**COURSE STRUCTURE**

**AND**

**DETAILED SYLLABI**

**A20 Regulation**

**for**

**B.Tech. (CSE) - Cyber Security**

**4 Years Course Structure and**

**Syllabi of III & IV Years Courses**

(Applicable for the Batch admitted in 2021-2022)

****

**DEPARTMENT OF CSE- CYBER SECURITY**

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY

(An Autonomous Institution approved by UGC and affiliated to JNTUH)

Yamnampet, Ghatkesar, Hyderabad - 501 301

**May 2023**

B. Tech (CSE) - Cyber Security Course Structure

Regulation: A20

##### B. Tech. (CSE) - Cyber Security I Year I Semester

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SNo.** | **Course Category** | **K / S / V** | **Dept Course** | **Course Code** | **Course** | **L** | **T** | **P** | **C** | **Max. Marks** | |
| **CIE** | **SEE** |
| 1 | BS | K | S&H | 8HC07 | Engineering Physics | 3 | 1 | 0 | 4 | 30 | 70 |
| 2 | ES | K | IT | 8FC01 | Problem Solving using C | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | BS | K | S&H | 8HC10 | Linear Algebra and Calculus | 2 | 1 | 0 | 3 | 30 | 70 |
| 4 | ES | K | ME | 8BC01 | Workshop/Manufacturing Processes | 1 | 0 | 0 | 1 | 30 | 70 |
| 5 | HS | S | S&H | 8HC02 | Written Communication Skills | 1 | 0 | 0 | 1 | 30 | 70 |
| 6 | BS | S | S&H | 8HC08 | Basic Mathematics, Analysis and Reasoning | 2 | 1 | 0 | 3 | 30 | 70 |
| 7 | BS | S | S&H | 8HC66 | Engineering Physics Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 8 | ES | S | IT | 8FC61 | Problem Solving using C Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 9 | ES | S | ME | 8BC61 | Workshop/Manufacturing Processes Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 10 | HS | S | S&H | 8HC62 | Written Communication Skills Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 11 | ES | K | CSE-CS | 8J176 | Comprehensive Test and Viva –Voce – I (2 Mids(Viva) and End Semester(Test and Viva) = 30+70) | 1 | 0 | 0 | 1 | 30 | 70 |
| 12 | PS | S | CSE-CS | 8J184 | Technical Seminar - I | 0 | 0 | 2 | 1 | 100 | -- |
| 13 | HS | V | S&H | 8HC18 | Orientation Course\* | 1 | 0 | 0 | 0 | Marks and  Grade will be given at the end of I year II semester | |
|  |  | **5/6/2** |  |  | **Total:** | **14** | **3** | **10** | **21** | **430** | **770** |

##### B. Tech. (CSE) - Cyber Security I Year II Semester

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SNo.** | **Course Category** | **K / S / V** | **Dept Course** | **Course Code** | **Course** | **L** | **T** | **P** | **C** | **Max. Marks** | |
| **CIE** | **SEE** |
| 1 | BS | K | S&H | 8HC04 | Engineering Chemistry | 4 | 0 | 0 | 4 | 30 | 70 |
| 2 | ES | K | CSE | 8EC01 | Data Structures and C++ | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | BS | K | S&H | 8HC13 | Differential Calculus and Numerical Methods | 2 | 1 | 0 | 3 | 30 | 70 |
| 4 | ES | S | ME | 8BC02 | Engineering Graphics | 1 | 0 | 4 | 3 | 30 | 70 |
| 5 | HS | S | S&H | 8HC01 | Oral Communication Skills | 1 | 0 | 0 | 1 | 30 | 70 |
| 6 | PC | K | IT | 8FC02 | Python Programming | 2 | 1 | 0 | 3 | 30 | 70 |
| 7 | PC | S | IT | 8F262 | IT Workshop and Python Programming Lab | 0 | 0 | 4 | 2 | 30 | 70 |
| 8 | BS | S | S&H | 8HC64 | Engineering Chemistry Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 9 | ES | S | CSE | 8EC61 | Data Structures (C/C++) Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 10 | HS | S | S&H | 8HC61 | Oral Communication Skills Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 11 | ES | K | CSE-CS | 8J277 | Comprehensive Test and Viva –Voce – II(2 Mids(Viva) and End Semester(Test and Viva) = 30+70) | 1 | 0 | 0 | 1 | 30 | 70 |
| 12 | PS | S | CSE-CS | 8J285 | Technical Seminar - II | 0 | 0 | 2 | 1 | 100 | -- |
| 13 | HS | V | S&H | 8HC18 | Orientation Course\* | 2 | 0 | 0 | 0 | 30 | 70 |
| Grade evaluation | |
|  |  | **5/7/1** |  |  | **Total :** | **16** | **2** | **16** | **24** | **460** | **840** |

\* a) Orientation Course for B. Tech I year I semester Students take place for 3 weeks duration covering the first Two Units

b) Orientation Course for B. Tech I year II semester Students take place for covering the remaining Four Units (Units III, IV, V, and VI).

##### B. Tech. (CSE) - Cyber Security II Year I Semester

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. No** | **Course Category** | **K/S/V** | **Dept Course** | **Course Code** | **Course** | **L** | **T** | **P/D** | **C** | **Max. Marks** | |
| **CIE** | **SEE** |
| 1 | BS | K | S&H | 8HC16 | Probability and Statistics | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | ES | K | ECE | 8AC48 | Elements of Electrical and Electronics Engineering | 2 | 0 | 0 | 2 | 30 | 70 |
| 3 | PC | K | CSE | 8EC02 | Object Oriented Programming through Java | 2 | 1 | 0 | 3 | 30 | 70 |
| 4 | ES | K | IT | 8F303 | Discrete Mathematics | 2 | 0 | 0 | 2 | 30 | 70 |
| 5 | ES | K | ECM | 8DC10 | Computer Organization & Architecture | 2 | 0 | 0 | 2 | 30 | 70 |
| 6 | PC | K | ECM | 8D310 | Software Engineering | 2 | 0 | 0 | 2 | 30 | 70 |
| 7 | HS | V | S&H | 8HC17 | Universal Human Values | 2 | 1 | 0 | 3 | 30 | 70 |
| 8 | PC | S | CSE | 8EC62 | Object oriented Programming through Java Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 9 | PC | S | CSE | 8EC77 | Software Engineering and Computer Organization Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 10 | ES | S | EEE & ECE | 8AC77 | Elements of Electrical and Electronics Engineering Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 11 | PS | K | CSE-CS | 8J378 | Comprehensive Test and Viva-voce - III | 1 | 0 | 0 | 1 | 30 | 70 |
| 12 | PS | S | CSE-CS | 8J386 | Technical Seminar - III | 0 | 0 | 2 | 1 | 100 | -- |
|  |  | **7/4/1** |  |  | **Total :** | **16** | **2** | **8** | **22** | **430** | **770** |

##### B. Tech. (CSE) - Cyber Security II Year II Semester

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. No** | **Course Category** | **K/S/V** | **Dept Course** | **Course Code** | **Course** | **L** | **T** | **P/D** | **C** | **Max. Marks** | |
| **CIE** | **SEE** |
| 1 | PC | K | CSE | 8E441 | Introduction to Cyber Security | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | PC | K | CSE | 8EC05 | Data Communications and Networks | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | PC | K | CSE | 8EC03 | Database Management Systems | 2 | 1 | 0 | 3 | 30 | 70 |
| 4 | PC | K | CSE | 8EC06 | Operating Systems | 2 | 1 | 0 | 3 | 30 | 70 |
| 5 | ES | K | ECE | 8CC55 | Digital Electronics | 2 | 0 | 0 | 2 | 30 | 70 |
| 6 | HS | K | MBA | 8ZC01 | Economics, Accountancy and Management Science | 2 | 0 | 0 | 2 | 30 | 70 |
| 7 | HS | S | S&H | 8HC03 | Soft Skills | 1 | 0 | 2 | 2 | 30 | 70 |
| 8 | PC | S | CSE | 8EC63 | Database Management Systems Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 9 | PC | S | CSE | 8EC66 | Operating Systems Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 10 | PC | S | CSE | 8EC65 | Computer Networks Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 11 | PS | K | CSE-CS | 8J479 | Comprehensive Test and Viva –Voce – IV (2 Mids(Viva) and End Semester(Test and Viva) = 30+70) | 1 | 0 | 0 | 1 | 30 | 70 |
| 12 | PS | S | CSE-CS | 8J487 | Technical Seminar - IV | 0 | 0 | 2 | 1 | 100 | -- |
|  |  | **7/5/-** |  |  | **Total :** | **16** | **2** | **10** | **23** | **430** | **770** |

##### B. Tech. (CSE) - Cyber Security III Year I Semester

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. No** | **Course Category** | **K/S/V** | **Dept Course** | **Course Code** | **Course** | **L** | **T** | **P/D** | **C** | **Max. Marks** | |
| **CIE** | **SEE** |
| 1 | OE | K | CSE |  | Open Elective-I | 2 | 0 | 0 | 2 | 30 | 70 |
| 2 | PE | K | CSE |  | Professional Elective - I | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | PC | K | IT | 8FC06 | Information Security | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | PC | K | CSE | 8EC07 | Web Technologies | 2 | 1 | 0 | 3 | 30 | 70 |
| 5 | PC | K | IT | 8FC05 | Design and Analysis of Algorithms | 2 | 1 | 0 | 3 | 30 | 70 |
| 6 | PC | K | CSE-DS | 8MC04 | Fundamentals of Data Science | 2 | 0 | 0 | 2 | 30 | 70 |
| 7 | HS | V | S&H | 8HC05 | Environmental Science and Ecology | 2 | 0 | 0 | 2 | 30 | 70 |
| 8 | PC | S | CSE-CS | 8JC61 | Web Technologies and Information Security Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 9 | PC | S | CSE-DS | 8MC61 | Design and Analysis of Algorithms and R Programming Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 10 | PS | **S** | CSE-CS | 8J491 | Evaluation of Summer Break  - Internship-I (2 Internal Reviews and External Evaluation) | 0 | 0 | 0 | 1 | 30 | 70 |
|  |  | **6/3/1** |  |  | **Total :** | **16** | **2** | **4** | **21** | **300** | **700** |

##### B. Tech. (CSE) - Cyber Security III Year II Semester

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. No** | **Course Category** | **K/S/V** | **Dept Course** | **Course Code** | **Course** | **L** | **T** | **P/D** | **C** | **Max. Marks** | |
| **CIE** | **SEE** |
| 1 | OE | K | CSE |  | Open Elective - II | 2 | 0 | 0 | 2 | 30 | 70 |
| 2 | PE | K | CSE |  | Professional Elective – II | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | PC | K | CSE | 8EC04 | Data Warehousing and Data Mining | 2 | 1 | 0 | 3 | 30 | 70 |
| 4 | PC | K | IT | 7FC08 | Cyber Security & Cyber Laws | 3 | 0 | 0 | 3 | 30 | 70 |
| 5 | PC | K | CSE | 8EC17 | Machine Learning | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | PC | K | IT | 8FC07 | Automata Theory and Compiler Design | 2 | 1 | 0 | 3 | 30 | 70 |
| 7 | PC | S | CSE-AIML | 8LC61 | Data Mining Lab & Machine Learning using Python Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 8 | PC | S | CSE-CS | 8JC62 | Cyber Security and Compiler Design Lab | 0 | 0 | 2 | 1 | 30 | 70 |
| 9 | PC | K | CSE-CS | 8J681 | Comprehensive Viva Voce | 0 | 0 | 0 | 1 | 30 | 70 |
| 10 | PS | S | CSE-CS | 8J694 | Group Project | 0 | 0 | 2 | 1 | 30 | 70 |
|  |  | **7/3/-** |  |  | **Total :** | **15** | **2** | **6** | **21** | **300** | **700** |

##### B. Tech. (CSE) - Cyber Security IV Year I Semester

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. No** | **Course Category** | **K/S/V** | **Dept Course** | **Course Code** | **Course** | **L** | **T** | **P/D** | **C** | **Max. Marks** | |
| **CIE** | **SEE** |
| 1 | PE | K | CSE |  | Professional Elective – III | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | PE | K | CSE |  | Professional Elective-IV | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | PC | K | CSE | 8EC13 | Blockchain Technologies | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | PC | K | CSE-AIML | 8LC01 | Introduction to Artificial Intelligence | 2 | 0 | 0 | 2 | 30 | 70 |
| 5 | PC | K | CSE-CS | 8JC01 | Vulnerability Assessment and Penetration Testing | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | PC | K | CSE-CS | 8JC02 | Ethical Hacking | 2 | 1 | 0 | 3 | 30 | 70 |
| 7 | HS | V | S&H | 8GC49 | Intellectual Property Rights | 1 | 0 | 0 | 1 | 30 | 70 |
| 8 | PC | S | CSE-CS | 8JC63 | Blockchain Technologies and Artificial Intelligence Lab | 0 | 0 | 3 | 1.5 | 30 | 70 |
| 9 | PC | S | CSE-CS | 8JC64 | Ethical Hacking Lab and Professional Elective-IV Lab | 0 | 0 | 3 | 1.5 | 30 | 70 |
| 10 | PS | S | CSE-CS | 8J692 | Evaluation of Summer Break – Internship – II(2 Internal Reviews and External Evaluation) | 0 | 0 | 0 | 1 | 30 | 70 |
|  |  | **6/3/1** |  |  | **Total :** | **17** | **1** | **6** | **22** | **300** | **700** |

##### B. Tech. (CSE) - Cyber Security IV Year II Semester

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. No** | **Course Category** | **K/S/V** | **Dept Course** | **Course Code** | **Course** | **L** | **T** | **P/ D** | **C** | **Max. Marks** | |
| **CIE** | **SEE** |
| 1 | OE | K | CSE |  | Open Elective- III | 2 | 0 | 0 | 2 | 30 | 70 |
| 2 | PE | K | CSE |  | Professional Elective – V | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | PS | S | CSE-CS | 8J896 | Major Project | - | - | 10 | 5 | 30 | 70 |
|  |  | **2/1/-** |  |  | **Total :** | **5** | **0** | **10** | **10** | **90** | **210** |

Note: All End Examinations (Theory and Practical) are of Three hours duration.

**T – Tutorial L - Theory P/D – Practical/Drawing**

**C - Credits Int. - Internal Exam Ext. - External Exam**

HS- Humanities and Social Sciences K/ S /V - Knowledge Course/ Skill Based Course/ Value Added Course

BS- Basic Science courses CIE - Continuous Internal Evaluation

ES- Engineering Science courses SEE - Semester End Evaluation

PC- Professional core courses L - Theory

PE- Professional Elective courses T – Tutorial

OE- Open Electives P/D – Practical/Drawing

PS- Project work, seminar and internship C - Credits

MC- Mandatory Courses

\* a) Orientation Course for B. Tech I year I semester Students take place for 3 weeks duration covering the first Two Units

b) Orientation Course for B. Tech I year II semester Students take place for covering the remaining Four Units (Units III, IV, V, and VI).

##### Professional Electives

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Professional Elective Streams** | **Professional Elective (PE)** | | | | | | | | | |
| **Code** | **PE– I (3-1)** | **Code** | **PE – II (3-2)** | **Code** | **PE – III (4-1)** | **Code** | **PE – IV  (4-1)** | **Code** | **PE – V  (4-2)** |
| **Network Security (CSE Board)** | 8EC11 | Semantic Web & Social Networks | 8EC12 | Advanced Computer Networks | 8JC04 | Web and Database Security | 8EC22 | Digital Forensics | 8JC06 | Cloud Security |
| **Software Engineering (IT Board)** | 8FC12 | Software Architecture and Design Patterns | 8FC13 | Software Project Management | 8FC14 | Software Requirements and Estimation | 8F711 | Software Automation and Testing | 8FC16 | Advanced Software Engineering |
| **Data Science (CSE Board)** | **8JC03** | Information Retrieval Systems | 8EC19 | Business Intelligence | 8EC18 | Big Data Analytics | **8JC05** | Scripting Languages |  | Exploratory Data Analysis |
| **Advanced Technologies (IT board)** | 8FC17 / 8EC20 | Computer Graphics/ Cloud Computing | 8FC18 | Image Processing | 8FC19 | Computer Vision | 8F710 | Linux Programming | 8EC45 | Introduction to Internet of Things |

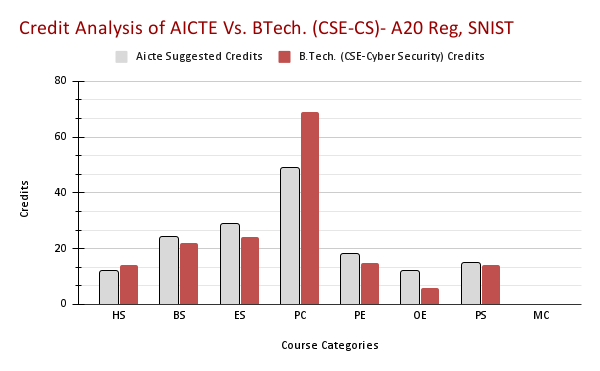
##### Open Electives

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Open Elective Streams** | **Open Elective (OE)** | | | | | |
| **Code** | **OE – I (3-1)** | **Code** | **OE – II (3-2)** | **Code** | **OE – III (4-2)** |
| **Entrepreneurship Stream** | 8ZC22 | Basics of Entrepreneurship | 8ZC23 | Advanced Entrepreneur ship | 8ZC24 | Product and Services |
| **Social Sciences Stream** | 8ZC25 | Basics of Indian Economy | 8ZC26 | Basics of Polity and Ecology | 8ZC27 | Indian History, Culture and Geography. |
| **Finance Stream** | 8ZC05 | Banking Operations, Insurance and Risk Management | 8ZC19 | Entrepreneur ship Project Management and Structured Finance | 8ZC15 | Financial Institutions, Markets and Services |
| **Mechanical** | 8BC51 | Introduction to Additive Manufacturing  Process | 8BC53 | Principles of Operations Research | 8BC52 | Principals of Automation and Robotics |
| **Electrical** | 8AC46 | Control System Engineering | 8AC44 | Fundamentals of Measurements and Instrumentation | 8AC45 | Fundamentals of Renewable Energy Sources |
| **Electronics** | 8DC52 | Embedded Systems | 8DC53 | Introduction To VLSI  Design | 8CC44 | Electronics Circuit Design and Analysis |
| **Innovation and Design Thinking** | 8ZC08 | Design Literacy and Design Thinking | 8ZC09 | Co-Creation and Product Design | 8ZC10 | Entrepreneurs hip & Business Design |

**CREDIT ANALYSIS-**

**AICTE VS.B.Tech(CSE)-SNIST - A20 REGULATION**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **s.no** | **category** | | **AICTE Suggested Breakup of Credits(Total 159) In UG Program in B.Tech. (CSE)** | **A20- B.Tech.(CSE-CS),  SNIST** |
| **1** | **Humanities and Social Sciences including Management courses** | **HS** | **12** | **14** |
| **2** | **Basic Science courses** | **BS** | **24** | **22** |
| **3** | **Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc** | **ES** | **29** | **24** |
| **4** | **Professional core courses** | **PC** | **49** | **69** |
| **5** | **Professional Elective courses relevant to chosen specialization/branch** | **PE** | **18** | **15** |
| **6** | **Open subjects – Electives from other technical and /or emerging subjects** | **OE** | **12** | **6** |
| **7** | **Project work, seminar and internship in industry or elsewhere** | **PS** | **15** | **14** |
| **8** | **Mandatory Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian traditional knowledge** | **MC** | **(non credit)** | **0** |
|  | **TOTAL** |  | **159** | **164** |



**Service Courses**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PC | S | CSE-CS | 8JC65 | Cyber Security and Machine Learning Lab | 0 | 0 | 2 | 1 | 30 | 70 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **H** |  |  |  | **M** | **L** | **L** |  |  |  | **M** | **M** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year I semester**

**B.Tech. (CSE) - Cyber Security**

### Basics of Entrepreneurship

**(Open Elective –I)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **L** | | **T** | **P** | **C** |
| **2** | **0** | | **0** | **2** |

**Code: 8ZC22**

**Prerequisite:** Economics, Accountancy and Management Science

**COURSE OBJECTIVES:**

The objective of the course is to make students understand the nature of Entrepreneurship, and its importance to business to the engineering students, which will allow them to get the required intuition and interest in starting their own start-up’s

**COURSE OUTCOMES:**

At the end of this course, the students will be able to

1. The students will acquire basic knowledge on Skills of Entrepreneurship.
2. The students will understand the techniques of selecting the customers through the process of customer segmentation and Targeting
3. Business Models and their validity are understood by the students.
4. The basic cost structure, Revenue Streams and the pricing strategies are understood by the students.
5. The students will acquire knowledge about the project management and its techniques.
6. The students get exposure on marketing strategies and business regulations for the Start up.

**Unit – I: Introduction to Entrepreneurship & Self Discovery: -** Define Entrepreneurship, Entrepreneurship as a Career option, Find your Flow, Stock of Your Means, Characteristics, Qualities and Skills of Entrepreneurship, Effectuation, Principles of Effectuation, Life as an Entrepreneur, Stories of Successful Entrepreneurs.

**Unit – II: Opportunity & Customer Analysis: -** Identify your Entrepreneurial Style, Methods of finding and understanding Customer Problems, Run Problem Interview, Process of Design Thinking, Identify Potential Problems worth Solving, Customer Segmentation, Niche Marketing and Targeting, Craft your Values Proportions, Customer-driven Innovation.

**Unit – III: Business Model & Validation: -** Introduction to Business Models, Lean approach to Business Model Canvas, Blue and Red Ocean Strategies, the Problem-Solution Fit, Build your Solution Demo, Solution Interview Method, Identify Minimum Viable Product (MVP), Product-Market fit test.

**Unit – IV: Economics & Financial Analysis: -** Revenue Analysis, Identify different Revenue Streams and Costs Analysis – Startup Cost, Fixed Cost and Variable Cost, Break Even Analysis, Profit Analysis, Introduction to Pricing, different Pricing Strategies, Sources of Finance, Bootstrapping and Initial Financing, Practice pitching to Investors and Corporate.

**Unit – V: Team Building & Project Management: -** Leadership Styles, Shared Leadership Model, Team Building in Venture, Roles and Responsibilities of team in venture, Explore collaboration tools and techniques, Brainstorming, Introduction to Project Management, Project Life Cycle, Create a Project Plan.

**Unit – VI: Marketing & Business Regulations: -** Positioning, Positioning Strategies, Branding, Branding Strategies, Selecting and Measuring Channels , Customer Acquisition, Selling Process, Selling Skills, Sales Plans. Business regulations – List of Required Registrations, Compliance Check List, Business Structures and Legal Entities.

**References:**

1. Robert D Hisrich, Michael P Peters, Dean A Shepherd, Entrepreneurship, Sixth Edition, New Delhi, 2006.
2. Thomas W. Zimmerer, Norman M. Scarborough, Essentials of Entrepreneurship And Small Business Management, Fourth Edition, Pearson, New Delhi, 2006
3. Alfred E. Osborne, Entrepreneur’s Toolkit, Harvard Business Essentials, HBS Press, USA, 2005.
4. MadhurimaLall, ShikhaSahai, Entrepreneurship, Excel Books, First Edition, New Delhi, 2006.
5. S.S. Khanka, Entrepreneurial Development, S. Chand and Company Limited, New Delhi, 2007.
6. H. Nandan, Fundamentals of Entrepreneurship, Prentice Hall of India, First Edition, New Delhi, 2007.
7. S.R. Bhowmik, M. Bhowmik, Entrepreneurship-A tool for Economic Growth   And A   
   key to Business Success, New Age International Publishers, First Edition,  (formerly   
   Wiley Eastern Limited), New Delhi, 2007.
8. https://www.wfglobal.org/
9. <https://www.learnwise.org/#/IN/en/home/login>,

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  |  |  |  |  | **M** | **L** | **L** |  |  | **L** | **L** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year I semester**

**B.Tech. (CSE) - Cyber Security**

### Basics of Indian Economy

**(Open Elective –I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

**Code: 8ZC25**

**Prerequisite: NIL**

**COURSE OBJECTIVES :**

To provide basic knowledge relating to the Indian Economy thus making the students aware of the current aspects taking place in the Indian and world economy.

**COURSE OUTCOMES :**

At the end of this course, the students will be able to

1. Gain knowledge relating to Economics, various sectors and its growth
2. Will gain knowledge relating to various concepts of National income and related aggregates
3. Students will learn about Indian Industrial policy and benefits of LPG to India
4. Comprehend knowledge relating to Fiscal policy & Taxation system in India
5. Learn about inflation & business cycles.
6. Know about the BoP and its influence on economy.

**Unit 1:Introduction to Economics**: Definition, Economics and economy, back ground of economy, sectors of the economy, types of economy, growth of economy, primary moving force of Economic growth in India, mixed economy.

**Unit 2: National Income and related aggregates:** Aggregates related to National Income: Gross National Product (GNP), Net National Product (NNP), Gross and Net Domestic Product (GDP and NDP) - at market price, at factor cost; National Disposable Income (gross and net), Private Income, Personal Income and Personal Disposable Income; Real and Nominal GDP.

**Unit 3: Industrial policy & Liberalization of Economy:** Industrial policy in India, its objectives, Review of Industrial policies up to 1986, Industrial policy 1991 - causes of its implementation, benefits of Liberalization, privatization & Globalization to the Indian economy.

**Unit 4: Fiscal policy & Taxation system:** Fiscal policy- Definition, objectives, importance, setbacks, recent fiscal policy of India, Reforms to strengthen the fiscal policy in India. Taxation system in India, methods of taxation, a good tax system, VAT, GST, Reforms in taxation.

**Unit 5: Inflation & Business Cycles**: Inflation – Definition, types, effects of inflation on various segments of the population and sectors of the economy, measures to control inflation, Business cycles: Introduction, Depression, Recovery, Boom, and Recession.

**Unit 6: Balance of Payments:** Balance of payments account - meaning and components; balance of payments deficit-meaning. Foreign exchange rate - meaning of fixed and flexible rates and managed floating. Determination of exchange rate in a free market

**Reference Books:**

1. Indian Economy, Datt& Mahajan, 70th Edition, Sultan Chand publishers.
2. Indian Economy, Misra&Puri, 33rd Edition, Himalaya publishing house.
3. Latest Budget document by Ministry of Finance
4. Latest Economic survey
5. 12th Five year plan
6. News articles in The Hindu, The Business Line

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  |  |  |  |  | **M** | **M** | **L** | **M** |  | **M** | **L** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year I semester**

**B.Tech. (CSE) - Cyber Security**

### Banking Operations, Insurance and Risk Management

**(Open Elective –I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

**Code: 8ZC05**

**Prerequisite: NIL**

**COURSE OBJECTIVES :**

To make the students understand the concepts and principles of Indian Banking Business, Insurance Business and Capital market business products and services, which facilitate them to understand the nature of market.

**COURSE OUTCOMES :**

At the end of this course, the students will be able to

1. Describe the new dimensions and products served by the banking system in INDIA.
2. Explain the credit control system and create awareness on NPA’s
3. Apply the knowledge of Insurance concepts in real life scenarios
4. Recognize the importance of regulatory and legal frame work of IRDA
5. Identify the risk management process and methods.
6. Calculate the diversity of risk and return

**Unit 1 INTRODUCTION TO BANKING BUSINESS:** Introduction to financial services - History of banking business in India, Structure of Indian banking system: Types of accounts, advances and deposits in a bank. KYC norms, New Dimensions and products- E-Banking: Mobile-Banking, Net Banking, Digital Banking, Negotiable Instruments: Cheque system.

