***RG 22 Regulations***

**GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY**

**Unit of USHODAYA EDUCATIONAL SOCIETY**

An ISO 9001:2015 certified Institution: Recognized under Sec. 2(f)& 12(B) of UGC Act, 1956

3rd Mile, Bombay Highway, Gangavaram (V), Kovur(M), SPSR Nellore (Dt), Andhra Pradesh, India- 524137  
 Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: [www.gist.edu.in](http://www.gist.edu.in)

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| **PROBABILITY AND STATISTICS**  (Common to CSE, AI&ML,DS,CS,CE) | | | | | | | |
| **Course Code** | **L:T:P:S** | | **Credits** | **Exam Marks** | **Exam Duration** | | **Course Type** |
| **22A0016T** | **3:0:0:0** | | **3** | **CIE:30 SEE:70** | **3 Hours** | | **BSC** |
| **Course Objectives:** | | | | | | | |
| * Summarize The Basic Concepts Of Data Science And Its Importance In Engineering * Analyze The Data Quantitatively Or Categorically, * Measure of averages ,Variability, Adopt correlation methods and principle of least squares, Regression analysis | | | | | | | |
| **Course Outcomes(CO):** | | | | | | | |
| On Completion Of This Course, Student Will Be Able To:   * Define The Terrestrial, Events, Sample Space, Probability, And Laws Of Probability, Make Use Of Probabilities Of Events Infinite Sample Spaces From Experiments, * Apply Baye’s Theorem To Real Time Problems And Explain The Notion Of Random Variable ,Distribution Functions And Expected Value. * Apply Binomial And Poisson Distributions For Real Data To Compute Probabilities, Theoretical Frequencies, Interpret The Properties Of Normal Distribution And Its Applications. * Explain The Concept Of Estimation, Interval Estimation And Confidence Intervals * Apply The Concept To Hypothesis Testing For Large Samples. * Apply The Concept Of Testing Hypothesis For Small Samples To Draw The Inferences And Estimate The Goodness Of Fit. | | | | | | | |
| **Syllabus** | | | | | | **Total Hours:48** | |
| **Module–I** | | **Descriptive Statistics** | | | | **10 Hrs** | |
| Statistics Introduction, Measures Of Variability (Dispersion) Skewness Kurtosis, Correlation, Correlation Coefficient, Rank Correlation, Principle Of Least Squares, Method Of Least Squares, Regression Lines, Regression Coefficients And Their Properties. | | | | | | | |
| **Module–II** | | **Probability** | | | | **9Hrs** | |
| Probability, Probability Axioms, Addition Law And Multiplicative Law Of Probability, Conditional Probability, Baye’s Theorem, Random Variables (Discrete And Continuous), Probability Density Functions, Properties. | | | | | | | |
| **Module–III** | | **Probability distributions** | | | | **10Hrs** | |
| Discrete Distribution-Binomial, Poisson Approximation To The Binomial Distribution And Their Properties. Continuous distribution: Normal Distribution And Their Properties. Normal Approximation To Binomial Distribution. Uniform distribution | | | | | | | |
| **Module–IV** | | **Estimation and Testing hypothesis , large sample tests** | | | | **9Hrs** | |
| Estimation-Parameters, Statistics, Sampling Distribution, Point Estimation, Formulation Of Null Hypothesis, Alternative Hypothesis, The Critical And Acceptance Regions, Level Of Significance, Two Types Of Errors And Power Of The Test. Large Sample Tests: Test For Single Proportion, Difference Of Proportions, Test For Single Mean And Difference Of Means. Confidence Interval For Parameters In One Sample And Two Sample Problems. | | | | | | | |
| **Module–V** | | **Test of Significance** | | | | **10Hrs** | |
| Student-Distribution(Test For Single Mean, Two Means And Pairedt-Test),Testing Of Equality Of Variances(F-Test), Χ2-Testforgoodnessoffit, Χ2-Test For Independence Of Attributes. | | | | | | | |
| Text Books:  1. B.S. Grewal , “Higher Engineering Mathematics” , Khanna publishers. 2. Miller and Freunds , Probability and Statistics for Engineers,7/e,Pearson,2008. | | | | | | | |
| Reference Books:  1. Probability & Statistics by T.K.V.Iyengar,B.KrishnaGandhi, S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication. 2. B.V.Ramana,“HigherEngineeringMathematics”,McGrawHillpublishers. 3. W.Feller,an Introductionto Probability Theory and its Applications,1/e,Wiley,1968. 4. Mathematical Foundations of Statistics by K.C.Kapoor & Gupta, S.ChandPublications. | | | | | | | |
| **Web references:**  https://onlinecourses.nptel.ac.in/noc21\_ma74/preview | | | | | | | |

