | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VII Stream: CSE

PAPER TITLE: Image Processing Lab (Prof. Elective- III Lab) PAPER CODE: CSE12044

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 5 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 8 = 40)** | | | |
| 1. | **Develop** a program in MATLAB toImplement the noise reduction for various types of noise | **AP** | **CO1** |
| 2. | **Develop** a program in MATLAB toImplement the histogram equalization method | **AP** | **CO2** |
| ­­­ 3. | **Develop** a program in MATLAB toDetecting a Cell Using Image Segmentation | **AP** | **CO3** |
| 4. | **Develop** a program in MATLAB toDetecting Cars in a Video of Traffic | **AP** | **CO4** |
| 5. | **Develop** a program in MATLAB toEdge detection: Sobel, Prewitt, Canny and Laplacian | **AP** | **CO4** |

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| **CSE12045** | **Cloud Computing Lab** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **DBMS, Java, Python** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives**

1. To understand the installation of hypervisors.

2. To understand the installation of different cloud simulation tools and cloud setup tools.

3. To deploy cloud services.

**Course Outcomes**

On completion of this course, the students will be able to

CO1. **Identify** the appropriate cloud services for a given application.

CO2. **Assess** the comparative advantages and disadvantages of Virtualization technology.

CO3. **Analyze** authentication, confidentiality and privacy issues in cloud computing.

CO4. **Identify** security implications in cloud computing.

CO5. **Interpret** the importance of protocols and standards in management for cloud services.

**Catalog Description**

This course provides a comprehensive study of Cloud concepts and capabilities across thevarious Cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS),Software as a Service (SaaS). It consists of topics like cloud service models, virtualization and cloud infrastructure, and security and management of cloud.

**Course Content**

**Experiment 1:**

Installation of various hypervisors and instantiation of VMs with image file using open source hypervisors.

**Experiment 2:**

Client server communication between two virtual machine instances, execution of chat application.

**Experiment 3:**

Creation of simple network topology using open source network virtualization tools.

**Experiment 4:**

Implementation of simple network protocols using open source network controllers .

**Experiment 5:**

Implementation of various scheduling mechanisms using open source cloud simulator

**Experiment 6:**

Familiarization and usage of the following cloud services with open source cloud tools.

**Experiment 7:**

Familiarization and usage of collaborative applications (SaaS).

**Experiment 8:**

Implementing applications using Google App Engine (PaaS).

**Experiment 9:**

Develop MapReduce application using Hadoop cluster set up

**Text Books:**

1. Barrie Sosinsky, “Cloud Computing Bible”, Wiley India Edition.

2. Anthony Velte, tobyVelte, Robert Elsenpeter, “Cloud Computing – A Practical Approach”, Tata McGraw-Hill Edition.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (Cos) and Program Outcomes (Pos)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and Pos** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Identify** the appropriate cloud services for a given application. | **PO2,PO4,PSO3** |
| **CO2** | **Experiment with** the comparative advantages and disadvantages of Virtualization technology. | **PO2, PO3,PO4, PO5, PO6,PSO2** |
| **CO3** | **Compare** authentication, confidentiality and privacy issues in cloud computing. | **PO1,PO4, PO6, PO12, PSO1,PSO2** |
| **CO4** | **Identify** security implications in cloud computing. | **PO1, PO3, PO2, PO5, PSO1** |
| **CO5** | **Interpret** the importance of protocols and standards in management for cloud services. | **PO1,PO3, PO5, PSO1** |

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|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12045 | Cloud Computing Lab | 3 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - |  | 2 | 3 |  |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VII Stream: CSE

PAPER TITLE: Cloud Computing Lab

PAPER CODE: CSE12045

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 5 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 8 = 40)** | | | |
| 1. | Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time. | **AP** | **CO2** |
| 2. | Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine. | **U** | **CO3** |
| ­­­ 3. | Find procedure to set up the one node Hadoop cluster. | **U** | **CO4** |
| 4. | Write a program to use the API's of Hadoop to interact with it. | **U** | **CO5** |
| 5. | Write a wordcount program to demonstrate the use of Map and Reduce tasks. | **AP** | **CO1** |

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| **CSE12046** | Information Retrieval Lab | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Pattern Recognition, Natural language processing** | | | | |
| **Co-requisites** | **Machine Learning** | | | | |

**Course Objectives**

1. Present the basic concepts in information retrieval and more advance techniques of multimodal based information systems.
2. Understand the underlined problems related to IR
3. Acquired the necessary experience to design, and implement real applications using Information Retrieval systems.

**Course Outcomes**

On the successful completion of the course, the students will be able to

CO1. **Discuss** various techniques of extraction

CO2. **Explain** various concepts to prepare a search engine

CO3. **Implement** NLP techniques to analyze sentiments into positive or negative

CO4. **Describe** twitter comments on Sports or Entertainment into some given categories.

CO5. **Analyze** these techniques and create models to summarize various documents

**Catalog Description**

Information retrieval is the process through which a computer system can respond to a user's query for text-based information on a specific topic. IR was one of the first and remains one of the most important problems in the domain of natural language processing (NLP). Web search is the application of information retrieval techniques to the largest corpus of text anywhere — the web — and it is the context where many people interact with IR systems most frequently.

**List of Experiments**

1. Prepare and build a model to extract keywords from any documents.
2. Prepare and build a search engine.
3. Build a sentiment classification model for user reviews Pizza Hut. Each user review should be classified as positive or negative.
4. Build a Twitter tweets classifier model for Sports or Entertainment. Train the classifier and predict the category of incoming tweets.
5. Build a model to detect summarized points from a huge or multiple paragraphs. The model will extract keywords which occur often and will detect summarized point from a collection of documents.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Discuss** various techniques of extraction | **PO1, PO2, PO5** |
| **CO2** | **Explain** various concepts to prepare a search engine | **PO3, PO4, PO11** |
| **CO3** | **Implement** NLP techniques to analyse sentiments into positive or negative | **PO1, PO2, PO11** |
| **CO4** | **Describe** twitter comments on Sports or Entertainment into some given categories. | **PO1, PO2, PO4, PSO1** |
| **CO5** | **Analyze** these techniques and create models to summarize various documents | **PO3, PSO2, PSO3** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop , test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12046 | Information Retrieval Lab | 3 | 3 | 2 | 2 |  |  | - | - | - | - | 2 |  | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VII Stream: CSE

PAPER TITLE: Information Retrieval Lab

PAPER CODE: CSE12046

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 4 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 4 = 40)** | | | |
| 1. | Given following 10 documents. **Write** name of documents that are retrieved after processing following queries.  Hint: A document is a matching document of a query if it contains any keyword of a query.  Queries1. “Natural Language Processing”  2.“Information Retrieval”  3.“Book Text”  4.“Book”  5.“Web HTML”  6.“Text Theory” | **U** | **CO2** |
| 2. | **Analyze** the goals of the user interface design? What is software architecture giving an example? Distinguish between metrics and measurements? | **AP** | **CO3** |
| ­­­ 3. | **Build** a model to detect summarized points from a huge or multiple paragraphs. The model will extract keywords which occur often and will detect summarized point from a collection of documents. | **U** | **CO4** |
| 4 | **Build** a Twitter tweets classifier model for Sports or Entertainment. Train the classifier and predict the category of incoming tweets. | **AP** | **CO1** |

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| --- | --- | --- | --- | --- | --- |
| **CSE12047** | Computer Graphics Lab | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Basic knowledge of Computer system** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives**

1. To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.

2. To learn the basic principles of 3-dimensional computer graphics.

3. To provide an understanding of how to scan convert the basic geometrical primitives, how to  
transform the shapes to fit them as per the picture definition.  
4. To provide an understanding of mapping from a world coordinates to device coordinates,  
clipping, and projections.

**Course Outcomes**

On completion of this course, the students will be able to

**CO1. Interpret** the basic concepts of computer graphics

**CO2. Design** scan conversion problems using programming.

**CO3. Apply** clipping and filling techniques for modifying an object.

**CO4. Outline** the concepts of different type of geometric transformation of objects in 2D and

3D.

**CO5. Illustrate** the practical implementation of modeling, rendering, viewing of objects in 2D.

**Catalog Description**

Computer Graphics refers to the representation and manipulation of image data by a computer. It is the sub-field of computer science which studies methods for digitally synthesizing and manipulating visual content. Students get an overview of two-dimensional transformation and viewing. Students get an exposure to three-dimensional geometry and representation of 3D objects. Students learn about the curve concept which is essential as not all objects in real life have flat surface. Students learn the different algorithms for hidden surface removal and about different color models.

**Course Content**

List of experiments

Write and execute C-code for the following programs:

|  |  |
| --- | --- |
| 1 | Implementation of Graphics output primitives – line, circle, ellipse, arc etc. |
| 2 | DDA Line drawing algorithm |
| 3 | Bresenham’s line and Circle drawing algorithm |
| 4 | Mid-point circle drawing algorithm |
| 5 | Creating two dimensional object |
| 6 | Implementation of geometric transformation for 2D objects – translation, rotation, scaling and reflection. |
| 7 | Implementation of clipping algorithms – line clipping, object clipping: convex and concave objects. |
| 8 | Implementation of 3D Transformation |
| 9 | Implementation of 3D Projection |
| 10 | Window to Viewport Mapping |

**Text Books**

1.Computer Graphics with Open GL, 4th Edition, Donald D. Hearn, M. Pauline Baker, Warren Carithers, Pearson Education

2.Computer Graphics using OPENGL, Third Edition,F.S. Hill, Pearson Education.

**Reference Books**

1.Computer Graphics- Principles and Practice, Third Edition, John F. Hughes, AndriesHYPERLINK "https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Andries+Van+Dam%22" Van Dam, James D. Foley, Steven K. HYPERLINK "https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Steven+K.+Feiner%22"Feiner, Addison-Wesley

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Interpret** the basic concepts of computer graphics | **PO1,PO2,PO4** |
| **CO2** | **Design** scan conversion problems using programming. | **PO1,PO2,PO4** |
| **CO3** | **Apply** clipping and filling techniques for modifying an object. | **PO3,PO4** |
| **CO4** | **Outline** the concepts of different type of geometric transformation of objects in 2D and 3D. | **PO6,PO3** |
| **CO5** | **Illustrate** the practical implementation of modeling, rendering, viewing of objects in 2D. | **PO1,PO2,PO4** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12047 | Computer Graphics Lab | 3 | 3 | 2 | 3 | - |  | - | - | - | - | - | - | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech Semester: VII Stream: CSE

PAPER TITLE: Computer Graphics Lab PAPER CODE: CSE12047

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 5 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of

Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh

page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 8 = 40)** | | | |
| 1. | **Write** a C program for implementing DDA Line drawing algorithm | **U** | **CO2** |
| 2. | **Write** a C program for implementation of geometric transformation for 2D objects – translation, rotation, scaling and reflection. | **U** | **CO4** |
| ­­­ 3. | **Write** a C program for Implementation of 3D Transformation | **U** | **CO4,CO5** |
| 4. | **Write** a C program for Implementation of 3D Projection | **U** | **CO5** |
| 5. | **Write** a C program for implementation of Window to Viewport Mapping | **U** | **CO5** |

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| --- | --- | --- | --- | --- | --- |
| **CSE12048** | Artificial Neural Network and Deep Learning Lab | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Introduction to probability theory, linear algebra or statistics** | | | | |
| **Co-requisites** | **Python, prior knowledge of some machine learning algorithms and data structures is very useful.** | | | | |

**Course Objectives**

1. To understand different neural network architectures and select the appropriate architecture for a given problem

2. To understand working principle of backpropagation algorithm to calculate weight gradients in a feed forward neural network by hand

3. To understand what the major categories of models are (such as CNNs and RNNs), and when they should be applied

**Course Outcomes**

On completion of this course, the students will be able to

CO1. **Identify** deep learning algorithms which are more appropriate for various types of learning

tasks in different domains

CO2. **Apply** neural networks using existing software libraries

CO3. **Illustrate** use of neural networks to recognize patterns and solve diverse problems.

CO4. **Apply** deep learning algorithms to explore state-of-art techniques and

applications

**Catalog Description**

Artificial Neural Networks and Deep learning laboratory mainly aim to focus underlying relationships among datasets. Such systems can learn to perform tasks without being programmed with precise rules. These programs are able to learn and write themselves when given an objective, some training data, and abundant computing power. The goal is to better understand human information processing, that is, how intelligent behavior in humans arises from neural network mechanisms. With focus on both theory and practice, we cover models for various applications, how they are trained and tested, and how they can be deployed in real world applications. Laboratory sessions will help students to gain knowledge related to various neural network projects to understand all about network architectures and how they works.

**List of Experiments**

**Experiment 1:**

Introduction to the libraries of Keras/TensorFlow/PyTorch

**Experiment 2:**

Calculating Gradient, Optimization, and Weight update

**Experiment 3:**

Implementation Gradient Descent algorithms that also uses stochastic gradient descent (SGD).

**Experiment 4:**

Implementation of single layer and multilayer perceptron.

**Experiment 5:**

Implementation of Back propagation algorithm.

**Experiment 6:**

Implementation of Recurrent Neural Network and LSTM.

**Experiment 7:**

Classification of MNIST Dataset using ANN.

**Experiment 8:**

[Convolutions](https://github.com/m2dsupsdlclass/lectures-labs/blob/master/labs/04_conv_nets/Convolutions.ipynb)

**Experiment 9:**

[Pretrained ConvNets](https://github.com/m2dsupsdlclass/lectures-labs/blob/master/labs/04_conv_nets/Pretrained_ConvNets_with_Keras_rendered.ipynb)

**Experiment 10:**

[Fine Tuning a pretrained ConvNet (GPU required)](https://github.com/m2dsupsdlclass/lectures-labs/blob/master/labs/04_conv_nets/Fine_Tuning_Deep_CNNs_with_GPU_rendered.ipynb)

**Experiment 11:**

Bonus: Convolution and ConvNets

**Experiment 12:**

[Fully Convolutional Neural Networks](https://github.com/m2dsupsdlclass/lectures-labs/blob/master/labs/05_conv_nets_2/Fully_Convolutional_Neural_Networks_rendered.ipynb)

**Experiment 13:**

[ConvNets for Classification and Localization](https://github.com/m2dsupsdlclass/lectures-labs/blob/master/labs/05_conv_nets_2/ConvNets_for_Classification_and_Localization_rendered.ipynb)

**Experiment 14:**

[Text Classification and Word Vectors](https://github.com/m2dsupsdlclass/lectures-labs/blob/master/labs/06_deep_nlp/NLP_word_vectors_classification_rendered.ipynb) [Character Level Language Model (GPU required)](https://github.com/m2dsupsdlclass/lectures-labs/blob/master/labs/06_deep_nlp/Character_Level_Language_Model_rendered.ipynb)

**Experiment 15:**

[Short Intro to Embeddings](https://github.com/m2dsupsdlclass/lectures-labs/blob/master/labs/03_neural_recsys/Short_Intro_to_Embeddings_with_Keras_rendered.ipynb)

**Experiment 16:**

[Neural Recommender Systems with Explicit Feedback](https://github.com/m2dsupsdlclass/lectures-labs/blob/master/labs/03_neural_recsys/Explicit_Feedback_Neural_Recommender_System_rendered.ipynb)

**Experiment 17:**

[Neural Recommender Systems with Implicit Feedback and the Triplet Loss](https://github.com/m2dsupsdlclass/lectures-labs/blob/master/labs/03_neural_recsys/Implicit_Feedback_Recsys_with_the_triplet_loss_rendered.ipynb)

**Experiment 18:**

Implementation of Auto Encoders and Variational Autoencoders

**Experiment 19:**

Face verification using Siamese Nets

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Identify** deep learning algorithms which are more appropriate for various types of learning tasks in different domains | **PO1, PO2, PO3, PO4, PSO1, PSO2, PSO3** |
| **CO2** | **Apply** neural networks using existing software libraries | **PO1, PO2, PO3,PO4,PO5,PSO1**  **PSO2, PSO3** |
| **CO3** | **Illustrate** use of neural networks to recognize patterns and solve diverse problems. | **PO1, PO2, PO3, PO4, PO5, PO9, PSO1**  **PSO2, PSO3** |
| **CO4** | **Apply** deep learning algorithms to explore state-of-art techniques and applications. | **PO1, PO2, PO3, PO5, PO6, PSO1, PSO2, PSO3** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CSE12048 | Artificial Neural Network and Deep learning Lab | 3 | 3 | 3 | 3 | 3 |  | - | - |  | - | 2 | - | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| ADAMAS UNIVERSITYSCHOOL OF ENGINEERING AND TECHNOLOGYEND-SEMESTER EXAMINATIONName of the Program: B. Tech Semester: VIICode- CSE12048 Stream- CSETime: 03 Hrs.Paper title– Artificial Neural Network and Deep Learning Lab Total pages- 1Max. Marks: 40 Total no. of questions- 12Instructions:Attempt All Questions1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.2. Assumptions made if any, should be stated clearly at the beginning of your answer. 3. **All parts of a Question should be answered consecutively** | | | | |
|  | | | | |
| 1. | Build and implement CNN for image classification. | | **Ap** | **CO1** |
| 2. | Implement the concept of neural network to detect whether any given dataset of an employee is application for loan or not. | | **Ap** | **CO2** |
| ­­­ 3. | Implement the concept of back propagation for updating weights. | | **Ap** | **CO3** |
| 4. | Implement the concept of object detection using deep CNN. | | **Ap** | **CO4** |
| 5. | Build computer vision-based application using deep neural networks. | | **Ap** | **CO5** |

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| **CSE14049** | SummerInternship | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -30** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Willing to knowledge acquisition** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives**

1. To Give and overview of Internship.

2. To enable students building team.

3. To give the students a outline of technical internship.

4. To expound Idea dissemination for internship.

**Course Outcomes**

On completion of this course, the students will be able to

CO1 **Interpret** importance of Internship.

CO2. **Construct** the real-life scenario with internship.

CO3. **Analyse** and practical implementation with emerging application.

CO4. **Classify** understanding in technology upgradation.

**Catalog Description**

The course involves presentation and report submission by every student. Reference search and technical internship skills along with effective presentation skills are focused. The course strengthens the research attributes including internship survey.

**Course Content**

An internship enables you to gain first-hand exposure of working in the real world. It also allows students to harness the skill, knowledge, and theoretical practice they learnt in university. You can acquire endless amounts of education in your life, however, that knowledge doesn’t always translate to the working life. The great thing about internships is that it teaches young professionals about the specific industries and companies they are interested in.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Interpret** importance of Internship. | **PO1, PO2, PO10, PO11,PO3, PO4, PO5,PSO1,PSO3** |
| **CO2** | **Construct** the real-life scenario with internship. | **PO1, PO2, PO10, PO3, PO4,PO5,PO7,PO8,PO9,PSO2** |
| **CO3** | **Analyse** and practical implementation with emerging application. | **PO1, PO3, PO4, PO5PO12, PO10, PO9, PSO1,PSO2** |
| **CO4** | **Classify** understanding in technology up gradation. | **PO3, PO4, PO5, PO6, PO2,PO12, PO9,PSO2** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| ECS  44601 | Summer Internship | 3 | 3 | 3 | 3 | 3 |  |  |  |  |  |  |  | 2 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **EEC44401** | Minor Project | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Basic idea of the required subjects** | | | | |
| **Co-requisites** |  | | | | |

**Course Objectives**

1. To be able to design, develop, document, and test software using current techniques.

2. To understand the fundamentals of computer architecture and computing theory.

3. To be able to solve problems working in group settings.

4. To demonstrate the ability to give presentations and write technical reports.

5. To demonstrate understanding of the importance of social and ethical issues related to the profession.

**Course Outcomes**

On completion of this course, the students will be able to

CO1**. Identify** a real world problem

CO2. **Utilize** the modern tools to solve the problems

CO3. **Discuss** in a group to promote team spirit and leadership quality among the students

CO4. **Plan** a projects involving both technological aspects and finance

CO5. **Identify** newer areas of in depth study and research and lifelong learning

**Catalog Description**

The course encourages students to take project works that are based on current trends and technologies in various subjects, which will augment the theory subjects. The students will form a group to do their project work. This teaming is to encourage team spirit and to insist the importance of team work. The students typically undergo group formation, finalization of area of work, testing, generation and verification of results, and possible research publication procedure.

**Course Content**

The Evaluation of the project work are to be carried out in the following way:

1. In-depth study of a topic proposed by the supervisor

2. Continuous Evaluation through guide.

3. An open pre-submission seminar by the student.

4. End-semester University Examination (An open seminar followed by a Viva voce)

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Investigate** a real world problem | **PO2,PO3,PSO1** |
| **CO2** | **Utilize** the modern tools to solve the problems | **PO2,PO3,PSO1** |
| **CO3** | **Discuss** in a group to promote team spirit and leadership quality among the students | **PO1, PO9** |
| **CO4** | **Plan** a projects involving both technological aspects and finance | **PO3,PO11** |
| **CO5** | **Identify** newer areas of in depth study and research and lifelong learning | **PO12,PSO2** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| ECS  44401 | Minor Project | 3 | 2 | 3 | - | - | - | - | - | 3 | - | 3 | 3 | 2 | 3 | - |

1=weakly mapped

2= moderately mapped

3=strongly mapped

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **EEC44402** | Major Project | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -135** | **0** | **0** | **9** | **6** |
| **Pre-requisites/Exposure** | **Basic idea of the required subjects** | | | | |
| **Co-requisites** |  | | | | |

**Course Objectives**

1. To be able to design, develop, document, and test software using current techniques.

2. To understand the fundamentals of computer architecture and computing theory.

3. To be able to solve problems working in group settings.

4. To demonstrate the ability to give presentations and write technical reports.

5. To demonstrate understanding of the importance of social and ethical issues related to the profession.

**Course Outcomes**

On completion of this course, the students will be able to

CO1**. Investigate** a real-world problem

CO2. **Utilize** the modern tools to solve the problems

CO3. **Take part in** a group to promote team spirit and leadership quality among the students

CO4. **Organize** projects involving both technological aspects and finance

CO5. **Identify** newer areas of in-depth study and research and lifelong learning

**Catalog Description**

The course encourages students to take project works that are based on current trends and technologies in various subjects, which will augment the theory subjects. The students will form a group to do their project work. This teaming is to encourage team spirit and to insist the importance of team work. The students typically undergo group formation, finalization of area of work, testing, generation and verification of results, and possible research publication procedure.

**Course Content**

The Evaluation of the project work are to be carried out in the following way:

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3. An open pre-submission seminar by the student.

4. End-semester University Examination (An open seminar followed by a Viva voce)

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Investigate** a real world problem | **PO1,PO2, PSO1** |
| **CO2** | **Utilize** the modern tools to solve the problems | **PO1,PO2,PO4,PSO1** |
| **CO3** | **Take part in** a group to promote team spirit and leadership quality among the students | **PO9,PO10, PSO2** |
| **CO4** | **Organize** projects involving both technological aspects and finance | **PO1,PO11, PO12** |
| **CO5** | **Identify** newer areas of in depth study and research and lifelong learning | **PO4,PO12,PSO3** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| ECS  44402 | Major Project | 3 | 2 | - | 3 | - | - | - | - | 3 | 3 | 3 |  | 2 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CSE15052** | Comprehensive Viva | **L** | **T** | **P** | **C** |
| **Version 1.0** |  | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Willing to knowledge acquisition** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives**

1. To Give an overview of emerging technology and relate to subject.

2. To enable students to improve their reasoning ability.

3. To give the students a outline of technical question.

4. To expound idea dissemination for a new technology by assessment of pupil knowledge.

**Course Outcomes**

On completion of this course, the students will be able to

CO1. **Interpret** the vital feature behind comprehensive viva.

CO2. **Analyse** the real-life scenario, based on viva question.

CO3. **Classify** effective team building for good software project analysis.

CO4. **Apply** logic of comprehensive viva in skill up gradation.

**Catalog Description**

The course tests the technical knowledge acquired during the study, spoken skills, and the ability to think logically under time pressure. The course proves extremely useful for placement interviews

**Course Content**

Scientific approach to resolve open end question, Theoretical Vs Practical exploration, in research paradigms, epistemology and ontology in management research, positivism vs. interpretivism, subjectivism vs. objectivism.