**Unit 2 BANKING SYSTEMS AND ITS REGULATION: Banking Systems:** Branch Banking, Unit Banking, Correspondent Banking, Group Banking, Deposit Banking, Mixed Banking and Investment Banking - Banking Sector Reforms with special reference to Prudential Norms, Capital Adequacy Norms, Classification of Assets and NPA’s, Functions of RBI, Role of RBI in regulating Indian Banking. Banking Ombudsman scheme.

**Unit 3 INTRODUCTION TO INSURANCE:** Introduction to insurance, Need and importance of Insurance, principles of Insurance, characteristics of insurance contract, branches of insurance and types of insurance: Life insurance and its products, General Insurance and its variants.

**Unit 4 INSURANCE BUSINESS ENVIRONMENT:** Procedure for issuing an insurance policy –Nomination - Surrender Value - Policy Loans – Assignment - Revivals and Claim Settlement; Insurance as a tax mitigation tool, Role of IRDA in Insurance Regulation.

**Unit 5 FINANCIAL MARKETS AND RISK MANAGEMENT:** Introduction to Financial Markets: Money Market – Capital market; Introduction to Risk Management, meaning and classification of risks, Risk management process, Risk Management Approaches and Techniques.

**Unit 6 DERIVATIVES AS A RISK MANAGEMENT TOOL:** Introduction to Financial Derivatives, Advantages of Derivatives - types of Derivative Contracts - Forwards, Futures, Options and Swaps - Differences among Forwards, Futures and Option Contracts.

**Reference Books:**

1. Varshney, P.N., Banking Law and Practice, Sultan Chand & Sons, New Delhi.
2. General Principles of Insurance Harding and Evantly
3. Mark S. Dorfman: Risk Management and Insurance, Pearson, 2009.
4. Scott E. Harringam Gregory R. Nichanus: Risk Management & Insurance, TMH, 2009.
5. Geroge E. Rejda: Principles of risk Management & Insurance, 9/e, pearson Education. 2009.
6. G. Koteshwar: Risk Management Insurance and Derivatives, Himalaya, 2008.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **H** |  |  | **M** | **L** |  |  |  |  |  |  |  |

H:High,M:Medium, L:LowCorrelation

**Syllabus for B. Tech. III Year I semester**

**B.Tech. (CSE) - Cyber Security**

**INTRODUCTION TO ADDITIVE MANUFACTURING PROCESS**

**(Open Elective–I)**

**Code:8BC51**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

**Prerequisite: NIL**

**COURSE OBJECTIVES:**

ToteachstudentsthefundamentalconceptsofAdditiveManufacturing,techniques involved and their advantages and limitations and various applications of these technologies in relevant fields such as mechanical, Bio-medical, Aerospace, electronics etc.

**COURSE OUTCOMES:**

1. Understand the Additive manufacturing processes and their relationship with subtractive manufacturing.
2. Demonstrate comprehensive knowledge of the broad range of liquid based rapid prototype processes, devices, capabilities and materials that are available.
3. Apply the principles of casting in Additive manufacturing processes
4. ArticulatethevarioustradeoffsofAdditivemanufacturingsoftware’s/dataformatthatmustbe made in selecting advanced/additive manufacturing processes, devices and materials to suit particular product requirements.
5. Learn various applications of additive manufacturing, such as in architecture art, health care direct part production and mass customization.

**UNIT-I**

**Introduction:**

Development of AM, Fundamentals of AM, Classification of AMS, Advantages, Standard son AM, Commonly used terms, AM process chain

**UNIT-II Liquid-based Additive manufacturing Systems:** Stereo lithography Apparatus(SLA), process, working principle, photopolymers, photo polymerization, Layering technology, laser and laser scanning, Applications, Advantages and Disadvantages, 3D bio printing **Solid-based Additive manufacturing Systems:**, Laminated Object Manufacturing (LOM):process, working principle, Applications, Advantages and Disadvantages, Fused Deposition Modeling (FDM):working principle, Applications, Advantages and Disadvantages

**UNIT-III**

**Powder Based Additive manufacturing Systems**: Selective laser sintering (SLS): working principle, Applications, Advantages and Disadvantages, Color Jet printing, working principle, Applications, Advantages and Disadvantages, **Build time calculations –**SLA, FDM**,** Problems

**UNIT-IV**

**Additive manufacturing Data Formats:** STL Format, STL File Problems, Consequence of Building Valid and Invalid Tessellated Models, STL file Repairs: Generic Solution, Features of various AM software’s like Magics, Mimics, Solid View, View Expert, 3DView,Velocity2, Rhino, STL View 3 Data Expert and 3 D doctor. **Design for AM** – Basic Principles and Practices

**UNIT-V**

**Rapid Tooling:** Introduction to Rapid Tooling (RT), Conventional Tooling Vs RT, Need forRT. Rapid Tooling Classification, Spray Metal Deposition, Silicone rubber molds, Casting-S and Casting, Investment Casting, evaporative Casting

**Reverse engineering**–what is RE, Why useRE, RE Generic process, Overview of RE-SoftwareandHardware,CMMs-applications and types

**UNIT-VI**

**Applications and examples:** Application-Material Relationship, Application in Design, Application in Engineering, Analysis and Planning, Aerospace Industry, Automotive Industry, Jewellery Industry, Coin Industry, Arts and Architecture. Medical and Bioengineering Applications: Planning and simulation of complex surgery, Customized Implants and Prosthesis, Design and Production of Medical Devices, Bionic ear, dentistry

**TextBooks:**

1. Chua C.K., LeongK.F. and LIMC.S ,Rapid prototyping; Principles and Applications, World Scientific Publications , Third Edition, 2010.
2. Reverse Engineering: An Industrial Perspective, Springer- Verlag, 2008. ISBN: 978-1-84628-855-5
3. Ian Gibson · David Rosen, Brent Stucker, Additive Manufacturing Technologies 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing, Springer

Paul F.Jacobs, Rapid Prototyping and Manufacturing ASME Press,1996.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **H** | **H** |  |  |  |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year I semester**

**B.Tech. (CSE) - Cyber Security**

### Control System Engineering

**(Open Elective –I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

**Code: 8AC46**

**Prerequisite: NIL**

**COURSE OBJECTIVES :**

Study the principles of system modeling, system analysis and feedback control and use them to design and evaluate feedback control systems with desired performance;

**COURSE OUTCOMES :**

At the end of this course, the students will be able to

1. Understand basic concepts of control systems.
2. Study about time response analysis.
3. Understand basic concepts of stability and root locus method.
4. Study about frequency response analysis.
5. Learn basic concepts stability analysis in frequency domain.
6. Outline fundamentals of state space analysis.

**UNIT – I INTRODUCTION:** Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions – Translational and Rotational mechanical systems

**Transfer function representation:** Transfer Function of Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using Mason’s gain formula.

**UNIT-II TIME RESPONSE ANALYSIS:** Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems, PID controllers.

**UNIT – III STABILITY ANALYSIS IN S-DOMAIN:** The concept of stability – Routh’s stability criterion – qualitative stability and conditional stability – limitations of Routh’s stability.

**Root Locus Technique:** The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

**UNIT – IV FREQUENCY RESPONSE ANALYSIS:** Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

**UNIT – V STABILITY ANALYSIS IN FREQUENCY DOMAIN:** Polar Plots-Nyquist Plots-Stability Analysis.

**CLASSICAL CONTROL DESIGN TECHNIQUES:** Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain.

**UNIT – VI STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS:** Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and its Properties.

**TEXT BOOKS:**

1. Automatic Control Systems 8th edition –B. C. Kuo 2003– John wiley and sons.
2. Control Systems Engineering – I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.

**REFERENCES:**

1. Modern Control Engineering – Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

2. Control Systems – N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.

3. Control Systems Engg. – NISE 3rd Edition – John wiley.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** |  |  | **L** |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year I semester**

**B.Tech. (CSE) - Cyber Security**

### Embedded Systems

**(Open Elective –I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

**Code: 8DC52**

**Prerequisite: Computer Organisation**

**COURSE OBJECTIVES :**

The constraints and challenges of an Embedded System design The 8051 Architecture, Assembly Language Programming , Interfacing and Interrupt handling mechanism Modern Embedded System Design case studies

**COURSE OUTCOMES :**

At the end of this course, the students will be able to

1. Classify embedded systems and their applications
2. Write ALP for 8051 architecture
3. Implement interfaces for Embedded System using various protocols and hardware modules.
4. Understand the principles of Communication Interface, Wireless and Mobile Systems Protocols
5. Design the interrupt routines for variois OS concepts and Memory Management techniques in an RTOS Environment
6. Recognize the issues and design of basic Real-Time Operating System principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations.

**UNIT – I: Introduction to Embedded Systems:** Embedded Systems, Comparing Embedded and General Computing, Complex System Design and Processors, Classification of Embedded Systems, Embedded System Design Process, Formalization of System Design, Embedded SOC and VLSI Circuit Technology, Application examples of Embedded Systems.

**UNIT – II: 8051 Architecture, Memory Organization and Programming:** 8051 Architecture, features, Addressing modes, Instruction set, Input/output Ports and Circuits, External Memory, Counter and Timers, Serial data, Input/Output, Interrupts; The Assembly Language programming Process, Programming the 8051, Data Transfer and Logical Instructions. Arithmetic Operations, Decimal Arithmetic.Jump and Call Instructions, use of C programming for 8051.

**UNIT – III: 8051 Real World Interfacing:** Part A - Real World Interfacing, Performance metrics, Memory map, Processor and Memory selection, Part B - IO Subsystem, Sensors and Actuators, LED and LCD Interfacing, Keyboard Interfacing, Stepper Motor Interfacing, DC motor Interfacing Using PWM

**UNIT – IV: Embedded Communication Interface:** Serial and Parallel Communication, Timer and Counting Devices, Watchdog Timer, Real Time Clock, I2C, SPI protocol, ISA , PCI, Internet Enabled Systems, Wireless and Mobile Systems Protocols

**UNIT – V: Introduction to Real - Time Operating Systems:** Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment. (Chapter 6 and 7 from Text Book 3, SImon).

**UNIT – VI: Basic Design Using a Real-Time Operating System**: Principles, Semaphores and Queues, Hard Real-Tjme Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); **Embedded Software Development Tools**: Host and Target machines, Linker! Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging **Techniques:** Testing on Host Machine, Using Laboratory Tools, An Example System. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

**TEXT BOOKS:**

1. Embedded Systems- Architecture, Programming and Design 2E, Raj Kamal, TMH
2. Introduction to Embedded Systems, K.Shibu, Tata McGraw-Hill
3. The 8051 Microcontroller and Embedded Systems Using Assembly and C – Mazidi, Pearson Education India, 2nd edition, 2008.
4. An Embedded Software Primer, David E. Simon, Pearson Education

**REFERENCES:**

1. An Embedded Software Primer, David E. Simon, Pearson Education.
2. Computers and Components: principles of embedded computing system design, Wayne Wolf, Elsevier.
3. 8051 Application Notes by Atmel.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  |  | **M** |  |  | **L** | **L** |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year I semester**

**B.Tech. (CSE) - Cyber Security**

### Design Literacy and Design Thinking

**(Open Elective –I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

**Code: 8ZC08**

**Prerequisite: NIL**

**Course Objective:**

The objective of the course is to make students understand the fundamental concepts of design thinking, and to familiarize with product design process and to motivate the students to ideate new products and services.

**Course Outcomes:**

At the end of this course, the students will be able to

1. Gain the knowledge on the inputs required for design thinking and also gain familiarity on concepts related to design thinking.
2. Understand the techniques of idea generation
3. Classify different phases of design thinking
4. Realize the product design process.
5. Understand design thinking for service design.
6. Gain knowledge on various cases related to design thinking.

**Unit – I: Design Thinking –** Introduction to Design thinking, Principles of design thinking, Benefits of design thinking, Applications of Design thinking, Social Innovation, Impact of Design thinking, Design thinking tools and techniques. Innovation and Design thinking.

**Unit – II: Idea Generation**: New Idea generation methods - Principles of Idea Generation, Techniques, Creativity thinking techniques and tools, types of creative thinking, select ideas from ideation methods.

**Unit – III: Design Thinking Foundations:** The Design Double Diamond: Discover-Define-Develop-Deliver, User-centric design approaches: Importance of user-centricity for design, Empathisation, Empathy Maps, Data collection from users and for users, Data Validation Responsible Innovation and Ethical Design:

**Unit – IV: Product Design Process**: Identification of opportunities, Problem Statement, Product planning, Characteristics of Successful product Development, New product development process, Stanford design thinking iterative model

**Unit – V:Design Thinking for Service Design:** Attributes of a good service design, service design tools – blueprint, customer journey mapping Identifying the user needs in a service-driven economy; Process Flows and Customer Experience considerations for designing and improving services; 5 Why‟s; Service Delivery Pathways

**Unit – VI: Case Studies on Design thinking:** Case 1: Arcturus IV by John E.Arnold, Case – 2: How can we make AI to make things better for humans. Case – 3: User Centered Helmet Design by Prof. B.K. Chakravarthy- Part 1 and Part 2; Case – 4: Challenges of Reaching a Million Users by Prof. Chetan Solanki and Prof Jayendran V.

**Text Books:**

1. Brown, T. (2008). Design thinking. *Harvard business review*, *86*(6), 84.
2. “Innovation by Design", Gerald H. (Gus) Gaynor, AMACOM {American Management Association), NYC, 2002
3. Ansell, C., &Torfing, J. (2014). Collaboration and design: new tools for public innovation. In *Public innovation through collaboration and design* (pp. 19-36). Routledge.
4. Lewrick, M., & Link, P. (2015). Design thinking tools: Early insights accelerate marketers’ success. *Marketing Review St. Gallen*, *32*(1), 40-51.

**References Books:**

1. Mæhlum, A. R. (2017). *Extending the TILES Toolkit-from Ideation to Prototyping* (Master's thesis, NTNU).
2. Norman, D. (2013). *The design of everyday things: Revised and expanded edition*. Basic books.
3. Design Thinking – A primer,Prof: Dr. BalaRamadurai, Indian Institute of Technology, Madras.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **L** | **L** |  | **M** |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year I semester**

**B.Tech. (CSE) - Cyber Security**

### Semantic Web & Social Networks

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**(Professional Elective –I)**

**Code: 8EC11**

**Prerequisite: Nil**

**Course Objectives:**

Understand Web Intelligence and Ontology. Learn basics of Semantic web, its representation issues and Social Network Analysis.

**Course Outcomes**: At the end of this course the student will be able to

1. Appraise the role of the Web, its need and Intelligence.
2. Outline the concepts of Machine Intelligence Ontology, Inference engines, Software Agents, Berners-Lee www and Semantic Road Map.
3. Conceptualize Knowledge Representation for the Semantic Web with Resource Description Framework (RDF) / RDF Schema, Ontology Web Language (OWL), UML and XML Schema.
4. Apply Ontology Engineering using Ontology Development Tools/ Methods, Ontology Libraries, Ontology Mapping, Logic and Inference Engines.
5. Illustrate Semantic Web Applications, Services and Technology.
6. Apply Social Network Analysis, Semantic web networks analysis and describe Building of Semantic Web Applications with social network features.

**UNIT I Web Intelligence:** Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today’s Web, The Next Generation Web

**UNIT II Machine Intelligence:** Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

**UNIT III Knowledge Representation for the Semantic Web:** Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework (RDF) / RDF Schema, Ontology Web Language (OWL), UML, XML/XML Schema.

**UNIT IV Ontology Engineering:** Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

**UNIT V Semantic Web Applications, Services and Technology:** Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

**UNIT VI Social Network Analysis and Semantic web:** Development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks, Building Semantic Web Applications with social network features.

**TEXT BOOKS:**

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

**REFERENCES:**

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, RudiStuder, PaulWarren,JohnWiley&Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers (Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T. Segaran, C. Evans, J. Taylor, O’Reilly, SPD.
5. A Semantic Web Primer, G. Antoniou and V. Harmelen, PHI.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **H** | **M** | **M** | **H** | **H** | **H** | **M** | **M** | **H** | **L** | **H** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year I semester**

**B.Tech. (CSE) - Cyber Security**

### Software Architecture and Design Patterns

**(Professional Elective –I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8FC12**

**Prerequisite:** Software Engineering and OOAD

**Course Objectives:**

The main objective is to introduce the student to architecture of software and design Patterns. Upon completion of this course the student will get an idea on envisioning architecture, creating architecture, analyzing architecture.

1. Understand the creational and structural patterns.
2. Be capable of applying his knowledge to create an architecture for given application.
3. Be able to explain the role of analyzing architectures.
4. Be able to identify different structural patterns.

**Course Outcomes:**

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

1. Explain Architecture Business Cycle, Architectural patterns, reference models, reference architectures, and architecture structures.
2. Describe architecture, Quality Attributes, styles, patterns and design of Architecture along with the Documentation of architecture.
3. Discuss Software Architecture evaluation, Architecture design decision making, SAAM, ATAM and CBAM. And plan software architecture in future.
4. Plan and use Creational patterns and Structural patterns application development.
5. Solving problems usingInduction learning, Decision Tree, Statistical learning methods, learning with hidden variables, EM algorithm, Instance based learning and Neural Networks.
6. Explain Behavioral patterns using Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template method and Visitor.

**UNIT I**

**Envisioning Architecture**

The Architecture Business Cycle, What is Software Architecture? , Architectural patterns, reference models, reference architectures, architecture structures and views.

**UNIT II**

**Creating an Architecture**

Quality Attributes, Architectural styles and patterns, designing the Architecture, Documenting the architecture, Reconstructing Software Architecture.

**UNIT III**

**Analyzing Software Architecture**

Architecture evaluation, SAAM, ATAM, CBAM.

**Moving from Architecture to Systems**

Software Product Lines, Building systems from off the shelf components, Software architecture in future.

**UNIT IV**

**Design Patterns**

What is pattern ? Pattern Description, Organizing catalogs, Role in solving problems, Selection, usage.

**UNIT V**

**Creational patterns**: Abstract factory, Builder, Factory method, prototype, singleton.

**Structural patterns:** Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy.

**UNIT VI**

**Behavioral patterns:** Chain of responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template method, Visitor.

**Case Studies**

The World Wide Web - a case study in interoperability, Flight Simulation- A Case Study in an Architecture for Integrability.

**Text Books:**

1 Software Architecture in Practice, 2nd Edition by Len Bass, Paul Clements, Rick Kazman, published by Pearson Edition

2. Design Patterns, by Erich Gamma, Pearson Education

**ReferenceS:**

1. Beyond Software Architecture, Luke Hohmann, Addison Wesley, 2003.
2. Software Architecture, David M Dikel, David kane and James R Wilson, Prentice Hall PTR, 2001.
3. Pattern Oriented Software Architecture, F Buschmann&others, John Wiley&Sons.
4. Head First Design patterns, Erec Freeman & Elisabeth Freeman, O’REILLY, 2007.
5. Design pattern in java, Steven John Metsker&William C. Wake, Pearson Education, 2006.
6. Design patterns in C#, Steven John Metsker, Pearson Education, 2004.
7. J2EE Pattens, Deepak Alur, John Crupi&DanMalks, Pearson Education, 2003.
8. Software Design, David Budgen, Second edition, Pearson Education, 2003.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  |  |  |  |  |  |  |  |  |  |  |  |

**Syllabus for B. Tech. III Year I semester**

**B.Tech. (CSE) - Cyber Security**

### Information Retrieval Systems

**(Professional Elective –I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8JC03**

**Prerequisite(s) :** Software Engineering and OOAD

**Course Objectives**

* + - 1. To learn the important concepts and algorithms in IRS
      2. To understand the data / file structures that are necessary to design, and implement information retrieval (IR) systems.

**Course Outcomes:** At the end of this course, a student is able to

1. Apply IR principles to locate relevant information large collections of data
2. Design different document clustering algorithms
3. Implement retrieval systems for web search tasks.
4. Design an Information Retrieval System for web search tasks.

**Unit-I Introduction to Information Retrieval Systems:**

Definition of Information Retrieval System, Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses

**Unit-II** **Information Retrieval System Capabilities:**

Search Capabilities, Browse Capabilities, Miscellaneous Capabilities

**Cataloging and Indexing:**

History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction

**Unit III: Data Structure:**

Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models

**Unit IV: Automatic Indexing:**

Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages

**Document and Term Clustering:**

Introduction to Clustering, Thesaurus Generation, Item Clustering, Hierarchy of Clusters

**Unit V: User Search Techniques:**

Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the INTERNET and Hypertext

**Information Visualization:**

Introduction to Information Visualization, Cognition and Perception, Information Visualization Technologies

**Unit VI: Text Search Algorithms:**

Introduction to Text Search Techniques, Software Text Search Algorithms, Hardware Text Search Systems

**Multimedia Information Retrieval:**

Spoken Language Audio Retrieval, Non-Speech Audio Retrieval, Graph Retrieval, Imagery Retrieval, Video Retrieval

**TEXT BOOK**

1. Information Storage and Retrieval Systems – Theory and Implementation, Second Edition, Gerald J. Kowalski, Mark T. Maybury, Springer

**REFERENCES**

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.

2. Information Storage & Retrieval By Robert Korfhage – John Wiley & Sons.

3. Modern Information Retrieval By Yates and Neto Pearson Education.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** | **M** |  | **H** |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Computer Graphics

**(Professional Elective –I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code:** 8FC17

**Course Objectives:**

Various Input and Out Put devices and various Out Put Primitive Algorithms

Filled Area Primitive Algorithms and 2-D geometrical transformations

2-D Viewing and clipping Algorithms

3-D Object Representation and 3-D geometrical Transformations

3-D Viewing and visible surface detection methods

Computer Animation languages

**Course Outcomes:** At the end of this course, the student will be able to

1. Understand fundamental terms in Computer Graphics, various visible surface determination algorithms and midpoint and line segment analysis.
2. Explore 2D graphics and algorithms including: line drawing, polygon filling, clipping, and transformations.
3. Apply functions 2D viewing and apply clipping algorithms.
4. Understand the concepts and techniques used in 3D computer graphics, including viewing transformations, hierarchical modeling, color, lighting and texture mapping.
5. Apply single and multiple 3-D viewing techniques like viewing coordinates etc and also back-face detection, depth-buffer, and scan-line methods.
6. Analyze the animation production pipeline and Produce a short animation.

**Unit-1**

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices. Output primitives : Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms, Applications.

**Unit-2**

Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms 2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

**Unit- 3**

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm

**UNIT-4**

3-D Object Representation: Polygon surfaces, quadric surfaces, spline representation, Bezier curve and B-Spline curves, polygon rendering methods. 3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

**UNIT-5**

3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

**UNIT-6**

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications. (p.nos 604- 16 of text book -1, chapter 21 of text book-2).

**TEXT BOOKS:**

Text books:

1. “Computer Graphics C version”, Donald Hearn and M.Pauline Baker, Pearson Education.

2. “Computer Graphics Principles & practice”, second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

**REFERENCE BOOKS:**

1. “Computer Graphics”, second Edition, Donald Hearn and M.Pauline Baker, PHI/Pearson Education.

2. “Computer Graphics Second edition”, Zhigandxiang, Roy Plastock, Schaum’s outlines, Tata Mc- Graw hill edition.

3. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.

4. “Principles of Interactive Computer Graphics”, Neuman and Sproul, TMH.

5. Principles of Computer Graphics, ShaliniGovil, Pai, 2005, Springer.

6. Computer Graphics, Steven Harrington, TMH

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** | **L** | **H** | **M** | **M** |  |  |  |  | **H** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Cloud Computing

**(Professional Elective –I)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8EC20**

**Prerequisite: NIL**

**COURSE OBJECTIVES:**

Understand the basic characteristics of cloud computing and technologies that support to implement cloud computing. Analyze the basic cloud computing models that are used to implement cloud technology and available cloud resources in the market. Analyzing the security issues in cloud computing environment and understanding different case studies in cloud computing and IOT platform.

**COURSE OUTCOMES :**

At the end of this course, the students will be able to

1. Summarize the characteristics of cloud and differentiate the cloud service and deployment models.
2. Demonstrate the different kinds of cloud services.
3. Analyze different architectures for cloud applications, Create and run Amazon ec2 instance through python programs
4. Assess the performance of cloud services and summarize the innovative applications of IOT on cloud.
5. Design architecture of an Apps such as map reduce, image processing app etc on cloud.
6. Understand various security aspects in cloud.

**UNIT-1** Introduction to Cloud Computing : Introduction ,characteristics ,Cloud Models and examples ,Applications of Cloud Services .Cloud Concepts and Technologies .

**UNIT-2** Cloud Services and Platforms : Compute Services, Storage Services, Database Services, Application Services, Content Delivery Services, Analytics Services, Deployment and Management Services, Identity and Access Management Services, Open Source Private cloud Software.

**UNIT-3** Cloud Application Design: Design Considerations for Cloud Application, Reference Architectures for Cloud Applications .Cloud Application Design Methodologies , Data Storage Approaches. Python For Cloud: Python for Amazon Web Services, Map Reduce

**UNIT – 4 book 2.** Cloud and the Internet of Things:  Performance of Distributed Systems and the Cloud- Enabling Technologies for the Internet of Things- Innovative Applications of the Internet of Things- Online Social and Professional Networking

**UNIT-5** Cloud Application Development in Python: Design Approaches, Image Processing App, Document Storage App, Map Reduce App, Social Media Analytics App.

**UNIT-6** Cloud Security: Introduction, Cloud Security Architecture (CSA), Authentication, Authorization, Identity Access Management (IAM), Data Security, Key Management, Auditing.

Cloud for Industry, Healthcare and Education.

**TEXT BOOKS:**

1. Cloud Computing –A Hands on Approach ,Arshdeep,VijayMedisetti,University Press.

2. Distributed and Cloud Computing,1stEdition,From Parallel Processing to the Internet of Things,Authors: Kai Hwang Jack Dongarra Geoffrey Fox(Unit4)

3. Cloud Computing: Raj Kumar Buyya,JamesBroberg,AndrzejGOscinski,Wiley.

**REFERENCES:**

1. Cloud Computing: Dr.KumarSaurab Wiley India 2011 .

2. Code in the cloud computing: K Chandrasekharan CRC Press.

3. Cloud Compuitng: John W. Rittinghouse ,JamesRansome,CRC press.

4. Virtualization Security: Dave Shackleford2013,SYBEX a Willy Brand.

5. Cloud Computing and Software Service: Ahson, iiyas.2011.

6. Cloud Computing Bible: Sosinsky 2012 Wiley India.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** |  |  |  | **H** |  | **H** |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Information Security

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8FC06**

**Prerequisite:** Computer Networks, Data Structures

**Course Objectives:**

* + - 1. To learn the fundamental concepts of security attacks, security services.
      2. To apply conventional cryptographic techniques in order to do encryption.
      3. To apply Public key cryptography techniques in order to do encryption.
      4. To learn IP security Architecture and its role in security framework.
      5. To apply SSL and TLS for Web Security.To design and develop Intrusion Detection Systems and Firewall.

**Course Outcomes:**

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

1. Understand the fundamental concepts of Security Attacks and security standards with the model for network Security.
2. Review and analyze conventional cryptographic techniques and authentication
3. Review and analyze public cryptographic techniques and outline the concepts of Kerberos and email privacy
4. Recognize architecture, key management and header formats of Ipsec
5. Outline the various web security threats and protocols
6. Understand Intrusion Detection System and Design principles of Firewalls

**UNIT – I:** Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs.

**UNIT – II:** Conventional Encryption Principles, Conventional encryption algorithms: DES, TDES, AES, cipher block modes of operation, location of encryption devices, key distribution, Approaches of Message Authentication, Secure Hash Functions: SHA1 and HMAC.

**UNIT – III:** Public key cryptography principles, public key cryptography algorithms: RSA, DIFFIE HELL MAN, digital signatures, digital Certificates, Certificate Authority and key management

Kerberos, X.509 Directory Authentication Service. Email privacy: Pretty Good Privacy (PGP) and S/MIME.