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| **COMPUTER ORGANIZATION**  (Common to CSE,AI&ML,DS,CS) | | | | | | | |
| **Course Code** | **L:T:P:S** | | **Credits** | **Exam Marks** | **Exam Duration** | | **Course Type** |
| **22A0506T** | **3:0:0:0** | | **3** | **CIE:30 SEE:70** | **3 Hours** | | **PCC** |
| **Course Objectives:** | | | | | | | |
| This course will enable students to:   * Illustrate the fundamental concepts of computer organization. * Determine the Machine Instructions, develop programs. * Develop Arithmetic Operations on Integers and Floating Point Numbers. * Demonstrate types of memories, use of I/O devices. * Illustrate concepts of Pipelining, Large Computer Systems. | | | | | | | |
| **Course Outcomes(CO):** | | | | | | | |
| **On completion of this course, student will be able to**   * Determine the basic concepts of Computer Organization. * Interpret the Machine Instructions and basic Input / Output Operations. * Demonstrate Arithmetic Operations on signed and unsigned numbers, design of Control Unit. * Differentiate types of memories and distinguish I/O Devices. * Illustrate the concepts of Pipelining. * Illustrate the concepts of Large Computer Systems | | | | | | | |
| **Syllabus** | | | | | | **Total Hours:48** | |
| **Module-I** | | **Basic Structure of Computers** | | | | **9Hrs** | |
| **Basic Structure of Computer**: Computer Types, Functional Units, Basic operational Concepts, Bus  Structure, Software, Performance, Multiprocessors and Multi computer. | | | | | | | |
| **Module-II** | | **Machine Instructions and Programs** | | | | **10Hrs** | |
| **Machine Instructions and Programs**: Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines. | | | | | | | |
| **Module-III** | | **Computer Arithmetic and Micro Programmed Control Unit** | | | | **10Hrs** | |
| **Computer Arithmetic**: Addition and Subtraction, Multiplication algorithms, Division algorithms, Floating point arithmetic operations.  **Micro Programmed Control Unit:** Control memory, address sequencing, design of control unit. | | | | | | | |
| **Module-IV** | | **The Memory System and Input / Output Organization** | | | | **10Hrs** | |
| **The Memory System:**  RAM, ROM, Cache Memory, Virtual Memory, And Secondary Storage.  **Input / Output Organization:** Accessing I/O Devices, Interrupts, Direct Memory Access, Buses, Standard I/O Interfaces. | | | | | | | |
| **Module-V** | | **Pipelining, Large Computer Systems** | | | | **9Hrs** | |
| **Pipelining:** Basic Concepts, Data Hazards, and Instruction Hazards.  **Large Computer Systems:** Forms of Parallel Processing, The Structure of General-Purpose multiprocessors, Interconnection Networks. | | | | | | | |
| Text Books:  1. CarlHamacher, ZvonkoVranesic, SafwatZaky, “Computer Organization”, 5th Edition, McGraw Hill Education, 2013. 2. M.Morris Mano, RajibMall, ”Computer System Architecture”, Revised Third Edition, Pearson Education India. | | | | | | | |
| Reference Books:  1. Themes and Variations, Alan Clements, “Computer Organization and Architecture”, CENGAGE Learning. 2. Smruti Ranjan Sarangi, “Computer Organization and Architecture”, McGraw Hill Education. | | | | | | | |
| **Web References:**  https://archive.nptel.ac.in/courses/106/105/106105163/ | | | | | | | |

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| **OBJECT ORIENTED PROGRAMMING THROUGH JAVA**  (Common to CSE,AI&ML,DS,CS) | | | | | | | |
| **Course Code** | **L:T:P:S** | | **Credits** | **Exam Marks** | **Exam Duration** | | **Course Type** |
| **22A0507T** | **3:0:0:0** | | **3** | **CIE:30 SEE:70** | **3 Hours** | | **PCC** |
| **Course Objectives:** | | | | | | | |
| This course will enable students to:   * To understand object-oriented principles like abstraction, encapsulation, inheritance, polymorphism and apply them in solving problems. * To understand the principles of inheritance and polymorphism and demonstrate how they relate to the design of abstract classes. * To implement the concept of packages, interfaces, exception handling and concurrency mechanism. * Demonstrate on the multi-tasking by using multiple threads. * To understand the design of Graphical User Interface using applets and swing controls. | | | | | | | |
| **Course Outcomes(CO):** | | | | | | | |
| **On completion of this course, student will be able to**   * Understand the Object-Oriented Programming Principles to develop java programs. * Apply code reusability through inheritance, packages and interfaces. * Inspect Exception Handling and multi-threading mechanisms in real time applications. * Develop applications by using I/O streams for better performance. * Construct GUI based applications using applets, AWT and swings for internet and system-based   applications.   * Compare AWT and Swing classes for GUI based applications. | | | | | | | |
| **Syllabus** | | | | | | **Total Hours:48** | |
| **Module-I** | | **Introduction** | | | | **10Hrs** | |
| **Introduction:** History and Evolution of Java, Java Buzzwords, Object Oriented Programming Principles, A first Simple Program, Data types, Variables, Type Conversion and Casting, Arrays, Operators, Control Statements, Classes, Objects, Methods, Constructors this key word, Garbage Collection, Parameter Passing, Method Overloading, Constructor Overloading. String handling methods. | | | | | | | |
| **Module-II** | | **Inheritance, Packages & Interfaces** | | | | **9Hrs** | |
| **Inheritance:** Basics, Using Super, Creating Multilevel hierarchy, Method overriding, Dynamic Method Dispatch, Using Abstract classes, using final with inheritance.  **Packages:** Basics, finding packages and CLASSPATH, Access Protection, Importing packages. **Interfaces:** Definition, Implementing Interfaces, Extending Interfaces, Applying Interfaces. | | | | | | | |
| **Module-III** | | **Exception handling &Multi threading** | | | | **10Hrs** | |
| **Exception handling -** Fundamentals, Exception types, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built-in exceptions, creating own exception sub classes.  **Multithreading:** The Java thread model, creating threads, Thread priorities, Synchronizing threads, Inter thread communication. | | | | | | | |
| **Module-IV** | | **Stream based I/O & Applet** | | | | **9Hrs** | |
| **Stream based I/O (java.io) –** The Stream classes-Byte streams and Character streams, reading console Input and Writing Console Output, File class, Reading and Writing Files, Random access file operations Scanner class.  **Applet:** Basics, Architecture, Applet Skeleton, requesting repainting, using the status window, passing parameters to applets | | | | | | | |
| **Module-V** | | **Introducing AWT & Swings** | | | | **10Hrs** | |
| **Introducing AWT:** AWT Classes, Window Fundamentals, Working with Frame Windows, Working with Graphics, Working with Color, Event Handling.  **GUI Programming with Swings –**Swing components and containers, layout managers, using a push button, j text field, j label. | | | | | | | |
| Text Books:  1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd. 2. Core Java: An Integrated Approach – Dr R Nageswara Rao. | | | | | | | |
| Reference Books:  1. Object Oriented Programming through Java, P.Radha Krishna, Universities Press. 2. Java and Object Orientation, an introduction, John Hunt, second edition, Springer. 3. Maurach’s Beginning Java2 JDK 5, SPD. 4. Introduction to Java Programming 7/e, Brief version, Y.Daniel Liang, Pearson 5. Java How to Program, 7/E: Paul Deitel, Deitel& Associates, Inc | | | | | | | |
| **Web References:**  https://onlinecourses.nptel.ac.in/noc22\_cs47/preview | | | | | | | |