Foundations of confidence building in answering question, Categories of theory, theory building vs. theory testing, conceptualization and hypothesis testing. Analyze the conformity of the system to the functional requirements Appreciate importance of fundamental knowledge and its application.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Continious Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

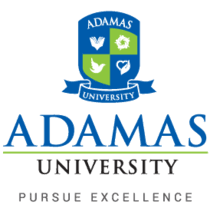
|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Interpret** the vital feature behind comprehensive viva. | **PO3,PO5,PO6,PO9,PSO1,PSO2** |
| **CO2** | **Analyse** the real-life scenario, based on viva question. | **PO10, PO2, PO3,PO5,PO6, PO9,PSO1,PSO2** |
| **CO3** | **Classify** effective team building for good software project analysis. | **PO1, PO12, PO2, PO3,PO5,PO6,PO11, PO9,PSO1,PSO2,PSO3** |
| **CO4** | **Apply** logic of comprehensive viva in skill up gradation. | **PO2, PO3,PO5,PO6, PO9,PSO1,PSO2** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| ECS  44502 | Comprehensive Viva | 3 | 3 | 3 |  | 3 | 3 |  |  | 3 |  |  |  | 3 | 3 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped



**ADAMAS UNIVERSITY**

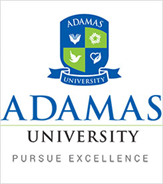
**SCHOOL OF ENGINEERING & TECHNOLOGY**

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**CO – PO & PSO MAPPING**

**Name of the Programme: B. Tech in Computer Science & Engineering**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Course Title** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| MTH11501 | Engineering Mathematics -I | - | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | - | - | - |
| PHY11201 | Applied Science | 3 | 2 | 1 | 3 | 2 | 2 | - | - | - | - | - | 2 | - | - | - |
| CSE11001 | Introduction to Programming | 3 | - | 1 | 1 | 1 | - | - | - | 1 | - | 1 | - | - | - | - |
| ENG11053 | HSSM –I (English Communication- I) | - | 3 | 3 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | - | 1 | - | - | - |
| BIT11003 | Life Science | 2 | 2 | 3 | - | 3 | 3 | - | 2 | 1 | - | - | 2 | 3 | 3 | - |
| PHY12202 | Applied Science Lab | 3 | 3 | 3 | - | 2 | - | - | - | 1 | - | - | - | - | - | - |
| CSE12002 | Programming Lab | 3 | 1 | 1 | 1 | 1 | - | 1 | - | - | - | 1 | - | 1 | - | - |
| CEE12001 | Engineering Drawing and CAD | 3 | 2 | 2 | 1 | - | 1 | - | - | - | - | - | 3 | 2 | 2 | - |
| ENG11043 | Communication and Collaboration Skill-I | - | 2 | - | - | - | - | - | - | 3 | 3 | - | - | 3 | 3 | - |
| GEE14003 | Capstone Project- I | 3 | 3 | 3 | - | - | - | - | - | - |  | - | - | - | - |  |
| DGS11001 | Design Thinking | 3 | 2 | - | 1 | 1 | - | - | - | - | - | 1 | - | - | - | - |
| MTH11502 | Engineering Mathematics -II | 3 | 1 | 2 | 3 | 1 | - | 1 | - | - | - | - | 2 | - | - | - |
| GEE11001 | Electrical and Electronics Technology | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 3 | - | - | - |
| MEE11002 | Engineering Mechanics | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| EVS11107 | Environmental Science | 1 | 3 | 3 | - | - | 3 | 3 | 2 | - | - | 2 | 2 | - | 2 | - |
| **Course Code** | **Course Title** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| GEE12002 | Electrical and Electronics Technology Lab | 3 | - | 2 | - | **-** | - | - | - | - | - | - | - | - | - | - |
| MEE12001 | Engineering Workshop | 3 | 1 | - | - | - | - | - | - | 3 | - | - | - | 3 | - | - |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ENG11044 | Communication and Collaboration Skill-II | - | 1 | - | - | - | - | - | 1 | 2 | 2 | - | - | 2 | 2 | - |
| GEE14004 | Capstone Project- II | 3 | 2 | 2 | 2 | 3 | - | - | - | - | --- | - | - | - | - | - |
| IDP14001 | Interdisciplinary Project | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 | - |
| SMA42111 | Probability, Statistics and Numerical Methods | 2 | 3 | 2 | - | 3 | - | - | - | - | - | - | 3 | 2 | 3 | 2 |
| HEC42180 | HSS–IV (Economics for Engineers) | - | 2 | 3 | 2 | - | 2 | - | - | - | - | 2 | 3 | 2 | - | 2 |
| CSE11003 | Data Structures and Algorithms | 2 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 2 | 3 |
| CSE11004 | Switching circuit and logic design Lab | 3 | 2 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 2 | 2 |
| CSE11005 | Formal Language And Automata Theory | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 3 | 3 |
| CSE11006 | Engineering Science Course (Introduction to Python) | 3 | 3 | 3 | 2 | - | - | - | - | - | - | 2 | 3 | 2 | 3 | - |
| CSE12007 | Data Structures and Algorithms Lab | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 3 | 3 | 3 |
| GEE14005 | Capstone Project- III | 3 | 3 | 3 | 3 | 3 | - | - | - | 3 | - | - | - | 3 | 3 | 3 |
| SOC14100 | Community Service | - | 2 | - | - | - | 2 | 2 | 2 | 2 | 2 |  |  | - | - | - |
| EIC11001 | Venture Ideation | - | - | - | - | - | 3 | 2 | 3 | - | - | 3 | - | - | - |  |
| SMA42112 | Operations Research | 3 | 3 |  | - | 3 | - | - | - | - | - | - | 3 | 2 | 3 | - |
| CSE11008 | Design and Analysis of Algorithms | 3 | 2 | 3 | 3 |  | - | - | - | - | - | - | 3 | 3 | 3 | 3 |
| CSE11009 | Object Oriented Programming (Prof. Core- V) | 3 | 3 | 3 | - | - | - | - | - | - | - | - | - | 3 | 3 | 3 |
| CSE11010 | Software Engineering | 3 | 2 |  |  | 2 | 2 |  |  |  |  |  | 3 | 2 | 3 | 2 |
| **Course Code** | **Course Title** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CSE11011 | Computer Architecture | 3 |  | 3 | - | 2 | 3 | - | - | - | - | - | 3 | 3 | 2 | 3 |
| PSG11021 | Human Values and Professional Ethics | 3 | - | - | - | 3 | 3 | 3 | - | - | - | - | - | 3 | 3 | - |
| SMA42211 | Numerical Techniques Lab | 3 | - | - | - | 3 | 3 | 3 | - | - | - | - | - | 3 | 3 | - |
| CSE12012 | Design & Analysis of Algorithm Lab | 2 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | 2 | 3 | 3 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CSE12013 | Object Oriented Programming Lab | 3 | 3 | 3 | - | 3 | - | - | - | - | - | - | - | 3 | - | 3 |
| GEE14006 | Capstone Project -IV | 3 | - | 3 |  | 3 | 2 | - | - | 3 |  | - | 3 | 2 | 2 | 3 |
| CSE11014 | Compiler Design | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 3 | - | 3 | 3 |
| CSE11015 | Database Management Systems | 3 |  | 3 |  | 2 | - | - | - | - | - | 3 | 2 | 3 | 2 | 3 |
| CSE11016 | Operating Systems | 3 | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 |
| CSE11017 | Applied Graph Theory(Prof. Elective -I) | 3 | 2 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 | 2 |
| CSE11018 | Communication Network(Prof. Elective -I) | 3 | 3 | 3 | 3 | - | 2 | - | - | - | 3 | - | - | 3 | 3 | 2 |
| CSE11019 | Big Data Analytics(Prof. Elective -I) | 3 | 2 | 2 | 3 | 3 | - | - | - | - | - | - | - | 2 | 3 | 2 |
| CSE12020 | Compiler Design Lab | 3 | - | 2 | - | 2 | - | - | - | - | - | - | 3 | 2 | 3 | 2 |
| CSE12021 | Database Management Systems Lab | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | 2 | 2 | 3 |
| CSE12022 | Operating Systems Lab | 2 | 3 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | 2 | 3 |
| GEE14007 | Capstone Project -V |  | - | 3 | - | 3 | - | 3 | - | 3 | 2 | 3 |  | 3 | - | 2 |
| CSE11023 | Computer Networks | 2 | 3 | 2 | 3 | - | 3 | - | - | - | - | - | - | 3 | 3 | 3 |
| CSE11024 | Artificial Intelligence and Machine Learning | 3 | 2 | 2 | 3 | 2 | - | - | - | - | - | - | - | 2 | 3 | 3 |
| CSE11025 | High Performance Computer Architecture(Prof. Elective -II) | 3 | 2 | 3 | - | 3 | 2 | - | - | - | - | - | 3 | 3 | 2 | 2 |
| CSE11026 | Pattern Recognition(Prof. Elective -II) | 3 | 2 | 2 | 2 | 3 | - | - | - | - | - | - | - | 3 | 2 | 3- |
| **Course Code** | **Course Title** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CSE11027 | Computational Geometry(Prof. Elective -II) | 3 | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | 3 | 3 | 3 |
| CSE11028 | Artificial Intelligence(Open Elective -I) |  | 3 | 3 | 2 | - | 3 | 3 | - | - | - | - | 2 | 3 | 2 | 2 |
| CSE11027 | Computational Geometry(Open Elective -I) | 3 | 3 | 3 | 3 | 1 | - | - | - | - | - | - | - | 3 | 3 | 3 |
| CSE12029 | Computer Networks Lab (Prof. Core- XI Lab) | 3 | 3 | 2 | 2 | 3 | 3 | - | - | 3 | - | - | - | 2 | 2 | 1 |
| CSE12030 | Artificial Intelligence and Machine Learning Lab | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 |
| CSE12031 | High Performance Computer Architecture Lab(Prof. Elective –II Lab) | 3 | - | 3 | - | 3 | - | - | - | - | - | - | 2 | 3 | 2 | 2 |
| CSE12032 | Pattern Recognition(Prof. Elective –II Lab) | 3 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | - |
| CSE12033 | Computational Geometry Lab(Prof. Elective –II Lab) | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 3 | 3 | 3 |
| CSE15034 | Technical Seminar | 3 | 2 | 2 | 3 | 3 | 2 | - | -- |  |  | - |  | - | 3 | - |
| MBA43144 | HSSM –V (Industrial Management) | 3 | 2 | 3 | 3 |  | 3 | 2 |  |  | - | - | - | 2 | 2 | 2 |
| CSE11035 | Image Processing(Prof. Elective- III) | 3 | 3 | 2 | 3 | - |  | - | - | - | - | - | - | 3 | 3 | 2 |
| CSE11036 | Cloud Computing(Prof. Elective- III) | 3 | 2 | 3 | 3 | 3 | - | - | - | - | - | - | 2 | 2 | 3 | 3 |
| CSE11037 | Information Retrieval(Prof. Elective- III) |  | 2 | 2 | 2 | 3 | 3 | 3 | - | - | - | - |  | 3 | 2 | 2 |
| CSE11038 | Computer Graphics(Prof. Elective- III) | 3 | 3 | 2 | 3 | 3 | - | - | - | - | - | - | **-** | 3 | 3 | 3 |
| CSE11039 | Artificial Neural Network and Deep Learning(Prof. Elective- III) | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 |
| **Course Code** | **Course Title** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CSE11040 | Cryptography & Cyber Security (Prof. Elective- IV) | 3 | 3 | 3 | - | 3 | - | - | - | - | - | - | **3** | 3 | 3 | 3 |
| CSE11041 | Internet of Things (Prof. Elective- IV) | 3 | 2 | 3 |  |  | 3 |  | 3 |  |  |  | 2 | 2 | 3 | 3 |
| CSE11042 | 5G Wireless Communication (Prof. Elective- IV) | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | 3 | 3 | 2 | 2 |
| CSE11043 | Machine Learning(Open Elective- II) | 3 | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | - | - |
| CSE11041 | Internet of Things(Open Elective- III) | 3 | 2 | 3 |  |  | 3 |  | 3 |  |  |  | 2 | 2 | 3 | 3 |
| CSE12044 | Image Processing Lab(Prof. Elective- III Lab) | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | **-** | 3 | 3 | 3 |
| CSE12045 | Cloud Computing Lab(Prof. Elective- III Lab) | 3 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - |  | 2 | 3 |  |
| CSE12046 | Information Retrieval Lab(Prof. Elective -III Lab) | 3 | 3 | 2 | 2 |  |  | - | - | - | - | 2 |  | 3 | 3 | 3 |
| CSE12047 | Computer Graphics Lab(Prof. Elective- III Lab) | 3 | 3 | 2 | 3 | - |  | - | - | - | - | - | - | 3 | 3 | 3 |
| CSE12048 | Artificial Neural Network and Deep Learning Lab(Prof. Elective- III Lab) | 3 | 3 | 3 | 3 | 3 |  | - | - |  | - | 2 | - | 3 | 3 | 3 |
| CSE14049 | Summer Internship | 3 | 3 | 3 | 3 | 3 |  |  |  |  |  |  |  | 2 | 3 | 3 |
| CSE14050 | Minor Project | 3 | 2 | 3 | - | - | - | - | - | 3 | - | 3 | 3 | 2 | 3 | - |
| CSE14051 | Industry Work Experience / SIRE / Major Project | 3 | 2 | - | 3 | - | - | - | - | 3 | 3 | 3 |  | 2 | 3 | 3 |
| CSE15052 | Comprehensive Viva Voce | 3 | 3 | 3 |  | 3 | 3 |  |  | 3 |  |  |  | 3 | 3 | 3 |
| **Average of CO-PO Mapping** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING**

**AND**

**TECHNOLOGY**

**DEPARTMENT**

**OF**

**COMPUTER SCIENCE AND ENGINEERING**

**Course Structure & Syllabus**

**For**

**Bachelor of Technology (B.Tech)**

**In**

**Computer Science & Engineering**

**With Hons.**

**In**

**Artificial Intelligence and Machine Learning**

**W.e.f. AY 2020-21**

**SoET 2.0**

**(Engineering +)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER-V** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
| 1 | Theory | CSE11053 | Algorithm for Intelligent System and Robot | 3 | 1 | 0 | 4 | 4 |
| 2 | Practical | CSE12054 | Algorithm for Intelligent System and Robot Lab | 0 | 0 | 3 | 3 | 2 |
| **Total** | | | | **3** | **1** | **3** | **7** | **6** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER-VI** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
| 1 | Theory | CSE11055 | Application of machine learning in industries and Anomaly Detection | 3 | 1 | 0 | 4 | 4 |
| 2 | Theory | CSE11056 | Data Analysis & Modelling Technique | 3 | 0 | 0 | 3 | 3 |
| 3 | Practical | CSE12057 | Application of machine learning in industries and Anomaly Detection Lab | 0 | 0 | 3 | 3 | 2 |
| **Total** | | | | **6** | **1** | **3** | **10** | **9** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER -VII** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
| 1 | Theory | CSE11058 | Neural Network and Deep Learning Fundamentals | 3 | 0 | 0 | 3 | 3 |
| 2 | Practical | CSE12059 | Neural Network and Deep Learning Fundamentals Lab | 0 | 0 | 3 | 3 | 2 |
| **Total** | | | | **3** | **0** | **3** | **6** | **5** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER -VIII** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
| 1 | Theory | CSE11060 | Subject from other schools AI(Online)  Overview of Recent Trends in AI/ML(Tentative Title) | 3 | 0 | 0 | 3 | 3 |
| 2 | Viva | CSE15061 | Specialization Viva Voce | ------ | | | ------ | 2 |
| **Total** | | | | **3** | **0** | **0** | **3** | **5** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CSE11053** | Algorithm for Intelligent System and Robot | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -60** | **3** | **1** | **0** | **4** |
| **Pre-requisites/Exposure** | **H. S. Mathematics and Physics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To introduce the basic concepts of artificial intelligence and robotics
2. To develop concepts of logic and knowledge representation for sentient systems
3. To develop methods of combining intelligent algorithms with moving machines
4. To provide foundation for development of intelligent robotic systems

**Course Outcomes:**

On completion of this course, the students will be able to

CO1: **Define** basic mechanics of robot

CO2: **Explain** forces, trajectories and kinematics in a robotic system

CO3: **Identify** optimal search strategies for robots

CO4: **Interpret** logic and knowledge representation techniques

CO5: **Construct** artificial intelligence algorithms for robots

**Catalog Description:**

Robotics and Artificial intelligence have become quite popular in several industries. The course is designed to introduce basic concepts of artificial intelligence and robotics to students. Various A.I. based concepts have been covered that is necessary to build intelligent robots such as logic representation, search strategies, knowledge representation and genetic algorithm. Additionally, students can also familiarize themselves with advanced concepts of robotics such as forces, velocities trajectories, and kinematics. Moreover, various robotic controllers have also been discussed thoroughly.

**Course Content:**

**Module 1: 12 Lecture Hours**

Birth of AI: Evolution of AI, Subfields and technologies that support AI,

Robotics: Basic Terminologies like joint (revolute and prismatic), links, degrees of freedom, end-effectors, position and force/torque sensors, encoders, actuators, joint controllers, forward and inverse kinematics, velocity mapping, Cartesian and joint space

**Module 2: 12 Lecture Hours**

Logic Representation: First order predicate calculus, interpretation and truth values, inference rules, completeness, unification, examples

Forward kinematics of n DOF planar robots: position and orientation of a planar serial manipulator of any number of joints, Inverse kinematics of 3 DOF planar robots: joint angles given Cartesian position and orientation for a planar serial manipulator with three joints

**Module 3: 12 Lecture Hours**

Search Strategies: State space search, data-driven search, goal-driven search, graphs/examples

Rule based problem solving.

Static forces and velocities (Cartesian velocities, forces and torque calculations)

**Module 4: 12 Lecture Hours**

Knowledge Representation**:** semantic networks and network representations, conceptual graphs generalization, specialization, propositions. Independent robot joint controllers: Simplified 2nd order linear model of a robot actuator based on DC motor with permanent magnet, parameters of the independent PD joint controller)

**Module 5: 12 Lecture Hours**

Evolutionary and genetic algorithms: Simulation of natural evolution, genetic algorithms, genetic operators, fitness function, applications

Trajectory generators: Types of various velocity profiles for trajectory generation, including cubic, quintic, cycloid and trapezoidal profiles

**Text Books:**

1. Introduction to robotics- mechanics, planning, and control - F. C. Park and K. M. Lynch
2. Artificial Intelligence: A Modern Approach – S. Russell and P. Norvig

**Reference Books:**

1. Fundamentals of Robotic Mechanical Systems - robots robotics – J. Angeles
2. Principles of Artificial Intelligence – Nils J. Nilsson

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Define** basic mechanics of robot | **PO1, PO2, PO12,** **PSO 2** |
| **CO2** | **Explain** forces, trajectories and kinematics in a robotic system | **PO1, PO2, PO4, PO12,** **PSO 3** |
| **CO3** | **Identify** optimal search strategies for robots | **PO1, PO2, PO3, PO4, PSO2,PSO4** |
| **CO4** | **Interpret** logic and knowledge representation techniques | **PO2, PO4,PSO3 ,PSO4** |
| **CO5** | **Construct** artificial intelligence algorithms for robots | **PO3, PSO4** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | Ability to develop smart machines with a cutting-edge combination of AI & Data Science technologies. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO 2 | PSO 3 | PS04 |
| CSE11053 | Algorithm for Intelligent  System and Robot | 3 | 3 | 2 | 3 | - | - | - | - | - | - | - | 2 | - | 2 | 2 | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No.:** | | **Image result for adamas university logo** | | |
| **Course: CSE11053 – Algorithm for Intelligent System and Robot**  **Program: B.Tech with specialization in Artificial Intelligence and Machine Learning Stream: CSE**  **Semester: V**  **Time: 03 Hrs.**  **Max. Marks: 40**  **Instructions:**  Attempt all questions from **Section A** (each carrying 1 marks); any **Three Questions** from **Section B** (each carrying 5 marks) any two questions from **Section C** (each carrying 10 marks)**.** | | | | |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | | |
| 1. | **Explain** the meaning of degrees of freedom in a robot. | | **U** | **CO1** |
| 2. | **Explain** the purpose of crossover in genetic algorithm. | | **U** | **CO5** |
| ­­­ 3. | **Define** tautology. | | **R** | **CO4** |
| 4. | **What** are the differences between data-driven search and goal-driven search | | **R** | **CO3** |
| 5. | **Explain** cubic profile for trajectory generation | | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** | |  | |
| 6. | **Distinguish** between data driven search and goal driven search with proper examples | | **R** | **CO3** |
| 7. | **Explain** the various steps of a genetic algorithm. | | **U** | **CO5** |
| 8. | Three identical SRS open chain arms are grasping a common object. **Identify** the degrees of freedom of this system (b) Suppose there are now a total of n such arms grasping the object. Calculate the degrees of freedom of this system? | | **Ap** | **CO2** |
| 9. | Consider an elliptical path in the (x, y) plane. The path starts at (0,0) and proceeds clockwise to (2,1), (4,0), (2−1), and back to (0,0). **Identify** the path as a function of s ∈ [0,1] | | **Ap** | **CO2** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** | |  | |
| 10. | **Show** that a six-dof spatial open chain is in a kinematic singularity when any two of its revolute joint axes are parallel, and any prismatic joint axis is normal to the plane spanned by the two parallel revolute joint axes | | **U** | **CO2** |
| 11. | **Explain** forward and inverse kinematics along with examples | | **U** | **CO1** |
| 12. | **Identify** the predicate logic to represent the following:  1. John likes all kinds of food.  2. Apples are food.  3. Chicken is food.  4. Anything anyone eats and isn’t killed by is food.  5. Bill eats peanuts and is still alive.  6. Sue eats everything Bill eats. | | **Ap** | **CO4** |

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| **CSE12054** | **Algorithm for Intelligent System and Robot Lab** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Programming and H. S. level Mathematics, Physics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

To develop algorithms to simulate the mechanics of a robot

To develop AI based solutions for controlling motion in robotic systems

To develop machine learning techniques to train robotic systems to improve performance

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Develop** algorithms to simulate and control motion in a robotic systems

CO2. **Build** machine learning models to improve performance of robots

CO3. **Model** environment based on sensor data

CO4. **Find** optimal traversal path for moving robots

**Catalog Description:**

The course is designed to introduce students to the application of AI in robotics. Students will be encouraged to find intelligent solutions to improve performance of robots in a complex environment. Solutions involve, analysis of environment using sensor data, planning traversal path and trajectories and also using machine learning to improve performance of robots.

**Course Content:**

**List of Experiments:**

1. Matlab Tutorials - Introduction to the Matlab Environment, Programming Basics, Advanced Tools

2. Autonomous Mobile Robots(Planning and Learning),

3. Multirobot systems in cooperative settings

(Distributed Task Level Planning, Scheduling & Learning and Failure Detection & Recovery)

4. Sensor & Robot Systems.

**Text Books:**

1**.** Introduction to robotics- mechanics, planning, and control - F. C. Park and K. M. Lynch

2. Artificial Intelligence: A Modern Approach – S. Russell and P. Norvig

**Reference Books:**

1. Fundamentals of Robotic Mechanical Systems - robots robotics – J. Angeles

2. Principles of Artificial Intelligence – Nils J. Nilsson

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Internal Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Develop** algorithms to control motion in a robotic arm | **PO3, PO9, PO11**  **PSO1** |
| **CO2** | **Build** machine learning models to improve performance of robots | **PO3, PO9, PO11,  PSO1,PS04** |
| **CO3** | **Model** environment based on sensor data | **PO9, PO11  PSO1,PSO4** |
| **CO4** | **Find** optimal traversal path for moving robots | **PO9, PO11,**  **PSO1** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | Ability to develop smart machines with a cutting-edge combination of AI & Data Science technologies. | Ability to develop smart machines with a cutting-edge combination of AI & Data Science technologies. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO 2 | PSO 3 | PS04 | PS04 |
| CSE12054 | Algorithm for Intelligent  System and Robot Lab | - | - | 2 | - | - | - | - | - | 3 | - | 3 | - | 3 | 3 | 3 | 3 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No.:** | | **Image result for adamas university logo** | | |
| **Course: CSE12054 – Algorithm for Intelligent System and Robot Lab**  **Program: B.Tech with specialization in Artificial Intelligence and Machine Learning Stream: CSE**  **Semester: V**  **Time: 03 Hrs.**  **Max. Marks: 40**  **Instructions:**  Attempt all questions from **Section A** (each carrying 1 marks); any **Three Questions** from **Section B** (each carrying 5 marks) any two questions from **Section C** (each carrying 10 marks)**.** | | | | |
| **Part A [20 marks]** | | | | |
| 1. | Write a program to **model** a 4 bar mechanism that takes the length of four arms as input parameters. | | **Ap** | **CO1** |
|  | **Part B (5 + 5 + 10)** | |  | |
| 2. | **Construct** a 2d the 4 bar mechanism as a 2d plot. | | **Ap** | **CO1** |
| 3. | **Solve** the following: (L1 = 5 units, L2 = 3 units, L3 = 6 units and L4= 4 units)  i) Crank angle for rocker angle = 60 degree  ii) Rocker angle for crank angle = 90 degree | | **Ap** | **CO4** |
| 4. | **Compare** the difference between coupler angle and horizon an **develop** an optimization technique to **solve** for the required angle of the crank to keep the coupler horizontal. | | **U Ap** | **CO2** |

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| **CSE11055** | **Application of Machine Learning in Industries and Anomaly Detection** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -60** | **3** | **1** | **0** | **4** |
| **Pre-requisites/Exposure** | **H. S. knowledge of Mathematics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To introduce the fundamental concepts of machine learning techniques

2. To develop AI based systems for anomaly detection

3. To provide tools to detect, measure and avoid anomalies using intelligent systems

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Define** different types of anomaly detection techniques

CO2. **Compare** different types of learning techniques

CO3. **Explain** modern algorithms using popular AI platforms

CO4. **Apply** anomaly detection techniques in various application areas

CO5. **Identify** thetypes of anomalies present various systems

**Catalog Description:**

As a fundamental part of data science and AI theory, the study and application of how to identify abnormal data can be applied to supervised learning, data analytics, financial prediction, and many more industries. Understanding the theory and intuition behind these methods is an essential part of the modern developers and researcher’s tools and knowledge base. The main objectives of this course are to discuss the theory and methods used for anomaly detection from beginning to advanced levels, derive depth-based and proximity-based detection models and use many types of data from real-time streaming to high-dimensional abstractions

**Course Content:**

**Module 1: [12 Lecture Hours]**

Steps required understanding machine learning problem, processing dataset, ML Project overview

Case Study on ML Algorithms: Analyzing Problem Requirement, Dataset Preparation, Training and Testing

**Module 2: [12 Lecture Hours]**

Overview of some of the popular AI platforms, such as AWS, Google Cloud AI, Microsoft Azure Learning Studio, and IBM Watson, Hands-on learning of modern AI tools, including Google’s Tensor Flow and Deep Learning capabilities of Rapid Miner;

**Module 3: [12 Lecture Hours]**

Application of ML in various industries: Data sourcing, Feature Extraction, Understanding Taxonomies and Relationships, Modelling process, real world case problems of prediction, detection and estimation

**Module 4: [12 Lecture Hours]**

Anomaly Detection I: Different aspects, Statistical outlier detection: Grubb’s test, anomalies in time series, Distance and density based anomaly detection: KNN distance, Local outlier factor, LOF calculation and visualization

**Module 5: [12 Lecture Hours]**

Anomaly Detection II: Isolation forest, Visualizing isolation score, Comparing performance:

Labeled anomalies, Measuring performance Applications: Credit-card fraud, fake news detection, Insurance, Healthcare

**Text Books:**

# Practical Machine Learning – A New Look at Anomaly Detection – Ted Dunning Ellen Friedman

1. Anomaly Detection Principles and Algorithms – Kishan Mehrotra, Chilukuri Mohan ,Huaming Huang

**Reference Books:**

1. Outlier Analysis | Charu C. Aggarwal
2. Beginning Anomaly Detection Using Python-Based Deep Learning – Sridhar Alla, Suman Kalyan Adari

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Define** different types of anomaly detection techniques | **PO1, PO2, PO12, PSO3** |
| **CO2** | **Compare** different types of learning techniques | **PO1, PO2, PO3, PSO2** |
| **CO3** | **Explain** modern algorithms using popular AI platforms | **PO1, PO2, PO5, PSO2** |
| **CO4** | **Apply** anomaly detection techniques in various application areas | **PO3, PO4, PSO4** |
| **CO5** | **Identify** thetypes of anomalies present various systems | **PO4, PO5 PSO3,PSO4** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | Ability to develop smart machines with a cutting-edge combination of AI & Data Science technologies. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO 2 | PSO 3 | PS04 |
| CSE11055 | Application of Machine Learning in Industries and Anomaly Detection | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | **Name:**  **Enrolment No.:** | **Image result for adamas university logo** | | **Course: CSE11055 – Application of Machine Learning in Industries and Anomaly Detection**  **Program: B.Tech with specialization in Artificial Intelligence and Machine Learning Stream: CSE**  **Time: 03 Hrs.**  **Max. Marks: 40**  **Instructions:**  Attempt all questions from **Section A** (each carrying 1 marks); any **Three Questions** from **Section B** (each carrying 5 marks) any two questions from **Section C** (each carrying 10 marks)**.** | |   **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Explain** the role of feature extraction in machine learning | **U** | **CO2** |
| 2. | **Compare** supervised and unsupervised learning | **U** | **CO2** |
| ­­­ 3. | **Define** Grubb’s statistics. | **R** | **CO5** |
| 4. | **List** the benefits of using Isolation forest. | **R** | **CO1** |
| 5. | **Choose** 3 real-life examples where cluster based anomaly detection can be applied. | **Ap** | **CO4** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Explain** the difference between outliers and anomalies? | **U** | **CO1** |
| 7. | **What** are the differences between proximity based and density-based anomaly technique | **R** | **CO1** |
| 8. | **Identify** the use of time series anomaly detection in healthcare? | **Ap** | **CO4** |
| 9. | **Define** K-nearest neighbor algorithm. **What** the time complexity of a K-nearest neighbor algorithm | **R** | **CO2** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Define** anomaly score. **Explain** how it can be used to detect anomalies. **List** the different properties of isolation forests. | **R & U** | **CO5** |
| 11. | **Explain** how principal component analysis transform the feature space. | **U** | **CO3** |
| 12. | **Identify** the application of anomaly detection in the following domains with examples:   1. Insurance 2. Security 3. Healthcare 4. Industries 5. Surveillance | **Ap** | **CO4** |

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| **CSE11056** | **Data Analysis and Modelling Techniques** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **H. S. level mathematics and statistics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To introduce fundamental concepts of data analysis

2. To develop statistical models to represent data

3. To provide intelligent solutions for data mining processes

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Define** different types of data analysis techniques

CO2. **Compare** various statistical tests

CO3. **Explain** data using different types of data distributions

CO4. **Build** algorithms for data processing

CO5. **Interpret** different types of data visualization

**Catalog Description:**

Data mining, or knowledge discovery in databases, has during the last few years emerged as one of the most exciting fields in Computer Science. Data mining aims at finding useful regularities in large data sets. Interest in the field is motivated by the growth of computerized data collections which are routinely kept by many organizations and commercial enterprises, and by the high potential value of patterns discovered in those collections. In this course we explore how this interdisciplinary field brings together techniques from databases, statistics, machine learning, and information retrieval. We will discuss the main data mining methods currently used, including data warehousing and data cleaning, clustering, classification, association rules mining, query flocks, text indexing and seaching algorithms, how search engines rank pages, and recent techniques for web mining.