**UNIT - IV**

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

**UNIT – V**

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Intruders, Viruses and related threats

**UNIT – VI:** Firewall Design principles, Trusted Systems. Intrusion Detection Systems.

**TEXT BOOKS:**

* 1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education, 4th Edition.
  2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn IdoDubrawsky, Steve W.Manzuik and Ryan Permeh, wileyDreamtech

**REFERENCE BOOKS:**

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)

2. Network Security - Private Communication in a Public World by Charlie

Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.

3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson

4. Principles of Information Security, Whitman, Thomson.

5. Network Security: The complete reference, Robert Bragg, Mark Rhodes,

TMH

6. Introduction to Cryptography, Buchmann, Springer.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **H** | **H** | **H** | **H** |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Web Technologies

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **2** | **1** | **0** | **3** |

**Code: 8EC07**

**Prerequisite:** Data Communications and Computer Networks, Object Oriented Programming through Java

**Course Objective:**

To understand the basics of Web Designing using HTML and CSS, perform the client-side scripting with JavaScript. Understand the different data stores XML, and JSON with full-stack web application development using Angular and study with Server-side programming using Java Servlets and PHP.

**Course Outcomes:**

At the end of this course the student will be able to

1. Demonstrate the use of HTML tags. Apply Styles using CSS and Bootstrap.
2. Develop dynamic programs using Javascript and Typescript.
3. Develop scripts using XML and validate using parsers and design a data-interchange format using JSON.
4. Comprehend the uses of Web servers and design the server-side scripts using Servlets
5. Design and develop server-side scripts and components using PHP.
6. Design responsive web applications with Forms, Scope, Dependency Injection & Services, and Single Page Application (SPA) of Angular.

**UNIT I: Client-Side Web Development. (Text Book 1)**

**HTML 4** - List, Tables, Images, Forms, Div. (with all attributes and sub-elements)

**Cascading Style sheets 3** - Types of CSS, Types of Selectors (Basic, Combinatory, Attribute, Pseudo-class, Pseudo Element)

**Bootstrap** : Introduction with example

**UNIT II:**

**JavaScript** - Introduction, variables, objects (Boolean, Number, String, Date, Math, Regular expression, Array), Function, Event handlers (mouse, keyboard, window), Using CSS with JavaScript.

**TypeScript** - Introduction, Simple and Special Types, Arrays, Tuples, Object Types, Enums, Aliases and Interfaces, Union Types, Functions, Casting, Classes, Basic Generics, Utility Types, Keyof, Null, Definitely Typed.

**UNIT III: Data Store**

**XML**: DTD, XML Schemas, Difference between DOM Parser and SAX Parser.

**JSON**: Introduction, JSON vs XML, Data Types, Parsing JSON, stringify(), Objects, Array, JSON HTML (Refer to Textbook: 1 and 5)

**UNIT IV: Web Hosting (Text Book 3)**

**Servlets**: Introduction to Servlets, Lifecycle of a Servlet, Servlet API: javax.servletPackage,Reading Servlet Context Parameters, Reading Initialization parameters, Request Dispatcher Handling HTTP Requests & Responses. Session Tracking.

**UNIT V: Server Scripting Language: PHP (Text Book 1)**

Declaring variables, data types, array, string, operators, Expression, control statement, function, Reading data from form controls like text boxes, radio buttons, lists, etc.

Handling file upload. Connecting to the database with CRUD operation (Mysql as reference), Handling sessions and cookies. File handling in PHP.

**UNIT VI: Application Development Using Angular: (Basics) (Text Book 2)**

Basics: MVC-The Angular way, Features of Angular, My First Angular app.

Expressions: Angular Expressions, Angular vs JavaScript.

Filters: Built-In Filters, Using Angular Filters, Creating Custom Filters.

Directives: Introduction to Directives, Directive Lifecycle, Binding controls to data, Matching directives, Using Angular built-in directives, creating a custom directive.

Controllers: Role of a Controller, Controllers & Modules, Attaching Properties and functions to scope, Nested Controllers, Using Filters in Controllers, Controllers in External Files

Modules: Introduction to Angular Modules, Bootstrapping Angular.

**TEXTBOOKS**:

1. Web Programming: Building Internet Applications, 3rd Edition, [Chris Bates](https://www.wiley.com/en-us/search?pq=%7Crelevance%7Cauthor%3AChris+Bates), Wiley Publications.
2. Angular - The Complete Guide [2021 Edition], Maximilian Schwarzmuller, Packt Publishing.
3. Head First Servlets and JSP, 2nd Edition by Kathy Sierra, Bryan Basham, Bert Bates, O'Reilly Media, Inc.

**REFERENCES**:

1. Building Web Applications with TypeScript, Angular and React, Sahil Malik, Ivo Gabe de Wolff, Gabriel Isenberg, Packt Publishing.
2. Web Technologies – Uttam Kumar Roy- Oxford University Press
3. Core SERVLETS AND JAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES, Marty Hall and Larry Brown Pearson
4. Internet and World Wide Web – How to program, Dietel and Nieto PHI/Pearson.
5. Murach’s Beginning JAVA JDK 5, Murach, SPD
6. Java Script, D.Flanagan, O’Reilly, SPD.
7. Complete Reference to PHP.
8. https://www.w3schools.com/
9. https://angular.io/
10. <https://www.php.net/>
11. <https://www.typescriptlang.org/>
12. <https://www.json.org/json-en.html>

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **H** | **H** | **M** | **M** |  |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Design and Analysis of Algorithms

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **2** | **1** | **0** | **3** |

**Code: 8FC05**

**Prerequisite:** Data Structures and C++

**Course Objectives:**

1. To provide a solid foundation in algorithm design and analysis**,** specifically, the student learning outcomes include: Basic knowledge of graph and matching algorithms.

2. Ability to understand and design algorithms using greedy strategy, divide and conquer approach, dynamic programming, backtracking and branch and bound.

**Course Outcomes:**

After completion of the course, the student will be able to

1. Analyze worst-case running times of algorithms using asymptotic analysis.
2. Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
3. Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
4. Comprehend the concept of dynamic programming algorithms, their applications and analyze them.
5. Analyze the Backtracking and Branch and Bound algorithms and also identify the scenarios for its applicability.
6. Comprehend the concept of P and NP Problems and its usage in the applications.

**UNIT I**

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.

Applications: Designing optimal solution with respect to time for a problem.

**UNIT II**

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen’s matrix multiplication.

Applications:PNR number Search, sorting the google search results.

**UNIT III**

Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

Applications: Allocation of funds/resources based on the priority in the computer systems.

**UNIT IV**

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales personproblem,Reliabilitydesign.  
Applications: Routing Algorithms in the computer networking

**UNIT V**

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring,Hamiltoniancycles.  
Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

Applications: Undo in MS-Word, Games

**UNIT VI**

Introduction to NP-Hard and NP-Complete problems: Basic concepts of non deterministic algorithms, Definitions of NP-Hard and NP-Complete classes, Modular Arithmetic.

Applications: Performance evaluation in the dynamic systems.

**TEXT BOOKS:**

1. Fundamentals of Computer Algorithms, Ellis Horowitz,SatrajSahni and Rajasekharam, Galgotia publications pvt. Ltd.

2. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, Johnwiley and sons.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  |  |  |  |  |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Fundamentals of Data Science

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **2** | **0** | **0** | **2** |

**Code: 8MC04**

**Prerequisite: NIL**

**Course Objective:**

To know the fundamental concepts of Data Science.To explore tools and practices for working with Data Science.To learn about Principle component analysis and understand about Predictive Analytics.

**Course Outcomes:** At the end of this course, the student will be able to

1. Learn about various data types, types of data sets a data quality
2. Implementation of R fundamentals and perform factors and data frames.
3. Implementation of data structures iterative programming & function concepts using R
4. Learn about data visualization techniques and apply suitable visualization techniques
5. Learn about dimensionality reduction based on examples illustrations
6. Perform predictive data analysis on variety of data along with appropriate statistical tests using R.

**UNIT-I**

**DATA TYPES & COLLECTION**

Types of Data: Attributes and Measurement, What is an Attribute?, The Type of an Attribute, The Different Types of Attributes, Describing Attributes by the Number of Values, Asymmetric Attributes, Binary Attribute (Pg.No:22-29, Text Book-1), Nominal Attributes, Binary Attributes, Ordinal Attributes, Numeric Attributes, Discrete versus Continuous Attributes (Pg. No. 39-44, Text-2), Types of Data Sets, General Characteristics of Data Sets, Record Data, Transaction or Market Basket Data, The Data Matrix, The Sparse Data Matrix, Graph Based Data, Graph- Based Data, Ordered Data. Handling Non-Record Data, Data Quality, Measurement and Data Collection Issues, Precision, Bias and Accuracy. (Pg. No. 29-39, Text-1)

**UNIT-II**

**Basics of R:** Introduction, R-Environment Setup, Programming with R, Basic Data Types, Vectors: Creating and Naming Vectors, Vector Arithmetic, Vector Sub setting, Matrices: Creating and Naming Matrices, Matrix Sub setting, Arrays, Class.

**Factors and Data Frames:** Introduction to Factors: Factor Levels, Summarizing a Factor, Ordered Factors, Comparing Ordered Factors, Introduction to Data Frame, Sub setting of Data Frames, Extending Data Frames, Sorting Data Frames. (Text Book-3)

**UNIT-III**

**Lists:** Introduction, Creating a List: Creating a Named List, Accessing List Elements, Manipulating List Elements, Merging Lists, Converting Lists to Vectors, Conditionals and

**Control Flow:** Relational Operators, Relational Operators and Vectors, Logical Operators, Logical Operators and Vectors, Conditional Statements.

**Iterative Programming in R:**Introduction, While Loop, For Loop, Looping Over List.

**Functions in R:** Introduction, Writing a Function in R, Nested Functions, Function Scoping, Recursion, Loading an R Package, Mathematical Functions in R.(Text Book -4)

**UNIT-IV:**

**DATA VISUALIZATION**

**Data Visualization**

Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations. (Pg. No. 56-64, Text-2)

**Charts and Graphs :** Introduction, Pie Chart: Chart Legend, Bar Chart, Box Plot, Histogram, Line Graph: Multiple Lines in Line Graph, Scatter Plot.(Text Book-4)

**UNIT-V:**

**DIMENSIONALITY REDUCTION**

Eigen values and Eigenvectors of Symmetric Matrices, Definitions, Computing Eigen values and Eigenvectors, The Matrix of Eigenvectors, Principal-Component Analysis, An Illustrative Example, Using Eigenvectors for Dimensionality Reduction, Singular-Value Decomposition, Definition of SVD, Interpretation of SVD, Dimensionality Reduction Using SVD (Pg. No.405-422, Text Book-3)

**UNIT VI**

**PREDICTIVE ANALYTICS**

**Data Interfaces:** Introduction, CSV Files: Syntax, Importing a CSV File

**Statistical Applications:** Introduction, Basic Statistical Operations, Linear Regression Analysis, Chi-Squared Goodness of Fit Test, Chi-Squared Test of Independence, Multiple Regression. (Text Book-4)

**TEXT BOOKS:**

1.Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Education Inc.

2. Han, Jiawei, Jian Pei, and Micheline Kamber, “Data mining: concepts and techniques”, 3 rd Edition, Elsevier, 2011.

3. Jure Leskovec, AnandRajaraman, Jeffrey D. Ullman, Mining of Massive Datasets, Cambridge University Press

4. K G Srinivas ,G M Siddesh “Statistical programming in R”, Oxford Publications.

**REFERENCE BOOKS:**

1. Brain S. Everitt, “A Handbook of Statistical Analysis Using R”, Second Edition, 4 LLC, 2014.

2. Dalgaard, Peter, “Introductory statistics with R”, Springer Science & Business Media, 2008.

3. Samir Madhavan, “Mastering Python for Data Science”, Packt, 2015.

4. Paul Teetor, “R Cookbook, O’Reilly, 2011.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  |  |  |  |  |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Environmental Science and Ecology

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **2** | **0** | **0** | **2** |

**Code: 8HC05**

**Prerequisite: NIL**

**Course Objectives:**

1. To understand structure and function of ecosystem
2. To learn classification and uses of natural resources
3. To learn about Understanding the impacts of developmental activities and mitigation

measures.

1. To know the source, causes and preventive methods of pollution
2. To understand the importance of ecological balance for sustainable development.
3. To understand the environmental policies and regulations

**Course Outcomes**

After completion of the course, the student will be able to:

1. Understand about ecosystem and energy flow among the organisms.
2. Know the resources available, use of them and overexploitation of the resources in the

nature.

1. Learn the value, use and value of biodiversity.
2. Understand the causes and effect of pollution and implement measures in control of

pollution.

1. Understand the sustainable development and implement green technology for

sustainable development.

1. Learn and implement policy to protect the environment.

**UNIT-I**

**Ecosystems**: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity.

**UNIT-II**

**Natural Resources**: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy source.

**UNIT-III**

**Biodiversity and Biotic Resources**: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation.

**UNIT-IV**

**Environmental Pollution and Control Technologies**: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants. Acid rain-Threshold limit values of chemicals present in environment, Global warming, Ozone layer depletion, Water pollution: Sources and types of pollution. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Sewage water Treatment, Kyoto protocol, and Montréal Protocol.

**UNIT-V**

**Sustainable development and Green Technology**: Concept of sustainable development, threats to sustainability population and its explosion, Crazy consumerism, over- exploitation of resources, strategies for achieving sustainable development environmental education, conservation of resources, urban sprawl sustainable cities and sustainable communities, human health , role of IT in Environment, Environmental Ethics, Environmental Economic – Concept of Green Building, Clean Development Mechanism ( CDM ).

**UNIT-VI**

**Environmental Policy, Legislation & Environment Impact Assessment**: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects.Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).

**TEXT BOOKS:**

1. Perspectives in Environmental Studies: Kaushik A. and Kaushik, C.P. New Age

International (P) Ltd. (2008)

**REFERENCE BOOKS:**

1. Environmental Studies by ErachBharucha, 2005 University Press.
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL

Learning Private Ltd. New Delhi.

1. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela.

2008 PHI Learning Pvt. Ltd.

1. Environmental Science by Daniel B. Botkin& Edward A. Keller, Wiley INDIA edition.
2. Environmental Studies by Anubha Kaushik, 4th Edition, New age international

publishers.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  | **M** | **H** | **M** | **H** |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Web Technologies and Information Security Lab

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **0** | **0** | **2** | **1** |

**Code: 8JC61**

**Prerequisite:** Introduction to Cyber Security, Programming Language and Data Structures

**Course Objectives**

1. Implement programs using HTML tags, Java scripts along with Event Handling. Implement scripts using XML, DOM parser, and SAX parser for project development.
2. Learn the fundamental of information security principles and services offered to secure the data.

**Course Outcomes:** After completion of the course, the student will be able to:

1. Design and implement dynamic webpages using HTML, Javascript, XML, servlets, and PHP.
2. Implement various cryptographic, hashing and key exchange techniques.

**Web Technologies Lab- List of Programs**

Week-1:

1. Create a web page with advanced layouts and positioning with CSS and HTML.
2. Create a web page through which the user can enter his / her details to become an authenticated user of that page.

Week-2:

1. Create a web page that shows different methods of embedding JavaScript with validation.
2. Create a simple calculator, which can perform the basic arithmetic operations.

Week-3:

1. Write an XML file which will display the Book information which includes the following: 1) Title of the book

2) Author Name

3) ISBN number

4) Publisher name

5) Edition

6) Price

1. Write a Document Type Definition (DTD) or XML Schema Definition (XSD) to validate the above XML file.

Week-4:

1. Prepare a JSON file with Student information and display the content in HTML Table format.

Week-5:

1. Write a servlet program to print welcome messages on the browser.
2. Develop a web application to pass the parameters from the HTML page and display them using servlet.
3. Develop a web application using servlet to perform Session Tracking with cookies (Files to developed- Html,Java, Web.xml)

Week-6:

1. Write a PHP to perform CURD operations in database ( eg. Registration Page)

**Information Security Lab - List of Programs**

* 1. Implement Substitution Cipher.
  2. Implement Transposition Cipher.
  3. Implement DES cipher:

1. Generate Cipher text for the given Plaintext.
2. Retrieve the Plaintext from the given Cipher text.
   1. Implement Diffie Hellman Algorithm and generate Secret Key.
   2. Implement RSA algorithm
3. Generate Public key and Private key pair
4. Generate Cipher text for the Plaintext
5. Obtain the Plaintext from the Cipher text
   1. Implement Hash Algorithm.
   2. Generate Digital Signature

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  | **H** | **M** | **M** | **H** |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Design and Analysis of Algorithms and R Programming Lab

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **0** | **0** | **2** | **1** |

**Code: 8MC61**

**Prerequisite: NIL**

**Course Objectives:**

* To write programs in java to solve problems using divide and conquer strategy.
* To write programs in java to solve problems using backtracking strategy.
* To write programs in java to solve problems using greedy and dynamic programming techniques.

**Course Outcomes**: At the end of this course, the student will be able to

1. Implement Merge sort algorithm for sorting a list of integers in ascending order, Dijkstra’s algorithm for the single source shortest path problem.
2. Implement Prim’s algorithm to generate minimum cost spanning tree.
3. Solve the job sequencing with deadlines problem using greedy algorithm.
4. Design the solution for the 0/1 knapsack problem using implement Dynamic Programming and implement.
5. Using Dynamic programming approach solve the Optimal Binary search Tree problem.
6. Design and implement n-queens problem using backtracking approach.

**Design and Analysis of Algorithms Lab- List of Programs**

1. Write a C program to implement Merge sort algorithm for sorting a list of integers in Ascending order.
2. Write a C program to implement Character sorting.
3. Write a C program to implement Dijkstra’s algorithm for the single source shortest path problem.
4. Write a C program that implements Prim’s algorithm to generate minimum cost
   1. Spanning tree.
5. Write a C program to implement greedy algorithm for job sequencing with deadlines.
6. Write a C program to implement Dynamic Programming algorithm for the 0/1 Knapsack problem.
7. Write a C program to implement Dynamic programming algorithm for the Optimal Binary search Tree problem.
8. Write a C program to implement backtracking algorithm for n-queens problems.

**R Programming Lab - List of Programs**

R Environment setup: Installation of R and RStudio in Windows

Write R commands for i) Variable declaration and Retrieving the value of the stored variables, ii) Write an R script with comments, iii)Type of a variable using class() Function.

1. Write R command to i) illustrate summation, subtraction, multiplication, and division operations on vectors using vectors.

ii) Enumerate multiplication and division operations between matrices and vectors in R console

Write R command to i) illustrates the usage of Vector subsetting& Matrix subsetting

ii) Write a program to create an array of 3×3 matrixes with 3 rows and 3 columns.

iii) Write a program to create a class, object, and function

1. Write a command in R console i)to create a tshirt\_factor, which is ordered with levels ‘S’, ‘M’, and ‘L’. Is it possible to identify from the examples discussed earlier, if blood type ‘O’ is greater or less than blood type ‘A’?

ii) Write the command in R console to create a new data frame containing the ‘age’ parameter from the existing data frame. Check if the result is a data frame or not. Also R commands for data frame functions cbind(), rbind(), sort()

1. Write R command for i) Create a list containing strings, numbers, vectors and logical values

ii) To create a list containing a vector, a matrix, and a list. Also give names to the elements in the list and display the list also access the list elements

iii) To add a new element at the end of the list and delete the element from the middle display the same

iv) To create two lists, merge two lists. Convert the lists into vectors and perform addition on the two vectors. Display the resultant vector.

1. Write R command for i) logical operators—AND (&), OR (|) and NOT (!).

ii) Conditional Statements

iii) Create four vectors namely patientid, age, diabetes, and status. Put these four vectors into a data frame patientdata and print the values using a for loop & While loop

iv) Create a user-defined function to compute the square of an integer in R

v) Create a user-defined function to compute the square of an integer in R

vi) Recursion function for a) factorial of a number b) find nth Fibonacci number

8. Write R code for i) Illustrate Quick Sort

ii) Illustrate Binary Search Tree

1. Write R command to i) illustrate Mathematical functions & I/O functions

ii) Illustrate Naming of functions and sapply(), lapply(), tapply() &mapply()

1. Write R command for i) Pie chart & 3D Pie Chart, Bar Chart to demonstrate the percentage conveyance of various ways for traveling to office such as walking, car, bus, cycle, and train

ii)Using a chart legend, show the percentage conveyance of various ways for traveling to office such as walking, car, bus, cycle, and train.

(a) Walking is assigned red color, car – blue color, bus – yellow color, cycle – green color, and train – white color; all these values are assigned through cols and lbls variables and the legend function.

(b) The fill parameter is used to assign colors to the legend.

(c) Legend is added to the top-right side of the chart, by assigning

iii) Using box plots, Histogram, Line Graph, Multiple line graphs and scatter plot to demonstrate the relation between the cars speed and the distance taken to stop, Consider the parameters data and x Display the speed and dist parameter of Cars data set using x and data parameters

**TEXT BOOK:**

1. K G Srinivas, G M Siddesh, “Statistical programming in R”, Oxford Publications.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **H** | **M** | **M** | **M** | **M** | **M** | **L** | **M** | **H** | **H** | **L** | **H** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Summer Industry Internship-I

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **0** | **0** | **0** | **1** |

**Code: 8J491**

**Prerequisite:** All Courses till this semester

**Course Objectives:**

To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

**Course Outcomes:**

At the end of this course the student will be able to

1. Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
2. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
3. Inculcate an enthusiasm to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole.
4. Improve their communicative skills and team skills.

A summer industry internship project shall be carried out by a group of students consisting of 2 to 3 in number during summer third year first semester at industries. This work shall be carried out under the guidance of the faculty assigned as internal guide as well as external guide at industry where students are carrying out summer industry internship projects. Project shall consist of design, fabrication, software development or building of prototype or application app. This can be of interdisciplinary nature also.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external

The **internal evaluation** shall consist of:

1. Abstract, Design, Implementation and Presentation : 15 marks

in font of Project review Committee consisting of

HoD, Senior faculty and Internal Guides. (Average)

1. Report : 05 marks
2. Evaluation by Internal Guide : 10 marks --------------

Total 30 marks

Semester End examination : 70 Marks.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the internal guide.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  |  |  |  |  | **M** | **L** | **L** | **M** |  | **M** | **M** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech III Year II semester**

**B.Tech. (CSE) - Cyber Security**

### Advanced Entrepreneurship

**(Open Elective –II)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

**Code: 8ZC23**

**Prerequisite:** Basics of Entrepreneurship

**COURSE OBJECTIVES:**

The course is designed to impart the necessary managerial skills and tactics required for an emerging Entrepreneur for the Engineering students to enhance their prospects as an Entrepreneur.

**COURSE OUTCOMES:**

At the end of this course, the students will be able to

1. Gain knowledge on the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup.
2. Exposed to the various business models and critically evaluating the effectiveness of the business models and products
3. Understand the method of business traction, create roles and build their A- team
4. Understand the various channels of revenue building and exploration of new revenue avenues.
5. Understand the need of sales planning and people plan and also financial modeling
6. Exposed to the legal implications affecting the company’s prospects and identifying right mentors and advisors to support startups

**Unit – I: Fundamentals of Entrepreneurship & Refining Business Model and Product:**

Fundamentals and key concepts of entrepreneurship, refining the business model, products and services, pivoting, types of business models, business model evolution, generating new business models, analyzing the business model, adding new customer segment, product manager, significance and role of product manager.

**Unit – II: Business Planning & Exploring Revenue:** Business plan, sales plan, hiring sale team, people plan, financial planning, financial forecasting, create a procurement plan, negotiating role play, understanding primary revenue sources, exploring customer lifecycle for growth customers, exploring and identify secondary sources of revenue,

**Unit- III: Funding the Growth & Building the A-Team:** Overview of funding, funding options for an entrepreneur, explore the right funding options, create funding plan, pitch deck, introduction to building A-Team, pitching to attract the talent, setting your team, defining roles, hiring the A-Team members.

**Unit- IV: Brand and Channel Strategy & Leveraging Technologies:** Introduction to branding, drawn the venture’s golden circle, positioning and positioning statements, creating brand name, logo, social media handle, Identify right channels, leaping ahead with technology, digital marketing for startups, plan a social media campaign, digital collaboration, store documents online, other technology platforms, make tech plan, platform wish list.

**Unit V: Measuring Progress and Legal Matters:** Metrics for customer acquisition (CAC, CLV, and ARPU), metrics for customer retention and satisfaction, find CAC, CLV and ARPU, key financial metrics, communicate metrics, new revenue stream through key financial metrics, re-forecasting of financial plan, identify professional help for legal and compliance requirements, searching of trademark and brand name and company name.

**Unit –VI: Seeking Support and Final Project:** Mentors help to create successful startups, identify mentors and advisors, importance of mentors and advisors, scout the board of directors, overview on final project, capstone project presentation, contents of capstone project.

**TEXT BOOKS:**

1. Entrepreneurship Rajeev Roy “” oxford ,2012
2. Entrepreneurship Development Khanka, ,S.Chand 2012

**REFERENCES:**

1. Small Scale industries and Entrepreneurship Vasanth Desai “Himalya publishing 2012
2. Robert Hisrich et al “enterpreneruship TMH 2012
3. Entrepreneurship Development Khanka, ,S.Chand 2012
4. Entrepreneurship Development B.Janikairam and M Rizwana
5. e-source: - [www.learnwise.org](http://www.learnwise.org)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  |  |  |  |  | **M** | **M** | **M** |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year II semester**

**B.Tech. (CSE) - Cyber Security**

### Basics of Polity And Ecology

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

**(Open Elective –II)**

**Code: 8ZC26**

**Prerequisite: NIL**

**COURSE OBJECTIVE :**

To provide basic knowledge relating to the Indian Polity and Ecology, thus making the students appreciate the current aspects related to both polity and ecology.

**COURSE OUTCOMES :**

At the end of this course, the students will be able to

1. Outline knowledge relating to the Indian Constitution and the Preamble to the Constitution.
2. Relate to the fundamental rights and duties of the Indian citizens and the directive principles of state policy.
3. Identify about the federal structure and judiciary of India.
4. Understand knowledge relating to the conservation of the environment.
5. Analyse about bio-diversity and climatic changes occurring in the environment.
6. Discuss about the international treaties, conventions and organizations active in the field of environmental protection.

**Unit 1: Introduction to Salient Features of Constitution** Significance of the Constitution, Distinction between Written and Unwritten Constitution, Composition of the Constituent Assembly and the role and objectives of the Drafting Committee, Main features and the nature of the Constitution of India. Preamble to the Constitution and its relevance; Basic principles of Preamble and their reflection in the constitutional provisions.

**Unit 2: Fundamental Rights, Duties and Directive Principles of State Policy** Fundamental Rights and Duties of Citizens- Importance of Rights and Duties, Dignity of an individual, Safeguards against deprivation of life and personal liberty; Writs for the protection of Fundamental Rights; Meaning of Directive Principles of State Policy, Classification of the Directive Principles, Role of Directive Principles, Role of Directive Principles in the establishment of economic and social democracy.

**Unit 3: Government and Judiciary** Legislative, financial and judicial powers of the President; Appointment of Prime Minister and constitution of Council of Ministers; Powers and functions of Prime Minister; Individual and collective responsibility; Powers and discretionary powers of the Governor; Appointment of the Chief Minister, Formation of the Council of Ministers; Powers and jurisdiction of the Supreme Court and High Courts of India.

**Unit 4: Ecology and Environment** Environment-Origin, Evolution of Environment and its uses by Humans; Degradation of Natural Environment, Principles of Ecology; Composition and various types of Ecosystem; International Solar Alliance.