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| **DIGITAL ELECTRONICS AND MICRO PROCESSORS**  (Common to CSE,AI&ML,DS,CS) | | | | | | | |
| **Course Code** | **L:T:P:S** | | **Credits** | **Exam Marks** | **Exam Duration** | | **Course Type** |
| **22A0410T** | **3:0:0:0** | | **3** | **CIE:30 SEE:70** | **3 Hours** | | **ESC** |
| **Course Objectives:** | | | | | | | |
| This course will enable students to:   * To understand all the concepts of Logic Gates and Boolean Functions. * To learn about Combinational Logic and Sequential Logic Circuits. * To design logic circuits using Programmable Logic Devices. * To understand basics of 8086 Microprocessor and 8051 Microcontroller. * To understand architecture of 8086 Microprocessor and 8051 Microcontroller. * To learn Assembly Language Programming of 8086 and 8051. | | | | | | | |
| **Course Outcomes(CO):** | | | | | | | |
| **On completion of this course, student will be able to**   * Differentiate various number systems and binary codes**.** * Solve the Boolean Expressions using Boolean algebra and k-maps. * Implement different combinational and Sequential circuits * Explain the internal architecture and organization of the 8086 microprocessor. * Demonstrate the assembly level language programming for 8086 and 8051. * Describe the architecture, hardware details and memory organization of 8051 microcontroller. | | | | | | | |
| **Syllabus** | | | | | | **Total Hours:48** | |
| **Module-I** | | **Number Systems & Code Conversion** | | | | **10Hrs** | |
| Number Systems & Code conversions, Boolean Algebra & Boolean properties, Logic Gates, Truth Tables, Universal Gates, Simplification of Boolean functions using Boolean properties, SOP and POS methods – Simplification of Boolean functions using K-maps, Signed and Unsigned Binary Numbers. | | | | | | | |
| **Module-II** | | **Combinational Circuits** | | | | **9Hrs** | |
| **Combinational Logic Circuits:** Adders & Subtractors, magnitude Comparators, Multiplexers, De-multiplexers, Encoders, Decoders, Programmable Logic Devices.. | | | | | | | |
| **Module-III** | | **Sequential Circuits** | | | | **10Hrs** | |
| **Sequential Logic Circuits:** Compression between combinational & sequential circuits, Latches, SR Latch , Flipflops , SR Flip Flop, JK Flip Flop , Master Slave JK, T Flip-Flops, D Flip Flop , Shift Registers, Types of Shift Registers, Counters, Synchronous Counters, Asynchronous Counters, Up-Down Counter | | | | | | | |
| **Module-IV** | | **Microprocessors – I** | | | | **9Hrs** | |
| 8085 microprocessor, Block Diagram of 8085 Microprocessor, 8086 microprocessor, Functional Diagram, register organization 8086, Flag register of 8086 and its functions, Addressing modes of 8086, Pin diagram of 8086, Minimum mode & Maximum mode operation of 8086, Interrupts in 8086. | | | | | | | |
| **Module-V** | | **Microprocessors – II** | | | | **10Hrs** | |
| Instruction set of 8086, Assembler directives, Procedures and Macros, Simple programs involving arithmetic, logical, branch instructions, Ascending, Descending and Block move programs, String Manipulation Instructions. Functional Diagram of 8051, register organization 8051. | | | | | | | |
| Text Books:  1. M. Morris Mano, Michael D. Ciletti, Digital Design, Pearson Education, 5th Edition, 2013 2. Anil K. Maini, Digital Electronics: Principles, Devices and Applications, John Wiley & Sons,Ltd., 2007. | | | | | | | |
| Reference Books:  1. Advanced microprocessors and peripherals-A.K Ray and K.M.Bhurchandani, TMH, 2nd edition, 2006. 2. Thomas L. Floyd, Digital Fundamentals – A Systems Approach, Pearson, 2013. 3. Charles H. Roth, Fundamentals of Logic Design, Cengage Learning, 5th, Edition, 2004. 4. D.V.Hall, Microprocessors and Interfacing. TMGH, 2nd edition, 2006. | | | | | | | |
| Web References:https://onlinecourses.nptel.ac.in/noc22\_ee55/preview | | | | | | | |