**Course Content:**

**Module 1: [10 Lecture Hours]**

Introduction to core concepts and technologies: Introduction, Terminology, data analysis process, types of data, Example applications   
Basic Review on Statistics I: Distributions, Estimation,

**Module 2: [11 Lecture Hours]**

Basic Review on Statistics II: Type I and II errors, rejection regions; Z-test, T-test, F-test, Chi-Square test, Bayesian test, Markov process, Hidden Markov Models, Poisson Process, Bayesian Network, Regression, Queuing systems

**Module 3: [12 Lecture Hours]**

Data Exploration: Observation, Interviews, Other sources

Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management, using multiple data sources

**Module 4: [12 Lecture Hours]**

Data preparation: Removing unwanted data, missing data handling

Data Visualization: Introduction, Types of data visualization, recent trends in various data collection and analysis techniques, Data Mining Trends and Research Frontiers: Mining Complex Data Types, Other Methodologies of Data, Mining, Data Mining Applications, Data Mining and Society, Data Mining Trends

**Text Books:**

1. Data Mining: Concepts and Techniques - Jiawei Han, ‎Jian Pei, ‎Micheline Kamber
2. Data Mining: Practical Machine Learning Tools and Techniques - Ian H. Witten, ‎Eibe Frank, ‎Mark A. Hall

**Reference Books:**

1. Machine Learning and Data Mining - Igor Kononenko, ‎Matjaz Kukar · 2007
2. Applied Data Mining for Business and Industry - Paolo Giudici, ‎Silvia Figini ·

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Define** different types of data analysis techniques | **PO1, PO2, PO3, PO12** |
| **CO2** | **Compare** various statistical tests | **PO1, PO2, PO3 PO11** |
| **CO3** | **Explain** data using different types of data distributions | **PO2, PO3, PO11, PO12, PSO2,** |
| **CO4** | **Build** algorithms for data processing | **PO3, PO6, PO9, PSO4** |
| **CO5** | **Interpret** different types of data visualization | **PO4, PO9, PSO2,PSO4** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | Ability to develop smart machines with a cutting-edge combination of AI & Data Science technologies. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO 2 | PSO 3 | PS04 |
| CSE11056 | Data Analysis and Modelling Technique | 2 | 3 | 3 | - | - | - | - | - | 2 | - | 2 | 2 | - | 2 | - | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No.:** | | **Image result for adamas university logo** | | |
| **Course: CSE11056 – Data Analysis and Modelling Techniques**  **Program: B.Tech with specialization in Artificial Intelligence and Machine Learning Stream: CSE**  **Semester: VI**  **Time: 03 Hrs.**  **Max. Marks: 40**  **Instructions:**  Attempt all questions from **Section A** (each carrying 1 marks); any **Three Questions** from **Section B** (each carrying 5 marks) any two questions from **Section C** (each carrying 10 marks)**.** | | | | |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | | |
| 1. | **List** the different methods to measure central tendency of data. | | **R** | **CO1** |
| 2. | **What** is the Central Limit Theorem and **why** is it important? | | **R** | **CO1** |
| ­­­ 3. | **Explain** the difference between type I vs type II error | | **U** | **CO2** |
| 4. | **What** are the differences between outliers and anomalies? | | **R** | **CO3** |
| 5. | **Explain** Chi-Square test of significance | | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** | |  | |
| 6. | **Classify** the different types of data and along with suitable examples | | **U** | **CO1** |
| 7. | **Define** Gaussian/Normal Distribution. Explain the impact of changing and on the gaussian distribution. | | **Ap** | **CO3** |
| 8. | **Explain** the significance of T-Test. **Identify** a real-life scenario where T-Test is applicable. | | **U & Ap** | **CO2** |
| 9. | **Explain** the role of data visualization. **Demonstrate** the use of a pie chart using a real-life example. | | **U** | **CO5** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** | |  | |
| 10. | **Compare** Poisson process and Gaussian Process. **Illustrate** two different scenarios each which can be modelled by using Poisson and Gaussian processes. | | **U** | **CO3** |
| 11. | **Explain** the different methods for data cleaning. | | **U** | **CO4** |
| 10. | **Model** aBayesian classification technique to predict class membership probabilities. | | **Ap** | **CO4** |

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| **CSE12057** | **Application of machine learning in industries and Anomaly Detection Lab** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **H. S. level Mathematics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

To develop machine learning applications for anomaly detection

To provide tools for detection of anomalies in various types of real-life scenarios

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Develop** supervised machine learning algorithms for real world cases

CO2. **Build** unsupervised algorithms for pattern recognition in unlabelled data

CO3. **Experiment with** real world scenarios to detect presence of anomalies

CO4. **Identify** anomalies in various real-world systems using intelligent algorithms

**Catalog Description:**

As a fundamental part of data science and AI theory, the study and application of how to identify abnormal data can be applied to supervised learning, data analytics, financial prediction, and many more industries. Understanding the theory and intuition behind these methods is an essential part of the modern developers and researcher’s tools and knowledge base. The main objectives of this course are to apply various methods used for anomaly detection from beginning to advanced levels, derive depth-based and proximity-based detection models and use many types of data from real-time streaming to high-dimensional abstractions

**Course Content:**

1. Implementation of Regression with real world cases  
2. Implementation of Classification with real world cases  
3. Implementation of unsupervised learning algorithms using real world cases.  
4. Intrusion detection   
5. Fraud detection   
6. Industrial damage detection

**Text Books:**

1. Practical Machine Learning – A New Look at Anomaly Detection – Ted Dunning Ellen Friedman
2. Anomaly Detection Principles and Algorithms – Kishan Mehrotra, Chilukuri Mohan ,Huaming Huang

**Reference Books:**

1. Outlier Analysis | Charu C. Aggarwal
2. Beginning Anomaly Detection Using Python-Based Deep Learning – Sridhar Alla, Suman Kalyan Adari

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Internal Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

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| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Develop** supervised machine learning algorithms for real world cases | **PO3, PO9**  **PSO1** |
| **CO2** | **Build** unsupervised algorithms for pattern recognition in unlabelled data | **PO2, PO3, PO9,**  **PSO1** |
| **CO3** | **Experiment with** real world scenarios to detect presence of anomalies | **PO2, PO3, PO4, PO7, PO11**  **PSO1, PSO4** |
| **CO4** | **Identify** and isolate anomalies in various real-world systems using intelligent algorithms | **PO2, PO3, PO4, PO7, PO11**  **PSO1,PSO4** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyses the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | Ability to develop smart machines with a cutting-edge combination of AI & Data Science technologies. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO 2 | PSO 3 | PS04 |
| CSE12057 | Application of machine learning in industries and anomaly detection lab | - | 3 | 3 | 2 | - | - | 2 | - | 2 | - | 2 | - | 3 | - | - | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No.:** | | **Image result for adamas university logo** | | |
| **Course: CSE12057 – Application of Machine Learning in Industries and Anomaly Detection Lab**  **Program: B.Tech with specialization in Artificial Intelligence and Machine Learning Stream: CSE**  **Semester: VI**  **Time: 03 Hrs.**  **Max. Marks: 40**  **Instructions:**  Attempt all questions from **Section A** (each carrying 1 marks); any **Three Questions** from **Section B** (each carrying 5 marks) any two questions from **Section C** (each carrying 10 marks)**.** | | | | |
| **Part A [20]** | | | | |
| 1. | **Build** a K-Means clustering algorithm. | | **Ap** | **CO2** |
| **Part B (10x2 = 20)** | | | | |
| 2. | **Solve** for the optimal value of K to maximize the DB-index | | **Ap** | **CO2** |
| 3. | **Infer** an optimal threshold to reject 5% of the outliers | | **U** | **CO3, CO4** |

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| **CSE11058** | **Neural Networks and Deep Learning Fundamentals** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **H. S. level Mathematics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

To develop state of the art solutions for challenging AI problems

To provide the concepts of neural networks and deep learning

**Course Outcomes:**

On completion of this course, the students will be able to

CO1: **Define** various types of neurons and layers in neural networks

CO2: **Compare** different types of loss functions

CO3: **Explain** the optimization techniques for training neural networks

CO4: **Build** neural networks for supervised and unsupervised problems

CO5: **Identify** the complexity of neural networks

**Catalog Description:**

Neural networks have enjoyed several waves of popularity over the past half century. Each time they become popular, they promise to provide a general purpose artificial intelligence--a computer that can learn to do any task that you could program it to do. The first wave of popularity, in the late 1950s, was crushed by theoreticians who proved serious limitations to the techniques of the time. These limitations were overcome by advances that allowed neural networks to discover internal representations, leading to another wave of enthusiasm in the late 1980s. The second wave died out as more elegant, mathematically principled algorithms were developed (e.g., support-vector machines, Bayesian models). Around 2010, neural nets had a third resurgence. What happened over the past 20 years? Basically, computers got much faster and data sets got much larger, and the algorithms from the 1980s with a few critical tweaks and improvements appear to once again be state of the art, consistently winning competitions in computer vision, speech recognition, and natural language processing. The many accomplishments of the field have helped move research from academic journals into systems that improve our daily lives: apps that identify our friends in photos, automated vision systems that match or outperform humans in large-scale object recognition, phones and home appliances that recognize continuous, natural speech, self-driving cars, and software that translates from any language to any other language.

**Course Content:**

**Module 1: 10 Lecture Hours**

Introduction: what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks Learning Process: Error Correction learning, Memory based learning, Hebbian learing, Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process

**Module 2: 12 Lecture Hours**

Single Layer Perceptron’s: Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception –convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment. Multilayer Perceptron: Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection.

**Module 3: 10 Lecture Hours**

Back Propagation: Back propagation and differentiation, Hessian matrix, Generalization network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning, Loss Function

**Module 4: 13 Lecture Hours**

Introduction to Deep Learning: Basic Concepts, Need of Deep Learning, McCulloch-Pitts unit, Perceptron Learning Algorithm, Linear Separability, Gradient Descent, Empirical Risk Minimization Deep Learning Models: Restricted Boltzmann Machines, Deep Belief Nets,

Autoencoders. Convolutional Neural Networks: Invariance, stability. Variability models (deformation model, stochastic model), Scattering networks Group Formalism, Supervised Learning: classification, Properties of CNN representations: inevitability, stability, invariance, covariance/invariance: capsules and related models,

**Text Books:**

1. “Neural networks A comprehensive foundations”, Simon Haykin, Pearson Education 2nd Edition 2004.”
2. “Deep Learning”, Ian Goodfellow, Yoshua Bengio, and Aaron Courville, MIT press, 2016.

**Reference Books:**

1. “Artificial neural networks”, B.Vegnanarayana Prentice Halll of India P Ltd, 2005.
2. “Neural networks in Computer intelligence”, Li Min Fu, TMH, 2003.
3. “Neural networks”, James A., Freeman David, M. S. Kapura, Pearson Education.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Define** various types of neurons & layers in neural networks | **PO1, PO2, PO3** |
| **CO2** | **Compare** different types of loss functions | **PO1, PO2, PO3, PO5,PSO2** |
| **CO3** | **Explain** the optimization techniques for training neural networks | **PO1, PO2, PO3, PSO2** |
| **CO4** | **Build** neural networks for supervised and unsupervised problems | **PO3, PO4, PO5, PO9, PSO3,PSO4** |
| **CO5** | **Identify** the complexity of neural networks | **PO3, PO4, PSO3,PSO4** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | Ability to develop smart machines with a cutting-edge combination of AI & Data Science technologies. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO 2 | PSO 3 | PS04 |
| ECS 44101 | Neural Network and Deep Learning Fundamentals | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 3 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No.:** | | **Image result for adamas university logo** | | |
| **Course: CSE11058 – Neural Networks and Deep Learning**  **Program: B.Tech with specialization in Artificial Intelligence and Machine Learning Stream: CSE**  **Semester: VII**  **Time: 03 Hrs.**  **Max. Marks: 40**  **Instructions:**  Attempt all questions from **Section A** (each carrying 1 marks); any **Three Questions** from **Section B** (each carrying 5 marks) any two questions from **Section C** (each carrying 10 marks)**.** | | | | |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | | |
| 1. | **Demonstrate** how a Mc-culloch Pitts neuron model a linear hyperplane. | | **U** | **CO1** |
| 2. | **Apply** amax pooling operation with 3x3 kernels and stride of 2 on the following matrix: | | **Ap** | **CO2** |
| ­­­3. | **What** is binary cross entropy loss? | | **R** | **CO2** |
| 4. | **Identify** a neural network that can be used for unsupervised learning. | | **Ap** | **CO4** |
| 5. | **Choose** the correct loss function for regression problem.  a) MSE Loss, b) Binary Cross Entropy, c) NLL Loss, d) KL Divergence | | **Ap** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** | |  | |
| 6. | **What** is Cross Entropy Measure? **Identify** a real-life scenario where this can be used to train a neural network. | | **R Ap** | **CO2** |
| 7. | Consider a simple neural network with one input signal, one hidden neuron and one output neuron. Each neuron has a sigmoid activation and an MSELoss function is being used to train the network. **Build** the computational graph. Also **show** the chain of partial derivatives according to the backpropagation algorithm for all weights and biases. | | **U Ap** | **CO2** |
| 8. | **Define** Stochastic Gradient Descent algorithm. **Explain** the role of learning rate. | | **R U** | **CO3** |
| 9. | **Build** an autoencoder which accepts an input of 1024 dimensional vector. **What** kind of loss function required to train the auto encoder | | **R Ap** | **CO4 /CO2** |
|  | **SECTION (Answer Any Two Questions) (2 x 10 = 20)** | |  | |
| 10. | **Explain** the XOR problem? **Show** that XOR problem can be solved by using multilayered perceptron | | **U & Ap** | **CO4** |
| 11. | **Explain** are the different types of layers in a convolutional neural network? Which layers tend to be most costly in terms of computational resources? Justify your answer. Discuss an approach to make CNNs more efficient in this regard. | | **U** | **CO1** |
| 12. | **Build** convolutional neural network to accept an input of 28 x 28 RGB image and produce a 10 class multinomial distribution as output and calculate the number of parameters for the proposed network. | | **Ap** | **CO4/CO5** |

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| **CSE12059** | **Neural Networks and Deep Learning Fundamentals Lab** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **H. S. level Mathematics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

To develop algorithms to implement neural networks

To provide a platform to train neural networks using back propagation

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Develop** multi layered perceptron

CO2. **Explain** the effect of weights and biases on neural networks

CO3. **Solve** error of a neural network and train using backpropagation

CO4. **Build** model on datasets

**Catalog Description:**

This course is designed to help students implement neural networks from scratch. Students will be able to understand the effect of weights and biases, design loss functions and carry out backpropagation to train neural networks.

**Course Content:**

1. To study about MATLAB.

2. Write a program to perform basic matrix operations

3. How the weight & bias value effects the output of neurons

4. Implementation of weight and bias value to present a decision boundary in the feature space

5. Implementation of perceptron learning rule works for linearly and non-linearly separable problem

6. Implementation of multi-layered perceptron using backpropagation

**Text Books:**

1. “Neural networks A comprehensive foundations”, Simon Hhaykin, Pearson Education 2nd Edition 2004.”
2. “Deep Learning”, Ian Goodfellow, YoshuaBengio, and Aaron Courville, MIT press, 2016.

**Reference Books:**

1. “Artificial neural networks”, B.Vegnanarayana Prentice Halll of India P Ltd, 2005.
2. “Neural networks in Computer intelligence”, Li Min Fu, TMH, 2003.
3. “Neural networks”, James A., Freeman David, M. S. Kapura, Pearson Education.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Internal Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Develop** multi layered perceptron | **PO2,PO3**  **PSO1** |
| **CO2** | **Explain** the effect of weights and biases on neural networks | **PO2, PO3,PO5**  **PSO1** |
| **CO3** | **Estimate** error of a neural network and train using back propagation | **PO3, PO4, PO5, PO6,PO9,PSO1,PSO4** |
| **CO4** | **Test** model on datasets | **PO4, PO6, PO9,**  **PSO1,PSO4** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | Ability to develop smart machines with a cutting-edge combination of AI & Data Science technologies. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO 2 | PSO 3 | PS04 |
| CSE12059 | Neural Network and Deep Learning Fundamentals Lab | - | 2 | 3 | 2 | 2 | 2 | - | - | 2 | - | - | - | 3 | - | - | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

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| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No.:** | | **Image result for adamas university logo** | | |
| **Course: CSE12059 – Neural Network and Deep Learning Fundamentals Lab**  **Program: B.Tech with specialization in Artificial Intelligence and Machine Learning Stream: CSE**  **Semester: VII**  **Time: 03 Hrs.**  **Max. Marks: 40**  **Instructions:**  Attempt all questions from **Section A** (each carrying 1 marks); any **Three Questions** from **Section B** (each carrying 5 marks) any two questions from **Section C** (each carrying 10 marks)**.** | | | | |
| **Part A (20 Marks)** | | | | |
| 1. | **Build** a multilayered perceptron. Take the number of layers and neurons in each layer as input (Input is 784 dimensional) | | **Ap** | **CO1** |
|  | **Part B (3 x 5 = 15)** | |  | |
| 2. | **Solve** the training error by training the model on the MNIST dataset for 10 epochs | | **Ap** | **CO3** |
| 3. | **Illustrate** the error curve as a 2d plot | | **U** | **CO3** |
| 4. | **Apply** the model on the test set and report the accuracy | | **App** | **CO4** |

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| **CSE11060** | **Subject from other schools AI(Online) Overview of Recent Trends in AI/ML** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **H. S. level Mathematics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

To develop awareness among students about the latest trends in the field of AI and ML

To provide a basic concept of natural language processing and reinforcement learning

To develop knowledge about the various facets and challenges of cognitive systems

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Define** challenges in the field of AI and ML

CO2. **Compare** different types of cognitive systems

CO3. **Develop** reinforcement learning algorthms

CO4. **Develop** models for natural language processing

**Catalog Description:**

This course is designed to spread awareness about the state of the art topics of AI/ML. Starting from a historical perspective, the course is designed to illustrate the several challenges in the field of AI and ML along with several recent developments in areas like natural language processing and reinforcement learning.

**Course Content:**

**Module 1: [10 Lecture Hours]**

Computational Linguistic and NLP : Tokenization, POS Tagging, Constituent Parsing, Dependency Parsing, Formal Grammars, Language Modelling, Word sense disambiguation, Named Entity Recognition, Embedding.

**Module 2: [11 Lecture Hours]**

Reinforcement Learning : Multi arm bandits, Finite Markov Decision Process, Dynamic Programming, Monte Carlo Methods, Temporal Difference Learning, Approximate Solution methods.

**Module 3: [12 Lecture Hours]**

Cognitive Systems-An AI Paradigm shift: Birth of AI, Hebbian learning, cybernetics, perceptrons, non-linear systems, connectionist movement, backpropagation and neural networks, recurrent neural networks, vanishing and exploding gradients, support vector machines, the role of GPUs, deep learning.

**Module 4: [12 Lecture Hours]**

Challenges of AI/ML : Data availability: Quality and quantity, annotation, bias ; financial constraints: funding opportunities, role of government and industries; computational overheads: CPU vs GPU, quantum computing, communication bottlenecks: transition from 4G to 5G, knowledge transfer: skill enhancement, open sourcing, spreading AI awareness; explainability.

**Text Books:**

1. Speech and Language Processing - Dan Jurafsky and James H. Martin
2. Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto

**Reference Books:**

1. Deep Learning – Ian Goodfellow, Yoshua Bengio, Aaron Courville
2. Artificial Intelligence in Practice - Bernard Marr

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Define** challenges in the field of AI and ML | **PO1, PO2, PO3, PO9, PSO3** |
| **CO2** | **Compare** different types of cognitive systems | **PO1, PO2, PO3, PO4, PSO3** |
| **CO3** | **Develop** reinforcement learning algorithms | **PO3, PO4, PO9,PSO4** |
| **CO4** | **Examine** models for natural language processing | **PO2, PO4,PSO4** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | Ability to develop smart machines with a cutting-edge combination of AI & Data Science technologies. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO 2 | PSO 3 | PS04 |
| CSE11060 | Overview of Recent Trends in AIML | 2 | 3 | 3 | 3 | - |  | - | - | 2 | - | - | - | - | - | 2 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No.:** | | **Image result for adamas university logo** | | |
| **Course: CSE11060 – Overview of recent trends in AI/ML**  **Program: B.Tech with specialization in Artificial Intelligence and Machine Learning Stream: CSE**  **Semester: VIII**  **Time: 03 Hrs.**  **Max. Marks: 40**  **Instructions:**  Attempt all questions from **Section A** (each carrying 1 marks); any **Three Questions** from **Section B** (each carrying 5 marks) any two questions from **Section C** (each carrying 10 marks)**.** | | | | |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | | |
| 1. | **Define** Chomsky hierarchy of formal grammars | | **R** | **CO4** |
| 2. | **What** do you mean by Q-Learning | | **R** | **CO3** |
| ­­­ 3. | **List** the main advantages of GPUs over CPUs | | **R** | **CO1** |
| 4. | **Explain** vanishing gradients | | **U** | **CO2** |
| 5. | **Explain** why modelling the XOR function is not possible with a perceptron | | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** | |  | |
| 6. | **Explain** the backpropagation algorithm | | **U** | **CO2** |
| 7. | **Demonstrate** the role of multi arm bandits. | | **U** | **CO3** |
| 8. | **Outline** 5 major challenges in the field of AL and ML. | | **U** | **CO3** |
| 9. | **Identify** the POS Tags of the following sentences:  1) The buffalo is grazing on the field  2) A boy is going to school  3) The car is red  4) The president was elected  5) Walking is a good exercise | | **Ap** | **CO4** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** | |  | |
| 10. | **What** action value pair, **Explain** the role of optimal policy gradient in the training of reinforcement learning systems. | | **R, U** | **CO3** |
| 11. | **Demonstrate** how XOR problem can be solved by multi layered perceptrons | | **U** | **CO2** |
| 12 | Consider the following sentences:  1) ram is eating  2) eating rice is good  3) john is good  4) john buys rice  5) ram buys good rice  **Construct** a unigram, bigram and trigram model and calculate the probability of the sentence  “John eats good rice” | | **Ap** | **CO4** |

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| CSE15061 | Specialization Viva Voce | **L** | **T** | **P** | **C** |
| **Version 1.0** |  | **0** | **0** | **0** | **2** |
| **Pre-requisites/Exposure** |  | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To teach deep understanding of AI/ML issues & incident response..
2. To provide the students with specialist knowledge and experience of various AI/ML techniques and incident response.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Learn** understanding of various digital forensics techniques and its usage for the potential countermeasures or incident response.

CO2. **Demonstrate** a critical evaluation and use of digital forensics technique to do incident response with an independent project.

**Catalog Description:**

is an integral part of life. Aim of this course is to teach students how to think like a hacker, providing them with a deep understanding of security issues and concerns. In addition, this course also provides the students with specialist knowledge and experience of advanced hacking techniques and their countermeasures.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Internal Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

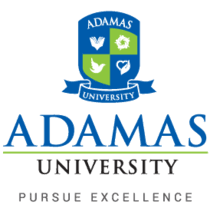
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| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Learn** understanding of various digital forensics techniques and its usage for the potential countermeasures or incident response. | **PO1, PO3, PSO1,PSO4** |
| **CO2** | **Demonstrate** a critical evaluation and use of digital forensics technique to do incident response with an independent project. | **PO5, PO4,PSO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | Ability to develop smart machines with a cutting-edge combination of AI & Data Science technologies. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO 2 | PSO 3 | PS04 |
| CSE15061 | Specialization Viva Voce | 2 | - | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | - | - | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING & TECHNOLOGY**

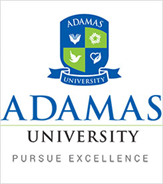
**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**CO – PO & PSO MAPPING**