**Unit 5: Bio-diversity and Climate Change** Classification of Biodiversity, Biodiversity loss, Methods of biodiversity conservation, Conservation of Natural Resources such as Soil, Land, Water and Energy. Sustainable Development and Cleaner Technology.Green house effect and Global Warming, Strategies to cope with Green House Effect, Desertification, Depletion of ozone layer.

**Unit 6: International Treaties, Conventions & Organizations:** Indian Board for Wildlife (IBW). United Nations Environmental Programme (UNEP), United Nations Framework Convention for Climate Change (UNFCCC). International Union for conservation of Nature and National Resources (IUCN), World Wide Fund for Nature (WWF).Montreal Protocol (1987), Kyoto Protocol (1997), Paris Agreement (2016).

**REFERENCE BOOKS:**

1. Indian Polity - M. Laxmikanth, 5th Edition, McGraw Hill Education, Chennai
2. Environment And Ecology A Complete Guide for Civil Services Preliminary and Main Examinations – R. Rajgopalan, 2017, Oakbridge Publishing Pvt. Limited.
3. Introduction to Constitution of India – Dr. Durga Das Basu, 22nd Edition, 2015, LexisNexis
4. Our Constitution – Subhash C Kashyap, 5th Edition, 2015, National Book Trust, India
5. Environment and Ecology – Anil Kumar De and Arnab Kumar De, 2009, New Age International (P) Limited.
6. ICSE Environment Education for Class X – Dr. M.P. Mishra , 2009, S.Chand and Company

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  |  |  |  |  | **L** | **L** |  | **L** |  | **M** |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year II semester**

**CSE- Cyber Security**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

### Entrepreneurship Project Management and Structured Finance

**(Open Elective –II)**

**Code: 8ZC19**

**Prerequisite:** Basics of Entrepreneurship

**COURSE OBJECTIVES :**

Make students understand the nature of Entrepreneurship, its importance and to create an awareness regarding the systematic planning and implementation of projects; highlight the components of structured finance and establish a framework of CMBS with respect to Servicing Agreements

**COURSE OUTCOMES :**

At the end of this course, the students will be able to

1. Students will understand the nature of Entrepreneurship andits importance
2. Will gain knowledge regarding project, its life cycle and organization
3. Will gain knowledge relating to project formulation and implementation
4. Comprehend the components of structured finance
5. Establish a framework of CMBS
6. Students will gain knowledge relating to the CRE Servicing

**UNIT I CONCEPTS OF ENTREPRENEURSHIP:** Definition of Entrepreneurship, Evolution of Entrepreneurship, Classification of Entrepreneurs**,** Characteristics of Entrepreneur**,** Selection of Product and the means required for starting an enterprise, Financing and Financial incentives available, Success rate of entrepreneurs – a case study.

**UNIT-II BASICS OF PROJECT MANAGEMENT:** Concept and characteristics of a project - types of projects - Objectives of project management - Project Organizational structure - Project life cycle - Challenges and problems of project management - Qualities & functions of a project manager.

**UNIT III PROJECT FORMULATION AND IMPLEMENTATION:** Generation of Project Ideas; Monitoring the environment; Preliminary Screening of Projects; Feasibility study; Project Selection. Detailed Project Report: Market, Technical, Financial and Economic aspects.Pre-requisites for Successful Project Implementation; Control of in-progress Projects (Gantt chart, PERT, CPM); Project Risk Management Process, Post-audit; Abandonment Analysis

**UNIT-IV INTRODUCTION TO STRUCTURED FINANCE**: Term Loans, Bonds/Debentures, Types of debentures, Issue of debt instruments. Structured Finance: Evolution, Securitization process, characteristics, and structured finance products (ABS, CDO, MBS, CDS)

**UNIT-V COMMERCIAL MORTAGAGE LOAN BASICS**: Definition and characteristics of CMBS, CMBS Vs other Mortgage Backed Securities, CMBS three level perspective: property level, loan level, bond level; Life cycle of commercial real estate loans – Loan cycle, Key players in loan cycle; Property types and characteristics, property performance.

**UNIT-V1 BASICS OF CRE SERVICING:** Introduction to servicing, Role of the Servicer, Servicing approaches, Influence of technology, Ethics in commercial servicing, Servicing – sources of income, Overview of servicing agreements, Pooling & Servicing agreement, Sub servicing agreement.

**REFERENCE BOOKS:**

1. H. Nandan, Fundamentals of Entrepreneurship, Prentice Hall of India, First Edition, New Delhi, 2007.
2. Jeffrey K. Pinto “Project Management”, 2nd edition, Pearson
3. DhandapaniAlagiri “Structured Finance – Concepts & Perspectives”, ICFAI University press.
4. Projects by Prasanna Chandra, McGraw-Hill Publishing Co. Ltd
5. Project Management: Systems approach to Planning Scheduling and Controlling, H. Kerzner.
6. The Complete Real Estate Documents by Mazyar M. Hedayat, John J. Oleary
7. The Fundamentals of Listing and Selling Commercial Real Estate - By Keim K. Loren (Author)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **H** | **M** | **M** |  |  |  |  |  |  |  |  |  |

HH :High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year II semester**

**CSE- Cyber Security**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

### Principles of Operations Research

**(Open Elective –II)**

**Code: 8BC53**

**Prerequisite :** Linear Algebra and Calculus, Differential Calculus and Numerical Methods

**Course Objectives:**

The course aims at building capabilities in the students for analyzing different situations in the industrial/ business scenario involving limited resources and finding the optimal solution within constraints.

**Course Outcomes:**

1. Formulate and solve mathematical model (linear programming problem) for a physical situations like production, distribution of goods and economics.
2. Recognize and Solve the problem of transportation involving a large number of shipping routes with least transportation cost and generate optimal assignment strategy for different situations
3. Use Johnson’s rule to create the optimal sequencing schedule for a sequencing problem and make decisions about replacing an item using replacement policy
4. Analyze the performance measures of Queing system and Calculate the EOQ for minimizing the total inventory cost
5. Apply simulation techniques for solving various types of problems and general idea development about Markov chains

**UNIT – I**

**INTRODUCTION:** Definition, Characteristics and Phases and Types of models, applications.

**LINEAR PROGRAMMING PROBLEM**- Formulation – Graphical solution, Simplex method-Types of variables, Unique and Multiple optimal solution, Redundancy & Degeneracy in LPP, Unbounded solution, Artificial variables techniques - Big-M method with feasible and infeasible solutions, Two–phase method, Primal to Dual formation with Duality Principle.

**UNIT – II**

**TRANSPORTATION PROBLEM** – Formulation – methods of finding initial solution (NW corner, VAM, Least cost Method) Optimal solution (Stepping stone Method, MODI method) Special cases in TP: unbalanced, Degeneracy, Restriction and maximization case.

**ASSIGNMENT PROBLEM** – Formulation – Optimal solution (Hungarian Method) - Variants of Assignment Problem-Unbalanced, Restriction, Maximization, Airlines layover case, Traveling Salesman problem.

**UNIT – III**

**SEQUENCING** – Introduction – Terminology, Assumptions, Johnson’s procedure- Processing n jobs through two machines – Processing n jobs through three machines – Processing two jobs through ‘m’ machines (Gantt Chart).

**REPLACEMENT:** Introduction – Types of failure, Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, Group replacement.

**UNIT – IV**

**THEORY OF GAMES:** Introduction andTerminologies, Criterion and optimal strategy – Solution of games with saddle points: Mixed Strategies-Rectangular games without saddle points, Dominance principle, Average Relational Dominance, m X 2 & 2 X n games -Graphical method and Sub Game Method, Matrix Method, Application of LPP in game theory.

**UNIT – V**

**WAITING LINES:** Introduction, Terminology, Structure of a queue, calling population characteristics-size, behavior, pattern of arrivals, Kendall-Lee notation, Queuing Models: Single Channel: Poisson arrivals: exponential service times: with finite and infinite population, Multichannel: Poisson arrivals: exponential service times with infinite population

**INVENTORY :** Introduction, Inventory costs, Concept of EOQ, Single item Deterministic models with and without shortages, Single item inventory models with one price break and multiple price breaks, Stochastic models – Instantaneous demand and no set up cost.

**UNIT – VI**

**SIMULATION:** Definition – Types of simulation – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages

Markov chains: Introduction to Markov chains, Analysis Assumptions, Input output probabilities, Applications (Only basic understanding)

**TEXT BOOKS:**

1. Operations research / Hira & Gupta

2. Operation Research /J.K.Sharma/Macmillan Publishers.

**REFERENCES:**

1. Quantitative Techniques in Management: N D Vohra, TMH

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **L** |  |  | **L** | **L** |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year II semester**

**CSE- Cyber Security**

### Fundamentals of Measurements And Instrumentation

**(Open Elective –II)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

**Code: 8AC44**

**Prerequisite: NIL**

**COURSE OBJECTIVES :**

The basic principles of all measuring instruments and in measurement of electrical and non-electrical parameters viz., Resistance, Inductance, Capacitance, voltage, current Power factor, Power, Energy, Strain, Temperature, Torque, Displacement etc. and the different types of electrical and non electrical transducers. It introduces the different signal analyzers and oscilloscopes.

**COURSE OUTCOMES :**

At the end of this course, the students will be able to

1. Understand the principle of operation of different types of instruments viz., PMMC, moving iron type of instruments, the required characteristics of an instrument in general. The student demonstrates the ability to compensate for the errors in the instruments and to extend the range of the instruments.
2. Demonstrates the knowledge of Potential and Current transformers; the errors in them and the effect of having an open/short in the secondary circuits; Understand the principle of operation of Dynamometer and Moving-iron type of Power factor meters.
3. Understand the principle of operation of dynamometer type of Wattmeter and Induction type of Energy meter; use the wattmeter to measure the Active and Reactive power and demonstrates the ability to extend the range of them.
4. Identify and use different techniques of measurement of Resistance, Inductance and Capacitance values.
5. Understand the principle of operation of Different type of digital voltmeters, wave analyzers, spectrum analyzers and Cathode ray Oscilloscope.
6. Demonstrates the ability in characterizing the different types of transducers and uses them to measure Strain, Gauge Sensitivity, Displacement, Velocity, Acceleration, Force, Torque and Temperature.

**UNIT-I MEASURING INSTRUMENTS- INSTRUMENT TRANSFORMERS:** Significance of Measurement, static characteristic of system- Linearity, Sensitivity, Precision, Accuracy - Classification - Deflecting, Control and Damping torques, Ammeters and Voltmeters, PMMC, Moving iron type instruments, Expression for the Deflecting torque and Control torque, Errors and Compensations, Extension of range using Shunts and Series resistance.

**UNIT –II: INSTRUMENT TRANSFORMERS** Introduction, advantages, burden of instrument transformer, Current Transformer - errors in current transformer, Effect of secondary open circuit, Potential transformer- errors in potential transformer, Testing of current transformers with silsbee’s method. Power Factor Meters: Type of P.F. Meters, Dynamometer and Moving iron type, 1- ph and 3-ph meters.

**UNIT –III MEASUREMENT OF POWER& ENERGY:** Single phase dynamometer wattmeter-LPF and UPF-Double element and three element dynamometer wattmeter, Expression for deflecting and control torques, Extension of range of wattmeter using instrument transformers, Measurement of active and reactive powers in balanced and unbalanced systems, Single phase induction type energy meter, Driving and braking torques, Testing by phantom loading, Three phase energy meter .

**UNIT - IV MEASUREMENT OF RESISTANCE - MAGNETIC MEASUREMENTS- A.C. BRIDGES:** Principle and operation of D.C. Crompton’s potentiometer, Standardization, Measurement of unknown resistance, current, voltage. Method of measuring low- Medium and High resistance, sensitivity of Wheatstone’s bridge, Carey Foster’s bridge, Kelvin’s double bridge for measuring low resistance, Measurement of high resistance, loss of charge method, Measurement of inductance, Quality Factor, Maxwell’s bridge, Hay’s bridge, Anderson’s bridge, Owen’s bridge. Measurement of capacitance and loss angle, Desauty Bridge, Wien’s bridge, Schering Bridge.

**UNIT-V DIGITAL VOLTMETERS- SIGNAL ANALYZERS- CRO:** Digital voltmeters, Successive approximation, Ramp, Dual slope integration continuous balance type, Wave Analyzers, Frequency selective analyzers, Heterodyne, Application of Wave analyzers, Harmonic Analyzers, Total Harmonic distortion, spectrum analyzers, Basic spectrum analyzers, Spectral displays, Q meter and RMS voltmeters . CRO- Cathode Ray Tube (CRT), Screens, Probes, Applications of CRO, Measurement of frequency and phase using CRO, Block diagram.

**UNIT-VI MEASUREMENT OF NON-ELECTRICAL QUANTITIES:** Transducers - Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers, Principle operation of Resistor, Inductor, LVDT and Capacitor transducers, LVDT Applications, Strain gauge and its principle of operation, Guage factor- Thermistors, Thermocouples, Piezo electric transducers, Photovoltaic, Photo conductive cells. Measurement of strain, Gauge Sensitivity, Displacement, Velocity, Acceleration, Force, Torque, Measurement of Temperature.

**TEXT BOOKS:**

1. Electrical Measurements and measuring Instruments – E.W. Golding and F.C. Widdis, 5th Edition, Wheeler Publishing.
2. Transducers and Instrumentation– D.V.S Murthy, Prentice Hall of India, 2nd Edition.
3. A course in Electrical and Electronic Measurements and Instrumentation -A.K. Sawhney, Dhanpatrai& Co. 18th Edition.

**REFERENCE BOOKS:**

1. Measurements Systems, Applications and Design – D O Doeblin- Tata MC Graw-Hill.
2. Principles of Measurement and Instrumentation – A.S Morris, Pearson /Prentice Hall of India.
3. Electronic Instrumentation- H.S.Kalsi Tata MC Graw – Hill Edition, 3rd Edition.
4. Modern Electronic Instrumentation and Measurement techniques – A.D Helfrick and W.D.Cooper, Pearson/Prentice Hall of India.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **L** | **M** |  |  |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year II semester**

**CSE- Cyber Security**

### Introduction to VLSI Design

**(Open Elective –II)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

**Code: 8DC53**

**Prerequisite:** Embedded Systems

**COURSE OBJECTIVES:**

IC fabrication process of various technologies and to understand the electrical properties of MOS transistor. Various Layers and layouts for a different technology design rules and how scaling impacts its performance.

**COURSE OUTCOMES:**

At the end of this course, the students will be able to

1. Identify the working principle of diffusion, ion implantation, metallization and other basic components.
2. Comprehend basic electrical properties of various types of mos transistors
3. Identify the significance of cmos logic gates and design the multiplexers.
4. Draw layouts for a cmos circuit and logic design and validate them.
5. Differentiate the various types of memories and clocking strategies
6. Design various combinational and sequential circuits

**UNIT I**

**INTRODUCTION TO MOS AND IC FABRICATION TECHNOLOGY**: MOS, PMOS, NMOS, CMOS &BiCMOS, VLSI Design Flow, Oxidation, Lithography, Diffusion, Ion Implantation, Metallization, Encapsulation, Probe testing, Integrated Resistors and Capacitors

**Application** – CMOS IC Manufacturing

**UNIT II**

**BASIC ELECTRICAL PROPERTIES:** Basic Electrical Properties of MOS and BiCMOS Circuits: V-I characteristics, Ids-Vds relationships, MOS transistor threshold Voltage, gm, gds, Figure of Merit (ωo), Zpu/Zpd, Latch-Up in CMOS

**INVERTERS**: NMOS Inverter, Various Pull-Ups, CMOS Inverter Analysis & Design, Bi-CMOS Inverters

**UNIT III**

**CIRCUIT DESIGN PROCESSES:** MOS Layers, Stick Diagrams, Lamda-based CMOS Design rules for Wires, Contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling

**GATES**: CMOS Logic Gates and Structures, Switch logic, NAND, NOR, Compound gates, Multiplexers, Layout Diagrams Gates

**Application** – IC Physical Design – NAND and NOR

**UNIT IV**

**PART A - CIRCUIT CHARACTERIZATION AND PERFORMANCE**

Switching characteristics – fall time, Rise time, Delay time, CMOS Gate sizing, Power consumption (Static and Dynamic), Charge sharing

**PART B – CMOS CIRCUIT AND LOGIC DESIGN**

Logic structures / styles – Pseudo NMOS, Dynamic, Clock CMOS, Domino logic, CVSL, Modified domino logic, Pass transistor logic, transmission gate

**UNIT V**

**MEMORY:** Latches and Registers**,** Clocking strategies (Single Phase),Memory cells (SRAM & DRAM), Row decoders, Column decoders, Read/Write circuitry, LIFO

**UNIT VI**

**SUBSYSTEM DESIGN:** Adders, parity generators, comparators, binary counters, multipliers, Shifter, ALUs

**TEXTBOOKS**:

1. Principles of CMOS VLSI Design - Weste and Eshraghian, Pearson Education, 2nd Edition, 2009.
2. Digital Integrated Circuits: A Design Perspective - John M. Rabaey, 2nd Edition, 2002.

**REFERENCE BOOKS:**

* 1. Chip Design for Submicron VLSI: CMOS Layout & Simulation, - John P. Uyemura, Thomson Learning.
  2. Introduction to VLSI Circuits and Systems - John .P. Uyemura, JohnWiley, 2003.
  3. Essentials of VLSI circuits and systems – Kamran Eshraghian, EshraghianDougles and A. Pucknell, PHI, 2005 Edition.
  4. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.

VLSI Technology – S.M. SZE, 2nd Edition, TMH, 2003.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **L** |  | **M** |  |  | **M** | **L** | **L** |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year II semester**

**CSE- Cyber Security**

### Co – Creation and Product Design

**(Open Elective –II)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

**Code: 8ZC09**

**Prerequisite:**

**Course Objective:**

The objective of the course is to make students understand the fundamental concepts of design thinking, and to familiarize with product design process and to motivate the students to ideate new products and services.

**Course Outcomes:**

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

1. Understand the inputs required for human centric design thinking the students learn the techniques of idea generation.
2. Explore the different phases of Ideation process.
3. Outline emerging technologies and understand 3d printing in manufacturing.
4. Indicate developments of prototypes.
5. Understand reverse engineering methods in product development.
6. Review the information on IPR, and patent application.

**Unit – I: Human Centered Design:** Understanding user and Customer perspectives, Identify insights and opportunities, Interviewing, User Experience design.Frame your design challenge**.**

Empathy tools and techniques.

**Unit – II: Ideation Process:** Articulation of Problem Statement, Visualizing Ideas, Communicating ideas and compelling story telling, Brainstorming, Divergent thinking in exploring solutions, 3- box thinking, 3-box framework and Box-3 ideation.

**Unit – III: Emerging Technologies and Design:** Emerging technologies, utilization and growth, Automation through Industry 4.0, IOT for Network and Intelligent world, efficient and effective manufacturing aided by Robotics, Custom manufacturing by Additive / 3D printing, Augmented reality for product and process.

**Unit – IV: Prototyping**: Introduction to Prototype, types of prototype, prototyping strategies, Design consideration in the five stages of the product life cycle. Prototype building by different engineering disciplines. Testing Solution and taking the solution to the users. Create a pitch for your design.

**Unit – V:Reverse engineering in product development:** Reversing engineering methods, identifying the bad features in a product, reduction in size and weight, usage of new materials,importance of ergonomics in product development, environmental considerations in design, and safety considerations in design.

**Unit – VI: Intellectual Property Rights:** Introduction to IPR, Patents – Types of Patents, elements of patentability, Patents registration Procedure, Patent office and Appellate Board, Rights and Duties of Patentee, Restoration of Lapsed patents.

**Text Books:**

1. Philip Kosky, Robert T. Balmer, William D. Keat, George Wise, “Exploring Engineering: An Introduction to Engineering and Design”, 4th edition, Elsevier, 2016.
2. David Ralzman, “History of Modern Design”, 2nd edition, Laurence King Publishing Ltd., 2010 3. An AVA Book, “Design Thinking”, AVA Publishing, 2010.
3. Ingle, B. R. (2013). Design thinking for entrepreneurs and small businesses: Putting the power of design to work. Apress.
4. Norman, D. A. (2016). Living with complexity. MIT press.
5. Chapman, J. (2017). Routledge handbook of sustainable product design. Taylor & Francis.
6. Nithyananda, K.V. (2019), IPR, protection and Management, India, Cengage learning India.

**Reference Books:**

1. G. Pahl, W.Beitz, J. Feldhusen, KH Grote, “Engineering Design: A Systematic Approach”, 3rd edition, Springer, 2007. 2. Tom Kelley, Jonathan Littman, “Ten Faces in Innovation”, Currency Books, 2006.
2. Kumar, V. (2012). 101 design methods: A structured approach for driving innovation in your organization. John Wiley & Sons.
3. Chapman, J. (2012). Designers Visionaries and Other Stories: A Collection of Sustainable Design Essays. Taylor & Francis.
4. Garrett, J. J. (2010). The elements of user experience: user-centered design for the web and beyond. Pearson Education.
5. Neeraj, P. &Khusdeep, D (2014), IPR, India, IN: PHI Learning.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **H** | **M** | **L** |  |  |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech III Year II semester**

**CSE- Cyber Security**

### Advanced Computer Networks

**(Professional Elective –II)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8EC12**

**Prerequisite:** Data Communications and Computer Networks

**Course Objectives:**

This course aims to provide advanced background on relevant computer networking topics to have a comprehensive and deep knowledge in computer networks.

**Course Outcomes:**

At the end of this course the student will be able to

1. Appraise networking and Internet concepts and be familiar with OSI Model and TCP/IP model.
2. Detect networking errors learn correction techniques
3. Infer the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack.
4. Differentiate Internet addressing IPv4 and IPv6 and Internet protocols
5. Conceptualize wireless networking and to Develop new protocols in networking
6. Design new virtual private networks

**UNIT I Computer Networks and the Internet: I**ntroduction toInternetand Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, History of Computer Networking and the Internet – **(Chapter 1) of T1.**

**Foundation of Networking Models:** 6-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM - **(Chapter 2) of T2**.

**UNIT II The Link Layer and Local Area Networks:** Link Layer: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, And Ethernet – **(Chapter 6) of T1**

**Unit – III Routing and Internetworking:** Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols, Congestion Control at Network Layer – **(Chapter 7) of T2**

**UNIT IV Logical Addressing:** IPv4 Addresses, IPv6 Addresses - **Internet Protocol:** Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6 – **(Chapter 19, 20) of T3**

**Transport and End-to-End Protocols:** Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control – **(Chapter 8) of T2**

**Application Layer:** Principles of Network Applications, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing – **(Chapter 2) of T1**

**UNIT V Wireless Networks and Mobile IP**: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs) - **Mobile Ad-Hoc Networks:** Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks – **Wireless Sensor Networks** and Protocol Structures - **(Chapter 6, 19, 20) of T2**

**UNIT VI VPNs, Tunneling and Overlay Networks**: Virtual Private Networks (VPNs), Multiprotocol Label Switching (MPLS), Overlay Networks – **VoIP and Multimedia Networking:** Overview of IP Telephony – **(Chapters 16, 18) of T2**

**TEXT BOOKS:**

1. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, Keith W.Ross, Third Edition, Pearson Education, 2007
2. Computer and Communication Networks, Nader F. Mir, Pearson Education, 2007

**REFERENCES:**

1. An Engineering Approach to Computer Networking , S.Keshav, Pearson Education, 1997
2. Computer Networks: Principles, Technologies And Protocols For Network Design,  NataliaOlifer, Victor Olifer, Wiley India, 2006.
3. Computer Networks, Andrew S. Tanenbaum, Fourth Edition, Prentice Hall.
4. Fundamentals of Business Data Communications, Jerry FitzGerald and Alan Dennis, Tenth Edition, Wiley, 2009.
5. Campus Network Design Fundamentals, Diane Teare, Catherine Paquet, Pearson Education (CISCO Press)
6. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill, 2007

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **H** | **M** | **M** | **H** | **M** | **M** | **M** | **H** | **M** | **H** | **M** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year II semester**

**CSE- Cyber Security**

### Software Project Management

**(Professional Elective –II)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code : 8FC13**

**Prerequisite : Software Engineering and OOAD**

**Course Objectives:**

Software Project Management course aims to give the students an understanding of the building blocks of software projects and induces the essence of project management. The spectrum of topics covered in this subject including software lifecycle, software economics, artifacts, processes, workflows, architecture, planning etc help strengthen the fundamentals of the student enabling them to have a deeper understanding of software project management.

**Course Outcomes**:

At the end of this course the student will be able to

1. Explain primitives of Project Planning and evolution of software economics.
2. Describe software economics; reduce Software product size, improvement in software processes, improving team effectiveness, improving automation, Achieving quality.
3. Explain Life cycle phases and Artifacts of the process.
4. Describe Model based software architectures and Work Flows.
5. Apply Checkpoints for a process such as Major mile stones, Minor Milestones and apply work breakdown structures for a iterative process within cost and schedule. Describe Project Organizations and Responsibilities.
6. Describe Automation and Project Control and Process instrumentation and explain Future Software Project Management such as Modern Project Profiles and Next generation project management.

**UNIT I: Concept of Management:** Management Definition, Role and Responsibilities of Management, Management in Software Industry

**Types of Software Organizations:** Start-up companies, Independent Software Companies, Multi-National Software Companies.

**Conventional Software Management:** The waterfall model, conventional software Management performance.

**Evolution of Software Economics:** Software Economics, pragmatic software cost estimation.

**UNIT II: Improving Software Economics:** Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

**The old way and the new way:** The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

**UNIT III: Life cycle phases:** Engineering and production stages, inception, Elaboration, construction, transition phases.

**Artifacts of the process:** The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

**UNIT IV: Model based software architectures:** A Management perspective and technical perspective. **Work Flows of the process:** Software process workflows, Iteration workflows.

**UNIT V: Checkpoints of the process:** Major mile stones, Minor Milestones, Periodic status assessments. **Iterative Process Planning:** Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning. **Project Organizations and Responsibilities:** Line-of-Business Organizations, Project Organizations, evolution of Organizations.

**UNIT VI: Process Automation:** Automation Building blocks, The Project Environment.

**Project Control and Process instrumentation:** The seven core Metrics, Management indicators, quality indicators, life cycle expectations,

**Future Software Project Management:** Modern Project Profiles, Next generation Software economics, modern process transitions.