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| **COMPUTER NETWORKS**  (Common **to CSE, AI&ML, CS, DS**) | | | | | | | |
| **Course Code** | **L:T:P:S** | | **Credits** | **Exam Marks** | **Exam Duration** | | **Course Type** |
| **22A0520T** | **3: 0:0:0** | | **3** | **CIE:30 SEE:70** | **3 Hours** | | **PCC** |
| **Course Objectives:** | | | | | | | |
| This course will enable students:   * Determine the basic concepts of Computer Networks. * Determine the layered approach for design of computer networks * Distinguish OSI and TCP/IP reference models * Predict the network path used in Internet environment * Use the format of headers of IP, TCP and UDP * Illustrate the concepts of application layer, network security fundamentals. | | | | | | | |
| **Course Outcomes (CO):** | | | | | | | |
| **On completion of this course, student will be able to:**   * Use the software and hardware components of a computer network * Apply the reference model of a computer network * Solve the error correction and detection in existing protocols * Predict path for routing, and congestion control algorithms * Determine the functionality of TCP and UDP * Use the appropriate application layer applications | | | | | | | |
| **Syllabus** | | | | | | **Total Hours:48** | |
| **Module-I** | | **The Internet and the Reference Models** | | | | **10Hrs** | |
| **Introduction:** Computer Network, Network Topologies, types of networks, Reference models- The OSI Reference Model the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models.  **Physical Layer** –Introduction to physical layer, Guided Media- Twisted-pair cable, Coaxial cable, Fiber optic cable, Unguided media: Wireless-Radio waves, microwaves, infra red.. | | | | | | | |
| **Module-II** | | **The Data Link Layer** | | | | **9Hrs** | |
| **The Data Link Layer**: Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols | | | | | | | |
| **Module-III** | | **The Network Layer** | | | | **10Hrs** | |
| **The Network Layer**: Network Layer design issues, Routing algorithms, Congestion control and  Internetworking, Network layer in internet. | | | | | | | |
| **Module-IV** | | **Transport Layer** | | | | **9Hrs** | |
| **Transport Layer**: Transport layer services, service primitives, Elements of transport protocols**,** The Internet Transport Protocols: TCP/IP, UDP. | | | | | | | |
| **Module-V** | | **The Application Layer and Network security** | | | | **10Hrs** | |
| **The Application Layer:** DNS, SMTP, FTP, Email and security, network security. | | | | | | | |
| Text Books:  1. Andrew S.Tanenbaum, David j.wetherall, Computer Networks, 5th Edition, PEARSON. 2. James F. Kurose, Keith W. Ross, “Computer Networking: A Top-Down Approach”, 6th edition, Pearson, 2019. | | | | | | | |
| Reference Books:  1. Forouzan, Data communications and Networking, 5th Edition, McGraw Hill Publication. 2. Youlu Zheng, Shakil Akthar, “Networks for Computer Scientists and Engineers”, Oxford Publishers, 2016. | | | | | | | |
| Web References:  * <https://nptel.ac.in/courses/106105183/25> * <http://www.nptelvideos.in/2012/11/computer-networks.html> * <https://nptel.ac.in/courses/106105183/3> | | | | | | | |