**Name of the Programme: B. Tech in Computer Science & Engineering**

**Specialization: Artificial Intelligence and Machine Learning**

| **Course Code** | **Course Title** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** | **PSO4** |
| MTH11501 | Engineering Mathematics -I | - | 3 | 3 | 3 | - | - | - | - | - | - | - |  |  |  |  | NA |
| 3 | - | - | - |
| PHY11201 | Applied Science | 3 | 2 | 1 | 3 | 2 | 2 | - | - | - | - | - | 2 | - | - | - | NA |
| CSE11001 | Introduction to Programming | 3 | - | 1 | 1 | 1 | - | - | - | 1 | - | 1 | - | - | - | - | NA |
| ENG11053 | HSSM –I (English Communication- I) | - | 3 | 3 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | - | 1 | - | - | - | NA |
| BIT11003 | Life Science | 2 | 2 | 3 | - | 3 | 3 | - | 2 | 1 | - | - | 2 | 3 | 3 | - | NA |
| PHY12202 | Applied Science Lab | 3 | 3 | 3 | - | 2 | - | - | - | 1 | - | - | - | - | - | - | NA |
| CSE12002 | Programming Lab | 3 | 1 | 1 | 1 | 1 | - | 1 | - | - | - | 1 | - | 1 | - | - | NA |
| CEE12001 | Engineering Drawing and CAD | 3 | 2 | 2 | 1 | - | 1 | - | - | - | - | - | 3 | 2 | 2 | - | NA |
| ENG11043 | Communication and Collaboration Skill-I | - | 2 | - | - | - | - | - | - | 3 | 3 | - |  |  |  |  | NA |
| - | 3 | 3 | - |
| GEE14003 | Capstone Project- I | 3 | 3 | 3 | - | - | - | - | - | - |  | - | - | - | - |  | NA |
| DGS11001 | Design Thinking | 3 | 2 | - | 1 | 1 | - | - | - | - | - | 1 | - | - | - | - | NA |
| MTH11502 | Engineering Mathematics -II | 3 | 1 | 2 | 3 | 1 | - | 1 | - | - | - | - | 2 | - | - | - | NA |
|  |
| GEE11001 | Electrical and Electronics Technology | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 3 | - | - | - | NA |  |
| MEE11002 | Engineering Mechanics | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | NA |  |
|  |
| EVS11107 | Environmental Science | 1 | 3 | 3 | - | - | 3 | 3 | 2 | - | - | 2 | 2 | - | 2 | - | NA |  |
| GEE12002 | Electrical and Electronics Technology Lab | 3 | - | 2 | - | **-** | - | - | - | - | - | - | - | - | - | - | NA |  |
|  |
|  |
| MEE12001 | Engineering Workshop | 3 | 1 | - | - | - | - | - | - | 3 | - | - | - | 3 | - | - | NA |  |
|  |
| ENG11044 | Communication and Collaboration Skill-II | - | 1 | - | - | - | - | - | 1 | 2 | 2 | - | - | 2 | 2 | - | NA |  |
|  |
| GEE14004 | Capstone Project- II | 3 | 2 | 2 | 2 | 3 | - | - | - | - | --- | - | - | - | - | - | NA |  |
|  |
| IDP14001 | Interdisciplinary Project | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 |  | NA |  |
| - |  |
| SMA42111 | Probability, Statistics and Numerical Methods | 2 | 3 | 2 | - | 3 | - | - | - | - | - | - | 3 | 2 | 3 |  | NA |  |
| 2 |  |
| HEC42180 | HSS–IV (Economics for Engineers) | - | 2 | 3 | 2 | - | 2 | - | - | - | - | 2 | 3 | 2 | - | 2 | NA |  |
| CSE11003 | Data Structures and Algorithms | 2 | 3 | 3 | - | - | - | - | - | - | - | - | 3 |  |  |  | NA |  |
| 3 | 2 | 3 |  |
| CSE11004 | Switching circuit and logic design Lab | 3 | 2 | 3 | - | - | - | - | - | - | - | - |  |  |  |  | NA |  |
| 3 | 3 | 2 | 2 |  |
| CSE11005 | Formal Language And Automata Theory | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 3 | 3 | NA |  |
| CSE11006 | Engineering Science Course (Introduction to Python) | 3 | 3 | 3 | 2 | - | - | - | - | - | - | 2 | 3 |  |  |  | NA |  |
| 2 | 3 | - |  |
|  | Data Structures and Algorithms Lab | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | - |  |  |  | NA |  |
| CSE12007 | 3 | 3 | 3 |  |
|  |  |  |  |  |
| GEE14005 | Capstone Project- III | 3 | 3 | 3 | 3 | 3 | - | - | - | 3 | - | - | - | 3 | 3 | 3 | NA |  |
| SOC14100 | Community Service | - | 2 | - | - | - | 2 | 2 | 2 | 2 | 2 |  |  | - | - | - | NA |  |
| EIC11001 | Venture Ideation | - | - | - | - | - | 3 | 2 | 3 | - | - | 3 | - | - | - |  | NA |  |
| SMA42112 | Operations Research | 3 | 3 |  | - | 3 | - | - | - | - | - | - | 3 |  | 3 |  | NA |  |
| 2 | - |  |
| CSE11008 | Design and Analysis of Algorithms | 3 | 2 | 3 | 3 |  | - | - | - | - | - | - | 3 | 3 | 3 | 3 | NA |  |
| CSE11009 | Object Oriented Programming (Prof. Core- V) | 3 | 3 | 3 | - | - | - | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
| CSE11010 | Software Engineering | 3 | 2 |  |  | 2 | 2 |  |  |  |  |  | 3 | 2 | 3 | 2 | NA |  |
| CSE11011 | Computer Architecture | 3 |  | 3 | - | 2 | 3 | - | - | - | - | - | 3 | 3 | 2 | 3 | NA |  |
| PSG11021 | Human Values and Professional Ethics | 3 | - | - | - | 3 | 3 | 3 | - | - | - | - | - | 3 | 3 | - | NA |  |
| SMA42211 | Numerical Techniques Lab | 3 | - | - | - | 3 | 3 | 3 | - | - | - | - |  | 3 | 3 | - | NA |  |
| - |  |
| CSE12012 | Design & Analysis of Algorithm Lab | 2 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | 2 | 3 | 3 | NA |  |
| CSE12013 | Object Oriented Programming Lab | 3 | 3 | 3 | - | 3 | - | - | - | - | - | - | - |  |  |  | NA |  |
|  |
| GEE14006 | Capstone Project -IV | 3 | - | 3 |  | 3 | 2 | - | - | 3 |  | - | 3 | 2 | 2 | 3 | NA |  |
| CSE11014 | Compiler Design | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 3 | - | 3 | 3 | NA |  |
| CSE11015 | Database Management Systems | 3 |  | 3 |  | 2 | - | - | - | - | - | 3 | 2 | 3 | 2 | 3 | NA |  |
| CSE11016 | Operating Systems | 3 | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
| CSE11053 | Algorithm for Intelligent System and Robot | 3 | 3 | 2 | 3 | - | - | - | - | - | - | - | 2 | - | 2 | 2 | 3 |  |
|  |
|  |
| CSE11017 | Applied Graph Theory(Prof. Elective -I) | 3 | 2 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 | 2 | NA |  |
| CSE11018 | Communication Network(Prof. Elective -I) | 3 | 3 | 3 | 3 | - | 2 | - | - | - | 3 | - | - | 3 | 3 | 2 | NA |  |
|  |
| CSE11019 | Big Data Analytics(Prof. Elective -I) | 3 | 2 | 2 | 3 | 3 | - | - | - | - | - | - | - | 2 | 3 | 2 | NA |  |
| CSE12020 | Compiler Design Lab | 3 | - | 2 | - | 2 | - | - | - | - | - | - | 3 | 2 | 3 | 2 | NA |  |
| CSE12021 | Database Management Systems Lab | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - |  |  |  |  | NA |  |
| 3 | 2 | 2 | 3 |  |
| CSE12022 | Operating Systems Lab | 2 | 3 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | 2 | 3 | NA |  |
| CSE12054 | Algorithm for Intelligent System and Robot Lab | - | - | 2 | - | - | - | - | - | 3 | - | 3 | - | 3 | 3 | 3 | 3 |  |
|  |
|  |
|  |
| GEE14007 | Capstone Project -V |  | - | 3 | - | 3 | - | 3 | - | 3 | 2 | 3 |  | 3 | - | 2 | NA |  |
| CSE11023 | Computer Networks | 2 | 3 | 2 | 3 | - | 3 | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
| CSE11024 | Artificial Intelligence and Machine Learning(Prof. Core- XII) | 3 | 2 | 2 | 3 | 2 | - | - | - | - | - | - | - | 2 | 3 | 3 | NA |  |
|  |
| CSE11025 | High Performance Computer Architecture(Prof. Elective -II) | 3 | 2 | 3 | - | 3 | 2 | - | - | - | - | - | 3 | 3 | 2 | 2 | NA |  |
|  |
| CSE11026 | Pattern Recognition(Prof. Elective -II) | 3 | 2 | 2 | 2 | 3 | - | - | - | - | - | - | - | 3 | 2 |  | NA |  |
|  |  |
| 3 |  |
| CSE11027 | Computational Geometry(Prof. Elective -II) | 3 | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
|  |
| CSE11028 | Artificial Intelligence(Open Elective -I) |  | 3 | 3 | 2 | - | 3 | 3 | - | - | - | - | 2 | 3 | 2 | 2 | NA |  |
| CSE11027 | Computational Geometry(Open Elective -I) | 3 | 3 | 3 | 3 | 1 | - | - | - | - | - | - | - |  |  |  | NA |  |
| 3 | 3 | 3 |  |
| CSE11055 | Application of Machine Learning in Industries and Anomaly Detection | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 2 |  |
|  |
|  |
| CSE11056 | Data Analysis & Modelling Technique | 2 | 3 | 3 | - | - | - | - | - | 2 | - | 2 | 2 | - | 2 | - | 2 |  |
|  |
|  |
| CSE12029 | Computer Networks Lab (Prof. Core- XI Lab) | 3 | 3 | 2 | 2 | 3 | 3 | - | - | 3 | - | - |  |  |  |  | NA |  |
| - | 2 | 2 | 1 |  |
| CSE12030 | Artificial Intelligence and Machine Learning Lab(Prof. Core- XII Lab) | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 | NA |  |
|  |
|  |
| CSE12031 | High Performance Computer Architecture Lab(Prof. Elective –II Lab) | 3 | - | 3 | - | 3 | - | - | - | - | - | - | 2 | 3 | 2 | 2 | NA |  |
|  |
| CSE12032 | Pattern Recognition(Prof. Elective –II Lab) | 3 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | - | NA |  |
|  |
| CSE12033 | Computational Geometry Lab(Prof. Elective –II Lab) | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
|  |
| CSE12057 | Application of Machine Learning in Industries and Anomaly Detection Lab | - | 3 | 3 | 2 | - | - | 2 | - | 2 | - | 2 | - | 3 | - | - | 3 |  |
|  |
|  |
|  |
| CSE15034 | Technical Seminar | 3 | 2 | 2 | 3 | 3 | 2 | - | -- |  |  | - |  | - | 3 | - | NA |  |
| MBA43144 | HSSM –V (Industrial Management) | 3 | 2 | 3 | 3 |  | 3 | 2 |  |  | - | - | - | 2 | 2 | 2 | NA |  |
| CSE11035 | Image Processing(Prof. Elective- III) | 3 | 3 | 2 | 3 | - |  | - | - | - | - | - | - | 3 | 3 | 2 | NA |  |
|  | Cloud Computing(Prof. Elective- III) | 3 | 2 | 3 | 3 | 3 | - | - | - | - | - | - |  |  | 3 | 3 | NA |  |
| CSE11036 | 2 | 2 |  |
| CSE11037 | Information Retrieval(Prof. Elective- III) |  | 2 | 2 | 2 | 3 | 3 | 3 | - | - | - | - |  | 3 | 2 | 2 | NA |  |
| CSE11038 | Computer Graphics(Prof. Elective- III) | 3 | 3 | 2 | 3 | 3 | - | - | - | - | - | - | **-** | 3 | 3 | 3 | NA |  |
| CSE11039 | Artificial Neural Network and Deep Learning(Prof. Elective- III) | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - |  |  | 3 | NA |  |
|  |  |  |
| 3 | 3 |  |
| CSE11040 | Cryptography & Cyber Security (Prof. Elective- IV) | 3 | 3 | 3 | - | 3 | - | - | - | - | - | - | **3** |  |  |  | - |  |
| 3 | 3 | 3 |  |
|  |  |  |  |
| CSE11041 | Internet of Things (Prof. Elective- IV) | 3 | 2 | 3 |  |  | 3 |  | 3 |  |  |  | 2 | 2 | 3 | 3 | NA |  |
| CSE11042 | 5G Wireless Communication (Prof. Elective- IV) | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | 3 | 3 | 2 | 2 | NA |  |
|  |
| CSE11043 | Machine Learning(Open Elective- II) | 3 | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | - | - | NA |  |
| CSE11041 | Internet of Things(Open Elective- III) | 3 | 2 | 3 |  |  | 3 |  | 3 |  |  |  | 2 | 2 | 3 | 3 | NA |  |
| CSE12044 | Image Processing Lab(Prof. Elective- III Lab) | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | **-** | 3 | 3 | 3 | NA |  |
|  |
|  | Cloud Computing Lab(Prof. Elective- III Lab) | 3 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - |  |  |  |  | NA |  |
| CSE12045 | 2 | 3 |  |
|  | Information Retrieval Lab(Prof. Elective -III Lab) | 3 | 3 | 2 | 2 |  |  | - | - | - | - | 2 |  | 3 | 3 | 3 | NA |  |
| CSE12046 |  |
| CSE12047 | Computer Graphics Lab(Prof. Elective- III Lab) | 3 | 3 | 2 | 3 | - |  | - |  |  |  |  |  |  |  |  | NA |  |
| - | - | - | - | - | 3 | 3 | 3 |  |
|  | Artificial Neural Network and Deep Learning Lab(Prof. Elective- III Lab) | 3 | 3 | 3 | 3 | 3 |  | - | - |  | - | 2 | - |  |  |  | NA |  |
| CSE12048 | 3 | 3 | 3 |  |
|  |  |  |  |  |
| CSE11058 | Neural Network and Deep Learning Fundamentals | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 3 | 2 |  |
|  |
|  |
| CSE12059 | Neural Network and Deep Learning Fundamentals Lab | - | 2 | 3 | 2 | 2 | 2 | - | - | 2 | - | - | - | 3 | - | - | 2 |  |
|  |
|  |
| CSE14049 | Summer Internship | 3 | 3 | 3 | 3 | 3 |  |  |  |  |  |  |  | 2 | 3 | 3 | NA |  |
|  |
| CSE14050 | Minor Project | 3 | 2 | 3 | - | - | - | - | - | 3 | - | 3 | 3 | 2 | 3 | - | NA |  |
|  | Overview of Recent Trends in AI/ML | 2 | 3 | 3 | 3 | - | - | - | - | 2 | - | - | - | - | - | 2 | 2 |  |
| CSE11060 |  |
|  |  |
| CSE14051 | Industry Work Experience / SIRE / Major Project | 3 | 2 | - | 3 | - | - | - | - | 3 | 3 | 3 |  | 2 | 3 | 3 | NA |  |
|  |
| CSE15052 | Comprehensive Viva Voce | 3 | 3 | 3 |  | 3 | 3 |  |  | 3 | 3 |  |  | 3 | 3 | 3 | NA |  |
|  |
|  |  | 2 | - | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | - | - | 3 |  |
| CSE15061 | Specialization Viva Voce |  |
|  |  |  |
| **Average of CO-PO Mapping** | | 2.84 | 2.54 | 2.61 | 2.42 | 2.44 | 2.46 | 2.42 | 2.22 | 2.33 | 2.44 | 2.11 | 2.6 | 2.6 | 2.6 | 2.62 | 2.44 |  |

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**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING**

**AND**

**TECHNOLOGY**

**DEPARTMENT**

**OF**

**COMPUTER SCIENCE AND ENGINEERING**

**Course Structure & Syllabus**

**For**

**Bachelor of Technology (B.Tech)**

**In**

**Computer Science & Engineering**

**With Hons.**

**In**

**Cyber Security & Forensics**

**W.e.f. AY 2020-21**

**SoET 2.0**

**(Engineering +)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER-V** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
| 1 | Theory | CSE11071 | IT Application & Data Security  (Specialization Course –I) | 3 | 1 | 0 | 4 | 4 |
| 2 | Practical | CSE12072 | IT Application & Data Security  Lab  (Specialization Course –I Lab) | 0 | 0 | 3 | 3 | 2 |
| **Total** | | | | **3** | **1** | **3** | **7** | **6** |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER-VI** | | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** | |
| 1 | Theory | CSE11073 | IT Network Security (Specialization Course –II) | 3 | 1 | 0 | 4 | | 4 |
| 2 | Theory | CSE11074 | Information Security Governance (Specialization Course -III) | 3 | 0 | 0 | 3 | | 3 |
| 3 | Practical | CSE12075 | IT Network Security Lab (Specialization Course –II Lab) | 0 | 0 | 3 | 3 | | 2 |
| **Total** | | | | **6** | **1** | **6** | **10** | | **9** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER-VII** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
| 1 | Theory | CSE11076 | Ethical Hacking & Penetration Testing (Specialization Course –IV) | 3 | 0 | 0 | 3 | 3 |
| 2 | Practical | CSE12077 | Ethical Hacking & Penetration Testing Lab (Specialization Course-IV Lab) | 0 | 0 | 3 | 3 | 2 |
| **Total** | | | | **3** | **0** | **3** | **6** | **5** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER-VIII** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
| 1 | Theory | CSE11078 | Digital Forensics (Specialization Course –V) (Online/Offline mode ) | 3 | 0 | 0 | 3 | 3 |
| 2 | Viva | CSE15079 | Specialization Viva Voce | ------ | | | ------ | 2 |
| **Total** | | | | **3** | **0** | **0** | **3** | **5** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CSE11071 | IT Application & Data Security (Specialization Course –I) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact hours -60** | **3** | **1** | **0** | **4** |
| **Pre-requisites/Exposure** | **Introduction to Computing** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To create architectural, algorithmic and technological foundations for the maintenance of the security of individuals.
2. To enable the confidentiality of organizations.
3. To give the protection of sensitive information.
4. To enable students acquire the requirement that information be released publicly or semi-publicly.

**Course Outcomes:**

On completion of this course, the students will be able to

1. **Achieve** Knowledge of web application‘s vulnerability and malicious attacks.
2. **Able** to illustrate different attacking illustrations.
3. **Illustrate** different attacking illustrations.
4. **Analyze** Basic concepts of Attacking Data Stores.

**Catalog Description:**

IT Application & Data Security is an integral part of life. Student will understand the concepts of privacy in today’s environment. Obtain the understanding of how automation is changing the concepts and expectations concerning privacy and the increasingly interconnected issue of security. Obtain the knowledge of the role of private regulatory and self-help efforts. Have an understanding of how emerging issues are affecting society and business, with a concentration on how information security must shape corporate practices.

**Course Content:**

**Unit I: 12 lecture hours**

Web Application (In) security: The Evolution of Web Applications, Common Web Application Functions, Benefits of Web Applications, Web Application Security. Core Defense Mechanisms: Handling User Access Authentication, Session Management, Access Control, Handling User Input, Varieties of Input Approaches to Input Handling, Boundary Validation. Multistep Validation and Canonicalization: Handling Attackers, Handling Errors, Maintaining Audit Logs, Alerting Administrators, Reacting to Attacks.

**Unit II: 12 lecture hours**

Web Application Technologies: The HTTP Protocol, HTTP Requests, HTTP Responses, HTTP Methods, URLs, REST, HTTP Headers, Cookies, Status Codes, HTTPS, HTTP Proxies, HTTP Authentication, Web Functionality, Server-Side Functionality, Client-Side Functionality, State and Sessions, Encoding Schemes, URL Encoding, Unicode Encoding, HTML Encoding, Base64 Encoding, Hex Encoding, Remoting and Serialization Frameworks.

**Unit III: 12 lecture hours**

Mapping the Application: Enumerating Content and Functionality, Web Spidering, User-Directed Spidering, Discovering Hidden Content, Application Pages Versus Functional Paths, Discovering Hidden Parameters, Analyzing the Application, Identifying Entry Points for User Input, Identifying Server-Side Technologies, Identifying Server-Side Functionality, Mapping the Attack Surface.

**Unit IV: 12 lecture hours**

Attacking Authentication: Authentication Technologies, Design Flaws in Authentication Mechanisms, Bad Passwords, BruteForcible Login, Verbose Failure Messages, Vulnerable Transmission of Credentials, Password Change, Functionality, Forgotten Password Functionality, ―Remember Me‖ Functionality, User Impersonation, Functionality Incomplete, Validation of Credentials, Nonunique Usernames, Predictable Usernames, Predictable Initial Passwords, Insecure Distribution of Credentials. Attacking Access Controls: Common Vulnerabilities, Completely Unprotected, Functionality Identifier-Based Functions, Multistage Functions, Static Files, Platform Misconfiguration, Insecure Access Control Methods.

**Unit V: 12 lecture hours**

Attacking Data Stores: Injecting into Interpreted Contexts, Bypassing a Login, Injecting into SQL, Exploiting a Basic Vulnerability Injecting into Different Statement Types,Finding SQL Injection Bugs, Fingerprinting the Database, The UNION Operator, Extracting Useful Data, Extracting Data with UNION, Bypassing Filters, Second-Order SQL Injection, Advanced Exploitation Beyond SQL Injection: Escalating the Database Attack, Using SQL Exploitation Tools, SQL Syntax and Error Reference, Preventing SQL Injection.

**Text Books:**

1. The Web Application Hacker's Handbook: Finding and Exploiting Security

2. Defydd Stuttard, Marcus Pinto Wiley Publishing, Second Edition.

**Reference Books:**

1. Professional Pen Testing for Web application, Andres Andreu, Wrox Press.
2. Carlos Serrao, Vicente Aguilera, Fabio Cerullo, ―Web Application Security‖ Springer; 1st Edition
3. Joel Scambray, Vincent Liu, Caleb Sima ,―Hacking exposed‖, McGraw-Hill; 3rd Edition, (October, 2010).
4. OReilly Web Security Privacy and Commerce 2nd Edition 2011.

5. Software Security Theory Programming and Practice, Richard sinn, Cengage Learning.

6. Database Security and Auditing, Hassan, Cengage Learning.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Achieve** Knowledge of web application‘s vulnerability and malicious attacks. | **PO1, PO2, PO3** |
| **CO2** | **Able** to illustrate different attacking illustrations. | **PO2, PO3, PSO1** |
| **CO3** | **Illustrate** different attacking illustrations. | **PO1, PO4, PO5, PSO4** |
| **CO4** | **Analyze** Basic concepts of Attacking Data Stores. | **PO4,PSO1, PSO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. The ability to utilize Cyberspace security principles, collaborative plan and address any incidence response and secure critical infrastructure  Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. 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The ability to utilize Cyberspace security principles, collaborative plan and address any incidence response and secure critical infrastructure | The ability to utilize Cyberspace security principles, collaborative plan and address any incidence response and secure critical infrastructure. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE11071 | IT Application & Data Security | 2 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | - | - | 2 |

1=weakly mapped 2= moderately mapped 3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech in Cryptography and Cyber Security

Semester: V Stream: CSE

PAPER TITLE: IT Application & Data Security (Specialization Course –I)

PAPER CODE: CSE11071

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Describe** Web Application Security. | **U** | **CO1** |
| 2. | **Explain** HTTP Requests and HTTP Responses. | **Evaluate** | **CO1** |
| 3. | **Describe** Verbose Failure Messages. | **U** | **CO1** |
| 4. | **Explain** Bypassing a Login. | **Evaluate** | **CO2** |
| 5. | **Describe** URL Encoding. | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Write** the algorithm of Injecting into Interpreted Contexts. | **Ap** | **CO1** |
| 7. | **Examine** HTTP Requests and HTTP Responses | **Ap** | **CO2** |
| 8. | **Describe** Server-Side Technologies in details. | **U** | **CO4** |
| 9. | **Describe** with Example Handling User Access Authentication | **U** | **CO3** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Write** the method of Preventing SQL Injection. | **Ap** | **CO2** |
| 11. | **Write** the steps of Mapping the Attack Surface . | **Ap** | **CO4** |
| 12. | **Describe** Web Spidering and User-Directed Spidering in details. | **U** | **CO3** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CSE12072 | IT Application & Data Security Lab(Specialization Course –I Lab) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Introduction to Computing** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To create architectural, algorithmic and technological foundations for the maintenance of the security of individuals.
2. To enable the confidentiality of organizations.
3. To give the protection of sensitive information.
4. To enable students acquire the requirement that information be released publicly or semi-publicly.

**Course Outcomes:**

On completion of this course, the students will be able to

1. **Achieve** Knowledge of web application‘s vulnerability and malicious attacks.
2. **Able** to illustrate different attacking illustrations.
3. **Illustrate** different attacking illustrations.
4. **Analyze** Basic concepts of Attacking Data Stores.

**Catalog Description:**

IT Application & Data Security is an integral part of life. Student will understand the concepts of privacy in today’s environment. Obtain the understanding of how automation is changing the concepts and expectations concerning privacy and the increasingly interconnected issue of security. Obtain the knowledge of the role of private regulatory and self-help efforts. Have an understanding of how emerging issues are affecting society and business, with a concentration on how information security must shape corporate practices.

**Course Content**

**List of Experiments:**

1. Perform Buffer Overflow operation
2. Perform DNS Spoofing Attack
3. Perform ARP Spoofing Attack
4. Perform Data Packet filtering using Wireshark
5. Perform Cross Site Scripting Attack
6. Perform SQL Injection attack
7. Perform Session Hijacking Attack

**Text Books:**

1. The Web Application Hacker's Handbook: Finding And Exploiting Security

2. Defydd Stuttard, Marcus Pinto Wiley Publishing, Second Edition.

**Reference Books:**

1. Professional Pen Testing for Web application, Andres Andreu, Wrox Press.
2. Carlos Serrao, Vicente Aguilera, Fabio Cerullo, ―Web Application Security‖ Springer; 1st Edition
3. Joel Scambray, Vincent Liu, Caleb Sima ,―Hacking exposed‖, McGraw-Hill; 3rd Edition, (October, 2010).
4. OReilly Web Security Privacy and Commerce 2nd Edition 2011.

5. Software Security Theory Programming and Practice, Richard sinn, Cengage Learning.

6. Database Security and Auditing, Hassan, Cengage Learning.

**Modes of Examination: Assignment/Quiz/Project/Presentation/Written Exam**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Internal** | **End Term** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Achieve** Knowledge of web application‘s vulnerability and malicious attacks. | **PO1,PO2,PSO4** |
| **CO2** | **Able** to illustrate different attacking illustrations. | **PO2,PO3,PO5,PSO4** |
| **CO3** | **Illustrate** different attacking illustrations. | **PO1,PO2,PO3** |
| **CO4** | **Analyze** Basic concepts of Attacking Data Stores. | **PO4,PO5** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. 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The ability to utilize Cyberspace security principles, collaborative plan and address any incidence response and secure critical infrastructure | The ability to utilize Cyberspace security principles, collaborative plan and address any incidence response and secure critical infrastructure. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE12072 | IT Application & Data Security Lab(Specialization Course –I Lab) | 2 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | - | - | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech in Cyber Security & Forensics

Semester: V Stream: CSE

PAPER TITLE: IT Application & Data Security Lab (Specialization Course –I)

PAPER CODE: CSE12072

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Describe** Web Application Security. | **U** | **CO1** |
| 2. | **Explain** HTTP Requests and HTTP Responses. | **Evaluate** | **CO1** |
| 3. | **Describe** Verbose Failure Messages. | **U** | **CO1** |
| 4. | **Explain** Bypassing a Login. | **Evaluate** | **CO2** |
| 5. | **Describe** URL Encoding. | **U** | **CO2** |
|  | **SECTION B (**Attempt all **Questions) (7 x 5 = 35)** |  | |
| 6. | **Write** the algorithm of Injecting into Interpreted Contexts. | **Ap** | **CO1** |
| 7. | **Examine** HTTP Requests and HTTP Responses | **Ap** | **CO2** |
| 8. | **Describe** Server-Side Technologies in details. | **U** | **CO1** |
| 9. | **Describe** with Example Handling User Access Authentication | **U** | **CO3, CO4** |
| 10. | **Write** the method of Preventing SQL Injection. | **Ap** | **CO2** |
| 11. | **Write** the steps of Mapping the Attack Surface . | **Ap** | **CO4** |
| 12. | **Describe** Web Spidering and User-Directed Spidering in details. | **U** | **CO3** |

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| CSE11073 | IT Network Security (Specialization Course –II) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact hours -45** | **3** | **1** | **0** | **4** |
| **Pre-requisites/Exposure** | **Computer Network** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To provide understanding of the main issues related to security in modern networked computer systems.
2. To enable covering underlying concepts and foundations of computer security, basic knowledge about security-relevant decisions.
3. To give idea of designing IT infrastructures, techniques to secure complex systems.
4. To enable students aware of practical skills in managing a range of systems, from personal laptop to large-scale infrastructures.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Build** a good understanding of the concepts and foundations of computer security

CO2. **Identify** vulnerabilities of IT systems.

CO3. **Apply** basic security tools to enhance system security.

CO4. **Analyze** to develop basic security enhancements in stand-alone applications.

**Catalog Description:**

IT NetworkSecurity is an integral part of life. Student will understand the concepts of privacy in today’s environment. Obtain the understanding of how automation is changing the concepts and expectations concerning network security and the increasingly interconnected issue of security. Obtain the knowledge of the role of private regulatory and self-help efforts. Have an understanding of how emerging issues are affecting society and business, with a concentration on how information security must shape corporate practices.

**Course Content**

**Unit I: 12 lecture hours**

Computer Security Concepts- Introduction to Information Security, Introduction to Data and Network Security, Integrity, and Availability, NIST FIPS 199 Standard, Assets and Threat Models, Examples.

Control Hijacking– Attacks and defenses, Buffer overflow and control hijacking attacks Exploitation techniques and fuzzing- Finding vulnerabilities and exploits Dealing with Legacy code- Dealing with bad (legacy) application code: Sandboxing and Isolation.

**Unit II: 12 lecture hours**

Least privilege, access control, operating system security- The principle of least privilege, Access control concepts, Operating system mechanisms, Unix, Windows, Qmail, Chromium, and Android examples. Basic web security model- Browser content, Document object model (DOM), Same-origin policy.

**Unit III: 12 lecture hours**

Web Application Security- SQL injection, Cross-site request forgery, Cross-site scripting, Attacks and Defenses, Generating and storing session tokens, Authenticating users, The SSL protocol, The lock icon, User interface attacks, Pretty Good Privacy. Network Protocols and Vulnerabilities- Overview of basic networking infrastructure and network protocols, IP, TCP, Routing protocols, DNS.

**Unit IV: 12 lecture hours**

Network Defenses- Network defense tools, Secure protocols, Firewalls, VPNs, Tor, I2P, Intrusion Detection and filters, Host-Based IDS vs Network-Based IDS, Dealing with unwanted traffic: Denial of service attacks. Malicious Software and Software Security- Malicious Web, Internet Security Issues, Types of Internet Security Issues, Computer viruses, Spyware, Key-Loggers, Secure Coding, Electronic and Information Warfare.

**Unit V: 12 lecture hours**

Mobile platform security models- Android, iOSMobile platform security models, Detecting Android malware in Android markets. Security Risk Management- How Much Security Do You Really Need, Risk Management, Information Security Risk Assessment: Introduction, Information Security Risk Assessment: Case Studies, Risk Assessment in Practice. The Trusted Computing Architecture- Introduction to Trusted Computing, TPM Provisioning, Exact Mechanics of TPM.