**Case study:** The command center processing and display system – Replacement (CCPDS-R)

**TEXTBOOKS:**

1. Software Project Management, Walker Royce: Pearson Education, 2005.

**REFERENCE BOOKS:**

1. Management Concepts and Practices, Tim Hannagan, FT Prentice Hall, 5th Edition
2. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
3. Software Project Management, Joel Henry, Pearson Education.
4. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **L** |  |  | **L** |  |  |  |  |  |  |  | **M** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year II semester**

**CSE- Cyber Security**

### Business Intelligence

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**(Professional Elective –II)**

**Code: 8EC19**

**Prerequisite: Nil**

**Course Objectives:**

1. Introduce the Business intelligence concepts, techniques and models

2. Understand the modeling process behind business analytics

3. To analyze different data analysis tools and techniques Expected

**Course Outcomes:**

At the end of this course the student will be able to

|  |
| --- |
| 1. Understand the importance of business intelligence and its applications in today’s world. |
| 1. Illustrate the different form of analytics such as business analytics, predictive analytics. |
| 1. Compare in detail the various aspects of business intelligence. |
| 1. Understand the technological components of operational intelligence. |
| 1. Analyze and understand the broad concepts in prescriptive analytics with Decision Tables. |
| 1. Apply business intelligence process for web mining and web analytics. |

**UNIT-I**

Introduction to Business Intelligence, Business Intelligence, Mobile Business Intelligence, Real-time Business Intelligence (Text Book-1)

**UNIT-II**

Analytics: A Comprehensive Study, Business Analytics, Analytics, Software Analytics, Embedded Analytics, Learning Analytics, Predictive Analytics, Prescriptive Analytics, Social Media Analytics, Behavioral Analytics (Text Book-1)

**UNIT-III**

Essential Aspects of Business Intelligence, Context Analysis, Business Performance Management, Business Process Discovery, Information System, Organizational Intelligence, Data Visualization, Data Profiling, Data Cleansing, Process Mining, Competitive Intelligence (Text Book-1)

**UNIT-IV**

Operational Intelligence: Technological Components, Operational Intelligence, Business Activity Monitoring, Complex Event Processing, Business Process Management, Metadata, Root Cause Analysis (Text Book-1)

**UNIT-V**

Prescriptive Analytics

Decision Support Systems Modeling - Mathematical Models for Decision Support - Certainty, Uncertainty, and Risk- Decision Modeling with Spreadsheets - Mathematical Programming Optimization - Decision Analysis with Decision Tables and Decision Trees - Problem-Solving Search Methods - Problem-Solving Search Methods (Text Book-2)

**UNIT-VI**

Web Analytics and Web Mining

Web Mining Overview - Web Content and Web Structure Mining - Search Engines - Search Engine Optimization - Web Analytics Technologies, metrics - Web Analytics Maturity Model and Web Analytics Tools (Text Book-2)

**TEXT BOOK**

1. Drew Bentley, Business Intelligence and Analytics, Published by Library Press
2. Efraim Turban, Ramesh Sharda, DursunDelen, “Business Intelligence and Analytics”, 10th Edition, Pearson, 2015

**REFERENCES:**

1 S. Christian Albright, Wayne L. Winston, Business Analytics: Data Analysis & Decision Making, 6th Edition, CENGAGE INDIA, 2017

2 Dinabandhu Bag, Business Analytics, Routledge, 1st edition, 2016

3 Rick Sherman, Business Intelligence Guidebook: From Data Integration to Analytics, Morgan Kaufmann, 1st edition 2014

1. Introduction to business Intelligence and data warehousing, IBM, PHI.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **H** | **L** |  | **H** |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. III Year II semester**

**CSE- Cyber Security**

### Image Processing

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**(Professional Elective –II)**

**Code: 8FC18**

**Prerequisite : Computer Graphics**

**Course Objectives:**

Make decisions from image data, online inspection and face recognition

**Course Outcomes:**

At the end of this course the student will be able to

1. Analyze general terminology of image processing.

2. Examine various types of images, intensity transformations and spatial filtering.

3. Develop Fourier transform for image processing in frequency domain.

4. Evaluate the methodologies for image segmentation, restoration etc.

5. Implement image process and analysis algorithms.

6. Apply image processing algorithms in practical applications.

**UNIT – I**

**Introduction**: Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system.. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels   
  
**UNIT – II**

**Image enhancement** in the spatial domain: Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods

**UNIT – III**

**Image restoration**: A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner filtering, constrained least squares filtering, geometric transforms; Introduction to the Fourier transform and the frequency domain, estimating the degradation function

**UNIT– IV**

**Color Image Processing**: Color fundamentals, color models, pseudo color image processing, basics of full–color image processing, color transforms, smoothing and sharpening, color segmentation.

**UNIT – V**

**Image Compression and Morphology**: Fundamentals, image compression models, error-free compression, lossy predictive coding, image compression standards, Morphological Image Processing: Preliminaries, dilation, erosion, open and closing, hit or miss transformation

**UNIT – VI**

**Image Segmentation and Recognition**: Detection of discontinuous, edge linking and boundary detection, thresholding, region–based segmentation, Patterns and patterns classes, recognition based on decision–theoretic methods, matching, optimum statistical classifiers

**Text Books:**1. Digital Image Processing, RafealC.Gonzalez, Richard E.Woods, Third Edition, Pearson Education/PHI.

**REFERENCE BOOKS:**

* 1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and

Roger Boyle, Second Edition, Thomson Learning.

* 1. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson

Course Technology

3. Computer Vision and Image Processing, Adrian Low, Second Edition, B.S.Publications

4. Digital Image Processing, William K. Prat, Wily Third Edition

5. Digital Image Processing and Analysis, B. Chanda, D. DattaMajumder, Prentice Hall

of India, 2003

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **H** | **H** | **M** | **H** | **M** | **M** |  |  |  |  |  | **H** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year II Semester**

**B.Tech. (CSE) - Cyber Security**

### Data Warehousing and Data Mining

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **2** | **1** | **0** | **3** |

**Code: 8EC04**

**Prerequisite:** Database Management Systems

**Course Objectives:**

To understand the principles of Data warehousing and Data Mining and understand types of data to improve the quality of data and efficiency using the mining process.

1. To be familiar with the Data warehouse architecture.
2. To understand applications of Association Rule Mining and algorithms to find them.
3. To perform classification and prediction of data.
4. To understand applications and algorithms for Clustering.
5. To introduce advanced topics in Data Mining.

**Course Outcomes:**

At the end of this course the student will be able to

1. Understand the fundamentals of Data Mining and Identify the techniques used in data preprocessing.
2. Understand the fundamentals of Data Warehousing and issues of mining with respect to architectures, technologies such as OLAP.
3. Learn insights of Data Mining Primitives and Infer the significance of Concept Description.
4. Apply the algorithms for mining association rules in large databases.
5. Discuss and apply the models of classification and use those models for the prediction of the new samples.
6. Apply various clustering techniques available for numerous applications. Identify the optimal clustering technique for a particular application

**UNIT – I**

**Introduction:** Fundamentals of data mining, KDD process, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task primitives, Integration of a Data mining System with a Database or a Data warehouse systems, Major issues in Data Mining.

**Data Preprocessing:** Needs for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation, Data Mining Primitives, Data Mining Query Languages, Architectures of Data Mining Systems.

**UNIT – II**

**Data Warehouse and OLAP Technology for Data Mining:** Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining.

**UNIT – III**

**Mining Frequent, Associations and Correlations:** Basic concepts, Frequent Item set mining methods, Mining multilevel association rules from Transaction Databases, Mining Multidimensional association rules from Relational databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

**UNIT – IV**

**Classification and Prediction:** Issues regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Support Vector Machines (SVMs),k-nearest neighbor classifier, Other Classification Methods. Prediction, Classifier Accuracy

**UNIT – V**

**Cluster Analysis Introduction**: Issues Regarding Classification and Prediction, Types of Data in Cluster Analysis, Major Clustering methods, Partitioning Methods, Density-Based methods, Grid-Based methods, Model-Based Clustering methods, Outlier Analysis.

**UNIT – VI**

**Mining Complex Types of Data:** Social Network Analysis, Spatial Data Mining, Multimedia Data Mining, Mining Time-Series data, Mining sequence Patterns in Transactional Databases, Text Mining, Mining the World Wide Web.

**TEXT BOOKS:**

**1.** Data mining: Concepts and Techniques, Jiawei Han and Micheline Kamber, 2nd Edition, Elsevier, 2006.

2. Data Mining Techniques – ARUN K PUJARI, University Press.

**REFERENCE BOOKS:**

1. Data Mining Introductory and advanced topics –MARGARET H DUNHAM, PEARSON EDUCATION

2. Data Mining Techniques – ARUN K PUJARI, University Press.

3. Data Warehousing in the Real World – SAM ANAHORY & DENNIS MURRAY. Pearson Edn Asia.

4. Data Warehousing Fundamentals – PAULRAJ PONNAIAH WILEY STUDENT EDITION.

5. The Data Warehouse Lifecycle Toolkit – RALPH KIMBALL WILEY STUDENT EDITION

6. Introduction to Data Mining - First Edition, by Pang-Ning Tan, Michael Steinbach and Vipin Kumar, ISBN-13: 978-0321321367

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  |  |  |  |  |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year II Semester**

**B.Tech. (CSE) - Cyber Security**

### Cyber Security and Cyber Laws

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8FC08**

**Prerequisite: NIL**

**Course Objectives:**

1. To learn fundamentals of cryptography and its application to network security.
2. To understand network security threats, security services, and countermeasures.
3. To learn computer security, Internet, E-commerce and E-governance with reference to Free
4. Market Economy
5. To learn International Efforts relating to Cyberspace laws and Cyber crimes
6. To learn Law relating to electronic records and intellectual property rights in India
7. To understand ethical laws of computer for different countries.
8. To learn Penalties, Compensation and Offences under the Cyberspace and Internet in India
9. To learn Miscellaneous provisions of IT Act and Conclusions

**Course Outcomes:**

At the end of this course the student will be able to

1. Familiarize the cryptographic procedures and Understand its primitives
2. Outline Security policy in Legislation and Comprehend E-Commerce frame work, modelsand its associated threats
3. Justify the role of electronic signatures in E-Commerce and summarize the various laws relating to it.
4. Categorize international cyber laws and cyber crimes.
5. Explore Penalties, Compensation and Adjunction of violations of provisions of IT Act 2000
6. Classify and Outline theoffences under the Cyberspace law and the Internet in India

**UNIT-I**

**Introduction to cyber Security, cryptography, Types of Attacks, Secrete Key Cryptography**

Introduction: Cyber attacks, Defense Strategies and Techniques Mathematical background for Cryptography: Modulo arithmetic, The greatest common divisor, Useful Algebraic Structures, Chinese Remainder Theorem Basics of Cryptography: Secret versus Public key Cryptography, Types of attacks, Elementary substitution Ciphers, Elementary Transposition Ciphers, Other Cipher Properties Secrete Key Cryptography: Product Ciphers, DES Construction, Modes of Operation, MAC and other Applications, Attacks, Linear Crypt analysis.

**UNIT-II**

**Introduction to Computer Security, Internet, E-commerce and E-governance with reference to Free Market Economy**

Definition, Threats to security, Government requirements, Information Protection and Access Controls, Computer security efforts, Standards, Computer Security mandates and legislation, Privacy considerations, International security activity, Conceptual Framework of E-commerce: governance, the role of Electronic Signatures in E-commerce with Reference to Free Market Economy in India.

**UNIT-III**

**Law relating to electronic records and intellectual property rights in India**

Legal aspects of Electronic records / Digital signatures, Cyber laws, the roles and regulations of Certifying Authorities in India, Protection of Intellectual Property Rights in Cyberspace in India.

**UNIT-IV**

**International Efforts relating to Cyberspace laws and Cyber crimes**

International efforts related to Cyber laws, Council of Europe (COE) convention on Cyber Crimes.

**UNIT-V**

**Penalties, Compensation**

Penalties, Compensation and Adjunction of violations of provisions of IT Act 2000 and judicial review.

**UNIT-VI**

**Offences under the Cyberspace, Internet in India and Miscellaneous provisions of IT Act and Conclusions**

Some important offences under the Cyberspace law and the Internet in India, Other offences under the Information Technology Act in India, The role of Electronic Evidence and miscellaneous provisions of the IT Act.

**TEXT BOOK:**

1. Network security and Cryptography by Bernard Menezes CENGAGE Learning Publications, 2010.

2. Cyber Laws and IT Protection, Harish Chander, PHI, 2012

**REFERENCE BOOKS:**

**1.** Debby Russell and Sr. G.T Gangemi, "Computer Security Basics (Paperback)”, 2ndEdition, O’ Reilly Media, 2006.

**2.** Wenbo Mao, “Modern Cryptography – Theory and Practice”, Pearson Education, New Delhi, 2006.

3. Cyberspace and Cybersecurity, George Kostopoulos, Auerbach Publications, 2012.

4. Cyber Forensics: A Field Manual for Collecting, Examining, and Preserving Evidence of Computer Crimes, Second Edition, Albert Marcella, Jr., Doug Menendez, Auerbach Publications, 2007

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** | **M** | **M** | **L** |  |  |  |  |  |  |

H: High,M: Medium, L: Low Correlation

**Syllabus for B.Tech III year II Semester**

**B.Tech. (CSE) - Cyber Security**

### Machine Learning

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8EC17**

**Prerequisite: Introduction to Data Science**

**Course Objectives:**

1. To introduce students to the basic concepts and techniques of Machine Learning.
2. To have a thorough understanding of the Supervised and Unsupervised learning techniques
3. To study the various probability based learning techniques
4. To understand graphical models of machine learning algorithms

**Course Outcomes:**

At the end of this course, the student is able to

1. Understand the fundamental concepts of ML and Designing a Learning System.
2. Understand the basic concepts of MLP,RBF and SVM and their applications.
3. Understand the Probability models namely supervised, unsupervised,basic statistics analyze their analysis of algorithms along with their applications.
4. Understand various Dimensionality Reduction Techniques and Apply various Evolutionary Algorithms with models
5. Understand the Graphical models and their applications
6. Understanding Analytical Learning and Analyze KBANN Algorithm.

**UNIT I: INTRODUCTION:**

Learning (Book-1) – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Linear Discriminants: Definitions of Perceptron, Linear Separability Linear Regression.

Design a Learning System (Book-2) – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm.

**UNIT II: LINEAR MODELS:**

Multi-layer Perceptron(Book-1) – Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Interpolations and Basis Functions – Support Vector Machines

**UNIT III: TREE AND PROBABILISTIC MODELS:**

Learning with Trees (Book-1) – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms

**UNIT IV: DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS:**

Dimensionality Reduction(Book-1) – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example

**UNIT V: GRAPHICAL MODELS:**

Markov Chain Monte Carlo Methods (Book-1) – Sampling – Proposal Distribution – Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods

**UNIT – VI ANALYTICAL LEARNING**

Learning with perfect domain theory (Book-2) – Explanation based Learning – Inductive analytical approach to learning – KBANN algorithm

**TEXT BOOKS:**

1. Stephen Marsland, ―Machine Learning – An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.

2. Tom M Mitchell, ―Machine Learning, First Edition, McGraw Hill Education, 2013.

**REFERENCES:**

1. Peter Flach, ―Machine Learning: The Art and Science of Algorithms that Make Sense of Data‖, First Edition, Cambridge University Press, 2012.

2. Jason Bell, ―Machine learning – Hands on for Developers and Technical Professionals‖, First Edition, Wiley, 2014

3. EthemAlpaydin, ―Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press, 2014.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **L** | **M** | **M** |  |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year II Semester**

**B.Tech. (CSE) - Cyber Security**

### Automata Theory and Compiler Design

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **2** | **1** | **0** | **3** |

**Code: 8FC07**

**Prerequisite: NIL**

**Course Objectives:**

Learn principles of Finite state machine, finite automation models, and transition diagrams.

Understand regular languages and expressions for writing grammars.

Understand context free grammars useful in designing compilers.

Study the design and working of a complier .

Study the role of grammars in compiler design.

Learn a various parsing techniques for design of compilers.

**Course Outcomes:** At the end of this course the student will be able to

|  |
| --- |
| 1.  Design the finite automata different Languages |
| 2.   Construct finite Automata for a given regular expressions, and derive strings with suitable examples. Conceptualize context free grammars and normal forms. |
| 3. Design the push down automata and Turing Machine for complex languages. |
| 4. Understand LEX tool and relate parsing techniques, |
| 5. Demonstrate and solve problems on SLR, CLR, LALR, operator precedence parser, LR (O), LR(1), LR(K) grammar and use YACC tool. |
| 6. Understand Semantic Analysis concepts to design compiler: and describe Intermediate code generation such as 3-address code form. |

**UNIT-I:** Strings, Alphabet, Language, Operations, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton,   
 Equivalence between NFA to DFA conversion.

**UNIT-II: Regular Languages**, Regular sets, regular expressions, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Closure properties of regular sets (proofs not required).

**Context Free Grammars:** Context free grammar, derivation trees, Right most and leftmost derivation of strings. Ambiguity in context free grammars.Minimization of Context Free Grammars. Chomsky normal form, Greiback normal form,

**UNIT-III:** Push down automata: definition, model, acceptance of CFL, Introduction to DCFL and DPDA.  
**Turing Machine:** Turing Machine, definition, model, design of TM, recursively enumerable languages. Chomsky hierarchy of languages

**UNIT IV:** Overview of compiler – Environment, pass, phase, phases of compiler, LEX tool,

Top Down Parsing: Top down parsing technique, Recursive decent parsing with back tracking, Ambiguous grammar, Elimination of left recursion, Left factoring, Predictive parsing, LL (1).

**UNIT V** Bottom up parsing: shift reduce parser SLR, CLR, LALR, operator precedence parser, LR (O), LR(1), LR(K) grammar, YACC tool.

**UNIT VI:** Semantic Analysis: Syntax directed translation, S- Attributed, L Attributed definition, Type checker, Intermediate code generation: 3-address code form, DAG. Code optimization: Optimization, loop optimization, peep-hole optimization, Symbol table format

**TEXTBOOKS:**

1. Introduction to Automata Theory Languages and Computation. Hopcroft H.E. and Ullman J. D. Pearson Education
2. Introduction to Theory of Computation? Sipser 2nd edition Thomson
3. Compilers Principles, Techniques and Tools Aho, Ullman, Ravisethi, Pearson Education

**REFERENCES:**

1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
2. Introduction to languages and the Theory of Computation ,John C Martin, TMH
3. Elements of Theory of Computation?, Lewis H.P. &amp; Papadimition C.H. Pearson /PHI.
4. Theory of Computer Science Automata languages and computation -Mishra and Chandrashekaran, 2nd edition, PHI Course Requirements.
5. Modern Compiler Construction in C , Andrew W.Appel Cambridge University Press.
6. Compiler Construction, LOUDEN, Thomson

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  | **M** | **M** | **M** | **H** |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year II Semester**

**B.Tech. (CSE) - Cyber Security**

### Data Mining Lab & Machine Learning Using Python Lab

**(common to CSE-AI&ML, CSE-DS, CSE-IOT, CSE-CS)**

**L T P/D C**

**0 0 2 1**

**Code: 8LC61**

**Prerequisite:** NIL

**Course Objectives:**

Learn how to build a data warehouse and query it. Learn to perform data mining tasks using a data mining toolkit. Understand the data sets and data preprocessing. Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression. Exercise the data mining techniques with varied input values for different parameters. To obtain Practical Experience Working with all real data sets. Emphasize hands-on experience working with all real data sets.

**Course outcomes:** At the end of this course the student will be able to

1. Work with the ETL and Mining tools.
2. Demonstrate the classification, clustering techniques on the data sets.
3. Comprehend the results obtained in the clustering, Association and Classification techniques applied on the data sets with varied input parameters.
4. Ability to apply mining techniques for realistic data.
5. The practical/exercises in this section are psychomotor domain Learning Outcomes (i.e. subcomponents of the COs), to be developed and assessed to lead to the attainment of the competency.
6. Understand modern notions in predictive data analysis
7. Select data, model selection, model complexity and identify the trends
8. Understand a range of machine learning algorithms along with their strengths and weaknesses
9. Build predictive models from data and analyze their performance

**Data Mining Lab Exercises**

1. Compare the GRI and Apriori usage (Prepare a sample data set in Spread Sheet).
2. Determine the Drugs importance w.r.t. Age, Cholestrol and BP using C 5.0.
3. Predict the accuracy of the test data set using Neural Net model using a Case Study of Botanical data set.
4. Compare the C 5.0 and Neural Net using the sample data.
5. Using the BASKETS1n dataset, select the data as given below.

a) Customer age < 35 and count the customers who buy dairy and VEG products

b) Find the AVG income of customers who buy at least 5 products

1. Using the BASKETS1n dataset, select the data as given below.

a) Derive the field whose home own is 'YES' and Age > 30 and sort data w.r.t. income in

Ascending order, and output only the item fields.

b) Find the mean value of salary w.r.t age = {Young, Middle, Senior}.

7. Demonstrate the WEKA machine learning toolkit and perform the following exercises

* Determine the numbers of instances of each class are present in the data
* Load the weather dataset and remove all instances where the attribute ‘humidity’ has the value ‘high’?
* Load the iris dataset and view the Visualizer panel.

**Mini Project**

**Machine Learning Using Python Lab Exercises**

**1.**Write a python program to compute

* Central Tendency Measures: Mean, Median, Mode
* Measure of Dispersion: Variance, Standard Deviation

2. Study of Python Basic Libraries such as Statistics, Math, Numpy and Scipy

3. Study of Python Libraries for ML application such as Pandas and Matplotlib

4. Write a Python program to implement Simple Linear Regression

5. Implementation of Multiple Linear Regression for House Price Prediction using sklearn

6. Implementation of Decision tree using sklearn and its parameter tuning

7. Implementation of KNN using sklearn

8. Implementation of Logistic Regression using sklearn

9. Implementation of K-Means Clustering

10. Performance analysis of Classification Algorithms on a specific dataset

**(Mini Project)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO’s** | 1 | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **L** | **M** | **M** |  |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year II Semester**

**B.Tech. (CSE) - Cyber Security**

### Cyber Security and Compiler Design Lab

**L T P/D C**

**0 0 2 1**

**Code:** 8JC62

**Prerequisite(s):** Data Communications and Computer Networks, Information Security

**Course Objective:** To get practical exposure of Cyber security threats and Forensics tools. Understand the working of the compilers and is functions.

**Course Outcome:** At the end of this course, the student is able to

1. Use Autopsy tool to perform Memory capture and analysis.
2. Demonstrate Network analysis using Network miner tools
3. Demonstrate Lex and Yacc tools to simulate the grammar types used in the compilers.

**Cyber Security Exercises:**

1. Perform an Experiment for port scanning with NMAP
2. Install Jscript/Cryptool tool (or any other equivalent) and demonstrate Asymmetric, Symmetric crypto algorithm, Hash and Digital/PKI signatures.
3. Perform practical approach to implement Footprinting-Gathering target information using Dmitry-Dmagic, UAtester
4. Monitor the network communication with sniffers (like Wireshark).
5. Using Snort, perform real time traffic analysis and packet logging.
6. Perform email analysis, Filetype detection using the Autopsy tool.
7. Perform Registry analysis and get boot time logging using process monitor tool
8. Perform Memory capture and analysis using FTK imager tool
9. Perform Network analysis using the Network Miner tool

**Compiler Design Programs:**

1. Implement the DFA that accepts all the string of a’s and b’s where number of a’s is divisible by 3 and number of b’s is divisible by 2.
2. Design and execute lex program to implement lexical analyzer functionality.
3. Write a program to implement lexical analyzer using c program.
4. Design and execute recursive descent parser for the grammar
   1. E->E+T E->T T->T\*F T->F F->(E)/id,
   2. S->(L) S->a L->L,S L->S
5. Write a YACC program to implement top down parser for the given grammar.
6. Write a YACC program to evaluate algebraic expression.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **H** | **H** | **H** | **M** |  |  |  |  | **M** |  |  | **H** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year II Semester**

**B.Tech. (CSE) - Cyber Security**

### Comprehensive Viva Voce

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **0** | **0** | **0** | **1** |

**Code: 8J681**

**Prerequisite:** All core Courses till this semester

**Course Objectives:**

Prepare students in basics and advanced relevant courses to revise and face technical interviews for enhancing employability.

**Course Outcomes:** At the end of this course the student will be

1. Describe the core concepts of the subjects that they have studied till the completion of that academic year.

Comprehensive Viva Voce will be conducted in third year second semester for 100 marks. Out of 100 marks 30 marks are evaluated internally and 70 marks for external evaluation.

**Internal:**

Comprehensive Viva Voce is conducted twice in a semester and evaluated for 30 marks each and average will be considered for internal.

Internal Examination : 30 Marks

End examination : 70 Marks.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. The end examination will be carried out by a committee consisting of an external examiner, head of the department, and subject experts.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** | **M** | **L** | **L** | **L** | **L** | **H** | **H** |  | **H** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech III year II Semester**

**B.Tech. (CSE) - Cyber Security**

### Group Project

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **0** | **0** | **2** | **1** |

**Code: 8J694**

**Prerequisite:** All courses till this semester

**Course Objectives:**

To acquire basic knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

**Course Outcomes:**  At the end of this course the student will be able to

1. Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
2. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
3. Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
4. Improve their communicative skills and team skills largely improve.
5. Work as an individual and in a team.

A group project shall be carried out by a group of students consisting of 2 to 3 in number in third year first semester. This work shall be carried out under the guidance of the faculty assigned as internal guide and shall involve design, fabrication, software development or any other significant activity. This can be of interdisciplinary nature also.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external

The **internal evaluation** shall consist of:

Day to day work : 15 marks

Report : 05 marks

Demonstration / presentation : 10 marks

-----------

30 marks

End examination : 70 Marks.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the supervisor.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  |  |  |  |  |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year I semester**

**CSE-Cyber Security**

### Web and Database Security

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**(Professional Elective –III)**

**Code: 8JC04**

**Prerequisite: Database Management System, Information Security**

Course Objectives:

1. Give an Overview of information security

2. Give an overview of Access control of relational databases

**Course Outcomes:** At the end of this course, students will be able to

1. Understand the Web architecture and applications.

2. Understand client side and server-side programming.

3. Understand how common mistakes can be bypassed and exploit the application.

4. Identify common application vulnerabilities.

**UNIT - I** The Web Security, The Web Security Problem, Risk Analysis and Best Practices Cryptography and the Web: Cryptography and Web Security, Working Cryptographic Systems and Protocols, Legal Restrictions on Cryptography, Digital Identification

**UNIT - II** The Web’s War on Your Privacy, Privacy-Protecting Techniques, Backups and Antitheft, Web Server Security, Physical Security for Servers, Host Security for Servers, Securing Web Applications

**UNIT – III: Client-side attacks and defenses-** Cookies and Sessions, Session attacks, Cross-Site Request Forgery, Cross-Site Scripting Defenses, Denial-of-service, Phishing, [XS-Leaks](https://xsleaks.dev/), Online Tracking, Skim, **Server-side attacks and defenses**- Server security, Safe coding practices, HTTPS and the Lock Icon, HTTPS in the Real World, Authentication, WebAuthn - The future of user authentication on the web.

**Unit - IV**

Database Security: Recent Advances in Access Control, Access Control Models for XML, Database Issues in Trust Management and Trust Negotiation, Security in Data Warehouses and OLAP Systems

**UNIT - V** Security Re-engineering for Databases: Concepts and Techniques, Database Watermarking for Copyright Protection, Trustworthy Records Retention, Damage Quarantine and Recovery in Data Processing Systems, Hippocratic Databases: Current Capabilities

**UNIT - VI** Future Trends Privacy in Database Publishing: A Bayesian Perspective, Privacy-enhanced Locationbased Access Control, Efficiently Enforcing the Security and Privacy Policies in a Mobile Environment

**TEXT BOOKS:** 1. Web Security, Privacy and Commerce Simson GArfinkel, Gene Spafford, O’Reilly. 2. Handbook on Database security applications and trends Michael Gertz, Sushil Jajodia.

**REFERENCE BOOKS:** 1. Andrew Hoffman, Web Application Security: Exploitation and Countermeasures for Modern Web Applications, O’reilly. 2. Jonathan LeBlanc Tim Messerschmidt, Identity and Data Security for Web Development - Best Practices, O’reilly. 3. McDonald Malcolm, Web Security For Developers, No Starch Press, US.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** | **M** | **H** | **M** | **M** | **M** | **H** | **M** | **H** | **H** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year I semester**

**CSE-Cyber Security**

### Software Requirements and Estimation

**(Professional Elective –III)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code : 8FC14**

**Prerequisite: Software Project Management**

**Course Objectives:**

1. Demonstrate the knowledge of the distinction between critical and non- critical systems and should author a software requirements document.
2. Understand the proper contents of a software requirements document and distributed system architectures and application architectures.