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| **UNIVERSAL HUMAN VALUES**  (Common to CSE,AI&ML,DS,CS) | | | | | | | |
| **Course Code** | **L:T:P:S** | | **Credits** | **Exam Marks** | **Exam Duration** | | **Course Type** |
| **22A0021T** | **3:0:0:0** | | **3** | **CIE:30 SEE:70** | **3 Hours** | | **HSC** |
| **Course Objectives:** | | | | | | | |
| This course will enable students to:   * Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence. * Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence * Strengthening of self-reflection. * Development of commitment and courage to act. | | | | | | | |
| **Course Outcomes (CO):** | | | | | | | |
| **On completion of this course, student will be able to**   * Students are expected to become more a ware of themselves, and their surroundings (family, society, nature) * They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. * They would have better critical ability. * They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). * It is hoped that they would be able to apply what they have learnt to their own self indifferent day-to-day setting sin real life, at least a beginning would be made in this direction. | | | | | | | |
| **Syllabus** | | | | | | **Total Hours:48** | |
| **Module-I** | | **Course Introduction-Need, Basic Guidelines, Content and Process for Value Education** | | | | **10Hrs** | |
| * Purpose and motivation for the course, recapitulation from Universal Human Values-I * Self-Exploration–what is it?-Its content and process; ‘Natural Acceptance’ and Experiential Validation-as the process for self-exploration. * Continuous Happiness and Prosperity-A look at basic Human Aspirations Right understanding, Relationship and Physical Facility-the basic requirements for fulfillment of aspirations of every human being with their correct priority * Understanding Happiness and Prosperity correctly-Acritical appraisal of the current scenario * Method to fulfil the above human aspirations: understanding and living in harmony at various levels. * Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence)rather than as arbitrariness in choice based on liking-disliking | | | | | | | |
| **Module-II** | | **Understanding Harmony in the Human Being- Harmony in Myself!** | | | | **9Hrs** | |
| * Understanding human being as eco-existence of the sentient ‘I’ and the material ‘Body’ * Understanding the needs of Self(‘I’) and ‘Body’- happiness and physical facility Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer) Understanding the characteristics and activities of ‘I’ and harmony in ‘I’ * Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail * Programs to ensure Sanyam and Health. * Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one’s own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease | | | | | | | |
| **Module-III** | | **Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship** | | | | **10Hrs** | |
| * Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness; Trust and Respect as the foundational values of relationship * Understanding the meaning of Trust; Difference between intention and competence * Understanding the meaning of Respect, Difference between respect and differentiation ; the other salient values in relationship * Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness(trust)and co-existence as comprehensive Human Goals * Visualizing a universal harmonious order in society-Undivided Society, Universal Order-from family to world family. * Include practice sessions to reflection relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students’ lives | | | | | | | |
| **Module-IV** | | **Understand the Nature and Existence hole existence as Co axis** | | | | **9Hrs** | |
| * Understanding the harmony in the Nature * Inter connectedness and mutual fulfillment among the four orders of nature-recyclability and self-regulation in nature * Understanding Existence as Co-existence of mutually interacting unit sin all -pervasive space * Holistic perception of harmony at all levels of existence. * Include practice sessions to discuss human being as cause of imbalance in nature (film“ Home” can be used),pollution, depletion of resources and role of technology etc. | | | | | | | |
| **Module-V** | | **Implications of the above Holistic Understanding of Harmony on Professional Ethics** | | | | **10Hrs** | |
| * Natural acceptance of human values Definitiveness of Ethical Human Conduct * Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order * Competenceinprofessionalethics:a.Abilitytoutilizetheprofessionalcompetenceforaugmentinguniversalhumanorderb.Ability toidentifythescopeandcharacteristicsofpeoplefriendlyandeco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems. * Casestudiesoftypicalholistictechnologies,managementmodelsandproductionsystemsStrategyfortransitionfromthepresentstatetoUniversalHumanOrder: * Atthelevelofindividual:associallyandecologicallyresponsibleengineers,technologistsandmanagers * Atthelevelofsociety:asmutuallyenrichinginstitutionsandorganizationsSumup. * IncludepracticeExercisesandCaseStudieswillbetakenupinPractice(tutorial)Sessionseg.Todiscusstheconductasanengineerorscientistetc. | | | | | | | |
| Text Books:  1. RRGaur,RAsthana,GPBagaria,“AFoundationCourseinHumanValuesandProfessionalEthics”,2ndRevisedEdition,ExcelBooks,NewDelhi,2019.ISBN978-93-87034-47-1 2. R RGaur,RAsthana,GPBagaria,“Teachers’ManualforAFoundationCourseinHumanValues andProfessionalEthics”,2ndRevisedEdition,ExcelBooks,NewDelhi,2019.ISBN978-93-87034-53-2 | | | | | | | |
| Reference Books:  * JeevanVidya:EkParichaya,ANagaraj,JeevanVidyaPrakashan, Amar kantak,1999. * A.N.Tripathi,“HumanValues”,NewAgeIntl.Publishers,NewDelhi,2004.TheStoryofStuff(Book). * MohandasKaramchandGandhi“TheStoryofMyExperimentswithTruth” * E.FSchumacher.“SmallisBeautiful”SlowisBeautiful–CecileAndrews * J C Kumarappa“Economy of Permanence”Pandit Sunderlal “Bharat Mein Angreji Raj”Dharampal,“RediscoveringIndia” * MohandasK.Gandhi,“HindSwarajorIndianHomeRule”IndiaWinsFreedom-MaulanaAbdulKalamAzadVivekananda-RomainRolland(English)Gandhi-RomainRolland(English) | | | | | | | |