**Text Books:**

1. William Stallings, Network Security Essentials: Applications and Standards, Prentice Hall, 4th edition, 2010.

2. Michael T. Goodrich and Roberto Tamassia, Introduction to Computer Security, Addison Wesley, 2011.

**References Books**:

1. William Stallings, Network Security Essentials: Applications and Standards, Prentice Hall, 4th edition, 2010.

2. Alfred J. Menezes, Paul C. van Oorschot and Scott A. Vanstone, Handbook of Applied Cryptography, CRC Press, 2001.

**Modes of Examination: Assignment/Quiz/Project/Presentation/Written Exam**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal** | **Mid Term** | **End Term** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Build** a good understanding of the concepts and foundations of computer security | **PO1, PO2,PO5** |
| **CO2** | **Identify** vulnerabilities of IT systems. | **PO1,PO2, PO3,PO5,PSO1** |
| **CO3** | **Apply** basic security tools to enhance system security. | **PO3,PO4, PO5, PSO4** |
| **CO4** | **Analyze** to develop basic security enhancements in stand-alone applications. | **PO2, PO4,PSO1, PSO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | real world problems and meet the challenges of the future. Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | The ability to utilize Cyberspace security principles, collaborative plan and address any incidence response and secure critical infrastructure. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE11073 | IT Network Security (Specialization Course –II) | 2 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | -  - | 2 | - | - | 2 |

1=weakly mapped 2= moderately mapped 3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech in Cyber Security & Forensics

Semester: VI Stream: CSE

PAPER TITLE: IT Network Security (Specialization Course –II) PAPER CODE: CSE11073

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Describe** Web Application Security. | **U** | **CO1** |
| 2. | **Explain** HTTP Requests and HTTP Responses. | **Evaluate** | **CO1** |
| 3. | **Describe** Verbose Failure Messages. | **U** | **CO1** |
| 4. | **Explain** Bypassing a Login. | **Evaluate** | **CO2** |
| 5. | **Describe** URL Encoding. | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Write** the algorithm of Injecting into Interpreted Contexts. | **Ap** | **CO1** |
| 7. | **Examine** HTTP Requests and HTTP Responses | **Ap** | **CO2** |
| 8. | **Describe** Server-Side Technologies in details. | **U** | **CO6** |
| 9. | **Describe** with Example Handling User Access Authentication | **U** | **CO3, CO5** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Write** the method of Preventing SQL Injection. | **Ap** | **CO2** |
| 11. | **Write** the steps of Mapping the Attack Surface . | **Ap** | **CO4** |
| 12. | **Describe** Web Spidering and User-Directed Spidering in details. | **U** | **CO3** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CSE11074 | Information Security Governance (Specialization Course -III) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Computer Network** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To understand and development of concepts required for risk-based planning
2. To enable risk management of computer and information systems.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Identify,** analyze and articulate the importance of managing IS-related risk and security issues in

organizations

CO2. **Analyze**, synthesize and evaluate the costs of not appropriately identifying and managing risk.

CO3. **Develop** and document IS/IT risk and security management plans that detail contingency planning

strategies and practices.

CO4. **Synthesize** and articulate the major theories and concepts associated with IS failure and the

management.

**Catalog Description:**

Information Security Governance is an integral part of life. Student will understand the concepts of privacy in today’s environment. Obtain the understanding of how automation is changing the concepts and expectations concerning network security and the increasingly interconnected issue of security. Obtain the knowledge of the role of private regulatory and self-help efforts. Have an understanding of how emerging issues are affecting society and business, with a concentration on how information security must shape corporate practices.

**Course Content:**

**Unit I: 9 lecture hours**

An Introduction to Risk Management: Introduction to the Theories of Risk Management; The Changing Environment; The Art of Managing Risks.

**Unit II: 9 lecture hours**

The Threat Assessment Process: Threat Assessment and its Input to Risk Assessment; Threat Assessment Method; Example Threat Assessment.

**Unit III: 9 lecture hours**

Vulnerability Issues: Operating System Vulnerabilities; Application Vulnerabilities; Public Domain or Commercial Off-the-Shelf Software; Connectivity and Dependence

**Unit IV: 9 lecture hours**

Vulnerability assessment for natural disaster, technological hazards, and terrorist threats; implications for emergency response, vulnerability of critical infrastructures;

The Risk Process: What is Risk Assessment? Risk Analysis; who is Responsible?

**Unit V: 9 lecture hours**

Tools and Types of Risk Assessment: Qualitative and Quantitative risk Assessment; Policies, Procedures, Plans, and Processes of Risk Management; Tools and Techniques; Integrated Risk Management; Future Directions: The Future of the Risk Management.

**Text books:**

1. Malcolm Harkins, Managing Risk and Information Security, Apress, 2012.

2. Daniel Minoli, Information Technology Risk Management in Enterprise Environments, Wiley, 2009.

**Reference books:**

1. Andy Jones, Debi Ashenden ,Risk Management for Computer Security: Protecting Your Network & Information Assets, , 1st Edition, Butterworth-heinemann, Elsevier, 2005.

2. Andreas Von Grebmer, Information and IT Risk Management in a Nutshell: A pragmatic approach to Information Security, 2008, Books On Demand Gmbh.

**Modes of Examination: Assignment/Quiz/Project/Presentation/Written Exam**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal** | **Attendance** | **End Term** |
| **Weightage (%)** | **30** | **10** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Identify,** analyze and articulate the importance of managing IS-related risk and security issues in organizations | **PO1, PO2, PO3** |
| **CO2** | **Analyze**, synthesize and evaluate the costs of not appropriately identifying and managing risk. | **PO1, PO3, PO4,PO2, PSO4** |
| **CO3** | **Develop** and document IS/IT risk and security management plans that detail contingency planning strategies and practices. | **PO4, PO5, PSO4** |
| **CO4** | **Synthesize** and articulate the major theories and concepts associated with IS failure and the management. | **PO2, PO5, PSO4** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity.Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. 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| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE11074 | Information Security Governance (Specialization Course -III) | 2 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | - | - | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech in Cyber Security Forensics

Semester: VI Stream: CSE

PAPER TITLE: Information Security Governance (Specialization Course -III)

PAPER CODE: CSE11074

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Describe** Risk Management. | **U** | **CO1** |
| 2. | **Explain** Theories of Risk Management. | **Evaluate** | **CO1** |
| 3. | **Describe** Changing Environment. | **U** | **CO1** |
| 4. | **Explain** The Art of Managing Risks. | **Evaluate** | **CO2** |
| 5. | **Describe** Threat Assessment Process. | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Write** Risk Assessment Process. | **Ap** | **CO1** |
| 7. | **Examine** Example Threat Assessment | **Ap** | **CO2** |
| 8. | **Describe** Vulnerability Issues. | **U** | **CO6** |
| 9. | **Describe** Operating System Vulnerabilities | **U** | **CO3, CO5** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Write** Application Vulnerabilities. | **Ap** | **CO2** |
| 11. | **Write** Public Domain or Commercial Off-the-Shelf Software. | **Ap** | **CO4** |
| 12. | **Describe** Vulnerability assessment for natural disaster. | **U** | **CO3** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CSE12075 | IT Network Security Lab (Specialization Course –II Lab) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Computer Network** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To provide understanding of the main issues related to security in modern networked computer systems.
2. To enable covering underlying concepts and foundations of computer security, basic knowledge about security-relevant decisions.
3. To give idea of designing IT infrastructures, techniques to secure complex systems.
4. To enable students aware of practical skills in managing a range of systems, from personal laptop to large-scale infrastructures.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Build** good understanding of the concepts and foundations of computer security

CO2. **Identify** vulnerabilities of IT systems.

CO3. **Apply** basic security tools to enhance system security.

CO3. **Analyze** to develop basic security enhancements in stand-alone applications.

**Catalog Description:**

IT NetworkSecurity is an integral part of life. Student will understand the concepts of privacy in today’s environment. Obtain the understanding of how automation is changing the concepts and expectations concerning network security and the increasingly interconnected issue of security. Obtain the knowledge of the role of private regulatory and self-help efforts. Have an understanding of how emerging issues are affecting society and business, with a concentration on how information security must shape corporate practices.

**Course Content:**

**List of Experiments:**

1. Eavesdropping Attacks and its prevention using SSH

### **Isolating WLAN Traffic using Separate Firewall for VPN Connection**

### **Private Network Over WAN**

1. **Managing Security in Small Business Network**
2. **Security Group Policies Management**
3. Subnetting and OSI Model

**Modes of Examination: Assignment/Quiz/Project/Presentation/Written Exam**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Internal** | **End Term** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Build** good understanding of the concepts and foundations of computer security | **PO1, PO3, PO5, PSO2** |
| **CO2** | **Identify** vulnerabilities of IT systems. | **PO1, PO2, PO3, PO4, PSO2, PSO4** |
| **CO3** | **Apply** basic security tools to enhance system security. | **PO4, PO5, PSO1, PSO4** |
| **CO4** | **Analyze** to develop basic security enhancements in stand-alone applications. | **PO2,PSO1, PSO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity.Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. 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| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE12075 | IT Network Security Lab | 2 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | - | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech in Cyber Security & Forensics

Semester: VI Stream: CSE

PAPER TITLE: IT Network Security Lab (Specialization Course –II)

PAPER CODE: CSE12075

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Describe** Web Application Security. | **U** | **CO1** |
| 2. | **Explain** HTTP Requests and HTTP Responses. | **Evaluate** | **CO1** |
| 3. | **Describe** Verbose Failure Messages. | **U** | **CO1** |
| 4. | **Explain** Bypassing a Login. | **Evaluate** | **CO2** |
| 5. | **Describe** URL Encoding. | **U** | **CO2** |
|  | **SECTION B (**Attempt all **Questions) (7 x 5 = 35)** |  | |
| 6. | **Write** the algorithm of Injecting into Interpreted Contexts. | **Ap** | **CO1** |
| 7. | **Examine** HTTP Requests and HTTP Responses | **Ap** | **CO2** |
| 8. | **Describe** Server-Side Technologies in details. | **U** | **CO6** |
| 9. | **Describe** with Example Handling User Access Authentication | **U** | **CO3, CO5** |
| 10. | **Write** the method of Preventing SQL Injection. | **Ap** | **CO2** |
| 11. | **Write** the steps of Mapping the Attack Surface . | **Ap** | **CO4** |
| 12. | **Describe** Web Spidering and User-Directed Spidering in details. | **U** | **CO3** |

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| CSE11076 | Ethical Hacking & Penetration Testing (Specialization Course –IV) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **IT Application & Data Security** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To understand critically evaluate the potential countermeasures to advanced hacking techniques.
2. To enable Analyze and critically evaluate techniques used to break into an insecure web application and identify relevant countermeasures.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Explain** aspects of security, importance of data gathering, foot printing and system hacking.

CO2. **Analyze** and summarize tools and techniques to carry out a penetration testing.

CO3. **Develop** and Compare different types of hacking tools.

CO4. **Apply** the techniques for real world problems in the domain.

**Catalog Description:**

Ethical Hacking & Penetration Testing is an integral part of life. Aim of this course is to teach students how to think like a hacker, providing them with a deep understanding of security issues and concerns. In addition, this course also provides the students with specialist knowledge and experience of advanced hacking techniques and their countermeasures.

**Course Content:**

**Unit I: 9 lecture hours**

Casing the Establishment: What is foot printing, Internet Foot printing, Scanning, Enumeration, basic banner grabbing, Enumerating Common Network services. Case study: Network Security Monitoring.

**Unit II: 9 lecture hours**

Securing permission: Securing file and folder permission, Using the encrypting file system, Securing registry permissions. Securing service: Managing service permission, Default services in windows 2000 and windows XP. UNIX: The Quest for Root, Remote Access vs Local access, Remote access, Local access, After hacking root.

**Unit III: 9 lecture hours**

Dial-up, PBX, Voicemail and VPN hacking, Preparing to dial up, War-Dialing, Brute-Force Scripting PBX hacking, Voice mail hacking, VPN hacking, Network Devices: Discovery Autonomous System Lookup, Public Newsgroups, Service Detection, Network Vulnerability, Detecting Layer 2 Media.

**Unit IV: 9 lecture hours**

Wireless Hacking: Wireless Foot printing, Wireless Scanning and Enumeration, Gaining Access, Tools that exploiting WEP Weakness, Denial of Services Attacks, Firewalls: Firewalls landscape, Firewall Identification-Scanning Through firewalls, packet Filtering, Application Proxy Vulnerabilities, Denial of Service Attacks, Motivation of Dos Attackers, Types of DoS attacks, Generic Dos Attacks, UNIX and Windows DoS.

**Unit V: 9 lecture hours**

Remote Control Insecurities, Discovering Remote Control Software, Connection, Weakness. NC, Microsoft Terminal Server and Citrix ICA, Advanced Techniques Session Hijacking, Back Doors, Trojans, Cryptography, Subverting the systems Environment, Social Engineering, Web Hacking, Web server hacking web application hacking, Hacking the internet Use, Malicious Mobile code, SSL fraud, E-mail Hacking, IRC hacking, Global countermeasures to Internet User Hacking.

**Text Books:**

1. Stuart McClure, Joel Scambray and Goerge Kurtz, Hacking Exposed 7: Network Security Secrets & Solutions, Tata McGraw Hill Publishers, 2010.

2. Bensmith, and Brian Komer, Microsoft Windows Security Resource Kit, Prentice Hall of India, 2010.

**Reference Books**:

1. Stuart McClure, Joel Scambray and Goerge Kurtz, ―Hacking Exposed Network Security Secrets & Solutions‖, 5th Edition, Tata McGraw Hill Publishers, 2010.

2. RafayBaloch, ―A Beginners Guide to Ethical Hacking‖.

3. Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, ―Gray Hat Hacking The Ethical Hackers Handbook‖, 3rd Edition, McGraw-Hill Osborne Media paperback(January 27, 2011)

**Modes of Examination: Assignment/Quiz/Project/Presentation/Written Exam**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal** | **Mid Term** | **End Term** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** aspects of security, importance of data gathering, foot printing and system hacking. | **PO1, PSO2** |
| **CO2** | **Analyze** and summarize tools and techniques to carry out a penetration testing. | **PO1, PO5, PO4, PSO1** |
| **CO3** | **Develop** and Compare different types of hacking tools. | **PO2, PO4, PO5, PSO2, PSO4** |
| **CO4** | **Apply** the techniques for real world problems in the domain. | **PSO1, PO2, PSO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
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The ability to utilize Cyberspace security principles, collaborative plan and address any incidence response and secure critical infrastructure | The ability to utilize Cyberspace security principles, collaborative plan and address any incidence response and secure critical infrastructure. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE11076 | Ethical Hacking & Penetration Testing | 2 | 2 | - | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | - | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech in Cryptography and Cyber Security Semester: VII Stream: CSE

PAPER TITLE: Ethical Hacking & Penetration Testing (Specialization Course –IV)

PAPER CODE: CSE11076

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Describe** Wireless Hacking. | **U** | **CO1** |
| 2. | **Explain** VNC. | **Evaluate** | **CO1** |
| 3. | **Describe** VPN hacking. | **U** | **CO1** |
| 4. | **Explain** Firewall Identification. | **Evaluate** | **CO2** |
| 5. | **Describe** Remote Control Software. | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Write** the algorithm of Denial of Services Attacks. | **Ap** | **CO1** |
| 7. | **Examine** Advanced Techniques Session Hijacking | **Ap** | **CO2** |
| 8. | **Describe** Microsoft Terminal Server and Citrix ICA. | **U** | **CO4** |
| 9. | **Describe** with Example Internet Foot printing. | **U** | **CO3,** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Write** the method of Preventing E-mail Hacking. | **Ap** | **CO2** |
| 11. | **Write** the steps of Mapping Malicious Mobile code. | **Ap** | **CO4** |
| 12. | **Describe** Voicemail and VPN hacking. | **U** | **CO3** |

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| --- | --- | --- | --- | --- | --- |
| CSE12077 | Ethical Hacking & Penetration Testing Lab (Specialization Course –IV) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **IT Application & Data Security** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To understand critically evaluate the potential countermeasures to advanced hacking techniques.
2. To enable Analyze and critically evaluate techniques used to break into an insecure web application and identify relevant countermeasures.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Outline** aspects of security, importance of data gathering, foot printing and system hacking.

CO2. **Analyze** and summarize tools and techniques to carry out a penetration testing.

CO3. **Develop** and Compare different types of hacking tools.

CO4. **Apply** the techniques for real world problems in the domain.

**Catalog Description:**

Ethical Hacking & Penetration Testing is an integral part of life. Aim of this course is to teach students how to think like a hacker, providing them with a deep understanding of security issues and concerns. In addition, this course also provides the students with specialist knowledge and experience of advanced hacking techniques and their countermeasures.

**Course Content:**

**List of Experiments:**

1. Wireshark: Experiment to monitor live network capturing packets and analyzing over the live network.
2. LOIC: DoS attack using LOIC.
3. FTK: Bit level forensic analysis of evidential image and reporting the same.
4. Darkcomet : Develop a malware using Remote Access Tool Darkcomet to take a remote access over network.
5. HTTrack: Website mirroring using Httrack and hosting on a local network.
6. Emailtrackerpro: Email analysis involving header check, tracing the route. Also perform a check on a spam mail and non-spam mail.

**Modes of Examination: Assignment/Quiz/Project/Presentation/Written Exam**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Internal** | **End Term** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Learn** aspects of security, importance of data gathering, foot printing and system hacking. | **PO1, PSO2** |
| **CO2** | **Analyze** and summarize tools and techniques to carry out a penetration testing. | **PO1, PO5, PO4, PSO1,PSO4** |
| **CO3** | **Develop** and Compare different types of hacking tools. | **PO2, PO4, PO5, PSO2, PSO4** |
| **CO4** | **Apply** the techniques for real world problems in the domain. | **PSO1, PO2, PSO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity.Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. 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The ability to utilize Cyberspace security principles, collaborative plan and address any incidence response and secure critical infrastructure | The ability to utilize Cyberspace security principles, collaborative plan and address any incidence response and secure critical infrastructure. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE12077 | Ethical Hacking & Penetration Testing Lab | 2 | 2 | - | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | - | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech in Cyber Security & Forensics Semester: VII Stream: CSE

PAPER TITLE: Ethical Hacking & Penetration Testing Lab (Specialization Course –IV)

PAPER CODE: CSE12077

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Describe** Wireless Hacking. | **U** | **CO1** |
| 2. | **Explain** VNC. | **Evaluate** | **CO1** |
| 3. | **Describe** VPN hacking. | **U** | **CO1** |
| 4. | **Explain** Firewall Identification. | **Evaluate** | **CO2** |
| 5. | **Describe** Remote Control Software. | **U** | **CO2** |
|  | **SECTION B (**Attempt all **Questions) (7 x 5 = 35)** |  | |
| 6. | **Write** the algorithm of Denial of Services Attacks. | **Ap** | **CO1** |
| 7. | **Examine** Advanced Techniques Session Hijacking | **Ap** | **CO2** |
| 8. | **Describe** Microsoft Terminal Server and Citrix ICA. | **U** | **CO6** |
| 9. | **Describe** with Example Internet Foot printing. | **U** | **CO3, CO5** |
| 10. | **Write** the method of Preventing E-mail Hacking. | **Ap** | **CO2** |
| 11. | **Write** the steps of Mapping Malicious Mobile code. | **Ap** | **CO4** |
| 12. | **Describe** Voicemail and VPN hacking. | **U** | **CO3** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CSE11078 | Digital Forensics (Specialization Course –V) | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Introduction to Computing** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To teach deep understanding of security issues and digital forensics & incident response..
2. To provide the students with specialist knowledge and experience of various digital forensics techniques and incident response.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Explain** various digital forensics techniques and its usage for the potential

countermeasures or incident response.

CO2. **Demonstrate** a critical evaluation and use of digital forensics technique to do incident response

with an independent project.

**Catalog Description:**

Digital Forensics is an integral part of life. Aim of this course is to teach students how to think like a hacker, providing them with a deep understanding of security issues and concerns. In addition, this course also provides the students with specialist knowledge and experience of advanced hacking techniques and their countermeasures.

**Course Content:**

**Unit I: 9 lecture hours**

Forensics Overview: Computer Forensics Fundamentals, Benefits of Computer Forensics, Computer Crimes, Computer Forensics Evidence and the Courts, Legal Concerns and Privacy Issues.

**Unit II: 9 lecture hours**

Forensics Process: Forensics Investigation Process, Securing the Evidence and Crime Scene, Chain of Custody, Law Enforcement Methodologies, Forensics Evidence, Evidence Sources. Evidence Duplication, Preservation, Handling, and Security, Forensics Soundness, Order of Volatility of Evidence, Collection of Evidence on a Live System, Court Admissibility of Volatile Evidence

**Unit III: 9 lecture hours**

Acquisition and Duplication: Sterilizing Evidence Media, Acquiring Forensics Images, Acquiring Live Volatile Data, Data Analysis, Metadata Extraction, File System Analysis, Performing Searches, Recovering Deleted, Encrypted, and Hidden files

**Unit IV: 9 lecture hours**

Internet Forensics, Reconstructing Past Internet Activities and Events, E-mail Analysis, Messenger Analysis: AOL, Yahoo, MSN, and Chats

**Unit V: 9 lecture hours**

Mobile Device Forensics: Evidence in Cell Phone, PDA, Blackberry, iPhone, iPod, and MP3. Evidence in CD, DVD, Tape Drive, USB, Flash Memory, Digital Camera, Court Testimony, Testifying in Court, Expert Witness Testimony, Evidence Admissibility

**Text books:**

1. Jason Luttgens, Matthew Pepe, Kevin Mandia, Incident Response & Computer Forensics, McGraw-Hill Osborne Media, 3rd edition , 2014.

2. Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Real Digital Forensics: Computer Security and Incident Response, Paperback – Import, 2005.

**Reference books:**

1. John Sammons, The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics Paperback, February 24, 2012.

2. Hacking Exposed: Network Security Secrets & Solutions, Stuart McClure, Joel Scambray and George Kurtz, McGraw-Hill, 2005.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** various digital forensics techniques and its usage for the potential countermeasures or incident response. | **PO1, PO3, PSO1, PSO4** |
| **CO2** | **Demonstrate** a critical evaluation and use of digital forensics technique to do incident response with an independent project. | **PO5, PO4, PSO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity.Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. 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| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE11078 | Digital Forensics (Specialization Course –V) | 2 | - | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | - | - | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**



**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B.Tech in Cyber Security & Forensics Semester: VII Stream: CSE

PAPER TITLE: Digital Forensics (Specialization Course –V)

PAPER CODE: CSE11078

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **Describe** Benefits of Computer Forensics. | **U** | **CO1** |
| 2. | **Explain** Computer Crimes. | **Evaluate** | **CO1** |
| 3. | **Describe** Computer Forensics Evidence. | **U** | **CO1** |
| 4. | **Explain** Forensics Investigation Process. | **Evaluate** | **CO2** |
| 5. | **Describe** Forensics Soundness. | **U** | **CO2** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Write** Legal Concerns and Privacy Issues. | **Ap** | **CO1** |
| 7. | **Examine** Chain of Custody | **Ap** | **CO2** |
| 8. | **Describe** Evidence in Cell Phone. | **U** | **CO2** |
| 9. | **Describe** E-mail Analysis. | **U** | **CO2** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Write** the method of Internet Forensics. | **Ap** | **CO2** |
| 11. | **Write** the steps of , Reconstructing Past Internet Activities and Events. | **Ap** | **CO1** |
| 12. | **Describe** Incident Response & Computer Forensics. | **U** | **CO1** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CSE15079 | Specialization Viva Voce (Cyber Security & Forensics) | **L** | **T** | **P** | **C** |
| **Version 1.0** |  | **0** | **0** | **0** | **2** |
| **Pre-requisites/Exposure** | **Digital Forensics, Ethical Hacking & Penetration Testing, IT Application & Data Security** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To teach deep understanding of security issues and digital forensics & incident response..

2. To provide the students with specialist knowledge and experience of various digital forensics techniques and incident response.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Explain** various digital forensics techniques and its usage for the potential countermeasures or incident response.

CO2. **Demonstrate** a critical evaluation and use of digital forensics technique to do incident response with an independent project.