**Course Outcomes:** At the end of this course the student will be able to

1. Explain need, practices and Risk issues in Software requirements.
2. Describe Software Requirements Engineering elements such as review, quality and priorities.
3. Explain software Modeling and Requirements Management.
4. Apply Estimation methods for size using Mark II FPA, Full Function Points, LOC Estimation.
5. Apply Cost and Schedule estimation factors during software development.
6. Apply tools for Requirements Management and Estimation.

**UNIT- I Software Requirements: What and Why** Essential Software requirement, Good practices for requirements engineering, Improving requirements processes, Software requirements and risk management

**UNIT –II Software Requirements Engineering** Requirements elicitation, elicitation techniques, requirements analysis, documentation, review, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality.

**UNIT – III Software Requirements Modeling**, Analysis Models, Use Case Modeling, Dataflow diagram, state transition diagram, class diagrams.

**Software Requirements Management** Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain.

**UNIT IV Software Estimation** Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation Size **Estimation** Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, and Conversion between size measures.

**UNIT - V Effort, Schedule and Cost Estimation** What is Productivity?Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Cost Estimation.

**UNIT – VI Tools for Requirements Management and Estimation** Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber – RM, implementing requirements management automation.

**Software Estimation Tools:** Desirable features in software estimation tools, IFPUG, USC’s COCOMO II, and SLIM (Software Life Cycle Management) Tools.

**TEXT BOOK:**

1. Software Requirements and Estimation by Rajesh Naik and Swapna Kishore, Tata Mc Graw Hill.

**REFERENCE BOOKS:**

1. Software Requirements by Karl E. Weigers, Microsoft Press.

2. Managing Software Requirements, Dean Leffingwell& Don Widrig, Pearson Education, 2003.

3. Mastering the requirements process, second edition, Suzanne Robertson & James Robertson, Pearson Education, 2006.

4. Estimating Software Costs, Second edition, Capers Jones, TMH, 2007.

5. Practical Software Estimation, M.A. Parthasarathy, Pearson Education, 2007.

6. Measuring the software process, William A. Florac& Anita D. Carleton, Pearson Education, 1999.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** |  | **M** | **H** | **H** |  |  |  |  |  |  | **H** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year I semester**

**B.Tech. (CSE) - Cyber Security**

### Big Data Analytics

**(Professional Elective –III)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8EC18**

**Prerequisites:** Machine Learning

**Course Objectives:**

1. To explore the fundamental concepts of big data analytics.
2. To understand storage and parallel processing of Big Data using Hadoop
3. To introduce programming tools like HIVE, SQOOP, HBASE in Hadoop ecosystem.
4. To understand the applications using Apache Spark RDD Concepts.
5. To know high level API like Data Frames and Spark SQL
6. To teach the fundamental techniques and principles in achieving big data analytics with stream processing.

**Course Outcomes:**

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

|  |
| --- |
| 1. Comprehend the fundamentals of big data analytics and understand how Hadoop solves the big data problem in real life. |
|
| 2. Interpret the challenges with big data and elaborate the knowledge about the technological developments in big data environment. |
| 3. Demonstrate the difference between NOSQL and SQL databases. |
| 4. Discuss the Hadoop distributed file system (HDFS) framework and anatomy of Hadoop map-reduce. |
| 5. Design the algorithms to process big data using Apache Spark Low Level API. |
|
| 6. Apply Hadoop Data Analysis to social Media Analytics and Opinion Mining on Tweets. |
|

**UNIT– I:**

Introduction to Big Data: Big Data Analytics, Characteristics of Big Data – The Four Vs, importance of Big Data, Different Use cases, Data-Structured, Semi-Structured, Un-Structured

Introduction to Hadoop and its use in solving big data problems. Comparison Hadoop with RDBMS, Brief history of Hadoop, Apache Hadoop EcoSystem, Components of Hadoop, The Hadoop Distributed File System (HDFS):, Architecture and design of HDFS in detail, Working with HDFS (Commands)

**UNIT-II**

Anatomy of Hadoop map-reduce (Input Splits, map phase, shuffle, sort, combiner, reduce phase) (theory)

Hive: Introduction to Hive, data types and file formats, HiveQL data definition(Creating Databases and Tables),HiveQL for Data loading, HiveQL data manipulation, Logical joins, Window functions, Optimization, Table partitioning, Bucketing, Indexing, Join Strategies.

**UNIT-III**

SQOOP : Introduction to SQOOP, SQOOP imports : From Database to HDFS/Hive, SQOOP exports: From HDFS/Hive to Database, Incremental imports

NoSQL &HBase: Overview, HBasearchitecture, CRUD operations

**UNIT-IV**

SPARK Basics: History of Spark, Spark Architecture, Spark Shell, Working with RDDs in Spark: RDD Basics, Creating RDDs in Spark. RDD Operations. Passing Functions to Spark, Transformations and Actions in Spark, Spark RDD Persistence

Working with Key/Value Pairs: Pair RDDs, Transformations on Pair RDDs, Actions Available on Pair RDDs

**UNIT-V**

Structured API :DataFramesSQL : Overview of Structured Spark Types, Schemas, Columns and Expressions, DataFrame Transformations, Working with different types of data,

Aggregations- Aggregation Functions, Grouping, User-Defined Aggregation Functions, ,Joins-[Inner Joins](https://learning.oreilly.com/library/view/spark-the-definitive/9781491912201/ch08.html#inner-joins), [Outer Joins](https://learning.oreilly.com/library/view/spark-the-definitive/9781491912201/ch08.html#outer-joins), Processing CSV Files, JSON Files, Text Files and Parquet Files, Spark SQL

**UNIT-VI**

Spark streaming: Stream Processing Fundamentals, Structured Streaming Basics - Core Concepts, Structured Streaming in Action, Transformations on Streams, Input and Output(Kafka)

Case study: Twitter Stream processing application

**Text Books:**

1. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley,2012
2. SPARK: The Definitive Guide, Bill Chambers &MateiZaharia, O'Reilley, 2018 Edition

**REFERENCES:**

1. "Hadoop Operations", O'Reilley, Eric Sammer,2012
2. "ProgrammingHive",O'Reilley,E.Capriolo,D.Wampler,andJ.Rutherglen, 2012
3. "HBase: The Definitive Guide", O'Reilley, Lars George,2011
4. Big Data, Big Analytics: Emerging, Michael Minnelli, Michelle Chambers, and AmbigaDhiraj

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **L** |  | **H** |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year I semester**

**CSE- Cyber Security**

### Computer Vision

**(Professional Elective –III)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8FC19**

**Prerequisite:** Image Processing

**Course Objectives:**

In this course students will learn basic principles of image formation, image processing algorithms and different algorithms for 3D reconstruction and recognition from single or multiple images (video). This course emphasizes the core vision tasks of scene understanding and recognition. Applications to 3D modeling, video analysis, video surveillance, object recognition and vision based control will be discussed.

**Course Outcomes:**

After learning the course the students should be able to:

1. Understand the basic fundamentals of computer vision and diversity of computer vision applications
2. Explore the various camera models, multi view geometry, structures and generate 3D model from images
3. Analyze and apply image preprocessing, continuous and discrete representation methods and feature extraction techniques
4. Apply regularization theory, optical communication ,stereo vision, and motion estimation techniquesto detect moving objects in a video
5. Illustrate different image shape representations and understand Fourier and wavelet descriptors and segmentation methods
6. Understand various object recognition methods, Hough transforms and illustrate shape matching

**UNIT 1:**

Introduction : Computer Vision and Computer Graphics , What is Computer Vision - Low-level, Mid-level, High-level , Overview of Diverse Computer Vision Applications: Document Image Analysis, Biometrics, Object Recognition, Tracking, Medical Image Analysis, Content-Based Image Retrieval, Video Data Processing, Multimedia.

**UNIT 2:**

Image Formation Models : Monocular imaging system , Radiosity: The ‘Physics’ of Image Formation, Radiance, Irradiance, BRDF, color etc, Orthographic & Perspective Projection,• Camera model and Camera calibration, Binocular imaging systems, Multiple views geometry, Structure determination, shape from shading , Photometric Stereo, Depth from Defocus , Construction of 3D model from images

**UNIT 3:**

Image Processing and Feature Extraction: Image preprocessing, Image representations (continuous and discrete), Edge detection

**UNIT 4:**

Motion Estimation: Regularization theory, Optical computation, Stereo Vision, Motion estimation, Structure from motion

**UNIT 5:**

Shape Representation and Segmentation: Contour based representation, Region based representation, Deformable curves and surfaces, Snakes and active contours, Level set representations, Fourier and wavelet descriptors, Medial representations, Multiresolution analysis

**UNIT 6:**

Object recognition: Hough transforms and other simple object recognition methods, Shape correspondence and shape matching, Shape priors for recognition

**Text books:**

1. Computer Vision - A modern approach, by D. Forsyth and J. Ponce, Prentice Hall Robot

    Vision, by B. K. P. Horn, McGraw-Hill.

2. Introductory Techniques for 3D Computer Vision, by E. Trucco and A. Verri, Publisher:     Prentice Hall.

**Reference Books:**

* + 1. R. C. Gonzalez, R. E. Woods. Digital Image Processing. Addison Wesley Longman, Inc., 1992.

1. D. H. Ballard, C. M. Brown. Computer Vision. Prentice-Hall, Englewood Cliffs, 1982.
2. Richard Szeliski, Computer Vision: Algorithms and Applications (CVAA). Springer, 2010 4. Image Processing, Analysis, and Machine Vision. Sonka, Hlavac, and Boyle. Thomson.
3. E. R. Davies, Computer & Machine Vision, Fourth Edition, Academic Press, 2012
4. Simon J. D. Prince, Computer Vision: Models, Learning, and Inference, Cambridge

University Press, 2012

1. Mark Nixon and Alberto S. Aquado, Feature Extraction & Image
2. Processing for Computer Vision, Third Edition, Academic Press, 2012

**List of Open Source Software/learning website:**

1. Computer Vision. Ballard and Brown

2. Invitation to 3D Vision: From Images to Geometric Models: Y. Ma, S. Soatto, J. Kosecka and Sastry

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** |  |  | **M** | **M** | **M** | **M** |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech IV Year I semester**

**CSE- Cyber Security**

### Digital Forensics

**(Professional Elective –IV)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8EC22**

**Prerequisite: Digital Electronics, Operating System, Computer Organization**

**Course Objectives:**

1. To understand the basic digital forensics and techniques for conducting the forensic examination on different digital devices.
2. To understand how to examine digital evidences such as the data acquisition, identification analysis.

**Course Outcomes:**

At the end of this course the student will be able to

1. OutlineForensicscienceandDigitalForensicconcepts
2. Comprehend the technical concepts involved in understanding the digital forensics.
3. Interpretthecyberpiecesofevidence,Digitalforensicprocessmodel.
4. Familiarize the computer operating system concepts involved in digital forensics.
5. Determine the legalaspects of Digital Forensics.
6. Demonstratevariousforensictoolstoinvestigatethecybercrimeandtoidentifythedigitalpiecesof evidence

**UNIT I: Introduction:**

Understanding of forensic science, digital forensic, The digital forensic process, Locard’s

Exchange principle, scientific models.

**UNIT II: Understanding of thetechnicalconcepts:**

Basic computer organization, File system, Memory organization concept, Data storage concepts

**UNIT III: Digital Forensics Process Model:**

Introduction to cybercrime scene, Documenting the scene and evidence, maintaining the

Chain of custody, forensic cloning of evidence, Live and dead system forensic, Hashing concepts to maintain the integrity of evidence, Report drafting.

**UNIT IV: Computer Operating System Artifacts:**

Finding deleted data, hibernating files, examining window registry, recycle bin operation, understanding of metadata, Restore points and shadow copies

**UNIT V: Legal aspects of digital forensics:**

Understanding of legal aspects and their impact on digital forensics, Electronics discovery

**UNIT VI: Understanding of digital Forensic tools**

Quality assurance, Tool validation, Tool selection, Hardware and Software tools

**CaseStudy:**

Understanding of Internet resources, Web browser, Email header forensic, social

Networkingsites

**Text Books:**

1. ThebasicsofdigitalForensics(LatestEdition)–TheprimerforgettingstartedindigitalforensicsbyJohnSammons – Elsevier Syngress Imprint

**References:**

1. Cybersecurity–Understandingofcybercrimes,computerforensicsandLegalperspectivesbyNinaGodboleand SunitBelapure – WileyIndia Publication
2. PracticalDigitalForensics–RichardBoddington[PACKT]Publication,Opensourcecommunity
3. <https://nptel.ac.in/>
4. <https://www.coursera.org/>
5. Ministry of Electronics and Information Technology (MeitY) – Govt of India – Information Security Project -https://[www.infosecawareness.in/](http://www.infosecawareness.in/)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **L** | **M** | **M** | **H** | **M** | **H** | **M** | **M** | **M** | **M** | **H** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year I semester**

**CSE- Cyber Security**

### Software Automation and Testing

**(Professional Elective –IV)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8F711**

**Prerequisite:** Software Engineering and OOAD

**COURSE OBJECTIVES:**

To Understand the Basic concepts in Software testing, concepts of Flow graphs, Path testing and  Data Flow Testing, understand the concept of metrics and their types. Understand and implement various testing techniques and to make a thorough study on various testing tools. Set a strategy for testing environment and to learn the testing methodologies in detail.

**COURSE OUTCOMES :** At the end of this course, the students will be able to

1. Explain the concepts of Software testing
2. Apply the concepts Flow graphs, Path testing and Data Flow Testing in testing the modules**.**
3. Practice Software testing strategy and Environment with economics and apply Software Metrics useful in software development and maintenance.
4. Describe defects hard to find and explain various the Verification and validation, Functional and structural, Workbench concept, software testing methodologies
5. Demonstrate Software Testing Techniques such as JADs, Pareto Analysis , Regression Tasting, Structured walkthroughs, Thread testing , Performance testing and White box testing.
6. Describe Graph matrices and applications, and practice and apply automated testing tools such load Runner, UFT and QTP.

**UNIT I** : What is Testing, Characteristics of Test Engineers, Software Testing Life Cycle, Levels of Testing, Testing Approaches, Test Cases: Format for Writing Test Case, Test plan: Format to prepare Test plan Purpose of testing, Dichotomies, Consequences of bugs

**UNIT II: Flow graphs and Path testing: Basics** concepts of path testing, predicates, path predicates and achievable paths, application of path testing. Data Flow Testing: Basics of Data flow Testing Logic Based Testing : Decision Tables

**UNIT III :**Software testing strategy and Environment, Establishing testing policy, structured approach to testing, Test factors, Economics of SDLC testing. Software Metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

**UNIT IV:** Software Testing Methodology, Defects hard to find, Verification and validation, Functional and structural, Defects and Failures, Testing that parallels the software Development process, Workbench concept, Eight Consideration of software testing methodology, testing tactics checklist. Importance of Agility, Building an Agile Testing Process

**UNIT V**: Software Testing Techniques, Black**-**box, Boundary value, Branch coverage, Cause Effect graphing, CRUD, Database, Histogram, Gray box, Inspections, JADs, Pareto Analysis , Prototyping , Random Testing, Risk based testing , Regression Testing, Structured walkthroughs, Thread testing , Performance testing, Stress Testing, Accepting Testing, White box testing, Alpha and Beta Testing.

**UNIT VI:** Graph matrices and application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm. Need for Automated testing tools, Taxonomy of Testing Tools, Exposure to Software Testing Tools: Load Runner, UFT and QTP.

**Text Books**

1. Software testing techniques – Boris Beizer, Dreamtech, second edition.(Unit 1,2,6)
2. Software testing tools – by Dr. K.V.K.K Prasad Dreamtech (Unit 1,6)
3. Effective Methods for Software Testing, 2nd Edition by William E.Perry, Wiley publications.(Unit 3,4)
4. Software Testing and continuous Quality Improvement, by William E.Lewis,Gunasekaran,2nd Edition Auerbach publications (Unit 5,Refer Internet)
5. Software Engineering A practitioner’s Approach, Roger S Pressman, 6th edition. McGrawHill International Edition (Unit 3)

**References**

1. Software Testing Techniques ,by Bories Beizer, Second Edition, Dreamtech Press
2. Testing and Quality Assurance for Component based software ,by Gao, Tsao and Wu, Artech House Publishers
3. Managing the Testing Process, by Rex Black,Wiley.
4. Handbook of Software Quality Assurance, by G.Gordon Schulmeyer, James I.McManus,2nd Edition, International Thomson Computer Press

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **L** | **L** | **L** | **L** | **M** | **L** |  |  |  |  | **M** |

**Syllabus for B. Tech. IV Year I semester**

**CSE- Cyber Security**

### Scripting Languages

**(Professional Elective –IV)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8JC05**

**Prerequisites:** Computer Programming and Data Structures, Object Oriented Programming Concepts

**Course Objectives:**

1. This course introduces the script programming paradigm
2. Introduces scripting languages such as Perl, Ruby and TCL.

**Course Outcomes**: At the end of this course, the student is able to

1. Identify the between typical scripting languages and typical system and application programming languages.
2. Discuss the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.
3. Demonstrate programming skills in scripting language

**UNIT - I**

Introduction: Ruby, Rails, The structure and Excution of Ruby Programs, Package Management with RUBY GEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Webservers, SOAP andweb services RubyTk–SimpleTkApplication, widgets, Binding events, Canvas, scrolling

**UNIT - II**

Extending Ruby: Ruby Objects in C, the Jukebox extension, Memory allocation, RubyType System, Embedding Ruby to Other Languages, Embedding a Ruby Interpreter

**UNIT - III**

Introduction to PERL and Scripting

Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL-Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

**UNIT - IV**

Advanced Perl

Finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

**UNIT – V: TCL**

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and up level commands, Namespaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

**Unit VI:** Tk Tk-Visual ToolKits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl-Tk.

**TEXTBOOKS:**

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Ruby Progamming language by David Flanagan and Yukihiro Matsumoto O’Reilly
3. “ProgrammingRuby”ThePramaticProgammersguidebyDabveThomasSecondedition

**REFERENCEBOOKS:**

1. OpenSource Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J.Lee and B.Ware (AddisonWesley)Pearson Education.
2. Perl by Example, E .Quigley, Pearson Education.
3. ProgrammingPerl,LarryWall,T.ChristiansenandJ.Orwant,O’Reilly,SPD.
4. Tcland the TkToolkit, Ousterhout, PearsonEducation.
5. Perl Power, J.P.Flynt,CengageLearning.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **L** | **L** | **L** | **L** | **M** | **L** |  |  |  |  | **M** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year I semester**

**CSE- Cyber Security**

### Linux Programming

**(Professional Elective –IV)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code : 8F710**

**Prerequisite :** Operating Systems

**Course Objectives:**

1. Induce working principles of Linux operating system, usage of File handling utilities, Security by file permissions, process utilities, Disk utilities, networking utilities.
2. Impart the shell responsibilities and meta-characters of it, control structures, shell interrupt processing, functions, debugging shell scripts.
3. Impart basics of file concepts kernel support for file, file structure and low-level I/O functions, system calls (file API’s). Induce knowledge regarding Directory management and its API.
4. Demonstrate basics of process creation, execution and synchronization mechanisms. Give knowledge regarding a signal, need for having them, usage of various signals.
5. Narrate the need for Inter Process Communication. Explore the possible mechanisms to implement System V APIs. To demonstrate the usage of Message queues.
6. Incorporate implementation for semaphore API and shared memory API. To explain the need for using a basic Client-Server model.

**Course Outcomes:** At the end of this course, the student will be able to

1. List and demonstrate the basic Linux utilities
2. Recite and solve problems using Shell Scripting
3. Understand and elaborate File System structure and kernel supportfor files in Linux.
4. Summarize the fundamentals of process control primitives and signal handling.
5. Classify the techniques of Inter process communication and apply them to real world problems.
6. Demonstrate the significance of Semaphores for Kernel support and simulate program using the same.

**UNIT-I :**  Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities, sed – scripts, operation, addresses, commands, applications, awk – execution, fields and records, scripts, operation, patterns, using system commands in awk.

(Applications: Determining what types of files are present in a system, debugging issues with file accessibility, finding a process troubling for a task and discarding from its existing, Write and extract necessary information from huge test files.)

**UNIT – II:** Working with the Bourne again shell(bash): Introduction, shell responsibilities, pipes and input Redirection, output redirection, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

(Applications: Writing shell scripts for automating most of the regular jobs, taking backup on regular basis and restoring the same)

**UNIT-III:** Files: File Concept, File System Structure, I nodes, File Attributes, File types, Library functions, the standard I/O and formatted I/O in C, stream errors, kernel support for files, System calls, file descriptors, low level file access – File structure related system calls (File APIs), file and record locking, file and directory management – Directory file APIs, Symbolic links & hard links. (Applications: write some system programs to interact with file system, developing small system software’s to work with files and devices, developing program’s on directory management system)

**UNIT-IV**: Process – Process concept, Kernel support for process, process attributes, process control - process creation, waiting for a process, process termination, zombie process, orphan process, Process APIs. Signals– Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions.

(Applications: Applications to find number of typical processes are under different context and controlling them in synchronous manner. Develop user defined modules for handling a signal and controlling several issues with signals.)

**UNIT-V**: Inter-process Communication: Introduction to IPC, Pipes, FIFOs, Introduction to three types of IPC-message queues, semaphores and shared memory. Message Queues Kernel support for messages, UNIX system V APIs for messages, client/server example.

(Applications: Developing applications complying with IPC mechanisms, developing an application that exchanges a set of messages among different processes. Write a client server application to go with any concurrent approach)

**UNIT- VI:** Semaphores-Kernel support for semaphores, UNIX system V APIs for semaphores. Shared Memory- Kernel support for shared memory, UNIX system V APIs for shared memory, semaphore and shared memory example.

(Applications: Develop critical section handling mechanisms to deal with any real problems. Building applications to share a piece of memory resource among processes concurrently)

**TEXT BOOKS:**

* + 1. Unix System Programming using C++, T.Chan, PHI.
  1. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH, 2006.
  2. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, Wiley India Edition,rp-2008

**REFERENCES:**

1. Linux System Programming, Robert Love, O’Reilly, SPD.
2. Advanced Programming in the Unix environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. Unix Network Programming, W.R. Stevens, PHI.
4. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** |  | **H** |  |  |  |  |  |  | **H** |

**Syllabus for B. Tech. IV Year I semester**

**CSE- Cyber Security**

**BLOCKCHAIN TECHNOLOGIES**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code:** 8EC13

**Prerequisite:** Information Security

**Course Objectives:**

By the end of the course, students will be able to understand how blockchain systems (mainly Bitcoin and Ethereum) work, To securely interact with them, Design, build, and deploy smart contracts and distributed applications, Integrate ideas from blockchain technology into their own projects.

**Course Outcomes:**

**At the end of this course the student will be able to**

1. Understand the principles of HDFS and digital signature.

2. Explore the blockchain Technology, Simplified Payment Verification protocol and its life cycle.

3. Analyze the Nakamoto consensus and differentiate proof-of-work and proof-of-stake consensus algorithms.

4. Understand the working of crypto currency, Bitcoin and Ethereum.

5. Explore Applications on legal issues of blockchain.

6. Explore new trends in blockchain technologies.

**UNIT I:Basics:** Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. **Cryptography:** Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof.

**UNIT II:Blockchain:** Introduction, Advantage over conventional distributed database, Blockchain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Private and Public blockchain.

**UNIT III:** Distributed Consensus: Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy utilization and alternate.

**UNIT IV:** Cryptocurrency: History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum - Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin

**UNIT V:** Cryptocurrency Regulation: Stakeholders, Roots of Bitcoin, Legal Aspects-Crypto currency Exchange, Black Market and Global Economy. Applications: Internet of Things, Medical Record Management System, Domain Name Service and future of Blockchain.

**UNIT VI** - (Trends and Topics) - Zero Knowledge proofs and protocols in Blockchain - Succinct non interactive argument for Knowledge (SNARK) - pairing on Elliptic curves - Zcash.

**TEXT BOOK:**

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).

**REFERENCES:**

1. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies 2. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System 3. DR. Gavin Wood, “ETHEREUM: A Secure Decentralized Transaction Ledger,” Yellow paper.2014. 4. Nicola Atzei, Massimo Bartoletti, and TizianaCimoli, A survey of attacks on Ethereum smart contracts

**Syllabus for B.Tech IV year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Introduction to Artificial Intelligence

**Code: 8LC01**

**Syllabus for B.Tech IV year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Vulnerability Assessment and Penetration Testing

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8JC01**

**Prerequisite:** Knowledge in information security, Web application

**Course Objectives:**

1. Introduce Vulnerability Assessment and Penetration Testing and the relevant Tools.
2. Gain familiarity of Meta split exploitation tool, Linux exploit and Windows exploit.
3. Gain knowledge on Web Application Security Vulnerabilities, Vulnerability analysis and Malware analysis.

**Course Outcomes: At the end of this course, the student will be able to**

1. Explain social engineering attacks
2. Classify and outline the vulnerabilities of a Web application.
3. Perform penetration testing
4. Analyze the malware type and impact.

**UNIT-I**

Introduction to Ethics of Ethical Hacking: Why you need to understand your enemy’s tactics, recognizing the gray are a sin security, Vulnerability Assessment and Penetration Testing. Penetration Testing and Tools: Social Engineering Attacks: How a social engineering attack works, conducting a social engineering attack, common attacks used in penetration testing, preparing yourself for face-to-face attacks, defending against social engineering attacks.

**UNIT - II**

Physical Penetration Attacks: Why a physical penetration is important, conducting a physical penetration, Common ways into a building, Defending against physical penetrations. Insider Attacks: Conducting an insider attack, Defending against insider attacks.

**UNIT - III**

Metasploit: The Big Picture, Getting Meta sploit, Using the Meta sploit Console to Launch Exploits, Exploiting Client-Side Vulnerabilities with Meta sploit, Penetration Testing with Metasploit’s Meterpreter, Automating and Scripting Meta sploit, Going Further with Metasploit.

**UNIT - IV**

Managing a Penetration Test: planning a penetration test, structuring a penetration test, execution of a penetration test, information sharing during a penetration test, reporting the results of a Penetration Test. Basic Linux Exploits: Stack Operations, Buffer Overflows, Local Buffer Overflow Exploits, Exploit Development Process. Windows Exploits: Compiling and Debugging Windows Programs, Writing Windows Exploits, Understanding Structured Exception Handling (SEH), Understanding Windows Memory Protections (XPSP3, Vista, 7 and Server 2008), Bypassing Windows Memory Protections.

**UNIT - V**

Web Application Security Vulnerabilities: Overview of top web application security vulnerabilities, Injection vulnerabilities, cross-Site scripting vulnerabilities, the rest of the OWASP Top Ten SQL Injection vulnerabilities, Cross-site scripting vulnerabilities. Vulnerability Analysis: Passive Analysis, Source Code Analysis, Binary Analysis.

**UNIT - VI**

Client-Side Browser Exploits: Why client-side vulnerabilities are interesting, Internet explorer security concepts, history of client- side exploits and latest trends, finding new browser-based vulnerabilities heap spray to exploit, protecting yourself from client-side exploit. Malware Analysis: Collecting Malware and Initial Analysis: Malware, Latest Trends in Honeynet Technology, Catching Malware: Setting the Trap, Initial Analysis of Malware.

**TEXT BOOKS:**

1. Gray Hat Hacking-The Ethical Hackers Handbook, Allen Harper, Stephen Sims, Michael Baucom, 3rd Edition, Tata Mc Graw-Hill.
2. The Web Application Hacker’s Handbook-Discovering and Exploiting Security flaws, Dafy Suttard, Marcus pinto, 1st Edition, Wiley Publishing.