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| **OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB**  (Common to CSE,AI&ML,DS,CS) | | | | | | |
| **Course Code** | **L:T:P:S** | **Credits** | **Exam Marks** | **Exam Duration** | | **Course Type** |
| **22A0509P** | **0:0:3:0** | **1.5** | **CIE:30 SEE:70** | **3 Hours** | | **PCC** |
| **Course Objectives:** | | | | | | |
| This course will enable students to:   * Practice object-oriented programs and build java applications. * Implement java programs for establishing interfaces. * Implement sample programs for developing reusable software components. * Create database connectivity in java and implement GUI applications. | | | | | | |
| **Course Outcomes(CO):** | | | | | | |
| **On completion of this course, student will be able to**   * Recognize the Java programming environment. * Develop efficient programs using multi threading. * Design reliable programs using Java exception handling features. * Extend the programming functionality supported by Java. * Select appropriate programming constructs to solve a problem. * Develop the programs in swings and mouse events. | | | | | | |
| **Syllabus** | | | | | **Total Hours:48** | |
| **List of Experiments**  **Experiment-1**   1. Installation of Java software, study of any Integrated development environment, Use Eclipse or NetBeans platform and acquaint with the various menus. Create a test project, add a test class and run it.   See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with java program to find prime numbers between 1 to n.   1. Write a to Java program that prints all real solutions to the quadratic equation ax2+bx+c=0. Read in a, b, c and use the quadratic formula.   **Experiment- 2**   1. Write a Java program find the factorial of given number 2. Write a Java program to find whether given number is prime or not 3. The Fibonacci sequence is defined by the following rule. The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a java program that uses both recursive and non-recursive functions.   **Experiment-3**   1. Write a Java program to find the sum of individual digits of a number 2. Write a java program for Arithmetic calculator using switch case menu   **Experiment-4**   1. Write a java program to multiply two given matrices. 2. Write a java program to implement method overloading and constructors overloading. 3. Write a java program to implement method overriding.   **Experiment-5**   1. Create a Java class called Student with the following details as variables within it.USN, Name, Branch, Phone. Write a Java program to create n Student objects and print the USN, Name, Branch, and Phone of these objects with suitable headings. 2. Write Java program on use of inheritance, preventing inheritance using final, abstract classes   **Experiment-6**   1. Write a Java program to implement exception handling. 2. Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part where n is the sequence number of the part file.   **Experiment-7**   1. Write a java program that displays the number of characters, lines and words in a text file. 2. Write a java program that reads a file and displays the file on the screen with line number before each line   **Experiment-8**  Write a program that creates a user interface to perform integer division. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 and Num2 were not integers, the program would throw a Number Format Exception. If Num2 were zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box  **Experiment-9**   1. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number. 2. Write a java program that implements inter thread communication.   **Experiment-10**   1. Develop an applet in Java that displays a simple message. 2. Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked   **Experiment-11**   1. Develop a Java application to implement the opening of a door while opening man should present before hut and closing man should disappear. 2. Develop a java application for simple calculator.   **Experiment-12**   1. Develop a Java application to demonstrate the mouse event handlers. 2. Develop a Java application by using Swings. | | | | | | |
| Reference Books:  1. P. J. Deitel, H. M. Deitel, “Java for Programmers”, Pearson Education, PHI, 4th Edition, 2007. 2. P. Radha Krishna, “Object Oriented Programming through Java”, Universities Press, 2nd Edition, 2007 3. Bruce Eckel, “Thinking in Java”, Pearson Education, 4th Edition, 2006. 4. 4. Sachin Malhotra, Saurabh Chaudhary, “Programming in Java”, Oxford University Press, 5th Edition, 2010 | | | | | | |
| Web References:  1. www.niecdelhi.ac.in 2. <https://www.linkedin.com/in/achin-jain-85061412> 3. [www.rank1infotech.com](http://www.rank1infotech.com) | | | | | | |

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| **DIGITALELECTRONICSANDMICRO PROCESSORSLAB**  (Common to CSE,AI&ML,DS,CS) | | | | | | |
| **Course Code** | **L:T:P:S** | **Credits** | **Exam Marks** | **Exam Duration** | | **Course Type** |
| **22A0411P** | **0:0:3:0** | **1.5** | **CIE:30 SEE:70** | **3 Hours** | | **ESC** |
| **Course Objectives:** | | | | | | |
| This course will enable students to:   * To understand all the concepts of Logic Gates and Boolean Functions. * To learn about Combinational Logic and Sequential Logic Circuits. * To design logic circuits using Programmable Logic Devices. * To understand basics of 8086 Microprocessor * To understand architecture of 8085 & 8086 Microprocessor * To learn Assembly Language Programming of 8086. | | | | | | |
| **Course Outcomes(CO):** | | | | | | |
| **On completion of this course, student will be able to**   * Identify the various digital ICs and understand their operation. * Use Boolean laws and K-map to simplify the digital circuits. * Demonstrate the basic digital circuits and verify their operation. * Interpret the hardware architecture and assembly language programming using MASM. * Execute arithmetic and data transfer operations using MASM in 8086. * Implement some basic operations using Aurdino on IoT development trainer kit. | | | | | | |
| **Syllabus** | | | | | **Total Hours:48** | |
| **List of Experiments**  Note: Minimum of 12 (6+6) experiments shall be conducted from both the sections given below:  **DIGITAL ELECTRONICS:**  **Experiment-1**   * Verification of Truth Table for AND, OR, NOT, NAND, NOR and EX-OR gates.   **Experiment-2**   * Realization of NOT, AND, OR, EX-OR gates with only NAND and only NOR gates.   **Experiment-3**   * Karnaugh map Reduction and Logic Circuit Implementation.   **Experiment-4**   * Verification of DeMorgan’s Laws.   **Experiment-5**   * Implementation of Half-Adder and Half-Subtractor. * Implementation of Full-Adder and Full-Subtractor.   **Experiment-6**   * Four Bit Binary Adder * Four Bit Binary Subtractor using 1’s and 2’s Complement.   **MICROPROCESSORS (8086 Assembly Language Programming)**  **Experiment-7**   * 8 Bit Addition and Subtraction. * 16 Bit Addition.   **Experiment-8**   * BCD Addition. * BCD Subtraction.   **Experiment-9**   * 8 Bit Multiplication. * 8 Bit Division.   **Experiment-10**   * Searching for an Element in an Array. * Sorting in Ascending and Descending Orders. * Finding Largest and Smallest Elements from an Array. | | | | | | |
| Text Books:  1. M. Morris Mano, Michael D. Ciletti, Digital Design, Pearson Education, 5th Edition, 2013. 2. Anil K. Maini, Digital Electronics: Principles, Devices and Applications, John Wiley & Sons, Ltd., 2007. | | | | | | |
| Reference Books:  1. N. Senthil Kumar, M. Saravanan, S. Jeevanathan, Microprocessor and Microcontrollers, Oxford Publishers, 2010. 2. Advanced microprocessors and peripherals-A.K ray and K.M.Bhurchandani, TMH, 2nd edition, 2006. 3. Thomas L. Floyd, Digital Fundamentals – A Systems Approach, Pearson, 2013. 4. Charles H. Roth, Fundamentals of Logic Design, Cengage Learning, 5th, Edition, 2004. 5. D.V.Hall, Microprocessors and Interfacing. TMGH, 2nd edition, 2006. 6. Kenneth. J. Ayala, The 8051 microcontroller, 3rd edition, Cengage Learning, 2010 | | | | | | |
| Web References:  1. <https://www.vlab.co.in/> | | | | | | |