**Catalog Description:**

Digital Forensics is an integral part of life. Aim of this course is to teach students how to think like a hacker, providing them with a deep understanding of security issues and concerns. In addition, this course also provides the students with specialist knowledge and experience of advanced hacking techniques and their countermeasures.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Internal Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

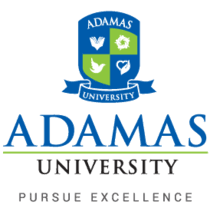
|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** various digital forensics techniques and its usage for the potential countermeasures or incident response. | **PO1, PO3, PSO1, PSO4** |
| **CO2** | **Demonstrate** a critical evaluation and use of digital forensics technique to do incident response with an independent project. | **PO5, PO4, PSO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
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| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE15079 | Specialization Viva Voce | 2 | - | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | - | - | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

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**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING & TECHNOLOGY**

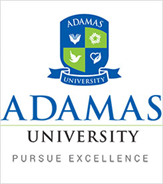
**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**CO – PO & PSO MAPPING**

**Name of the Programme: B. Tech in Computer Science & Engineering**

**Specialization: Cyber Security & Forensics**

| **Course Code** | **Course Title** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** | **PSO4** |
| MTH11501 | Engineering Mathematics -I | - | 3 | 3 | 3 | - | - | - | - | - | - | - |  |  |  |  | NA |
| 3 | - | - | - |
| PHY11201 | Applied Science | 3 | 2 | 1 | 3 | 2 | 2 | - | - | - | - | - | 2 | - | - | - | NA |
| CSE11001 | Introduction to Programming | 3 | - | 1 | 1 | 1 | - | - | - | 1 | - | 1 | - | - | - | - | NA |
| ENG11053 | HSSM –I (English Communication- I) | - | 3 | 3 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | - | 1 | - | - | - | NA |
| BIT11003 | Life Science | 2 | 2 | 3 | - | 3 | 3 | - | 2 | 1 | - | - | 2 | 3 | 3 | - | NA |
| PHY12202 | Applied Science Lab | 3 | 3 | 3 | - | 2 | - | - | - | 1 | - | - | - | - | - | - | NA |
| CSE12002 | Programming Lab | 3 | 1 | 1 | 1 | 1 | - | 1 | - | - | - | 1 | - | 1 | - | - | NA |
| CEE12001 | Engineering Drawing and CAD | 3 | 2 | 2 | 1 | - | 1 | - | - | - | - | - | 3 | 2 | 2 | - | NA |
| ENG11043 | Communication and Collaboration Skill-I | - | 2 | - | - | - | - | - | - | 3 | 3 | - |  |  |  |  | NA |
| - | 3 | 3 | - |
| GEE14003 | Capstone Project- I | 3 | 3 | 3 | - | - | - | - | - | - |  | - | - | - | - |  | NA |
| DGS11001 | Design Thinking | 3 | 2 | - | 1 | 1 | - | - | - | - | - | 1 | - | - | - | - | NA |
| MTH11502 | Engineering Mathematics -II | 3 | 1 | 2 | 3 | 1 | - | 1 | - | - | - | - | 2 | - | - | - | NA |
|  |
| GEE11001 | Electrical and Electronics Technology | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 3 | - | - | - | NA |  |
| MEE11002 | Engineering Mechanics | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | NA |  |
|  |
| EVS11107 | Environmental Science | 1 | 3 | 3 | - | - | 3 | 3 | 2 | - | - | 2 | 2 | - | 2 | - | NA |  |
| GEE12002 | Electrical and Electronics Technology Lab | 3 | - | 2 | - | **-** | - | - | - | - | - | - | - | - | - | - | NA |  |
|  |
|  |
| MEE12001 | Engineering Workshop | 3 | 1 | - | - | - | - | - | - | 3 | - | - | - | 3 | - | - | NA |  |
|  |
| ENG11044 | Communication and Collaboration Skill-II | - | 1 | - | - | - | - | - | 1 | 2 | 2 | - | - | 2 | 2 | - | NA |  |
|  |
| GEE14004 | Capstone Project- II | 3 | 2 | 2 | 2 | 3 | - | - | - | - | --- | - | - | - | - | - | NA |  |
|  |
| IDP14001 | Interdisciplinary Project | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 |  | NA |  |
| - |  |
| SMA42111 | Probability, Statistics and Numerical Methods | 2 | 3 | 2 | - | 3 | - | - | - | - | - | - | 3 | 2 | 3 |  | NA |  |
| 2 |  |
| HEC42180 | HSS–IV (Economics for Engineers) | - | 2 | 3 | 2 | - | 2 | - | - | - | - | 2 | 3 | 2 | - | 2 | NA |  |
| CSE11003 | Data Structures and Algorithms | 2 | 3 | 3 | - | - | - | - | - | - | - | - | 3 |  |  |  | NA |  |
| 3 | 2 | 3 |  |
| CSE11004 | Switching circuit and logic design Lab | 3 | 2 | 3 | - | - | - | - | - | - | - | - |  |  |  |  | NA |  |
| 3 | 3 | 2 | 2 |  |
| CSE11005 | Formal Language And Automata Theory | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 3 | 3 | NA |  |
| CSE11006 | Engineering Science Course (Introduction to Python) | 3 | 3 | 3 | 2 | - | - | - | - | - | - | 2 | 3 |  |  |  | NA |  |
| 2 | 3 | - |  |
|  | Data Structures and Algorithms Lab | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | - |  |  |  | NA |  |
| CSE12007 | 3 | 3 | 3 |  |
|  |  |  |  |  |
| GEE14005 | Capstone Project- III | 3 | 3 | 3 | 3 | 3 | - | - | - | 3 | - | - | - | 3 | 3 | 3 | NA |  |
| SOC14100 | Community Service | - | 2 | - | - | - | 2 | 2 | 2 | 2 | 2 |  |  | - | - | - | NA |  |
| EIC11001 | Venture Ideation | - | - | - | - | - | 3 | 2 | 3 | - | - | 3 | - | - | - |  | NA |  |
| SMA42112 | Operations Research | 3 | 3 |  | - | 3 | - | - | - | - | - | - | 3 |  | 3 |  | NA |  |
| 2 | - |  |
| CSE11008 | Design and Analysis of Algorithms | 3 | 2 | 3 | 3 |  | - | - | - | - | - | - | 3 | 3 | 3 | 3 | NA |  |
| CSE11009 | Object Oriented Programming (Prof. Core- V) | 3 | 3 | 3 | - | - | - | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
| CSE11010 | Software Engineering | 3 | 2 |  |  | 2 | 2 |  |  |  |  |  | 3 | 2 | 3 | 2 | NA |  |
| CSE11011 | Computer Architecture | 3 |  | 3 | - | 2 | 3 | - | - | - | - | - | 3 | 3 | 2 | 3 | NA |  |
| PSG11021 | Human Values and Professional Ethics | 3 | - | - | - | 3 | 3 | 3 | - | - | - | - | - | 3 | 3 | - | NA |  |
| SMA42211 | Numerical Techniques Lab | 3 | - | - | - | 3 | 3 | 3 | - | - | - | - |  | 3 | 3 | - | NA |  |
| - |  |
| CSE12012 | Design & Analysis of Algorithm Lab | 2 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | 2 | 3 | 3 | NA |  |
| CSE12013 | Object Oriented Programming Lab | 3 | 3 | 3 | - | 3 | - | - | - | - | - | - | - |  |  |  | NA |  |
|  |
| GEE14006 | Capstone Project -IV | 3 | - | 3 |  | 3 | 2 | - | - | 3 |  | - | 3 | 2 | 2 | 3 | NA |  |
| CSE11014 | Compiler Design | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 3 | - | 3 | 3 | NA |  |
| CSE11015 | Database Management Systems | 3 |  | 3 |  | 2 | - | - | - | - | - | 3 | 2 | 3 | 2 | 3 | NA |  |
| CSE11016 | Operating Systems | 3 | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
| CSE11071 | IT Application & Data Security (Specialization Course –I) | 2 | 2 | 2 | 2 | 2 | - | - | - | - | - | - |  |  |  |  |  |  |
|  |
|  |
| CSE11017 | Applied Graph Theory(Prof. Elective -I) | 3 | 2 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 | 2 | NA |  |
| CSE11018 | Communication Network(Prof. Elective -I) | 3 | 3 | 3 | 3 | - | 2 | - | - | - | 3 | - | - | 3 | 3 | 2 | NA |  |
|  |
| CSE11019 | Big Data Analytics(Prof. Elective -I) | 3 | 2 | 2 | 3 | 3 | - | - | - | - | - | - | - | 2 | 3 | 2 | NA |  |
| CSE12020 | Compiler Design Lab | 3 | - | 2 | - | 2 | - | - | - | - | - | - | 3 | 2 | 3 | 2 | NA |  |
| CSE12021 | Database Management Systems Lab | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - |  |  |  |  | NA |  |
| 3 | 2 | 2 | 3 |  |
| CSE12022 | Operating Systems Lab | 2 | 3 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | 2 | 3 | NA |  |
| CSE12072 | IT Application & Data Security Lab (Specialization Course –I Lab) | 2 | 2 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | - | - | 2 |  |
|  |
|  |
|  |
| GEE14007 | Capstone Project -V |  | - | 3 | - | 3 | - | 3 | - | 3 | 2 | 3 |  | 3 | - | 2 | NA |  |
| CSE11023 | Computer Networks | 2 | 3 | 2 | 3 | - | 3 | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
| CSE11024 | Artificial Intelligence and Machine Learning(Prof. Core- XII) | 3 | 2 | 2 | 3 | 2 | - | - | - | - | - | - | - | 2 | 3 | 3 | NA |  |
|  |
| CSE11025 | High Performance Computer Architecture(Prof. Elective -II) | 3 | 2 | 3 | - | 3 | 2 | - | - | - | - | - | 3 | 3 | 2 | 2 | NA |  |
|  |
| CSE11026 | Pattern Recognition(Prof. Elective -II) | 3 | 2 | 2 | 2 | 3 | - | - | - | - | - | - | - | 3 | 2 |  | NA |  |
|  |  |
| 3 |  |
| CSE11027 | Computational Geometry(Prof. Elective -II) | 3 | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
|  |
| CSE11028 | Artificial Intelligence(Open Elective -I) |  | 3 | 3 | 2 | - | 3 | 3 | - | - | - | - | 2 | 3 | 2 | 2 | NA |  |
| CSE11027 | Computational Geometry(Open Elective -I) | 3 | 3 | 3 | 3 | 1 | - | - | - | - | - | - | - |  |  |  | NA |  |
| 3 | 3 | 3 |  |
| CSE11073 | IT Network Security (Specialization Course –II) | 2 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | - | - | 2 |  |
|  |
|  |
| CSE11074 | Information Security Governance (Specialization Course -III) | 2 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | - | - | 2 |  |
|  |
|  |
| CSE12029 | Computer Networks Lab (Prof. Core- XI Lab) | 3 | 3 | 2 | 2 | 3 | 3 | - | - | 3 | - | - |  |  |  |  | NA |  |
| - | 2 | 2 | 1 |  |
| CSE12030 | Artificial Intelligence and Machine Learning Lab(Prof. Core- XII Lab) | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 | NA |  |
|  |
|  |
| CSE12031 | High Performance Computer Architecture Lab(Prof. Elective –II Lab) | 3 | - | 3 | - | 3 | - | - | - | - | - | - | 2 | 3 | 2 | 2 | NA |  |
|  |
| CSE12032 | Pattern Recognition(Prof. Elective –II Lab) | 3 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | - | NA |  |
|  |
| CSE12033 | Computational Geometry Lab(Prof. Elective –II Lab) | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
|  |
| CSE12075 | IT Network Security Lab (Specialization Course –II Lab) | 2 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | - | 3 |  |
|  |
|  |
|  |
| CSE15034 | Technical Seminar | 3 | 2 | 2 | 3 | 3 | 2 | - | -- |  |  | - |  | - | 3 | - | NA |  |
| MBA43144 | HSSM –V (Industrial Management) | 3 | 2 | 3 | 3 |  | 3 | 2 |  |  | - | - | - | 2 | 2 | 2 | NA |  |
| CSE11035 | Image Processing(Prof. Elective- III) | 3 | 3 | 2 | 3 | - |  | - | - | - | - | - | - | 3 | 3 | 2 | NA |  |
|  | Cloud Computing(Prof. Elective- III) | 3 | 2 | 3 | 3 | 3 | - | - | - | - | - | - |  |  | 3 | 3 | NA |  |
| CSE11036 | 2 | 2 |  |
| CSE11037 | Information Retrieval(Prof. Elective- III) |  | 2 | 2 | 2 | 3 | 3 | 3 | - | - | - | - |  | 3 | 2 | 2 | NA |  |
| CSE11038 | Computer Graphics(Prof. Elective- III) | 3 | 3 | 2 | 3 | 3 | - | - | - | - | - | - | **-** | 3 | 3 | 3 | NA |  |
| CSE11039 | Artificial Neural Network and Deep Learning(Prof. Elective- III) | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - |  |  | 3 | NA |  |
|  |  |  |
| 3 | 3 |  |
| CSE11040 | Cryptography & Cyber Security (Prof. Elective- IV) | 3 | 3 | 3 | - | 3 | - | - | - | - | - | - | **3** |  |  |  | - |  |
| 3 | 3 | 3 |  |
|  |  |  |  |
| CSE11041 | Internet of Things (Prof. Elective- IV) | 3 | 2 | 3 |  |  | 3 |  | 3 |  |  |  | 2 | 2 | 3 | 3 | NA |  |
| CSE11042 | 5G Wireless Communication (Prof. Elective- IV) | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | 3 | 3 | 2 | 2 | NA |  |
|  |
| CSE11043 | Machine Learning(Open Elective- II) | 3 | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | - | - | NA |  |
| CSE11041 | Internet of Things(Open Elective- III) | 3 | 2 | 3 |  |  | 3 |  | 3 |  |  |  | 2 | 2 | 3 | 3 | NA |  |
| CSE12044 | Image Processing Lab(Prof. Elective- III Lab) | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | **-** | 3 | 3 | 3 | NA |  |
|  |
|  | Cloud Computing Lab(Prof. Elective- III Lab) | 3 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - |  |  |  |  | NA |  |
| CSE12045 | 2 | 3 |  |
|  | Information Retrieval Lab(Prof. Elective -III Lab) | 3 | 3 | 2 | 2 |  |  | - | - | - | - | 2 |  | 3 | 3 | 3 | NA |  |
| CSE12046 |  |
| CSE12047 | Computer Graphics Lab(Prof. Elective- III Lab) | 3 | 3 | 2 | 3 | - |  | - |  |  |  |  |  |  |  |  | NA |  |
| - | - | - | - | - | 3 | 3 | 3 |  |
|  | Artificial Neural Network and Deep Learning Lab(Prof. Elective- III Lab) | 3 | 3 | 3 | 3 | 3 |  | - | - |  | - | 2 | - |  |  |  | NA |  |
| CSE12048 | 3 | 3 | 3 |  |
|  |  |  |  |  |
| CSE11076 | Ethical Hacking & Penetration Testing (Specialization Course –IV) | 2 | 2 | - | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | - | 2 |  |
|  |
|  |
| CSE12077 | Ethical Hacking & Penetration Testing Lab (Specialization Course-IV Lab) | 2 | 2 | - | 2 | 2 | - | - | - | - | - | - |  |  |  |  |  |  |
|  |
|  |
| CSE14049 | Summer Internship | 3 | 3 | 3 | 3 | 3 |  |  |  |  |  |  |  | 2 | 3 | 3 | NA |  |
|  |
| CSE14050 | Minor Project | 3 | 2 | 3 | - | - | - | - | - | 3 | - | 3 | 3 | 2 | 3 | - | NA |  |
|  | Digital Forensics (Specialization Course –V) (Online/Offline mode ) | 2 | - | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | - | - | 3 |  |
| CSE11078 |  |
|  |  |
| CSE14051 | Industry Work Experience / SIRE / Major Project | 3 | 2 | - | 3 | - | - | - | - | 3 | 3 | 3 |  | 2 | 3 | 3 | NA |  |
|  |
| CSE15052 | Comprehensive Viva Voce | 3 | 3 | 3 |  | 3 | 3 |  |  | 3 | 3 |  |  | 3 | 3 | 3 | NA |  |
|  |
|  |  | 2 | - | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | - | - | 3 |  |
| CSE15079 | Specialization Viva Voce |  |
|  |  |  |
| **Average of CO-PO Mapping** | | 2.78 | 2.49 | 2.57 | 2.37 | 2.4 | 2.48 | 2.46 | 2.22 | 2.37 | 2.44 | 2.07 | 2.63 | 2.54 | 2.65 | 2.64 | 2.55 |  |

****

**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING**

**AND**

**TECHNOLOGY**

**DEPARTMENT**

**OF**

**COMPUTER SCIENCE AND ENGINEERING**

**Course Structure & Syllabus**

**For**

**Bachelor of Technology (B.Tech)**

**In**

**Computer Science & Engineering**

**With Hons.**

**In**

**Blockchain Technology**

**W.e.f. AY 2020-21**

**SoET 2.0**

**(Engineering +)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER-V** | | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | | **T** | **P** | **Contact Hrs/week** | **Credits** |
| 1 | Theory | CSE11062 | Block chain Components and Architecture (Specialization Course –I) | | 3 | 1 | 0 | 4 | 4 |
| 2 | Practical | CSE12063 | Block chain Components and Architecture Lab  (Specialization Course –I Lab) | | 0 | 0 | 3 | 3 | 2 |
| **Total** | | | | | **3** | **1** | **3** | **7** | **6** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER-VI** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
| 1 | Theory | CSE11064 | Permission Block chain- Ethereum (Specialization Course –II) | 3 | 1 | 0 | 4 | 4 |
| 2 | Theory | CSE11065 | Block chain Applications for Cognitive (Specialization Course -III) | 3 | 0 | 0 | 3 | 3 |
| 3 | Practical | CSE12066 | Permission Block chain- Ethereum Lab (Specialization Course –II Lab) | 0 | 0 | 3 | 3 | 2 |
| **Total** | | | | **6** | **1** | **3** | **10** | **9** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER -VII** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
| 1 | Theory | CSE11067 | Industry Use Cases using Block chain (Specialization Course –IV) | 3 | 0 | 0 | 3 | 3 |
| 2 | Practical | CSE12068 | Industry Use Cases using Block chain Lab (Specialization Course-IV Lab) | 0 | 0 | 3 | 3 | 2 |
| **Total** | | | | **3** | **0** | **3** | **6** | **5** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER -VIII** | | | | | | | | |
| **S. No** | **Type** | **Course Code** | **Subject Name** | **L** | **T** | **P** | **Contact Hrs/week** | **Credits** |
| 1 | Theory | CSE11069 | Emerging areas in Block chain  (Specialization Course –V) (Online/Offline mode ) | 3 | 0 | 0 | 3 | 3 |
| 2 | Viva | CSE15070 | Specialization Viva Voce | ------ | | | ------ | 2 |
| **Total** | | | | **3** | **0** | **0** | **3** | **5** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CSE11062** | **Block chain Components and Architecture (Specialization Course –I)** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours - 60** | **3** | **1** | **0** | **4** |
| **Pre-requisites/Exposure** | **Network Security, Distributed Application** | | | | |
| **Co-requisites** | **---** | | | | |

**Course Objectives:**

1. To understand industry-wide enterprise level collaboration for development of high performance and reliable Blockchain and Hyperledger framework, that can be used across the various industry sectors to enhance the efficiency, performance and transactions.

2. To recognize Hyperledger Fabric, Architecture, Key Components and Tools involved.

3. To understand the Fabric overview of Assets, Membership, Identities Channels, Security and Membership services and setup endorsement policies for Hyperledger Fabric Network, including implementation of Blockchain Networks on systems and cloud environments

4. To understand the deployment process of Blockchain applications on IBM Cloud, Smart contracts User Interfaced Blockchain Transactions, Chaincodes

**Course Outcomes:**

On completion of this course, the students will be able to

CO1**: Analyze** Blockchain, Hyperledger framework across various industry sectors.

CO2: **Understand** the architecture, components and tools of Hyperledger Fabric.

CO3: **Learn** how the individual components of the Bitcoin protocol make the whole system works: transactions, script, blocks, and the peer-to-peer network

CO4: **Learn** how the individual components of the Bitcoin protocol make the whole system works: transactions, script, blocks, and the peer-to-peer network

CO5: **Familiarize** with Ethereum, smart contracts and related technologies, and solidity language.

CO6: **Comprehend** the deployment process of Blockchain Applications

**Catalog Description:**

Blockchain could help them reduce costs and improve certain processes, advance product and customer data tracking and security, increase product safety, and reduce fraud and counterfeiting. Blockchain is considered disruptive and game-changer solution in areas that involve multiple stakeholders, each having complex business processes implemented in unique systems and infrastructure; operating in different administrative and geopolitical boundaries. With cross-organization workflows and complex compliance requirements, industry sectors like Healthcare, Finance, Manufacturing, International Trade, Insurance, Retail, Supply Chain, Recruitment, Media, Real-estate, and Education etc. can benefit significantly by improved operational efficiency, enhanced security, and transparency offered by Blockchain implementation.

**Course Content:**

**Unit I: 9 lecture hours**

**Introduction:** Blockchain, Blockchain-Based Applications, Blockchain Functionality, Blockchain Non-functional Properties, Blockchain Architecture Design; **Existing Blockchain Platforms**: Bitcoin, Ethereum, Hyperledger Fabric, Other Representative Blockchain Platforms.

**Unit II: 9 lecture hours**

**Varieties of Blockchain**: Fundamental Properties of Blockchain, Decentralization, Ledger Structure, Consensus Protocol , Block Configuration ,Auxiliary Blockchains ,Anonymity ,Incentives , **Example Use Cases:** Agricultural Supply Chains ,Open Data Registry, International Money Transfers , Electricity Contract Selection and Continuous Reporting.

**Unit III: 10 lecture hours**

Blockchain in Software Architecture: Blockchain as an Architectural Element , Blockchain as Storage Element, Blockchain as Computational Element, Blockchain as Communication Mechanism, Blockchain as an Asset Management and Control Mechanism , Integrating Blockchain into a System as a Component; Design Process for Applications on Blockchain : Evaluation of Suitability ,Example Use Cases for Suitability Evaluation, Design Process for Blockchain-Based Systems..

**Unit IV: 10 lecture hours**

**Blockchain Patterns:** Patterns on Interacting with the External World, Data Management Patterns, Security Patterns, Contract Structural Patterns; **Model-Driven Engineering for Blockchain Applications:** Introduction, Model-Driven Generation of Smart Contract Code for Collaborative Business Processes, Model-Driven Registry Generation for Blockchain.

**Unit V: 10 lecture hours**

**Quality Impact of Using Blockchain:** On-Chain Data Cost, Smart Contract Cost, Cost Models, Using and Evaluating the Cost Model; **Performance:** Performance Characteristics of Blockchain, Architectural Performance Modelling, Predicting Latency for Blockchain-Based Systems Architectural Decision-Making

**Unit VI: 12 lecture hours**

**Dependability and Security:** Confidentiality, Integrity, Safety, Maintainability, Availability and Reliability, Variation in Blockchain Transaction Inclusion, Aborting and Retrying Blockchain Transactions. **Case Studies: AgriDigital:** Agricultural Supply Chains , The AgriDigital Vision , Designing for a Business Use ; **SecureVote :** Introduction and Background , The MVP Prototype ,Building Tokenvote, Details and Code Samples ; **originChain :** Introduction and Background , Architecture of originChain, Analysis.

**Text Books:**

1. Xiwei Xu, Ingo Weber, Mark Staples - Architecture for Blockchain Applications-Springer (2019).

2. Blockchain Applications: A Hands-on Approach by Arshdeep Bahga and Vijay K. Madisetti, ISBN: 9780996025560.

**Reference Books:**

1. Mastering Bitcoin: Programming The Open Blockchain, Andreas M. Antonopoulos, O'Reilly, ISBN: 9789352135745.

**Modes of Evaluation: Quiz/Assignment/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Analyze** Blockchain, Hyperledger framework across various industry sectors. | **PO1,PO2,PO3,PSO1** |
| **CO2** | **Understand** the architecture, components and tools of Hyperledger Fabric. | **PO2,PO3,PO4,PSO3** |
| **CO3** | **Learn** how the individual components of the Bitcoin protocol make the whole system works: transactions, script, blocks, and the peer-to-peer network | **PO1,PO4,PO5, PSO1** |
| **CO4** | **Define** security measures, and various types of services that allow people to trade and transact with Bitcoins | **PO2,PO3** |
| **CO5** | **Familiarize** with Ethereum, smart contracts and related technologies, and solidity language. | **PO2,PO3,PS03,PSO2** |
| **CO6** | **Comprehend** the deployment process of Blockchain Applications | **PO5,PS03,PSO1,PSO2** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | The ability to understand a wide range of essential topics, from the cryptographic underpinnings of Blockchain Technology to enabling decentralized applications on a private Blockchain platform. This program will provide a broad overview of the essential concepts of Blockchain Technology – by initially exploring the Bitcoin protocol followed by laying the foundation necessary for developing applications and programming. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE11062 | Blockchain Components and Architecture | 2 | 3 | 3 | 2 | 3 | - | - | - | - | - | - | - | 2 | - | 3 | 2 |

1=weakly mapped

2=moderately mapped

3=strongly mapped

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| **ADAMAS UNIVERSITY**  **SCHOOL OF ENGINEERING AND TECHNOLOGY**  **END-SEMESTER EXAMINATION**  **Name of the Program: B. Tech (CSE) in Blockchain Technology Semester: V**  **Code- CSE11062 Stream- CSE**  **Time: 03 Hrs.**  **Paper title– Blockchain Components and Architecture Total pages- 1**  **Max. Marks: 40 Total no. of questions- 12**  **Instructions:**  Attempt All Questions from **Section A** (Each Carrying 1 Marks); any **Three Questions** from  **Section B** (Each Carrying 5 Marks). **Any Two Questions from Section C** (Each Carrying 10 Marks ).  1. **At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.**  2. **Assumptions made if any, should be stated clearly at the beginning of your answer.**  3. **All parts of a Question should be answered consecutively** | | | | |
| **SECTION A (Answer All questions)** | | | | |
| 1. | **List** the different consensus protocol. | | **U** | **CO1** |
| 2. | **Where** Blockchain used. | | **U** | **CO2** |
| ­­­ 3. | **Define** smart contract. | | **R** | **CO3** |
| 4. | **What** is Hyperledger? | | **R** | **CO4** |
| 5. | **What** is the full from of POS. | | **U** | **CO5** |
|  | **SECTION B (**Attempt any **Three Questions)** | |  | |
| 1. | **Describe** Blockchain Architecture. | | **U** | **CO1** |
| 2. | **Explain SecureVote** architecture**.** | | **U** | **CO2** |
| 3. | **Elucidate** case studies of blockchain. | | **Ap** | **CO3** |
| 4. | **Wha**t is application of Bitcoin and Ethereum? | | **R** | **CO4 /CO5** |
|  | **SECTION C (**Attempt any **Two Questions)** | |  | |
| 1. | **Classify** cost Model and performance of Blockchain. | | **Ap** | **CO4** |
| 2. | **Construct** the block diagram of Blockchain. | | **Ap** | **CO4** |
| 3. | **Explain** double ended problem and how to overcome this problem. | | **R** | **CO5** |

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| **CSE12063** | **Blockchain Components and Architecture Lab** | L | T | P | C |
| **Version 1.0** | **Contact Hours -45** | 0 | 0 | 3 | 2 |
| **Pre-requisites/Exposure** | Object Oriented Programming | | | | |
| **Co-requisites** | -- | | | | |

**Course Objectives**

1. To introduce how blockchain systems (mainly Bitcoin and Ethereum) work,
2. To provide students with securely interact with them,
3. To develop students with design, build, and deploy smart contracts and distributed applications,
4. To introduce students how to integrate ideas from blockchain technology into their own projects.

**Course Outcomes**

On completion of this course, the students will be able to

1. **Explain** design principles of Bitcoin and Ethereum.
2. **Define** the Simplified Payment Verification protocol.
3. **Identify** a blockchain system by sending and reading transactions.
4. **Design**, build, and deploy a distributed application
5. **Familiarize** with Ethereum, smart contracts and related technologies, and solidity language.

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**Catalog Description**

This course is designed to expose students to Blockchain technology and recent trends in Blockchain Application development. The purpose is to raise awareness and foster discussion about importance of Blockchain technologies and tools in real-life applications. Specifically, this course focuses on Blockchain architecture and consensus protocol including (1) developing secure solutions for systems like healthcare, banking, supply chain etc.; (2) learning various techniques necessary to develop a small scale to large scale Blockchain applications using AI and Machine Learning.

**Course Content**

**Experiment 1:**

Smart Tender Management System Using Blockchain

**Experiment 2:**

Blockchain based Transaction & Settlement System

**Experiment 3:**

Blockchain Based Cloud Storage System

**Experiment 4:**

Medical Report Management & Distribution System over Blockchain Technology

**Experiment 5:**

Government Fund Allocation & Tracking System over Blockchain

**Experiment 6:**

Blockchain Project for Supply Chain Management System

**Experiment 7:**

Blockchain based Advanced Banking Software System

**Experiment 8:**

Automotive ERP System over Blockchain Technology

**Experiment 9:**

Industrial ERP System over Blockchain Technology

**Text Books**

1.Xiwei Xu, Ingo Weber, Mark Staples - Architecture for Blockchain Applications-Springer (2019).

2.Blockchain Applications: A Hands-on Approach by Arshdeep Bahga and Vijay K. Madisetti, ISBN: 9780996025560.

**Reference Books**

1.Mastering Bitcoin: Programming The Open Blockchain, Andreas M. Antonopoulos, O'Reilly, ISBN: 9789352135745.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Internal Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** design principles of Bitcoin and Ethereum. | **PO2,PO3,PO11** |
| **CO2** | **Define** the Simplified Payment Verification protocol. | **PO1,PO3,PO11** |
| **CO3** | **Identify** a blockchain system by sending and reading transactions. | **PO3,PO5,PO11** |
| **CO4** | **Design**, build, and deploy a distributed application | **PO3,PO5** |
| **CO5** | **Familiarize** with Ethereum, smart contracts and related technologies, and solidity language. | **PO2,PO3,PO5,PSO3** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | The ability to understand a wide range of essential topics, from the cryptographic underpinnings of Blockchain Technology to enabling decentralized applications on a private Blockchain platform. This program will provide a broad overview of the essential concepts of Blockchain Technology – by initially exploring the Bitcoin protocol followed by laying the foundation necessary for developing applications and programming. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE12063 | Blockchain Components and Architecture Lab | 2 | 3 | 3 | - | 3 | - | - | - | - | - | 3 | - | - | - | 2 | - |

**Model Question Paper**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:**  **Enrolment No:** | |  | | |
| **ADAMAS UNIVERSITY**  **SCHOOL OF ENGINEERING AND TECHNOLOGY**  **END-SEMESTER EXAMINATION**  **Name of the Program: B. Tech (CSE) in Blockchain Technology Semester: V**  **Code- CSE12063 Stream- CSE**  **Time: 03 Hrs.**  **Paper title– Blockchain Components and Architecture Lab Total pages- 1**  **Max. Marks: 40 Total no. of questions- 12**  **Instructions:**  Attempt All Questions from **Section A** (Each Carrying 1 Marks); any **Three Questions** from  **Section B** (Each Carrying 5 Marks). **Any Two Questions from Section C** (Each Carrying 10 Marks ).  1. **At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.**  2. **Assumptions made if any, should be stated clearly at the beginning of your answer.**  3. **All parts of a Question should be answered consecutively** | | | | |
| **SECTION A (Answer Any one questions) (40 x 1 = 40)** | | | | |
| 1. | **Develop** Medical Report Management & Distribution System over Blockchain Technology | | **Ap** | **CO1** |
| 2. | **Find** Government Fund Allocation & Tracking System over Blockchain | | **R** | **CO2** |
| ­­­ 3. | **Demonstrate** Blockchain based Transaction & Settlement System | | **U** | **CO3** |
| 4. | **Develop** Blockchain Based Cloud Storage System | | **Ap** | **CO4** |
| 5. | **Develop** Blockchain Project for Supply Chain Management System. | | **Ap** | **CO5** |

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| --- | --- | --- | --- | --- | --- |
| **CSE11064** | **Permission Blockchain-Ethereum** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -60** | **3** | **1** | **0** | **4** |
| **Pre-requisites/Exposure** | **Cryptocurrency and computer security basics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To gain knowledge about the building blocks of Blockchain Ethereum.