**REFERENCEBOOKS:**

1. Penetration Testing: Hands-on Introduction to Hacking”, Georgia Weidman, 1stEdition,No Starch Press.
2. The Pen Tester Blueprint-Starting a Career as an Ethical Hacker “, L. Wylie, Kim Crawly, 1st Edition, Wiley Publications.

**Syllabus for B.Tech IV year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Ethical Hacking

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **1** | **0** | **3** |

**Code: 8JC02**

**Prerequisite:** Knowledge in information security, Web application

Course Objectives:

1. Introduce the methodologies and framework of ethical hacking for enhancing the security.
2. The course includes-Impacts of Hacking; Types of Hackers; Information Security Models; Information Security Program; Business Perspective; Planning a Controlled Attack.

**Course Outcomes:** At the end of this course, the student will be able to

1. Gain the knowledge of the use and availability of tools to support an ethical hack.
2. Interpret the results of a controlled attack.
3. Explain the role of inherent and imposed limitations and metrics for planning of a test.
4. Comprehend the dangers associated with penetration testing.

UNIT- I

Introduction: Hacking Impacts, The Hacker Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Final Analysis, Deliverable, Integration

Information Security Models: Computer Security, Network Security, Service Security, Application Security, Security Architecture

UNIT - II

Information Security Program: The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking

The Business Perspective: Business Objectives, Security Policy, Previous Test Results, Business Challenges

UNIT - III

Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement

UNIT - IV

Preparing for a Hack: Technical Preparation, Managing the Engagement

Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance

UNIT - V

Enumeration: Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase

Exploitation: Intutive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern

UNIT - VI

Deliverable: The Deliverable, The Document, Overal Structure, Aligning Findings, Presentation Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion

**TEXT BOOK:**

1.James S. Tiller, “The Ethical Hack: A Framework for Business Value Penetration Testing”, Auerbach Publications, CRC Press

**REFERENCE BOOKS:**

1.EC-Council, “Ethical Hacking and Countermeasures Attack Phases”, Cengage Learning

2. Michael Simpson, Kent Backman, James Corley, “Hands-On Ethical Hacking and Network Defense”, Cengage Learning

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** | **M** | **H** | **M** | **H** | **M** | **H** | **M** | **H** | **H** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech IV Year I semester**

**CSE- Cyber Security**

### Intellectual Property Rights

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **1** | **0** | **0** | **1** |

**Code: 8GC49**

**Prerequisite : Nil**

**Course Objective:**

This course is intended to impart awareness on intellectual property rights and various regulatory issues related to IPR

**Course Outcomes:**

**At the end of this course the student will be able to**

1. Demonstrate a breadth of knowledge in Intellectual property

2. Overview of Patents, Searching, filling and drafting of Patents

3. Overview of copyright &GI .

4. Overview of Trade Mark & Trade Secret,

5. Overview of Integrated Circuit and Industrial Design.

6. Knowledge about different national and international: Conventions and Treaties Governing the IPRs

**UNIT I: Introduction to IPR:** Discovery, Invention, Creativity, Innovation, History & Significance of IPR, Overview of IPR -Patent, Copyright, Trade Mark, Trade Secret , GI, Industrial Design & Integrated Circuit, Non-patentable criteria

**UNIT II: Patents**: Patents- Patentability Criteria, Types of Patents-Process, Product & Utility Models, Software Patenting and protection, Patent infringement- Case studies- Apple Vs Samsung, Enfish LLC Vs Microsoft, Overview of Patent search-Types of Searching, Public & Private Searching Databases, Basics of Patent Filing & Drafting, Indian Patents Law

**UNIT III: Copyrights and Geographical Indications:** Types of Copyrights, Procedure for filing, copyright infringement, Copyright Law, Geographical Indications –TirupatiLaddu , Darjeeling Tea, Basmati rice

**UNIT IV: Trademark and Trade secrets:** Trade Marks –Commercial importance, protection, registration, Case Studies- Sabena and Subena, Castrol Vs Pentagon, Trade Secrets- Case Studies-Kentucky Fried Chicken (KFC), Coca-Cola

**UNIT V: Protection of Industrial Designs & Integrated Circuits:** Industrial Designs – Scope, protection, filing, infringement; Integrated Circuits & Layout design, Semiconductors, Unfair competition, Designs Act.

**UNIT VI: International Conventions & Treaties:** Overview of WTO, GATT, TRIPS, WIPO, Berne Convention, Rome convention, Paris Convention, Patent Cooperation Treaty (PCT), Madrid Protocol, Budapest Treaty, Hague agreement

**TEXT BOOKS:**

1. Deborah E. Bouchoux, Intellectual Property for Paralegals – The law of Trademarks, Copyrights, Patents & Trade secrets, 3rd Edition, Cengage learning, 2012
2. N.S. Gopalakrishnan& T.G. Agitha, Principles of Intellectual Property, Eastern Book Company, Lucknow, 2009.

**REFERENCE BOOKS:**

1. M. M. S. Karki , Intellectual Property Rights: Basic Concepts, Atlantic Publishers, 2009
2. Neeraj Pandey &KhushdeepDharni, Intellectual Property Rights, Phi Learning Pvt. Ltd
3. AjitParulekar and Sarita D’ Souza, Indian Patents Law – Legal & Business Implications; Macmillan India ltd, 2006.
4. B. L. Wadehra. Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications; Universal law Publishing Pvt. Ltd., India 2000.
5. P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi, 2010.

**Syllabus for B.Tech IV year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Blockchain Technologies and Artificial Intelligence Lab

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **0** | **0** | **3** | **1.5** |

**Code: 8JC63**

**Prerequisites:** Knowledge in Basics of JavaScript / Java for Hyper ledger Fabric.

Basics of Solidity for ETH.

**Course Objectives:**

1. To learn the basic block chain applications.
2. To be familiar with the block chain lab setup.

**Course Outcome:** At the end of this course, the student is able to

1. Create and deploy smart contracts using blockchain tools
2. Implement the simple AI programs using prolog.

**Blockchain Technologies Lab – List of Exercises**

1. Setup Meta mask in the System
   1. Create a wallet in the Metamask with Test Network.
   2. Create multiple accounts in Metamask and perform the balance transfer between the accounts and describe the transaction specifications.
2. Set up the Ganache Tools in the system and create a custom RPC network in Metamask and connect it with Ganache tool and transfer the either between ganache accounts.
3. Write a smart contract using a solidity program to perform the balance transfer from contract to other accounts.
4. Write a solidity program to perform the exception handling.
5. Set up the Hyper ledger Fabric Network with 2 Organizations- 1 per each in the system and create a channel called my channel, car channel in the deployed network.
6. Take the existing Fab car smart contract and add a new function to query the car on the basis of person name and deploy the smart contract on the Hyperledger Fabric Network.
7. Write an SDK program to query the person details from the deployed smart.

**Artificial Intelligence Lab –List of Exercises**

1. Write a program in prolog to implement
   1. simple facts and Queries
   2. Write a program in prolog to implement simple arithmetic
2. Write a program in prolog to solve Monkey banana problem
3. Write a program in prolog to solve Tower of Hanoi
4. Write a program in prolog to solve 8 Puzzle problems
5. Write a program in prolog to solve 4-Queens problem
6. Write a program in prolog to solve Traveling salesman problem
7. Write a program in prolog for Water jug problem

**Syllabus for B.Tech IV year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Ethical Hacking Lab and Professional Elective-IV Lab

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **0** | **0** | **3** | **1.5** |

**Code: 8JC64**

**Prerequisites:** Theoretical knowledge of Ethical Hacking, PE IV course

**Course Objectives:**

1.The aim of the course is to introduce the methodologies framework tools of ethical hacking to get awareness in enhancing the security

2. To get knowledge on various attacks and their detection

**Course Outcomes:** At the end of this course, the student will be able to

1. Use the available tools to support an ethical hack

2. Interpret the results of a controlled attack.

**Ethical Hacking Lab- List of Exercises**

1. Setup a honey pot and monitor the honey pot on network
2. Write a script or code to demonstrate SQL injection attacks
3. Create a social networking website login page using phishing techniques
4. Write a code to demonstrate DoS attacks
5. Install rootkits and study variety of options
6. Study of Techniques uses for Web Based Password Capturing.
7. Identify System Vulnerabilities with OpenVAS
8. Implement Passive scanning, active scanning, session hijacking, cookies extraction using Burp suit tool

**Syllabus for B.Tech. IV year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Digital Forensics Lab

(Professional Elective IV Lab)

**Course Objectives:**

1. To provide students with a comprehensive overview of collecting, investigating, preserving, and presenting evidence of cybercrime left in digital storage devices, emails, browsers, mobile devices using different Forensics tools.
2. To Understand file system basics and where hidden files may lie on the disk, as well as how to extract the data and preserve it for analysis.
3. Understand some of the tools of e-discovery.
4. To understand the network analysis, Registry analysis and analyze attacks using different forensics tools.

**Course Outcomes:** At the end of this course, the students will be able to

1. Elaborate the importance of a systematic procedure for investigation of data found on digital storage media that might provide evidence of wrong-doing.
2. Discuss the file system storage mechanisms and retrieve files in hidden format.
3. Use the computer forensics tools for data analysis.
4. Find data that may be clear or hidden on a computer disk, find out the open ports for the attackers through network analysis, Registry analysis.

**List of Experiments**

1. **Perform email analysis** using the tools like Exchange EDB viewer, MBOX viewer and View user mailboxes and public folders, Filter the mailbox databased on various criteria, Search for particular items in user mailboxes and public folders
2. **Perform Browser history analysis** and get the downloaded content, history, saved logins, searches, websites visited etc using Fox ton Forensics tool, Dumpzilla.
3. **Perform mobile analysis** in the form of retrieving call logs, SMS log, all contacts list using the forensics tool like SAFT
4. **Perform Registry analysis** and get boot time logging using process monitor tool
5. **Perform Disk imaging and cloning the** using the X-way Forensics tools
6. **Perform Data Analysis i.e** History about open file and folder, and view folder actions using Last view activity tool
7. **Perform information for incident response** using the crowd Response tool
8. **Perform Memory capture and analysis** using the Live RAM capture or any forensic tool

**Textbooks:**

1. Real Digital Forensics for Handheld Devices, E.P. Dorothy, Auerback Publications,2013.
2. The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics, J. Sammons, Syngress Publishing, 2012.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **L** | **M** | **M** | **H** | **M** | **L** | **M** | **H** | **M** | **L** | **H** |

HH: High, M:Medium, L: Low Correlation

**Syllabus for B.Tech IV year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Software Automation and Testing Lab

(Professional Elective IV Lab)

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **0** | **0** | **4** | **2** |

**Code: 8F769**

**Prerequisite: NIL**

**Course Objectives:**

In software testing lab the various manual and automation testing processes are carried out to efficiently learn the testing activities. Both commercial and open source testing tools are being taught to better the software testing in detail. According to the software industry requirements the testing tools are taught so that the students can directly make use of testing tools in industry. Implement various testing techniques and to make a thorough study on various testing tools.

**Course Outcomes:** At the end of this course, the students will be able to

1. Prepare Test Plan document and write Test Cases for Small scale Project (Like for their B.Tech. IV Year Project or Post-Graduate Projects), they are learn how to Analyze SRS document in order to prepare Test Plan Document.
2. Demonstrate skills to use modern software testing tools (EX: UFT, Test Link, Bugzilla, Selenium, Test Director and Quality Center) and test application (web, Window application) by using the tools.
3. Demonstrate the ability to differentiate between different Testing tools present in the market (like functional testing tools, Test Management Tools, Bug Tracking Tools and Performance Testing Tools) and prepare Test Plan document and write Test Cases for Small scale Project(Like for their B.Tech. IV Year Project or Post-Graduate Projects).

**List of Experiments:**

* 1. Write programs in ‘C’ Language to demonstrate the working of the following constructs:
     1. do…while ii)while…do iii)if…else iv) switch v)for
  2. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
  3. Create a test plan document for any application ( Ex: Internet Banking Application)
  4. Over view of any Test Management Tools (Open source testing tool: Ex-TestLink)
  5. Study of any Functional and Regression Testing Tools:
     1. Open source Tool: Soap UI
     2. Licensed Tool:UFT12.01
  6. Study of any bug tracking tool(open source testing tool: Bugzilla)
  7. Overview of Performance Testing Tools(Open source testing tool :Apache Jmeter)
  8. Study of Selenium IDE(open source testing tool)

**TEXTBOOKS**

1. Software testing techniques–Boris Beizer, Dreamtech, second edition.(Unit1,2,6)
2. Software testing tools– by Dr.K.V.K.K Prasad Dreamtech (Unit 1,6)
3. Effective Methods for SoftwareTesting,2nd Edition by William E. Perry, Wiley publications.(Unit3,4)
4. Software Testing and continuous Quality Improvement, by

William E. Lewis, Gunasekaran, 2ndEdition Auerbach publications (Unit5,ReferInternet)

1. Software Engineering A practitioner’s Approach, Roger S Pressman, 6thedition. Mc Graw Hill International Edition (Unit 3)

**Syllabus for B.Tech IV year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Scripting Languages Lab

(Professional Elective IV Lab)

**Code: 8JC05**

**Prerequisites:** Any High-level programming language(C,C++)

**Course Objectives:**

* To Understand the concepts of scripting languages for developing webbased projects
* To understand the applications the of Ruby, TCL, Perl scripting languages

**Course Outcomes:** At the end of this course, the students will be able to

* Explain the differences between Scripting languages and programming languages
* Implement the programs fluency programming in Ruby, Perl, TCL

**List of Experiments**

1. Write a Ruby script to create a new string which is n copies of a given string where n is a non-negative integer
2. Write a Ruby script to accept a file name from the user and print its extension.
3. Write a Ruby script to check two integers and return true if one of them is 20 otherwise return their sum.
4. Write a TCL script to find the factorial of a number.
5. Write a TCL script for Sorting a list using a comparison function.
6. Write a TCL script to (i)create a list (ii)append elements to the list (iii)Traverse the list (iv)Concatenate the list
7. a) Write a Perl script to find the largest number among three numbers.

b) Write a Perl script to print the multiplication tables from 1-10 using subroutines.

1. Write a Perl program to implement the following list of manipulating functions
2. Shift b) Unshift c) Push

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **L** | **L** |  | **L** | **M** | **L** |  |  | **M** |  |  | **M** |

**Syllabus for B.Tech IV year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Linux Programming Lab

(Professional Elective IV Lab)

**Prerequisite: NIL**

**Course Objectives:**

1. To make use of File handling utilities, Security by file permissions, process utilities, Disk utilities, networking utilities.
2. To understand meta-characters of BASH, acquire the knowledge regarding control structures, shell interrupt processing, functions, debugging shell scripts.
3. To impart usage of kernel support for files using C, understand file structure and low-level I/O functions, system calls (file API’s). Induce knowledge regarding Directory management and its API.

**Course Outcomes:** At the end of this course, the student will be able to

1. Work with Linux commands for handling files, processes, text utilities, backup and network utilities.
2. Explore basics of building shell scripts gain knowledge to compose various Shell Scripts.
3. Demonstrate the I/O functions, low-level system calls available for file and directory handling and the process APIs.
4. Implement pipes, FIFO used in IPC and demonstrate kernel programming.

**List of Experiments**

1. Basic Linux Commands File handling utilities, Security by file permissions, Process utilities, Disk utilities, sed, awk, grep.
2. Write a shell script that accepts a filename, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
3. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
4. a) Write an awk script to count the number of lines in a file that do not contain vowels.

b) Write an awk script to find the number of characters, words and lines in a file.

1. Implement in C the following UNIX commands using System calls a)rename b)link
2. Write a C program on zombie process
3. Write a C program that illustrates the following. a) Creating a message queue. b) Writing to a message queue. c) Reading from a message queue.
4. Write a C program that illustrates file locking using semaphores.

**Syllabus for B.Tech IV year I Semester**

**B.Tech. (CSE) - Cyber Security**

### Summer Industry Internship-II

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **0** | **0** | **0** | **1** |

**Code: 8J692**

**Prerequisite:** All Courses till this semester

**Course Objectives:**

To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

**Course Outcomes:** At the end of this course the student will be able to

1. Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
2. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
3. Inculcate an enthusiasm to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole.
4. Improve their communicative skills and team skills.

A summer industry internship project shall be carried out by a group of students consisting of 2 to 3 in number during summer third year first semester at industries. This work shall be carried out under the guidance of the faculty assigned as internal guide as well as external guide at industry where students are carrying out summer industry internship projects. Project shall consist of design, fabrication, software development or building of prototype or application app. This can be of interdisciplinary nature also.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external

The **internal evaluation** shall consist of:

1. Abstract, Design, Implementation and Presentation : 15 marks

in font of Project review Committee consisting of

HoD, Senior faculty and Internal Guides. (Average)

1. Report : 05 marks
2. Evaluation by Internal Guide : 10 marks --------------

Total 30 marks

Semester End examination : 70 Marks.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  | **M** | **H** | **L** |  | **L** | **L** |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year II semester**

**B.Tech. (CSE) - Cyber Security**

**PRODUCT AND SERVICES**

**(Open Elective –III)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **0** | **0** | **2** |

**Code: 8ZC24**

**Prerequisite: NIL**

**Course Objectives**:

This course helps to provide the basic concepts of Product and Services. This course will enable the students to study areas of basic insights in product management and Services Design.

**Course Outcomes**:

At the end of this course the student will be able to

1. Understand the basic concepts of product.
2. Determine the process of new product development and stages in the process.
3. Understand the concept of product testing, product planning and the preparatory groundwork for launching a new product
4. Differentiate various types of services, its differences with the goods and the application of marketing principles for services.
5. Understand the attributes of a good service design and the tools for producing and distributing the services.
6. Identify the importance of quality of services and also introduce some measurement scales to evaluate the service quality.

**UNIT- I**

**PRODUCT AS A COMMERCIAL FACTOR**

Product concept: premarketing, product definition, product dimensions. Product classification- by its nature, by final use by reasons for purchase, by consumer groups.

**UNIT- II**

**PRODUCT INNOVATION**

New products-What is a new product, Concept, Reasons, Succeed and failure factors, Launch process, Opportunities identification, Idea generation Systems, Evaluation, Check list, Financial analysis, Product concept.

**UNIT- III**

**PRODUCT MANAGEMENT**

Concept test, Product testing, Pre-launch, Market test, Final evaluation “Stage / Gate Process” A sequence system for a product launch. Product planning and development-Product planning, Price planning, Bake even point analysis, Communications Planning, Advertising Planning, Distribution planning

**UNIT - IV: INTRODUCTION TO SERVICE:**

Meaning and Definition of Service, Characteristics of Services, Classification of Service, Five levels of Service, Service verses Physical Goods, 7 P’s for Marketing of Services, Marketing Mix for Tourism, Hospitality, Education, and Health Industry.

**UNIT – V: SERVICE PROCESS DESIGN:**

Challenges & Critical Success Factors, Distribution Methods for Service, Process of Service Delivery, Tools for Service Design, Customer involvement in the Production Process, Tools for Innovation, Role of Intermediaries, Attributes of a Good Design.

**UNIT – VI: QUALITY OF SERVICE:**

Definition of Service Quality, Elements of Service Quality, Service Quality Measuring Tools; SERVQUAL Scale, Service Quality Gap Analysis, Objective Service Metrics, Cost of Quality in Service. Challenges and Problems of Service Quality in India.

**References:**

1. Dr. S.L. Gupta, Product Management, Wisdom Publications
2. C.Merle Crawford ,New Product Management
3. Valarie A.Zeithaml& Mary Jo-Bitner: Services Marketing—Integrating Customer Focus Across the Firm, 3/e, Tata McGraw Hill, 2007.
4. Thomas J.Delong&Asish Nanda: Managing Professional Servies—Text and Cases, McGraw-Hill International, 2006.
5. Christopher Lovelock: Services Marketing People, Technology, Strategy, Fourth Edition, Pearson Education, 2006

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  | **M** |  |  |  | **M** | **M** | **M** |  |  |  | **L** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year II semester**

**B.Tech. (CSE) - Cyber Security**

**INDIAN HISTORY, CULTURE AND GEOGRAPHY**

**(Open Elective –III)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **-** | **-** | **2** |

**Code: 8ZC27**

**Prerequisite: NIL**

**COURSE OBJECTIVES:**

To equip the students with necessary knowledge related to ancient, medieval and modern Indian and its culture and also facts relating to existence of earth.

**COURSE OUTCOMES:**

At the end of this course, the students will be able to

1. Understand our Indian History, Culture and Indian heritage.
2. Understand secularism of our country.
3. Analyze and understand the social reformers who brought revolutionary changes in

Indian society.

1. Review earth evolution and world climatic change.
2. Understand India Oceanography,
3. Relate the effects of Indian monsoons on Indian agriculture.

**UNIT I: Ancient Indian History** Fundamental Unity of Indian Harappan and Vedic Civilization – Evolution of Caste System – ainism and Buddhism – Gandhara Art., Political unification of India under Mauryas and Guptas, Historical evolution of Satavahanas., Contribution of Pallavas and Cholas to Art – Chola Administrative Systems .

**UNIT II: Medieval India and Culture** Influence of Islam on Indian Culture – The Sufi, Bhakthi and Vishnavite movements, Historical Achievements of Vijayanagara Rulers., Contribution of Shershah and Akbar to the evolution of administration system in India – Cultural Development under Mughals.

**UNIT III: Modern India** Western Impact on India – Introduction of Western Education – Social and Cultural awakening and social reform movements – Raja Rama Mohan Roy – DayanandaSaraswathi – Theosophical Society – Ramakrishna Paramahamsa and Vivekananda – Iswara Chandra Vidyasagar and Veeresalingam – Emancipaition of women and struggle against Caste. Rise of Indian Nationalism – Mahatma Gandhi – Non Violence and Satyagraha – Eradication of untouchability – Legacy of British rule.

**Unit IV:Geo Morphology and Climatology** The Origin and Evolution of the Earth, Interior of the Earth, Distribution of Oceans and Continents , Minerals and Rocks, Geomorphic Processes, Landforms and their Evolution Composition and Structure of Atmosphere, Solar Radiation, Heat Balance and Temperature.  
Atmospheric Circulation and Weather Systems, World Climate and Climate Change

**Unit V: Oceanography** Water (Oceans), Movements of Ocean Water, Physical features of India viz., The Mountains in the North , The Northern Plains, The Peninsular Plateau, The Great Indian Desert, The Coast; and The Islands.

**Unit VI: Physical Features Of India And India’s Monsoon** India’s monsoon., Winter, Summer(pre-monsoon),rainy (monsoon),autumn (post-monsoon)., Indian Agriculture, Agriculture and colonialism, Indian Agriculture after Independence Major crops and yields, Horticulture, Organic farming.

**References:**

1. Sharma .R.S., (2011).Indian Ancient past.,Oxford Publications.
2. Nitin Singhaniya.,(2017). Indian Culture and Heritage., Publisher: McgrawTestPrep., Second Edition.
3. Certificate of Physical and Human Geography,Goh Cheng Leong,Oxford University Press.
4. Bipin Chandra.(2000). India’s Struggle for Independence., Penguin Global Publishers
5. Saveendra Singh: Physical Geograpghy.,PrayagPustakBhavan ISBN-10: 8186539298. Edition : 1st Edition Number of Pages : 641 Pages Publication : Year 2006.
6. Majumdar, R. C. et al. *An Advanced History of India* London: Macmillan. 1960. [ISBN 0-333-90298-X](http://en.citizendium.org/wiki/Special:BookSources/033390298X)
7. Basham, A.L. : The wonder that was India ,New York: Grove Press, 1954. (OUP, Madras 1983)Basham, A.L. : Cultural heritage of India , Vols.I to IV ,Oxford University Press, Delhi, 1975***.***

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** |  | **M** |  |  |  | **M** | **L** | **L** |  |  | **M** |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year II semester**

**B.Tech. (CSE) - Cyber Security**

**FINANCIAL INSTITUTIONS, MARKETS AND SERVICES**

**(Open Elective –III)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **-** | **-** | **2** |

**Code: 8ZC15**

**Prerequisite:** Banking Operations, Insurance and Risk Management

**COURSE OBJECTIVES:**

The objective of the course is to provide to students an understanding of Financial Markets, the major Institutions involved and the Services offered within this framework.

**COURSE OUTCOMES:**

At the end of this course, the students will be able to

1. Understand the financial structure and the financial sector reforms after 1991.
2. Identify the role of RBI and the Regulating and credit policies adopted by the RBI.
3. Analyze the role of Non-Banking financial institutions and the role of financial institutions in India.
4. Understand the role of regulatory bodies like SEBI and also to know the capital and money market instruments.
5. Understand about the asset fund based financial services
6. Expose to investment banking and merchant banking.

**UNIT I INTRODUCTION:** The structure of financial system, Equilibrium in financial markets, Indicators of Financial Development, Financial system and Economic Development, Financial Sector Reforms after 1991.

**UNIT II BANKING INSTITUTIONS**: Structure and Comparative performance, Functions and Role of RBI, Competition, Interest rates, Spread; Bank Capital Adequacy norms; Banking Innovations – BPLR to Base rate, Core Banking System, Financial Inclusion, Current rates: Policy rates, Reserve Ratios, Exchange rates, Lending/ Deposit rates.

**UNIT III NON BANKING FINANCIAL INSTITUTIONS:** Structure and functioning of Unit Trust of India and Mutual Funds, Growth of Indian Mutual funds and their Regulation, Role of AMFI. Performance of Non-Statutory Financial Organizations: IFCI, IRBI, NABARD, SIDBI and SFCs.

**UNIT IV FINANCIAL AND SECURITIES MARKETS**: -, Role and functions of SEBI, Structure and functions of Call Money Market, Government Securities Market – T-bills Market, Commercial Bills Market, Commercial paper and Certificate of Deposits; Securities Market – Organization and Structure, Listing, Trading and Settlement, SEBI and Regulation of Primary and Secondary Markets.

**UNIT V ASSET/FUND BASED FINANCIAL SERVICES:** Lease Finance, Consumer Credit and Hire purchase Finance, Factoring - Definition, Functions, Advantages, Evaluation, Forfeiting, Bills Discounting, Housing Finance, and Venture Capital Financing. Fee-based Advisory services: Stock Broking, Credit Rating.

**UNIT VI INVESTMENT BANKING AND MERCHANT BANKING**: Investment Banking: Introduction, Functions and Activities, Underwriting, Banker to an Issue, Debenture Trustees and Portfolio managers, Challenges faced by Investment Bankers. Merchant Banking: Definition, Merchant Banks Vs Commercial Banks, Services of Merchant Banks.

**References:**

1. L.M. Bhole: Financial Institutions and Markets, TMH, 2009.
2. E. Gordon, K. Natarajan: Financial Markets and Services, Himalaya Publishing House, 2013.
3. Vasant Desai: Financial Markets and Financial Services, Himalaya,2009
4. Pathak: Indian Financial Systems, Pearson, 2009
5. M.Y. Khan: Financial Services, TMH, 2009.
6. S. Gurusamy: Financial Services and System, Cengage,2009
7. Justin Paul and Padmalatha Suresh: Management of Banking and Financial Services, Pearson, 2009.
8. Gomez, Financial Markets, Institutions and Financial Services, PHI, 2012.
9. R M Srivatsava: Dynamics of Financial Markets and Institutions in India, Excel, 2013.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **H** |  | **M** | **M** | **L** | **L** |  |  |  |  |  |  |

H:High, M:Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year II semester**

**B.Tech. (CSE) - Cyber Security**

### Principles of Automation and Robotics

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **-** | **-** | **2** |

**(Open Elective–III)**

**Code: 8BC53**

**Course Objectives:**

To improve a company's workflows with automation, we can reduce costs, time, and waste as well as increase productivity, reduce mistakes, and control all the processes of the business in real time. To introduce the concepts of Robotic system, its components and instrumentation and control related to robotics.