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| **COMPUTERNETWORKSLAB**  (Common to CSE,AI&ML,DS,CS) | | | | | | |
| **Course Code** | **L:T:P:S** | **Credits** | **Exam Marks** | **Exam Duration** | | **Course Type** |
| **22A0523P** | **0:0:3:0** | **1.5** | **CIE:30 SEE:70** | **3 Hours** | | **PCC** |
| **Course Objectives:** | | | | | | |
| This course will enable students to:   * Understand the basic concepts of Computer Networks * Understand the functionalities of various layers of OSI model * Apply the data link layer framing mechanisms * Apply the error detection mechanisms * Implement the routing protocols. | | | | | | |
| **Course Outcomes(CO):** | | | | | | |
| **On completion of this course, student will be able to**   * Use the basic components of a Computer Networks (L3) * Determine different hardware devices in computer networks(L3) * Determine the data link layer framing mechanisms(L3) * Use the error detection mechanisms(L3) * Apply the shortest routing protocols to transmit data(L3) * Determine spanning tree for a subnet(L3) | | | | | | |
| **Syllabus** | | | | | **Total Hours:48** | |
| **List of Experiments**  Experiment-1:   * Explain the basic networking commands.   Experiment-2:   * Study of network devices such as repeaters, hub, switch, bridge, router and gateway   Experiment-3:   * Implement the data link layer framing method as character count   Experiment-4:   * Implement the data link layer framing method as character stuffing   Experiment-5:   * Implement the data link layer framing method as bit stuffing   Experiment-6:   * Implement on a data set of characters the CRC polynomials CRC 12   Experiment-7:   * Implement Dijkstra’s algorithm to compute the shortest path through a graph   Experiment-8:   * Obtain hierarchical table by taking an example subnet graph with weights indicating delay between nodes   Experiment-9:   * Obtain Routing table at each node using distance vector routing algorithm   Experiment-10:   * Find minimum cost and minimum spanning tree for a given subnet of hosts | | | | | | |
| Text Books:  1. Andrew S.Tanenbaum, David j.wetherall, Computer Networks, 5th Edition, PEARSON. 2. James F. Kurose, Keith W. Ross, “Computer Networking: A Top-Down Approach”, 6th edition, Pearson, 2019. | | | | | | |
| Reference Books:  1. Forouzan, Datacommunications and Networking, 5th Edition, McGraw Hill Publication. 2. Youlu Zheng, Shakil Akthar, “Networks for Computer Scientists and Engineers”, Oxford Publishers, 2016. | | | | | | |
| Web References:  1. <https://nptel.ac.in/courses/106105183/25> 2. <http://www.nptelvideos.in/2012/11/computer-networks.html> 3. <https://nptel.ac.in/courses/106105183/3> | | | | | | |