2. To enable students to install and configure Mist browser,

3. To give the students a perspective to learn the basics of EVM and Solidity programming.

4. To enable students acquire knowledge about smart contract and tokens..

**Course Outcomes:**

On completion of this course, the students will be able to

CO1**. Understand** the basics of Blockchain Ethereum.

CO2. **Explain** the procedure of installation of Mist browser and its configuration.

CO3**. Explain** the role of Ethereum protocol in Banking.

CO4. **Understand** the basics of Solidity programming primer.

CO5. **Understand** the utility of smart contract and token.

CO6**. Evaluate** the ancestry of blocks and transactions.

**Catalog Description:**

This course is the definitive introduction to permissioned Blockchain for the students. Beyond the technology, this course will introduce you to some of the philosophy behind decentralization and why there is so much excitement around it.

During the tenure of the course, the students will be introduced to Blockchain and the technology behind it. In the later modules, the topics beyond bitcoin will be taken up and delve deeper into a next-generation Blockchain called Ethereum to introduce students to what modern Blockchain can do.

**Course Content:**

**Unit I: 10 lecture hours**

**Bridging the Blockchain Knowledge Gap**: What Ethereum Does, Three Parts of a Blockchain, Ether as a Currency and Commodity , The Power Is in the Protocol , You Can Build Trustless Systems, What Smart Contracts: Objects and Methods for Value , Just Add Commerce ,Content Creation; Where’s the Data? : What Is Mining? , Ether and Electricity Prices; EVM:The Mist Browser , Browser vs. Wallet or Keychain; What Ethereum Is Good For : State of Smart Contract Development Today, A Note to New Programmers : Ethereum Is Free and Open Source , The EVM Is Here to Stay ; What You Can Build Today : Private and Public Chains , The Promise of Decentralized Databases, What’s Next: New Ways of Working

**Unit II: 10 lecture hours**

**The Mist Browser:** introduction, The Bank Teller Metaphor , In Cryptocurrency, You Hold Your Own Assets , Visualizing Ethereum Transactions, Breaking with Banking History , How Encryption Leads to Trust, System Requirements , More about Eth.guide and This Book, Tools for Developers, CLI Nodes, Recommended: Using Parity with Geth, Finally, into the Mist! , Downloading and Installing Mist, Configuring Mist, Finding Your New Address, Sending and Receiving Ether, Understanding Ethereum Account Types, Backing Up and Restoring Your Keys, Using Paper Wallets, Using Mobile Wallets, Working with Messages and Transactions, So, What Is a Blockchain? , Paying for Transactions, Understanding Denominations, Getting Ether, Anonymity in Cryptocurrency, Blockchain Explorers .

**Unit III: 10 lecture hours**

**The EVM:**  The Role of the Ethereum Protocol in Banking , What the EVM Does, EVM Applications Are Called Smart Contracts, The Name “Smart Contracts” , Understanding State Machines , Digital vs. Analog, “Statements” , Data’s Role in State , How the Guts of the EVM Work, The EVM Constantly Checks for Transactions, Creating a Common Machine Narrative of What Happened, Cryptographic Hashing , Hash Functions (or Hash Algorithms), Blocks: The History of State Changes, Block Time, Drawbacks of Short Blocks, “Solo Node” Blockchain , Distributed Security, Mining’s Place in the State Transition Function , Renting Time on the EVM , Gas : Why Is Gas So Important?, Why Isn’t Gas Priced in Ether?, Fees as Regulation , Working with Gas , Gas Specifics, How Gas Relates to Scaling the System, Accounts, Transactions, and Messages, Externally Owned Accounts , Contract Accounts , Transactions and Messages, Characteristics of Transactions , Characteristics of Messages , Estimating Gas Fees for Operations , Opcodes in the EVM .

**Unit IV: 10 lecture hours**

Solidity Programming Primer: Global Banking Made (Almost) Real, Extra-Large Infrastructure, Worldwide Currency? , Complementary Currency, The Promise of Solidity, Browser Compiler, Learning to Program the EVM , Easy Deployment, The Case for Writing Business Logic in Solidity, Code, Deploy, Relax, Design Rationale , Writing Loops in Solidity, Expressiveness and Security, The Importance of Formal Proofs, Historical Impact of a Shared Global Resource , How Attackers Bring Down Communities, Hypothetical Attack Written in Solidity , Automated Proofs to the Rescue?, Determinism in Practice , Lost in Translation, Testing, Testing, Testing, Command Line Optional! , Formatting Solidity Files, Tips for Reading Code, Statements and Expressions in Solidity, What Is an Expression? What Is a Statement? , Functions, Public and Private , Value Types, Booleans, Signed and Unsigned Integers, Addresses, Members of Addresses, Address-Related Keywords , Less-Common Value Types , Complex (Reference) Types , Global Special Variables, Units, and Functions, Block and Transaction Properties , Operators Cheat Sheet, Global Functions, Exceptions and Inheritance .

**Unit V: 8 lecture hours**

**Smart Contracts and Tokens**: EVM as Back End, Smart Contracts to Dapps, Assets Backed by Anything , Bartering with Fiat Currency, Ether as Glass Beads, Cryptocurrency Is a Measure of Time, Asset Ownership and Civilization , Coins are Collectibles , The Function of Collectibles in Human Systems , Early Counterfeiting, Jewelry and Art as Money , The Step Toward Banknotes , Platforms for High-Value Digital Collectibles , Tokens Are a Category of Smart Contract , Tokens as Social Contracts, Tokens Are a Great First App, Creating a Token on the Testnet , Getting Test Ether from the Faucet, Registering Your Tokens , Deploying Your First Contract, Same House, Different Address , Playing with Contracts .

**Unit VI: 12 lecture hours**

**Mining Ether**: Ether’s Source, Mining , Self-Regulation, and the Race for Profit , How Proof of Work Helps Regulate Block Time , What’s Going on with the DAG and Nonce?, Making Fast Blocks Work , How Ethereum Uses Stale Blocks , Uncle Rules and Rewards, The Difficulty Bomb, Miner’s Winning Payout Structure , Limits on Ancestry, The Block Processing Play by Play , Evaluating the Ancestry of Blocks and Transactions, How Ethereum and Bitcoin Use Trees , Merkle-Patricia Trees, Contents of an Ethereum Block Header, Forking , Installing Geth on macOS , Installing Geth on Windows , Getting Comfortable with the Command Line, Installing Geth on Ubuntu 14.04 , Executing Commands in the EVM via the Geth Console, Launching Geth with Flags, Fire Up Your Miner! , Mining on the Testnet, GPU Mining Rigs, Mining on a Pool with Multiple GPUs.; use Cases: Chains Everywhere, The Internet of Ethereum Things, Retail and E-Commerce, Community and Government Financing, Human and Organizational Behavior, Financial and Insurance Applications, Inventory and Accounting Systems, Software Development, Gaming, Gambling, and Investing.

**Text Books:**

1. Mayukh Mukhopadhyay - Ethereum smart contract development\_ build blockchain-based decentralized applications using Solidity-Packt Publishing (2018)

2. Chris Dannen (auth.) - Introducing Ethereum and Solidity\_ Foundations of Cryptocurrency and Blockchain Programming for Beginners-Apress (2017)

3. Mastering Bitcoin: Programming The Open Blockchain, Andreas M. Antonopoulos, O'Reilly,

ISBN: 9789352135745.

**Reference Books:**

1. Ethereum for Architects and Developers: With Case Studies and Code Samples in Solidity by Debajani Mohanty

2. Blockchain for Business by Jai Singh Arun

3. Blockchain Applications: A Hands-on Approach by Arshdeep Bahga and Vijay K. Madisetti, ISBN: 9780996025560.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Understand** the basics of blockchain ethereum. | **PO1,PO2,PO3** |
| **CO2** | **Explain** the procedure of installation of Mist browser and its configuration. | **PO1,PO2,PO3** |
| **CO3** | **Explain** the role of Ethereum protocol in Banking. | **PO1,PO2,PO3,PO5** |
| **CO4** | **Understand** the basics of Solidity programming primer. | **PO3,PO4,PO5** |
| **CO5** | **Understand** the utility of smart contract and token. | **PO4,PO5** |
| **CO6** | **Evaluate** the ancestry of blocks and transactions. | **PO1,PO2,PO5,PO4** |

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|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | The ability to understand a wide range of essential topics, from the cryptographic underpinnings of Blockchain Technology to enabling decentralized applications on a private Blockchain platform. This program will provide a broad overview of the essential concepts of Blockchain Technology – by initially exploring the Bitcoin protocol followed by laying the foundation necessary for developing applications and programming. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE11064 | Permission Blockchain-Ethereum | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | **-** | - | - | - | 3 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

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**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech (Spl. in Blockchain) Semester: VI Stream: CSE

PAPER TITLE: Permission Blockchain-Ethereum PAPER CODE: CSE11064

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. ssumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **List** the three parts of a blockchain. | **R** | **CO1** |
| 2. | **List** the steps of installation of Mist browser. | **R** | **CO2** |
| ­­­ 3. | **Define** mining. | **R** | **CO3** |
| 4. | **What** is EVM? | **R** | **CO4** |
| 5. | **Define Smart contract.** | **R** | **CO5** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Explain** the characteristics of cryptocurrency | **U** | **CO1** |
| 7. | **Examine** the ancestry of blocks and transactions. | **An** | **CO6** |
| 8. | **Explain** the historical impact of a shared global resource. | **U** | **CO4** |
| 9. | **Explain** Ethereum protocol in banking. | **U** | **CO3** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Explain** any two use cases of Internet of Ethereum things. | **U** | **CO4** |
| 11. | **Explain** about Ethereum transactions. | **U** | **CO2** |
| 12. | **Distinguish** between private and public chain. | **An** | **CO1** |

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| **CSE11065** | **Block chain Applications for Cognitive (Specialization Course -III)** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Introduction to Cryptography** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. This course aims to provide conceptual understanding of the function of Blockchains as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable.

2. The technological underpinnings of blockchain operations as distributed data structures and decision-making systems, their functionality and different architecture types.

3. It provides a critical evaluation of existing “smart contract” capabilities and platforms, and examines their future directions, opportunities, risks and challenges

**Course Outcomes:**

On the successful completion of the course, students will be able to

CO1. **Understand** the structure of a Blockchain and why/when it is better than a simple distributed database.

CO2. **Analyze** the incentive structure in a Blockchain based system and critically assess its functions, benefits and vulnerabilities

CO3. **Evaluate** the setting where a Blockchain based structure may be applied, its potential and its limitations.

CO4. **Analyze** to what extent smart and self-executing contracts can benefit automation, governance, transparency and the Internet of Things (IOT)

CO5. **Create** awareness of the new challenges that exist in monetizing businesses around Blockchain and smart contracts.

**Catalog Description:**

This course aims to provide conceptual understanding of the function of Blockchains as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable. It covers the technological underpinnings of blockchain operations as distributed data structures and decision-making systems, their functionality and different architecture types. It provides a critical evaluation of existing “smart contract” capabilities and platforms, and examines their future directions, opportunities, risks and challenges.

**Course Content:**

**Unit I: 7 lecture hours**

Introduction of Blockchain and AI, Machine Learning, Deep Learning, Semantic Learning, Robotics, Drones, Cognitive nan robotics.

**Unit II: 8 lecture hours**

Blockchain and Cognitive Science, Imaging, BCIs, Neuroscience, and Enhancement, Intelligent Agent Reputation Systems.

**Unit III: 8 lecture hours**

Blockchain and Smart Contracts, Dapps, DAOs, DACs, DCOs, DASs, Mining, Consensus Trust, Automated Algorithmic Execution

**Unit IV: 8 lecture hours**

Blockchains and Virtual Reality, Cloud Computing, Decentralized Trust, Complex Adaptive Systems, Computational Complexity.

**Unit V: 8 lecture hours**

Blockchains and Health: EMRs, Large-scale Secure Databanks, Virtual Patient Modeling.

**Unit VI: 6 lecture hours**

Blockchains and Philosophy, Epistemology, Morality, and Computational Ethics.

**Text Books:**

1. Raval, "Decentralized Applications Harnessing Bitcoin’s Blockchain Technology",O'Reilly, 2017.
2. Ghassan Karame, Elli Androulaki, "Bitcoin and Blockchain Security", ISBN:978-1-63081-013-9,Artech, 2017.
3. Imran Bashir, "Mastering Blockchain", ISSN: 1787125440,iSBN:9781787125445,Packt Publishing, 2017

**Reference Books:**

1. Daniel Drescher, "Blockchain Basics: A Non-Technical Introduction in 25 Steps", ISBN: 978-1-4842-2604-9, Apress, 2017.

2. Melanie Swan, "Blockchain: Blueprint for a New Economy",[1 ed.], ISSN: 1491920491, ISBN:9781491920497, O'Reilly Media, 2015.

3. Andreas M. Antonopoulos, "Mastering Bitcoin: Unlocking digital crypto-currencies", 1 ed., ISSN: 1449374042, ISBN: 9781449374044, O'Reilly Media, 2014

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Class Assessment** | **Mid Term** | **End Term** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and Pos** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Understand** the structure of a Blockchain and why/when it is better than a simple distributed database. | **PO1,PO2, PO3, PO4, PSO2, PSO3** |
| **CO2** | **Analyze** the incentive structure in a Blockchain based system and critically assess its functions, benefits and vulnerabilities. | **PO1, PSO1,PSO2,** |
| **CO3** | **Evaluate** the setting where a Blockchain based structure may be applied, its potential and its limitations. | **PO2, PSO1, PSO4** |
| **CO4** | **Analyze** to what extent smart and self-executing contracts can benefit automation, governance, transparency and the Internet of Things (IOT) | **PO4, PSO1,PSO4** |
| **CO5** | **Create** awareness of the new challenges that exist in monetizing businesses around Blockchain and smart contracts. | **PO3, PSO2, PSO3,PSO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | The ability to understand a wide range of essential topics, from the cryptographic underpinnings of Blockchain Technology to enabling decentralized applications on a private Blockchain platform. This program will provide a broad overview of the essential concepts of Blockchain Technology – by initially exploring the Bitcoin protocol followed by laying the foundation necessary for developing applications and programming. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE11065 | Block chain Applications for Cognitive | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 2 | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

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**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech (Spl. in Blockchain) Semester: VI

Stream: CSE

PAPER TITLE: Block chain Applications for Cognitive

PAPER CODE: CSE11065

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **SECTION A (Attempt all the questions) (5 x 1 = 5)** | | | |
| 1. | **What** are hash functions in Block chain? | **R** | **CO1** |
| 2. | **Define** Merkle tree. | **U** | **CO2** |
| ­­­ 3. | **Explain** Genesis Block. | **U&R** | **CO3** |
| 4. | **List** down some of the extensively used cryptographic algorithm. | **R** | **CO1, CO4** |
| 5. | **How** is a blockchain ledger different from an ordinary one? | **U&R** | **CO5** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Analyze** the goals of the user interface design? What is software architecture giving an example? Distinguish between metrics and measurements? | **Ap** | **CO3** |
| 7. | **Compare** between Blockchain and Hyperledger. | **U** | **CO2, CO6** |
| 8. | **How** is Blockchain distributed ledger different from a traditional ledger? | **An** | **CO5** |
| 9. | **What** are Merkle trees? How important are Merkle trees in Blockchains? | **U&R** | **CO4** |
|  | **SECTION C (**Attempt any **Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Name** the steps that are involved in the blockchain project implementation. | **E & R** | **CO4,**  **CO1** |
| 11. | **Explain** blockchain technology for Financial services and Insurance Industry | **R & U** | **CO5** |
| 12. | **What** is a ledger? Is Blockchain an incorruptible ledger? | **U&R** | **CO2** |

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| --- | --- | --- | --- | --- | --- |
| **CSE12066** | **Permission Blockchain-Ethereum Lab** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Crypto currency and computer security basics** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To gain knowledge about the building blocks of blockchain ethereum.

2. To enable students to install and configure Mist browser,

3. To give the students a perspective to learn the basics of EVM and Solidity programming.

4. To enable students acquire knowledge about smart contract and tokens..

**Course Outcomes:**

On completion of this course, the students will be able to

CO1**. Understand** the basics of Solidity programming.

CO2. **Apply** the decision making constructs and loops to perform conditional execution.

CO3**. Apply** the various types of inheritance in Solidity programming.

CO4. **Distinguish** between function and contract polymorphism.

CO5. **Explain** and apply error handling use cases.

**Catalog Description:**

This course is the definitive introduction to permissioned blockchain for the students. Beyond the technology, this course will introduce you to some of the philosophy behind decentralization and why there is so much excitement around it. During the tenure of the course, the students will be introduced to blockchain and the technology behind it. In the later modules, the topics beyond bitcoin will be taken up and delve deeper into a next-generation blockchain called Ethereum to introduce students to what modern blockchains can do.

**Course Content:**

**List of Experiments:**

|  |  |
| --- | --- |
| 1 | Write a Solidity program to create a smart contract. |
| 2 | Solidity program to demonstrate the use of decision making statements. |
| 3 | Solidity program to demonstrate the use of loops. |
| 4 | Solidity program to demonstrate the creation of an event. |
| 5 | Solidity program to demonstrate the use of pure and view functions. |
| 6 | Solidity program to demonstrate the use of different types of inheritance. |
| 7 | Solidity program to demonstrate the use of abstract contract. |
| 8 | Solidity program to demonstrate the use of Function polymorphism. |
| 9 | Solidity program to demonstrate the use of contract polymorphism. |
| 10 | Solidity program to demonstrate the error handling. |

**Text Books:**

1. Mayukh Mukhopadhyay - Ethereum smart contract development\_ build blockchain-based decentralized applications using Solidity-Packt Publishing (2018)

2. Chris Dannen (auth.) - Introducing Ethereum and Solidity\_ Foundations of Cryptocurrency and Blockchain Programming for Beginners-Apress (2017)

3. Mastering Bitcoin: Programming The Open Blockchain, Andreas M. Antonopoulos, O'Reilly, ISBN: 9789352135745.

**Reference Books:**

1. Ethereum for Architects and Developers: With Case Studies and Code Samples in Solidity by Debajani Mohanty

2. Blockchain for Business by Jai Singh Arun

3. Blockchain Applications: A Hands-on Approach by Arshdeep Bahga and Vijay K. Madisetti, ISBN: 9780996025560.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Internal Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Understand** the basics of Solidity programming.  . | **PO1,PO2,PO4** |
| **CO2** | **Apply** the decision making constructs and loops to perform conditional execution. | **PO1,PO2,PO4** |
| **CO3** | **Apply** the various types of inheritance in Solidity programming. | **PO1,PO2,PO3,PO4** |
| **CO4** | **Distinguish** between function and contract polymorphism. | **PO4,PO3,PO5,PSO4** |
| **CO5** | **Explain** and apply error handling use cases. | **PO4,PO5,PSO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | The ability to understand a wide range of essential topics, from the cryptographic underpinnings of Blockchain Technology to enabling decentralized applications on a private Blockchain platform. This program will provide a broad overview of the essential concepts of Blockchain Technology – by initially exploring the Bitcoin protocol followed by laying the foundation necessary for developing applications and programming. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE12066 | Permission Blockchain-Ethereum Lab | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | **-** | - | - | - | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

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**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech (Spl. in Blockchain) Semester: VI Stream: CSE

PAPER TITLE: Permission Blockchain-Ethereum Lab PAPER CODE: CSE12066

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 5 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 8 = 40)** | | | |
| 1. | **Develop** a Solidity program to create a smart contract. | **Ap** | **CO1** |
| 2. | **Develop** a Solidity program to demonstrate the use of decision making statements.. | **U** | **CO2** |
| ­­­ 3. | **Develop** a Solidity program to demonstrate the use of different types of inheritance. | **U** | **CO3** |
| 4. | **Develop** a Solidity program to demonstrate the use of Function polymorphism. | **U** | **CO4** |
| 5. | **Develop** a Solidity program to demonstrate the error handling. | **U** | **CO5** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CSE11067** | **Industry Use Cases using Block chain (Specialization Course –IV)** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **Fundamental knowledge of hashing, Blockchain** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To help learners a overview of Communities in Blockchain network.

2. To enable students, communicate with Cross border payments, Stellar and Ripple protocols.

3. To give the students a perspective to Mortgage over Blockchain, Blockchain enabled Trade, Trade Finance Network.

4. To enable students, acquire Privacy in a Blockchain System, Privacy through Fabric Channels, Smart Contract Confidentiality for their profession.

**Course Outcomes:**

On completion of this course, the students will be able to

**CO1. Understand** the communities in blockchain network.

**CO2. Implement** privacy consents in block chain.

**CO3.** Give a **brief overview** of Blockchain for Trade Logistics, Global Trade Digitization.

**CO4. Classify** Smart Contract Confidentiality.

**CO5. Apply** and explore block chain domain in healthcare, energy etc.

**Catalog Description:**

Blockchain technologies have the potential to radically change the face of manufacturing, according to recent research. Blockchain, most commonly associated with crypto currencies such as Bitcoin, is a digital ledger technology which can be used to store and record transactions. As records along the chain are stored and distributed across nodes in the network, it is very difficult to falsify records, making the Blockchain a more secure and transparent way to record transactions and service records. This, in turn, gives Blockchain applications outside of Cryptocurrency exchanges. The enterprise is exploring ways to utilize Blockchain technologies in everything from finance to manufacturing.

**Course Content:**

**Unit I: 6 lecture hours**

**Blockchain Use Cases**

Sample use cases by Industry, Business Problems and Participants, Communities in Blockchain network.

**Unit II: 7 lecture hours**

**Blockchain in Financial Service**

Cross border payments, Stellar and Ripple protocols, Know Your Customer (KYC), Privacy Consents, Mortgage over Blockchain, Blockchain enabled Trade, Trade Finance Network, and Supply Chain Financing

**Unit III: 6 lecture hours**

**Revolutionizing Global Trade**

Blockchain for Trade Logistics, Global Trade Digitization, Blockchain for Container Management

**Unit IV: 7 lecture hours**

**Blockchain in Supply Chain**

Food Safety and Food Traceability, Supply Chain Orchestration, Ever ledger, The Diamond Lifecycle, Addressing Supply Chain Fraud through Blockchain

**Unit V: 7 lecture hours**

**Blockchain in Government**

Preventing Cyber Crime through Blockchain, Government Use-cases, Auditing and Compliance, Blockchain for Defense, Digital Identity and Single Sign On (SSO), Blockchain for Tax Payments, Blockchain for Managing Land Registry Records

**Unit VI: 12 lecture hours**

**Blockchain Security**

Identities and Policies, Membership and Access Control, Blockchain Crypto Service Providers, Security considerations for Blockchain, Intel SGX, Privacy in a Blockchain System, Privacy through Fabric Channels, Smart Contract Confidentiality

**Blockchain in Other Industries**

Blockchain in Healthcare, Blockchain in Energy Markets, Blockchain in Media

**Text Books:**

1. Industry Use Cases using Blockchain (IBM ICE Publication).

2. Mayukh Mukhopadhyay, "Ethereum Smart Contract Development", Packt Publishing, 2018

**Reference Books**

1. Ghassan Karame, Elli Androulaki, "Bitcoin and Blockchain Security", ISBN:978-1-63081-013-9,Artech, 2017.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Assessment** | **MTE** | **ETE** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | Understand the communities in Blockchain network. | **PO1, PO11** |
| **CO2** | Implement privacy consents in block chain | **PO1,PO2, PO3, PSO1,PSO2** |
| **CO3** | Give a brief overview of Blockchain for Trade Logistics, Global Trade Digitization. | **PO1, PO2, PO3, PO5, PO11,PO12, PSO2,PSO4** |
| **CO4** | Classify Smart Contract Confidentiality. | **PO1, PO5, PO12, PSO2** |
| **CO5** | Apply and explore block chain domain in healthcare, energy etc. | **PO1, PO12,PSO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | The ability to understand a wide range of essential topics, from the cryptographic underpinnings of Blockchain Technology to enabling decentralized applications on a private Blockchain platform. This program will provide a broad overview of the essential concepts of Blockchain Technology – by initially exploring the Bitcoin protocol followed by laying the foundation necessary for developing applications and programming. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE11067 | Industry use case using Blockchain | 3 | 2 | 2 | - | 2 | - | - | - | - | - | 2 | 3 | - | 3 | - | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

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**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech in Blockchain Technology Semester: VII

Stream: CSE

PAPER TITLE: Industry use case using Blockchain PAPER CODE: CSE11067

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **List** the steps involved in Communities in Blockchain network. | **U** | **CO1** |
| 2. | **Enumerate** the basic elements of Cross border payments, Stellar and Ripple protocols | **U** | **CO2** |
| ­­­ 3. | **Define** Policies, Membership and Access Control, Blockchain Crypto Service | **R** | **CO3** |
| 4. | **What** is Digital Identity and Single Sign On (SSO)? | **R** | **CO4** |
| 5. | **Give** the principles of Blockchain in Healthcare. | **U** | **CO4** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Describe** the characteristics of Blockchain for Managing Land Registry Records. | **U** | **CO1** |
| 7. | **Examine** Intel SGX, Privacy in a Blockchainwith your own example. | **Ap** | **CO2** |
| 8. | **Elucidate** the factors Preventing Cyber Crime through blockchain, Government Use-cases. | **Ap** | **CO3** |
| 9. | **Explain** with Example: i) Immutability ii) UTXO. | **U** | **CO4 /CO2** |
|  | **SECTION C (Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Explain** in detail about Privacy through Fabric Channels, Smart Contract Confidentiality. | **U** | **CO4** |
| 11. | **Write** a Quality Control **Plan** for Auditing and Compliance, Blockchain for Défense. | **U** | **CO4** |
| 12. | **Define** features of Blockchain in Energy Markets. | **R** | **CO5** |

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| **CSE12068** | **Industry Use Cases using Block chain Lab (Specialization Course -IV Lab)** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours -45** | **0** | **0** | **3** | **2** |
| **Pre-requisites/Exposure** | **Fundamental knowledge of hashing, object-oriented concept** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To help learners a practical overview of Communities in Blockchain network.
2. To enable students, communicate with Cross border payments, Stellar and Ripple protocols.
3. To give the students a real time perspective of smart contract over Blockchain, Blockchain enabled Trade, Trade Finance Network.
4. To enable students, acquire practical knowledge in Privacy in a Blockchain System, Privacy through Fabric Channels, Smart Contract Confidentiality for their profession.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. Understand the communities in blockchain network through python.

CO2. Communicate with privacy consents in block chain by python..

CO3. Give a brief overview of Blockchain for Trade Logistics, Global Trade Digitization.

CO4. Classify Smart Contract Confidentiality.

CO5.Construct and explore block chain domain in Ethereum IDE domain in healthcare, energy etc.

**Catalog Description:**

Blockchain technologies have the potential to radically change the face of manufacturing, according to recent research. Blockchain, most commonly associated with crypto currencies such as Bitcoin, is a digital ledger technology which can be used to store and record transactions. As records along the chain are stored and distributed across nodes in the network, it is very difficult to falsify records, making the Blockchain a more secure and transparent way to record transactions and service records. This, in turn, gives Blockchain applications outside of Cryptocurrency exchanges. The enterprise is exploring ways to utilize Blockchain technologies in everything from finance to manufacturing.