**Course Outcomes:**

After completing the subject,students willbeable to:

1. Understand aproductionsystem,principlesof automobile
2. Classifythemethodsof workparttransfermechanicalbufferstorage controlfunctions
3. Understandtheimplementationofautomatedflow lines
4. Aanalyseanddesignof materialhandlingsystems,automatedguidedvehiclesystem
5. Understandadaptivecontrol systemsandApplications.
6. OutlinethebusinessprocessEngineering.ConceptofconcurrentEngineering,techniquesofrapid prototype.

**UNIT– I**

Introduction: Production system, Automated manufacturing systems, Reasons, Principles andstrategies of automation, Basic elements of automated system, pneumatic and hydraulic circuitcomponents,Assemblysystemandlinebalancing:ManualAssemblyprocess,andworktransport systems, Line pacing, Analysis of manual assembly lines, line balancing methods-problems,ways of improvinglinebalance

lines.

**UNIT– II**

Analysis of Automated flow lines: System configuration, Work part transfer, General terminology and analysis of transfer lines without and with buffer storage.

AutomatedAssemblysystems: Fundamentals andDesignof assemblysystems.

**UNIT– III**

Automated material handling: Principles, Types of equipment, functions, analysis and design ofmaterial handling systems, conveyor systems, automated guided vehicle systems-technology, Analysis of material transport systems.

Automated storage systems: Basic terminology, AS/RS; Carousel storage, work in processstorage,

**UNIT– IV**

Adaptive control systems: Introduction, Adaptive control with optimization, Adaptive controlwith constraints, Application of A.C. in machining operations. Use of various parameters such as cutting force, Temperature, vibration and acoustice mission. Concept of Concurrent Engineering, MRP,MRPII, Techniques of Rapid Proto typing.

**Unit–V:Robotics:**

Classification and structure of Robotic systems, structure of continuous path robot systems,drivesand control systems, control approaches forrobots.

**Unit–VI**

Robot arm kinematics, the direct kinematics problem and inverse kinematic solutions, planning of manipulator trajectories, robot sensors, range sensors, proximity sensors, touch sensors, force and torque sensors, programming, manual teaching, lead through teaching, programming languages, storing and operating task programmes, robot selection and application.

**TEXTBOOKS:**

1. Automation, Production Systems and Computer Integrated Manufacturing: M.P.Groover./PE/PHI
2. Mittal and Nagrath, ‘Robotics and Control’,Tata Mc Graw Hill.

**REFERENCES**

1. Computer control of Manufacturing Systems by Yoram Coreom.
2. CAD/ CAM/CIM by Radhakrishnan.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** |  |  |  | **M** | **M** | **L** |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year II semester**

**B.Tech. (CSE) - Cyber Security**

**Fundamentals of Renewable Energy Sources**

**(Open Elective –III)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **-** | **-** | **2** |

**Code: 8AC45**

**Prerequisite: Nil**

**COURSE OBJECTIVES:**

Becomes familiar with solar energy, its radiation, Collection, storage and application and also gets introduced to other forms of Renewable Energy sources viz., the Wind energy, Biomass energy, geothermal energy and ocean energy.

**COURSE OUTCOMES:**

At the end of this course, the students will be able to

1. Understand the role and potential of new and renewable energy sources realize the potential of solar energy, its impact on environment; define and understand the terms describing the different angles that one may incur in setting up a solar panel and be able to use the instruments for measuring solar radiation.
2. Demonstrates the knowledge of different techniques of solar collection and storage.
3. Classify different types of horizontal and vertical axis wind mills and understands the performance characteristics of the same. The student also demonstrates the knowledge of different Bio-gas digesters and factors influencing its yield.
4. Understand the potential of geothermal energy in India and will be able to characterize different types of geothermal wells.
5. Differentiate the different methods of kinetic energy extraction from Ocean waves and tides and thermal energy extraction from Oceans.
6. Demonstrates the knowledge of Direct Energy Conversion in different phenomena viz., Joule Thomson effect, Seebeck effect, Peltier effect etc. and the principle of operation of Fuel Cells.

**UNIT – I -PRINCIPLES OF SOLAR RADIATION**: Role and potential of new and renewable source, The solar energy option, Environmental impact of solar power, Physics of the sun, the solar constant, Extraterrestrial and terrestrial solar radiation, Solar radiation on titled surface, Instruments for measuring solar radiation and sun shine, Solar radiation data.

**UNIT-II- SOLAR ENERGY COLLECTION STORAGE AND APPLICATIONS**: Flat plate and concentrating collectors, Classification of concentrating collectors, orientation and thermal analysis, advanced collectors. Different methods, Sensible, Latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

**UNIT – III WIND ENERGY**: Sources and potentials, Horizontal and vertical axis windmills, Performance characteristics, Betz criteria

**BIO-MASS**: Principles of Bio-Conversion, Anaerobic/aerobic digestion, Types of Bio-gas digesters, Gas yield, Combustion characteristics of bio-gas, Utilization for cooking, I.C.Engine operation and economic aspects.

**UNIT – IV GEOTHERMAL ENERGY**: Resources, types of wells, methods of harnessing the energy, Potential in India.

**UNIT-V OCEAN ENERGY**: OTEC, Principles utilization, Setting of OTEC plants, Thermodynamic cycles. Tidal and wave energy, Potential and conversion techniques, Mini-hydel power plants and their economics.

**UNIT-VI DIRECT ENERGY CONVERSION**: Need for DEC, Carnot cycle, Limitations, principles of DEC. Thermoelectric generators, seebeck, Peltier and joul Thomson effects, Figure of merit, materials, Applications, MHD generators, Principles, Dissociation and ionization, Hall effect, Magnetic flux, MHD accelerator, MHD Engine, Power generation systems, Electron gas dynamic conversion, economic aspects. Fuel cells – principles - Faraday’s law’s - Thermodynamic aspects - selection of fuels and operating conditions.

**TEXT BOOKS:**

1. Non-Conventional Energy Sources - G.D. Rai

2. Renewable Energy Technologies - Ramesh & Kumar /Narosa.

**REFERENCE BOOKS:**

1. Renewable energy resources - Tiwari and Ghosal/ Narosa.

2. Non-Conventional Energy - Ashok V Desai /Wiley Eastern.

3. Non-Conventional Energy Systems - K Mittal /Wheeler

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** |  |  |  |  |  |  |  |  |  |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.Tech.IV Year II semester**

**CSE - Cyber Security**

**ELECTRONICS CIRCUIT DESIGN AND ANALYSIS**

**(Open Elective –III)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **-** | **-** | **2** |

**Code: 8CC44**

**Prerequisite:** Analog Electronic Circuits

**COURSE OBJECTIVES:**

This course provides the analysis to design all kinds of amplifiers(Small signal and large signal amplifiers). It provides the back bone to design and generate the signals with different frequencies.

**COURSE OUTCOMES:**

At the end of this course, the students will be able to

1. Analyse and Design of BJT Single stage, multistage amplifiers at low and high frequencies.
2. Analyse and Design JFET and MOSFET amplifiers
3. Design different types of Feedback Amplifier, Oscillators and their analysis.
4. Analyse and Design power amplifiers. Understand distortions
5. Analyse and Design tuned and RF amplifiers such as single tuned, double tuned, stagger tuned and wide band amplifier.
6. Understand the stability of oscillators and tuned amplifiers.

**unit I: MULTISTAGE AMPLIFIERS** Review of Transistor Amplifiers. Review of BJT hybrid π model. Methods of inter stage coupling, N-stage cascaded amplifier, equivalent circuits, Miller’s theorem, high input resistance transistor circuits, cascade transistor configuration, CE – CC amplifier, two stage RC coupled J-FET amplifier (common sources configuration).**Frequency response of BJT Amplifier, Analysis at Low and High frequencies.**

Applications: Design of a 3-stage RC coupled amplifier (gain= 30 dB) which operates from 350Hz to 2 KHz.

**unit iI: FET AMPLIFIERS** Biasing of JFET - Self bias and fixed bias. Biasing of MOSFETS -.Depletion and Enhancement mode.Analysis of common source, common drain and common gate amplifier configurations – Thermal runaway in MOSFET – MOS Differential amplifier – Analysis.**Frequency Response of Common Source Amplifier.**

**unit iII: FEED BACK AMPLIFIERS** Fundamentals-classification- Characteristics of feedback Amplifier effect of feedback in voltage series, voltage shunt, current series and current shunt amplifiers.

**Applications: Design of a stable 50 KHz sinusoidal oscillator.**

**unit iV: OSCILLATORS** Condition for Oscillations. Classification of Oscillators. RC Oscillators-LC Oscillators, tuned collector and tuned drain oscillator and stability of oscillators. Design of audio and radio frequency oscillators.

**unit V: POWER AMPLIFIERS** Class A, B, AB, C&D power amplifiers –push pull configuration, complementary symmetry circuits , Distortion in Amplifiers. Harmonic distortion and Crossover Distortion in Power Amplifiers– Conversion efficiency and relative performance,

**unit VI: TUNED AND RF AMPLIFIERS** Introduction to Tuned Amplifiers, Q**-**Factor. single tuned capacitive coupled amplifier, tapped single tuned capacitance coupled amplifier, single tuned transformer coupled amplifier, stagger tunning, wideband tuned amplifiers.

Applications: Design of a IF tuner for AM receiver.

**TEXT BOOKS:**

1. Integrated electronics-J.Milliman and C.C.Halkias, MC Graw –Hill-1972

2. Electronic Devices and Circuits: T.F.Bogart, j.s.Bearsley, Pearson Edition, 6th edition, 2000

3. Electronic devices and Circuit Theory-Robert L. Boylsted, Louis Nashelsky, 9ht ed., 2008, PE

**REFERENCE:**

* + - 1. Electronic Circuit Analysis-K.Lal Kishore, 2004, BSP
      2. Electronic Circuits and Applications, Muhammad H Rashid, Cengage Learning
      3. Microelectronic Circuits – Sedra and Smith-5th ed., 2009, OxfordUniversity Press
      4. Electronic Devices and Circuits –S.Salivahanan, N.Suresh Kumar,AVallavaraj,2ed., 2009,TMH.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **L** |  | **M** |  |  | **M** | **L** | **L** |  |  |  | **L** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B.TechIV Year II semester**

**B.Tech. (CSE) - Cyber Security**

**ENTREPRENEURSHIP AND BUSINESS DESIGN**

**(Open Elective –III)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **2** | **-** | **-** | **2** |

**Code: 8ZC10**

**Prerequisite:**

**Course Objective:**

The objective of the course is to make students understand the essentials of building their startups and to familiarize with business design process develop business models, and market their product.

**Course Outcomes:**

At the end of this course, the students will be able to

1. Understand the essentials of entrepreneurship and the key role played by the entrepreneurs.
2. Differentiate the different phases of UI /UX.
3. Outline the attentiveness on designing a business strategy.
4. Explore on designing and delivery of services.
5. Understand reverse engineering methods in product development.
6. Indicate information on IPR, and patent application.

**Unit – I: Introduction to Entrepreneurship**: Meaning of Entrepreneurship. Reasons feeding the Entrepreneurial fire. Understanding Entrepreneurship as a Process. Multiple roles of Entrepreneur: Intrapreneur, Inventor, Coordinator, Manager and Controller. Psychological and behavioral aspects of First-Generation Entrepreneur.

**Unit – II: Introduction to UI/UX:** Human centered design and benefits, the distinction between UX and UI, UX process – user research, prototyping strategies, UI principles, UI analysis, UI design, UI components and Responsive design.

**Unit – III: Designing a Business Strategy:** Define a problem and frame a strategic question, map the lives of users, journey mapping and ideation, color theory, killing the ideas through Stage Gate Models, pitching of full-fledged, idea, choosing the Start-Up Team.

**Unit – IV: Designing Services and Services Delivery:**Services as solutions, Service delivery pathways, rapid branding and marketing strategies, key metrics for Design thinking. Types of New services, Mix of core services and secondary and enhancing services, service flower and service design matrix.

**Unit – V: Business Model:** Meaning of business model, Difference between business model and business planning, the business model canvas, Risks and Assumptions, Validation of business models, building solution demo and MVP, revenue streams and pricing strategies.

**Unit – VI: Entrepreneurial Funding and Risk Management:** Bootstrapping, Angel Investors, Venture capitalists, Private equity funding, customer acquisition, return on equity and Break even analysis, Risk propensity Vs. Risk avoidance, Locus of control of entrepreneur, Risk estimation techniques, risk avoidance strategies.

**Text Books:**

1. Adrian McEwen, Hakim Cassimally – “Designing the Internet of Things”, Wiley Publications, 2012
2. Hedman, J., &Kalling, T. (2003). The business model concept: theoretical underpinnings and empirical illustrations. European journal of information systems, 12(1), 49-59.
3. Cabrera, J. (2017). Modular Design Frameworks: A Projects-based Guide for UI/UX Designers. Apress.

**References:**

1. J. Chris Leach & Ronald W. Melicher “Entrepreneurial Finance, Fourth Edition”, South Western, Cengage Learning, 2012.
2. Robert D. Hisrich&VelandRamadani – “ E­ffective Entrepreneurial Management, Strategy, Planning, Risk Management, and Organization” , Springer, 2017.
3. Mæhlum, A. R. (2017). Extending the TILES Toolkit-from Ideation to Prototyping (Master's thesis, NTNU).
4. Norman, D. (2013). The design of everyday things: Revised and expanded edition. Basic books.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** | **M** | **H** | **H** | **M** | **H** | **M** | **M** | **M** | **M** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year II semester**

**B.Tech. (CSE) - Cyber Security**

### Cloud Security

**(Professional Elective –V)**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Code: 8JC06**

Pre-requisites: Computer Networks, Cryptography and Network Security, Cloud Computing.

**Course Objectives:**

1. Understand the fundamentals concepts of cloud computing, cloud security and privacy issue
2. Comprehend the Threat Model and Cloud Attacks, and analyze Security Management in the Cloud.

**Course Outcomes:** At the end of this course, the student will be able to

1. Explain the fundamentals concepts of cloud computing.
2. Distinguish the various cloud security and privacy issues.
3. Analyze the various threats and Attack tools
4. Discuss the Data Security and Storage issues
5. Analyze the Security Management in the Cloud.
6. Comprehend various security mechanisms in cloud

**UNIT - I**

Overview of Cloud Computing: Introduction, Definitions and Characteristics, Cloud Service Models, Cloud Deployment Models, Cloud Service Platforms, Challenges Ahead. Introduction to Cloud Security: Introduction, Cloud Security Concepts, CSA Cloud Reference Model, NIST Cloud Reference Model, NIST Cloud Reference Model.

**UNIT - II**

Cloud Security and Privacy Issues: Introduction, Cloud Security Goals/Concepts, Cloud Security Issues, Security Requirements for Privacy, Privacy Issues in Cloud. Infrastructure Security: The Network Level, the Host Level,the Application Level, SaaS Application Security, PaaS Application Security, IaaS Application Security.

**UNIT - III**

Threat Model and Cloud Attacks: Introduction, Threat Model- Type of attack entities, Attack surfaces with attack scenarios, A Taxonomy of Attacks, Attack Tools-Network-level attack tools, VMlevel attack tools, VMM attack tools, Security Tools, VMM security tools.

**UNIT - IV**

Information Security Basic Concepts, an Example of a Security Attack, Cloud Software Security Requirements, Rising Security Threats. Data Security and Storage: Aspects of Data Security, Data Security Mitigation, Provider Data and Its Security.

**UNIT - V**

Evolution of Security Considerations, Security Concerns of Cloud Operating Models, Identity Authentication, Secure Transmissions, Secure Storage and Computation, Security Using Encryption Keys.

**UNIT – VI**

Challenges of Using Standard Security Algorithms, Variations and Special Cases for Security Issues with Cloud Computing, Side Channel Security Attacks in the Cloud Security Management in the Cloud- Security Management Standards, Availability Management, Access Control, Security Vulnerability, Patch, and Configuration Management.

**TEXT BOOKS:**

1. Cloud Security Attacks, Techniques, Tools, and Challenges by Preeti Mishra, Emmanuel S Pilli, Jaipur R C Joshi Graphic Era, 1st Edition published 2022 by CRC press.

2. Cloud Computing with Security Concepts and Practices Second Edition by Naresh Kumar Sehgal Pramod Chandra, P. Bhatt John M. Acken, 2nd Edition Springer nature Switzerland AG 2020.

3. Cloud Security and Privacy by Tim Mather, Subra Kumaraswamy, and ShahedLati First Edition, September 2019.

**REFERENCES:**

1. Essentials of Cloud Computing by K. Chandrasekaran Special Indian Edition CRC press. 2. Cloud Computing Principles and Paradigms by RajkumarBuyya, John Wiley.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** | **M** | **H** | **H** | **M** | **H** | **M** | **M** | **M** | **M** |

HH: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year II semester**

**B.Tech. (CSE) - Cyber Security**

**ADVANCED SOFTWARE ENGINEERING**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**(Professional Elective –V)**

**Code: 8FC16**

**Prerequisite:** Software Engineering and OOAD

**COURSE OBJECTIVES:**

This course aims to further develop the understanding of the concepts and methods required for the construction of large software systems. It seeks to provide a broad understanding of the advanced and emerging techniques associated with the development of complex software systems***.***

**COURSE OUTCOMES:**

At the end of this course, the students will be able to

* 1. Understand the issues affecting the organization, planning, and development of large and complex software systems
  2. Understand the concepts of software metrics and reuse-based software engineering
  3. Apply software engineering principles in the development of distributed software systems
  4. Design and implement service-oriented software systems
  5. Understand the design and development of aspect-oriented software systems
  6. Understand software re-engineering process model

**Unit 1: Software Reuse** Reuse-based Software Engineering – Approaches supporting software reuse – Application Frameworks – Commercial-Of-The-Shelf (COTS) systems: COTS Solution Systems, COTS Integrated Systems. Component-Based Software Engineering (CBSE) – Components, Component Models –CBSE Processes: CBSE for Reuse, CBSE with Reuse –Component-based Development: Component Qualification, Adaptation, and Composition – Economics of CBSE.

**Unit 2: Distributed Software Engineering** Distributed Software Engineering – Distributed system characteristics – Design Issues –Middleware – Client-Server Computing – Client-Server Interaction – Architectural patterns for Distributed Systems:Master/Slave,Two-tier,Multi-tier, Distributed component, and Peer-to-Peer –Software as a Service(SaaS) –Key elements –Implementation factors – Configuration of a system offered as a service.

**Unit 3: Service-Oriented Software Engineering** Service-Oriented Architecture(SOA) – Difference between SaaSandSOA - Benefits of SOA – Key Standards-RESTful web services – Service-based Information Systems – Service-Oriented Software Engineering: Services as reusable components – Service Engineering: Service Candidate Identification, Service Interface Design, Service Implementation and Deployment, Legacy system services-Software Development with services: Workflow design and implementation, Service testing.

**Unit 4: Real-time Software Engineering** Introduction to Embedded and Real-time systems - Soft Real-time and Hard Real-time systems - Characteristics of embedded software - Stimuli and Response - Embedded system modeling - Design process for Real-time systems - Architectural patterns for Real-time systems - Timing analysis - Organization of Real-time Operating Systems.

**Unit 5: Software Re-Engineering** Software Maintenance – Software Re-Engineering Process Model – Reverse Engineering – Forward Engineering - Software Refactoring –Examples – Principles in Refactoring – Bad Code Smells.

**Unit 6: Software Metrics** Object-Oriented Metrics (OOM) – Characteristics of OO Metrics – Metrics for the OO Design Model – Class-oriented Metrics: CK Metrics Suite, Lorenz and Kidd Metrics, MOOD Metrics Suite – Metrics for Object-Oriented Testing – Calculation of Metrics.

**Text Books**:

1. Ian Sommerville,*Software Engineering*, 10th Edition, Pearson, 2017, ISBN-13: 9789332582699, ISBN-10: 9332582696.
2. Roger Pressman andBruce R. Maxim,*Software Engineering: A Practitioner's Approach, 8*th Edition, McGraw-Hill, 2014, ISB-13: 9780078022128,ISBN-10: 0078022126.

**Reference Books:**

1. Rajib Mall, Real-Time Systems: Theory and Practice, 2007, Pearson, ISBN-10: 8131700690, ISBN-13: 978-8131700693.
2. Robert C. Martin, Clean Architecture: A Craftsman's Guide to Software Structure and Design, 2017, Pearson, ISBN-10: 935286512X, ISBN-13: 978-9352865123,
3. Martin Fowler,Refactoring: Improving the design of existing code, 2nd Edition, 2018, Addison Wesley, ISBN-10: 0134757599, ISBN-13: 978-0134757599.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** | **M** | **H** | **H** | **M** | **H** | **M** | **M** | **M** | **M** |

HH: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year II semester**

**B.Tech. (CSE) - Cyber Security**

**EXPLORATARY DATA ANALYSIS**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**(Professional Elective –V)**

**Code:**

**Prerequisite:**

**Course Objectives:**

1. This course introduces the methods for data preparation and data understanding. 2. It covers essential exploratory techniques for understanding multivariate data by summarizing it through statistical methods and graphical methods.

3. Supports to summarize the insurers use of predictive analytics, data science and Data Visualization.

**Course Outcomes:** At the end of this course , the student will be able to

1. Understand basic data analytics.

2. Handle missing data in the real-world data sets by choosing appropriate methods.

3. Summarize the data using basic statistics. Visualize the data using basic graphs and plots.

4. Identify the outliers if any in the data set.

5. Choose appropriate feature selection and dimensionality reduction.

6. Techniques for handling multi-dimensional data.

**UNIT – I**

Introduction to Exploratory Data Analysis: Data Analytics lifecycle, Exploratory Data Analysis (EDA)– Definition, Motivation, Steps in data exploration, The basic data types Data Type Portability.

**UNIT – II**

Preprocessing - Traditional Methods and Maximum Likelihood Estimation: Introduction to Missing data, Traditional methods for dealing with missing data, Maximum Likelihood Estimation – Basics, Missing data handling, improving the accuracy of analysis. Preprocessing Bayesian Estimation: Introduction to Bayesian Estimation, Multiple Imputation-Imputation Phase, Analysis and Pooling Phase, Practical Issues in Multiple Imputation, Models for Missing Notation Random Data.

**UNIT – III**

Data Summarization & Visualization: Statistical data elaboration, 1-D Statistical data analysis, 2-D Statistical data Analysis, N-D Statistical data analysis.

**UNIT – IV**

Outlier Analysis: Introduction, Extreme Value Analysis, Clustering based, Distance Based and Density Based outlier analysis, Outlier Detection in Categorical Data.

**UNIT – V**

Feature Subset Selection: Feature selection algorithms: filter methods, wrapper methods and embedded methods, Forward selection backward elimination, Relief, greedy selection, genetic algorithms for features selection.

**UNIT – VI**

Dimensionality Reduction: Introduction, Principal Component Analysis (PCA), Kernel PCA, Canonical Correlation Analysis, Factor Analysis, Multidimensional scaling, Correspondence Analysis.

**TEXT BOOKS**

1. Making sense of Data: A practical Guide to Exploratory Data Analysis and Data Mining, by Glenn J. Myatt.

**REFERENCE BOOKS**

1. Charu C. Aggarwal, “Data Mining The Text book”, Springer, 2015.

2. Craig K. Enders, “Applied Missing Data Analysis”, The Guilford Press, 2010.

3. Inge Koch, “Analysis of Multivariate and High dimensional data”, Cambridge University Press, 2014.

4. Michael Jambu, “Exploratory and multivariate data analysis”, Academic Press Inc., 1990.

5. Charu C. Aggarwal, “Data Classification Algorithms and Applications”, CRC press, 2015.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **M** | **M** | **M** |  | **H** |  |  |  |  |  |  | **H** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year II semester**

**B.Tech. (CSE) - Cyber Security**

**INTRODUCTION TO INTERNET OF THINGS**

**(Professional Elective –V)**

**Code: 8EC45**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**Prerequisite:** Data Communications and Computer Networks

**COURSE OBJECTIVES:**

Terminology, technology and applications of IoTIoT system management using M2M (machine to machine) with necessary protocols Python Scripting Language preferred for many IoT applications Raspberry PI as a hardware platform for IoT sensor interfacing Implementation of web based services for IoT with case studies

**COURSE OUTCOMES:**

At the end of this course, the students will be able to

1. Getting familiar with terminology, technology and applications of IOT
2. Understand and explain IoT system management using M2M (machine to machine) with necessary protocols
3. Design and develop Python Scripting Language programs preferred for many IoT applications
4. Use Raspberry PI as a hardware platform for designing the IoT sensor interfacing
5. Implement web based services for IoT
6. Understand and analyze the case studies illustrating IoT Design

**UNIT I**

Introduction to Internet of Things Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies like Wireless Sensor Networks, Cloud Computing, Big data analytics, and Communication protocols, Embedded Systems, IoT Levels and Templates.

**UNIT II**

IoT and M2M Software defined networks, network function virtualization, difference between SDN and NFV for IoT; Basics of IoT System Management with NETCOZF-YANG (Block Diagrams).

**UNIT III**

Developing IoT,IoT Design Methodology – The 10 steps design methodology; Logical design using Python: Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, date/time operations, Python packages of interest for IoT.

**UNIT IV**

IoT Physical Devices and End points Raspberry PI – Introduction to Raspberry PI and its Interfaces (serial, SPI, I2C) Programming – Python programming with Raspberry PI – Controlling Input / output (Interfacing with LED and LDR).

**UNIT V**

IoT Physical Servers and Cloud Offerings Cloud concepts (IaaS, PaaS, Saas), Introduction to Cloud Storage models and communication APIs – WAMP, Xively; Python web application framework with Django, Designing a RESTful web API

**UNIT VI**

Case Studies Illustrating IoT Design Home Automation – Smart Lighting, Home intrusion detection, Cities – Smart parking, Environment – Weather monitoring system, Weather reporting bot, Air pollution monitoring, Forest fire detection, Agriculture – Smart irrigation, Productivity applications – IoT printer

**TEXT BOOKS:**

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Level** | **H** | **H** | **H** | **H** | **M** | **L** | **L** | **M** | **H** | **H** | **L** | **H** |

H: High, M: Medium, L: Low Correlation

**Syllabus for B. Tech. IV Year II semester**

**B.Tech. (CSE) - Cyber Security**

**MAJOR PROJECT**

|  |  |  |  |
| --- | --- | --- | --- |
| **L** | **T** | **P/D** | **C** |
| **0** | **0** | **10** | **5** |

**Code: 8J896**

**Prerequisite:** All Courses till this semester

**COURSE OBJECTIVES:**

To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

COU**RSE OUTCOMES:**

At the end of this course, the students will be able to

1. Estimate the human and physical resources required, and make plan for the development of Project
2. Break down the Project into tasks and determine handover procedures
3. Identify links and dependencies, and schedule to achieve deliverables
4. Allocate roles with clear lines of responsibility and accountability with team spirit.
5. Design and develop the software or prototype using modern software tools wherever applicable to meet societal needs
6. Present the Project done and submit the report

A project shall be carried out by a group of students consisting of 2 to 3 in number in fourth year second semester. This work shall be carried out under the guidance of the faculty assigned as internal guide and shall involve design, fabrication, software development or any other significant activity. This can be of interdisciplinary nature also.

Out of total 100 marks for project work (in the final year second semester), 30 marks shall be for Internal Evaluation and 70 marks for the External Evaluation at the end of the Semester.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. The committee consists of an external examiner, HOD, a Senior Faculty Member and Internal Guide.

**Division of marks for internal assessment – 30 marks**

**Division of Marks for External Evaluation – 70 Marks**