**Course Content:**

1. Introductory overview of components in blockchain and it’s fundamental aspect
2. Introduction to client, miners and block by using python
3. Set Jupiter notebook and export blockchain specific library.
4. Develop a client blockchain in python in such a way that client would be able to send money from his wallet to another known person.
5. Introduce a client class in python.
6. Generate a public and private key of client class in python and apply RSA cryptography algorithm.
7. Create a blockchain transaction in class by python
8. Display multiple transaction in python.
9. Introduction to nonce block and create a nonce block in python.
10. Develop a mining process on nonce block.
11. Develop a genesis block in python
12. Introduction to Ethereum IDE
13. Create a smart contract and deploy it.
14. Introduction to my Ether wallet and develop a wallet.

**Text Books:**

1. Industry Use Cases using Blockchain (IBM ICE Publication).

2. Mayukh Mukhopadhyay, "Ethereum Smart Contract Development", Packt Publishing, 2018

**Reference Books:**

1. Ghassan Karame, Elli Androulaki, "Bitcoin and Blockchain Security", ISBN:978-1-63081-013-9,Artech, 2017.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Internal Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | Understand the communities in Blockchain network through python. | **PO1, PSO2** |
| **CO2** | Communicate with privacy consents in block chain by python. | **PO1,PO2, PO3, PSO4** |
| **CO3** | Give a brief overview of Blockchain for Trade Logistics, Global Trade Digitization. | **PO1, PO2, PO3, PO5, PSO2** |
| **CO4** | Classify Smart Contract Confidentiality in python. | **PO1, PO5, PSO2** |
| **CO5** | Construct and explore block chain domain in Ethereum IDE domain in healthcare, energy etc | **PO1,PSO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual and team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | The ability to understand a wide range of essential topics, from the cryptographic underpinnings of Blockchain Technology to enabling decentralized applications on a private Blockchain platform. This program will provide a broad overview of the essential concepts of Blockchain Technology – by initially exploring the Bitcoin protocol followed by laying the foundation necessary for developing applications and programming. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE12068 | Industry use case using Blockchain Lab | 3 | 2 | 2 | - | 2 | - | - | - | - | - | - | - | - | 3 | - | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

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**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION: JULY 2020**

Name of the Program: B. Tech in Blockchain technology Semester: VII

Stream: CSE

PAPER TITLE: Industry use case using Blockchain Lab PAPER CODE: CSE12068

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 2 = 10)** | | | |
| 1. | **List** client class in python. | **U** | **CO1** |
| 2. | **Enumerate** the basic elements of Cross border payments, Stellar and Ripple protocols | **U** | **CO2** |
| ­­­ 3. | **Define** client, miners and block by using python. | **R** | **CO3** |
| 4. | **What** is Digital Identity and Single Sign On (SSO)? | **R** | **CO4** |
| 5. | **Give** the principles of Blockchain in Healthcare. | **U** | **CO4** |
|  | **SECTION B (**Attempt any **Six Questions) (6 x 5 = 30)** |  | |
| 6. | **Describe** the characteristics of Blockchain for Managing Land Registry Records. | **U** | **CO1** |
| 7. | **Examine** client blockchain in python in such a way that client would be able to send money from his wallet to another known person in a Blockchainwith your own example. | **An** | **CO2** |
| 8. | **What** is the public and private key of client class in python and apply RSA cryptography algorithm. | **R** | **CO3** |
| 9. | **Explain** with program for smart contract in Ethereum IDE. | **R** | **CO4 /CO2** |
| 10. | **Compare** in detail about multiple transaction in block chain in python. | **U** | **CO4** |
| 11. | **Classify** a mining process on nonce block in Python. | **U** | **CO4** |
| 12. | **Distinguish** features of a genesis block in python. | **An** | **CO5** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CSE11069** | **Emerging areas in Block chain**  **(Specialization Course –V) (Online/Offline mode )** | **L** | **T** | **P** | **C** |
| **Version 1.0** | **Contact Hours-45** | **3** | **0** | **0** | **3** |
| **Pre-requisites/Exposure** | **None** | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. It understands the function of Blockchain as a method of securing distributed ledgers

2. It covers the technological underpinnings of Blockchain operations as distributed data structures and decision-making systems, their functionality and different architecture types.

3. It provides a critical evaluation of existing “smart contract” capabilities and platforms, and examines their future directions, opportunities, risks and challenges.

**Course Outcomes:**

On the successful completion of the course, students will be able to

1. **Explain** the functional/operational aspects of Cryptocurrency ECOSYSTEM.
2. **Understand** emerging abstract models for Blockchain Technology.
3. **Analyse** the major research challenges and technical gaps existing between theories.
4. **Analyse** Cryptocurrency domain.

**Catalog Description:**

This course aims to provide conceptual understanding of the function of Blockchains as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable. It covers the technological underpinnings of blockchain operations as distributed data structures and decision making systems, their functionality and different architecture types. It provides a critical evaluation of existing “smart contract” capabilities and platforms, and examines their future directions, opportunities, risks and challenges.

**Course Content:**

**Unit I: 5 lecture hours**

Blockchain technology in networking and IoT.

**Unit II: 5 lecture hours**

Blockchain technology for digital identities.

**Unit III: 5 lecture hours**

Blockchain technology for retail (supply chain management, tracing the origin of the product, etc.).

**Unit IV: 5 lecture hours**

Blockchain in Real Estate (simplified property transaction, tracking the ownership and title deeds, etc.).

**Unit V: 5 lecture hours**

Blockchain technology for Agriculture.

**Unit VI: 5 lecture hours**

Blockchain technology for Democracy and Governance

**Unit VII: 5 lecture hours**

Blockchain technology in Energy, Climate and Environment

**Unit VIII: 5 lecture hours**

Blockchain technology for Banking, Financial services and Insurance Industry

**Unit IX: 5 lecture hours**

Blockchain technology in Philanthropy, Aid, and Donors

**Text Books:**

1. Melanie Swan, "Blockchain: Blueprint for a New Economy",[1 ed.], ISSN: 1491920491, ISBN:9781491920497, O'Reilly Media, 2015.

2.Mayukh Mukhopadhyay, "Ethereum Smart Contract Development", Packt Publishing, 2018

**Reference Books:**

1. Raval, "Decentralized Applications Harnessing Bitcoin’s Blockchain Technology",O'Reilly, 2017.

2. Ghassan Karame, Elli Androulaki, "Bitcoin and Blockchain Security", ISBN:978-1-63081-013-9,Artech, 2017.

3. Ying-Chang Liang, “Dynamic Spectrum Management: From Cognitive Radio to Blockchain and Artificial Intelligence”, 1st ed. 2020, Springer Singapore.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Class Assessment** | **Mid Term** | **End Term** |
| **Weightage (%)** | **30** | **20** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

|  |  |  |
| --- | --- | --- |
| **Mapping between COs and Pos** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Explain** the functional/operational aspects of cryptocurrency ECOSYSTEM. | **PO1,PO3,PSO2** |
| **CO2** | **Understand** emerging abstract models for Blockchain Technology. | **PO2,PO4,PSO4** |
| **CO3** | **Analyse** the major research challenges and technical gaps existing between theory. | **PO3,PO1,PSO4** |
| **CO4** | **Analyse** cryptocurrency domain. | **PO4,PO2,PSO2** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Engineering Knowledge | Problem analysis | Design/development of solutions | Conduct investigations of complex problems | Modern tool usage | The engineer and society | Environment and sustainability | Ethics | Individual or team work | Communication | Project management and finance | Life-long Learning | Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity. | The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future. | Ability to analyse the impact of Computer Science and Engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems. | The ability to understand a wide range of essential topics, from the cryptographic underpinnings of Blockchain Technology to enabling decentralized applications on a private Blockchain platform. This program will provide a broad overview of the essential concepts of Blockchain Technology – by initially exploring the Bitcoin protocol followed by laying the foundation necessary for developing applications and programming. |
| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE11069 | Emerging areas in Blockchain | 2 | 2 | 3 | 2 | - | - | - | - | - | - | - | - | - | 2 | - | 2 |

1=weakly mapped

2= moderately mapped

3=strongly mapped

**Model Question Paper**

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**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**END-SEMESTER EXAMINATION**

Name of the Program: B. Tech Blockchain Technology Semester: VII

Stream: CSE

PAPER TITLE: Emerging areas in Blockchain PAPER CODE: CSE11069

Maximum Marks: 40 Time duration: 3 hours

Total No of questions: 12 Total No of Pages: 01

**Instruction for the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.

2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Section A (Answer All the Questions) (5 x 1 = 5)** | | | |
| 1. | **What** are hash functions in Block chain? | **R** | **CO1** |
| 2. | **Define** Merkle tree. | **U** | **CO2** |
| ­­­ 3. | **Explain** Genesis Block. | **U&R** | **CO4** |
| 4. | **List** down some of the extensively used cryptographic algorithm. | **R** | **CO1, CO3** |
| 5. | **What** type of records can be kept in a Blockchain? Is there any restriction on same? | **U** | **CO4** |
|  | **SECTION B (**Attempt any **Three Questions) (3 x 5 = 15)** |  | |
| 6. | **Analyze** the goals of the user interface design? What is software architecture giving an example? Distinguish between metrics and measurements? | **Ap** | **CO3** |
| 7. | **Compare** between Blockchain and Hyperledger. | **U** | **CO2, CO1** |
| 8. | **How** is Blockchain distributed ledger different from a traditional ledger? | **An** | **CO4** |
| 9. | **Explain** the components of Blockchain Ecosystem? | **U** | **CO2, CO1** |
|  | **SECTION C(Answer Any Two Questions) (2 x 10 = 20)** |  | |
| 10. | **Name** the steps that are involved in the blockchain project implementation. | **E & R** | **CO4,**  **CO2** |
| 11. | **Explain** blockchain technology for Financial services and Insurance Industry | **R & U** | **CO3** |
| 12. | **How is a blockchain ledger different from an ordinary one?** | **R & U** | **CO1** |

|  |  |  |  |  |  |
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| CSE15070 | Specialization Viva Voice | **L** | **T** | **P** | **C** |
| **Version 1.0** |  | **0** | **0** | **0** | **2** |
| **Pre-requisites/Exposure** |  | | | | |
| **Co-requisites** | **--** | | | | |

**Course Objectives:**

1. To teach deep understanding of Blockchain.
2. To provide the students with specialist knowledge and experience of various Blockchain techniques and incident response.

**Course Outcomes:**

On completion of this course, the students will be able to

CO1. **Learn** understanding of various digital forensics techniques and its usage for the potential countermeasures or incident response.

CO2. **Demonstrate** a critical evaluation and use of digital forensics technique to do incident response with an independent project.

**Catalog Description:**

Thinking is an integral part of life. Aim of this course is to teach students how to think like a hacker, providing them with a deep understanding of security issues and concerns. In addition, this course also provides the students with specialist knowledge and experience of advanced hacking techniques and their countermeasures.

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |
| --- | --- | --- |
| **Components** | **Internal Assessment** | **ETE** |
| **Weightage (%)** | **50** | **50** |

**Relationship between the Course Outcomes (COs) and Program Outcomes (POs)**

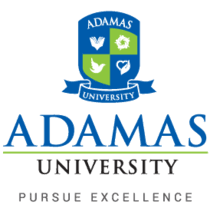
|  |  |  |
| --- | --- | --- |
| **Mapping between COs and POs** | | |
|  | **Course Outcomes (COs)** | **Mapped Program Outcomes** |
| **CO1** | **Learn** understanding of various digital forensics techniques and its usage for the potential countermeasures or incident response. | **PO1, PO3, PSO1** |
| **CO2** | **Demonstrate** a critical evaluation and use of digital forensics technique to do incident response with an independent project. | **PO5, PO4** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
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| Course Code | Course Title | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CSE15070 | Specialization Viva Voce | 2 | - | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | - | - | 2 |

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**ADAMAS UNIVERSITY**

**SCHOOL OF ENGINEERING & TECHNOLOGY**

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**CO – PO & PSO MAPPING**

**Name of the Programme: B. Tech in Computer Science & Engineering**

**Specialization: Blockchain Technology**

| **Course Code** | **Course Title** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** | **PSO4** |
| MTH11501 | Engineering Mathematics -I | - | 3 | 3 | 3 | - | - | - | - | - | - | - |  |  |  |  | NA |
| 3 | - | - | - |
| PHY11201 | Applied Science | 3 | 2 | 1 | 3 | 2 | 2 | - | - | - | - | - | 2 | - | - | - | NA |
| CSE11001 | Introduction to Programming | 3 | - | 1 | 1 | 1 | - | - | - | 1 | - | 1 | - | - | - | - | NA |
| ENG11053 | HSSM –I (English Communication- I) | - | 3 | 3 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | - | 1 | - | - | - | NA |
| BIT11003 | Life Science | 2 | 2 | 3 | - | 3 | 3 | - | 2 | 1 | - | - | 2 | 3 | 3 | - | NA |
| PHY12202 | Applied Science Lab | 3 | 3 | 3 | - | 2 | - | - | - | 1 | - | - | - | - | - | - | NA |
| CSE12002 | Programming Lab | 3 | 1 | 1 | 1 | 1 | - | 1 | - | - | - | 1 | - | 1 | - | - | NA |
| CEE12001 | Engineering Drawing and CAD | 3 | 2 | 2 | 1 | - | 1 | - | - | - | - | - | 3 | 2 | 2 | - | NA |
| ENG11043 | Communication and Collaboration Skill-I | - | 2 | - | - | - | - | - | - | 3 | 3 | - |  |  |  |  | NA |
| - | 3 | 3 | - |
| GEE14003 | Capstone Project- I | 3 | 3 | 3 | - | - | - | - | - | - |  | - | - | - | - |  | NA |
| DGS11001 | Design Thinking | 3 | 2 | - | 1 | 1 | - | - | - | - | - | 1 | - | - | - | - | NA |
| MTH11502 | Engineering Mathematics -II | 3 | 1 | 2 | 3 | 1 | - | 1 | - | - | - | - | 2 | - | - | - | NA |
|  |
| GEE11001 | Electrical and Electronics Technology | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 3 | - | - | - | NA |  |
| MEE11002 | Engineering Mechanics | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | NA |  |
|  |
| EVS11107 | Environmental Science | 1 | 3 | 3 | - | - | 3 | 3 | 2 | - | - | 2 | 2 | - | 2 | - | NA |  |
| GEE12002 | Electrical and Electronics Technology Lab | 3 | - | 2 | - | **-** | - | - | - | - | - | - | - | - | - | - | NA |  |
|  |
|  |
| MEE12001 | Engineering Workshop | 3 | 1 | - | - | - | - | - | - | 3 | - | - | - | 3 | - | - | NA |  |
|  |
| ENG11044 | Communication and Collaboration Skill-II | - | 1 | - | - | - | - | - | 1 | 2 | 2 | - | - | 2 | 2 | - | NA |  |
|  |
| GEE14004 | Capstone Project- II | 3 | 2 | 2 | 2 | 3 | - | - | - | - | --- | - | - | - | - | - | NA |  |
|  |
| IDP14001 | Interdisciplinary Project | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 |  | NA |  |
| - |  |
| SMA42111 | Probability, Statistics and Numerical Methods | 2 | 3 | 2 | - | 3 | - | - | - | - | - | - | 3 | 2 | 3 |  | NA |  |
| 2 |  |
| HEC42180 | HSS–IV (Economics for Engineers) | - | 2 | 3 | 2 | - | 2 | - | - | - | - | 2 | 3 | 2 | - | 2 | NA |  |
| CSE11003 | Data Structures and Algorithms | 2 | 3 | 3 | - | - | - | - | - | - | - | - | 3 |  |  |  | NA |  |
| 3 | 2 | 3 |  |
| CSE11004 | Switching circuit and logic design Lab | 3 | 2 | 3 | - | - | - | - | - | - | - | - |  |  |  |  | NA |  |
| 3 | 3 | 2 | 2 |  |
| CSE11005 | Formal Language And Automata Theory | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 3 | 3 | NA |  |
| CSE11006 | Engineering Science Course (Introduction to Python) | 3 | 3 | 3 | 2 | - | - | - | - | - | - | 2 | 3 |  |  |  | NA |  |
| 2 | 3 | - |  |
|  | Data Structures and Algorithms Lab | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | - |  |  |  | NA |  |
| CSE12007 | 3 | 3 | 3 |  |
|  |  |  |  |  |
| GEE14005 | Capstone Project- III | 3 | 3 | 3 | 3 | 3 | - | - | - | 3 | - | - | - | 3 | 3 | 3 | NA |  |
| SOC14100 | Community Service | - | 2 | - | - | - | 2 | 2 | 2 | 2 | 2 |  |  | - | - | - | NA |  |
| EIC11001 | Venture Ideation | - | - | - | - | - | 3 | 2 | 3 | - | - | 3 | - | - | - |  | NA |  |
| SMA42112 | Operations Research | 3 | 3 |  | - | 3 | - | - | - | - | - | - | 3 |  | 3 |  | NA |  |
| 2 | - |  |
| CSE11008 | Design and Analysis of Algorithms | 3 | 2 | 3 | 3 |  | - | - | - | - | - | - | 3 | 3 | 3 | 3 | NA |  |
| CSE11009 | Object Oriented Programming (Prof. Core- V) | 3 | 3 | 3 | - | - | - | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
| CSE11010 | Software Engineering | 3 | 2 |  |  | 2 | 2 |  |  |  |  |  | 3 | 2 | 3 | 2 | NA |  |
| CSE11011 | Computer Architecture | 3 |  | 3 | - | 2 | 3 | - | - | - | - | - | 3 | 3 | 2 | 3 | NA |  |
| PSG11021 | Human Values and Professional Ethics | 3 | - | - | - | 3 | 3 | 3 | - | - | - | - | - | 3 | 3 | - | NA |  |
| SMA42211 | Numerical Techniques Lab | 3 | - | - | - | 3 | 3 | 3 | - | - | - | - |  | 3 | 3 | - | NA |  |
| - |  |
| CSE12012 | Design & Analysis of Algorithm Lab | 2 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | - | 2 | 3 | 3 | NA |  |
| CSE12013 | Object Oriented Programming Lab | 3 | 3 | 3 | - | 3 | - | - | - | - | - | - | - |  |  |  | NA |  |
|  |
| GEE14006 | Capstone Project -IV | 3 | - | 3 |  | 3 | 2 | - | - | 3 |  | - | 3 | 2 | 2 | 3 | NA |  |
| CSE11014 | Compiler Design | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 3 | - | 3 | 3 | NA |  |
| CSE11015 | Database Management Systems | 3 |  | 3 |  | 2 | - | - | - | - | - | 3 | 2 | 3 | 2 | 3 | NA |  |
| CSE11016 | Operating Systems | 3 | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
| CSE11062 | Block chain Components and Architecture (Specialization Course –I) | 2 | 3 | 3 | 2 | 3 | - | - | - | - | - | - | - | 2 | - | 3 | 2 |  |
|  |
|  |
| CSE11017 | Applied Graph Theory(Prof. Elective -I) | 3 | 2 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 | 2 | NA |  |
| CSE11018 | Communication Network(Prof. Elective -I) | 3 | 3 | 3 | 3 | - | 2 | - | - | - | 3 | - | - | 3 | 3 | 2 | NA |  |
|  |
| CSE11019 | Big Data Analytics(Prof. Elective -I) | 3 | 2 | 2 | 3 | 3 | - | - | - | - | - | - | - | 2 | 3 | 2 | NA |  |
| CSE12020 | Compiler Design Lab | 3 | - | 2 | - | 2 | - | - | - | - | - | - | 3 | 2 | 3 | 2 | NA |  |
| CSE12021 | Database Management Systems Lab | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - |  |  |  |  | NA |  |
| 3 | 2 | 2 | 3 |  |
| CSE12022 | Operating Systems Lab | 2 | 3 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | 2 | 3 | NA |  |
| CSE12063 | Block chain Components and Architecture Lab (Specialization Course –I Lab) | 2 | 3 | 3 | - | 3 | - | - | - | - | - | 3 | - | - | - | 2 | - |  |
|  |
|  |
|  |
| GEE14007 | Capstone Project -V |  | - | 3 | - | 3 | - | 3 | - | 3 | 2 | 3 |  | 3 | - | 2 | NA |  |
| CSE11023 | Computer Networks | 2 | 3 | 2 | 3 | - | 3 | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
| CSE11024 | Artificial Intelligence and Machine Learning(Prof. Core- XII) | 3 | 2 | 2 | 3 | 2 | - | - | - | - | - | - | - | 2 | 3 | 3 | NA |  |
|  |
| CSE11025 | High Performance Computer Architecture(Prof. Elective -II) | 3 | 2 | 3 | - | 3 | 2 | - | - | - | - | - | 3 | 3 | 2 | 2 | NA |  |
|  |
| CSE11026 | Pattern Recognition(Prof. Elective -II) | 3 | 2 | 2 | 2 | 3 | - | - | - | - | - | - | - | 3 | 2 |  | NA |  |
|  |  |
| 3 |  |
| CSE11027 | Computational Geometry(Prof. Elective -II) | 3 | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
|  |
| CSE11028 | Artificial Intelligence(Open Elective -I) |  | 3 | 3 | 2 | - | 3 | 3 | - | - | - | - | 2 | 3 | 2 | 2 | NA |  |
| CSE11027 | Computational Geometry(Open Elective -I) | 3 | 3 | 3 | 3 | 1 | - | - | - | - | - | - | - |  |  |  | NA |  |
| 3 | 3 | 3 |  |
| CSE11064 | Permission Block chain- Ethereum (Specialization Course –II) | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | 3 |  |
|  |
|  |
| CSE11065 | Block chain Applications for Cognitive (Specialization Course -III) | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 2 | 2 |  |
|  |
|  |
| CSE12029 | Computer Networks Lab (Prof. Core- XI Lab) | 3 | 3 | 2 | 2 | 3 | 3 | - | - | 3 | - | - |  |  |  |  | NA |  |
| - | 2 | 2 | 1 |  |
| CSE12030 | Artificial Intelligence and Machine Learning Lab(Prof. Core- XII Lab) | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 2 | 2 | 3 | NA |  |
|  |
|  |
| CSE12031 | High Performance Computer Architecture Lab(Prof. Elective –II Lab) | 3 | - | 3 | - | 3 | - | - | - | - | - | - | 2 | 3 | 2 | 2 | NA |  |
|  |
| CSE12032 | Pattern Recognition(Prof. Elective –II Lab) | 3 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | 2 | - | NA |  |
|  |
| CSE12033 | Computational Geometry Lab(Prof. Elective –II Lab) | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 3 | 3 | 3 | NA |  |
|  |
| CSE12066 | Permission Block chain- Ethereum Lab (Specialization Course –II Lab) | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | **-** | - | - | - | 2 |  |
|  |
|  |
|  |
| CSE15034 | Technical Seminar | 3 | 2 | 2 | 3 | 3 | 2 | - | -- |  |  | - |  | - | 3 | - | NA |  |
| MBA43144 | HSSM –V (Industrial Management) | 3 | 2 | 3 | 3 |  | 3 | 2 |  |  | - | - | - | 2 | 2 | 2 | NA |  |
| CSE11035 | Image Processing(Prof. Elective- III) | 3 | 3 | 2 | 3 | - |  | - | - | - | - | - | - | 3 | 3 | 2 | NA |  |
|  | Cloud Computing(Prof. Elective- III) | 3 | 2 | 3 | 3 | 3 | - | - | - | - | - | - |  |  | 3 | 3 | NA |  |
| CSE11036 | 2 | 2 |  |
| CSE11037 | Information Retrieval(Prof. Elective- III) |  | 2 | 2 | 2 | 3 | 3 | 3 | - | - | - | - |  | 3 | 2 | 2 | NA |  |
| CSE11038 | Computer Graphics(Prof. Elective- III) | 3 | 3 | 2 | 3 | 3 | - | - | - | - | - | - | **-** | 3 | 3 | 3 | NA |  |
| CSE11039 | Artificial Neural Network and Deep Learning(Prof. Elective- III) | 3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - |  |  | 3 | NA |  |
|  |  |  |
| 3 | 3 |  |
| CSE11040 | Cryptography & Cyber Security (Prof. Elective- IV) | 3 | 3 | 3 | - | 3 | - | - | - | - | - | - | **3** |  |  |  | - |  |
| 3 | 3 | 3 |  |
|  |  |  |  |
| CSE11041 | Internet of Things (Prof. Elective- IV) | 3 | 2 | 3 |  |  | 3 |  | 3 |  |  |  | 2 | 2 | 3 | 3 | NA |  |
| CSE11042 | 5G Wireless Communication (Prof. Elective- IV) | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | 3 | 3 | 2 | 2 | NA |  |
|  |
| CSE11043 | Machine Learning(Open Elective- II) | 3 | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | 3 | - | - | NA |  |
| CSE11041 | Internet of Things(Open Elective- III) | 3 | 2 | 3 |  |  | 3 |  | 3 |  |  |  | 2 | 2 | 3 | 3 | NA |  |
| CSE12044 | Image Processing Lab(Prof. Elective- III Lab) | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | **-** | 3 | 3 | 3 | NA |  |
|  |
|  | Cloud Computing Lab(Prof. Elective- III Lab) | 3 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - |  |  |  |  | NA |  |
| CSE12045 | 2 | 3 |  |
|  | Information Retrieval Lab(Prof. Elective -III Lab) | 3 | 3 | 2 | 2 |  |  | - | - | - | - | 2 |  | 3 | 3 | 3 | NA |  |
| CSE12046 |  |
| CSE12047 | Computer Graphics Lab(Prof. Elective- III Lab) | 3 | 3 | 2 | 3 | - |  | - |  |  |  |  |  |  |  |  | NA |  |
| - | - | - | - | - | 3 | 3 | 3 |  |
|  | Artificial Neural Network and Deep Learning Lab(Prof. Elective- III Lab) | 3 | 3 | 3 | 3 | 3 |  | - | - |  | - | 2 | - |  |  |  | NA |  |
| CSE12048 | 3 | 3 | 3 |  |
|  |  |  |  |  |
| CSE11067 | Industry Use Cases using Block chain (Specialization Course –IV) | 3 | 2 | 2 | - | 2 | - | - | - | - | - | 2 | 3 | - | 3 | - | 2 |  |
|  |
|  |
| CSE12068 | Industry Use Cases using Block chain Lab (Specialization Course-IV Lab) | 3 | 2 | 2 | - | 2 | - | - | - | - | - | - | - | - | 3 | - | 2 |  |
|  |
|  |
| CSE14049 | Summer Internship | 3 | 3 | 3 | 3 | 3 |  |  |  |  |  |  |  | 2 | 3 | 3 | NA |  |
|  |
| CSE14050 | Minor Project | 3 | 2 | 3 | - | - | - | - | - | 3 | - | 3 | 3 | 2 | 3 | - | NA |  |
| CSE11069 | Emerging areas in Block chain (Specialization Course –V) (Online/Offline mode ) | 2 | 2 | 3 | 2 | - | - | - | - | - | - | - | - | - |  | - |  |  |
|  |  |
|  |  |
| CSE14051 | Industry Work Experience / SIRE / Major Project | 3 | 2 | - | 3 | - | - | - | - | 3 | 3 | 3 |  | 2 | 3 | 3 | NA |  |
|  |
| CSE15052 | Comprehensive Viva Voce | 3 | 3 | 3 |  | 3 | 3 |  |  | 3 | 3 |  |  | 3 | 3 | 3 | NA |  |
|  |
|  |  | 2 | - | 2 | 2 | 2 | - | - | - | - | - | - | - | 2 | - | - | 2 |  |
| CSE15070 | Specialization Viva Voce |  |
|  |  |  |
| **Average of CO-PO Mapping** | | 2.82 | 2.51 | 2.6 | 2.43 | 2.47 | 2.48 | 2.46 | 2.22 | 2.37 | 2.44 | 2.12 | 2.64 | 2.57 | 2.67 | 2.62 | 2.12 |  |