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| **LINUX PROGRAMMING (SKILL)**  (Common to CSE, AIML, DS,CS) | | | | | | |
| **Course Code** | **L:T:P:S** | **Credits** | **Exam Marks** | **Exam Duration** | | **Course Type** |
| **22A0518** | **1:0:2:0** | **2** | **CIE:30 SEE:70** | **3 Hours** | | **SC** |
| **Course Objectives:** | | | | | | |
| This course will enable students to:   * Analyze the Linux utilities and Linux environment. * Learn the fundamentals of shell scripting/programming. * Understand system administration processes by providing a hands-on experience. | | | | | | |
| **Course Outcomes (CO):** | | | | | | |
| **On completion of this course, student will be able to**   * Understand the Basic commands and utilities in Linux Environment. * Identify and use Linux utilities to create and manage simple file processing operations,   organize directory structures with appropriate security.   * Analyze the Linux utilities and Linux environment. * Use shell script to automate different tasks as Linux. * Illustrate file processing operations such as standard I/O and formatted I/O. * Develop various client server applications using TCP or UDP protocols. | | | | | | |
| **Syllabus** | | | | | **Total Hours:48** | |
| **Introduction to Linux/Unix:-** Architecture of Unix, Features of Unix , Unix Commands – man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, : User and session management commands: user add, groupadd, userdel, groupdel.  **Linux/Unix Utilities:-** Introduction to unix file system, file handling utilities, vi editor, Text processing utilities and backup utilities: commands to be covered are tail, head, sort, nl, uniq, sed, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr and awk.  Unix Session, Standard Streams, Redirection, Pipes.  Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files  **Shell Programming:**  Introduction to shells, Variables, input and output, Environment variables, Basic script concepts, Expressions, Decision making and repetition etc.  **Socket programming:** Client Sever Implementation Using Sockets and Shared Memory  **Experiment 1:** Study and Practice on various commands like man, echo, printf, clear, script, passwd, cal,uname, who, date, tty, stty, pwd, who,.  **Experiment 2**: Study and Practice on various commands like cd, mkdir, rmdir cp, mv, ln, rm, unlink, du, df, mount, umount, find, unmask, ulimit, ps.  **Experiment 3**: Study and Practice on various commands like tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr.  **Experiment 4:**  **Session-1**   1. Log into the system 2. Use vi editor to create a file called myfile.txt which contains some text. 3. Correct typing errors during creation. 4. Save the file 5. logout of the system   **Session-2**   1. Log into the system 2. open the file created in session 1 3. Add some text 4. Change some text 5. Delete some text 6. Save the Changes 7. Logout of the system   **Experiment 5:**   1. Login to the system 2. Use the appropriate command to determine your login shell 3. Use the /etc/passwd file to verify the result of step b. 4. Use the who command and redirect the result to a file called myfile1. Use the more   command to see the contents of myfile1.   1. Use the date and who commands in sequence (in one line) such that the output of date will  display on the screen and the output of who will be redirected to a file called myfile2. Use the  more command to check the contents of myfile2.   **Experiment 6:**   1. Log into the system 2. Use the cat command to create a file containing the following data. Call it mytable use tabs to separate the fields.    1425 Ravi 15.65   4320 Ramu 26.27   6830 Sita 36.15   1450 Raju 21.86   1. Use the cat command to display the file, mytable. 2. Use the vi command to correct any errors in the file, mytable. 3. Use the sort command to sort the file mytable according to the first field. Call the sorted file   my table  (same name)   1. Print the file mytable 2. Use the cut and paste commands to swap fields 2 and 3 of mytable. Call it my table (same name) 3. Print the new file, mytable 4. Logout of the system.   **Experiment 7:**   1. Write a sed command that deletes the first character in each line in a  file. 2. Write a sed command that deletes the character before the last character in each line in a file. 3. Write a sed command that swaps the first and second words in each line in a file.   **Experiment 8:**   * + - 1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.       2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments toit.   **Experiment 9:**  Write a program to generate Fibonacci series  Write a program to check whether given string is palindrome or not   * + - 1. Write a shell script to find factorial of a given integer.   **Experiment 10:**  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.  Write a shell script to list all of the directory files in a directory  **Experiment 11:**   * + - 1. Write an awk script to count the number of lines in a file that do not contain vowels.  1. Write an awk script to find the number of characters, words and lines in a file. 2. Write an awk script to calculate average marks of each student. 3. Write an awk script to replace a string in a file.   **Experiment12:**  Simulate the following commands  a) Simulate cat command b) Simulate cp command  **Experiment 13:**   1. Write client and server programs (using java) for interaction between server and client processes using Unix domain sockets. 2. Write client and server programs (using java) for interaction between server and client processes using Internet domain sockets. | | | | | | |
| Reference Books:  1. Sumitabha Das, “Your Unix The Ultimate Guide”, Tata McGraw-Hill, New Delhi, India, 2007. 2. B. A. Forouzan and R. F. Gilberg, “Unix and Shell Programming”, Cengage Learning. 3. Robert Love, “Linux System Programming”, O'Reilly, SPD. Stephen G. Kochan, Patrick Wood, “Unix Shell Programming”, Sams publications, 3rd Edition, 2007. 4. T. Chan, “Unix System Programming using C++”, Prentice Hall India, 1999. | | | | | | |
| **Web References:**  1.<https://nptel.ac.in/courses/117106113>  2.<https://archive.nptel.ac.in/courses/117/106/117106113/> | | | | | | |

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| **ENVIRONMENTAL STUDIES**  (Common **to CSE, AI&ML, CS, DS, ECE, EEE, ME**) | | | | | | | |
| **Course Code** | **L:T:P:S** | | **Credits** | **Exam Marks** | **Exam Duration** | | **Course Type** |
| **22A0028T** | **2:0:0:0** | | **0** | **CIE:30** | **-** | | **MC** |
| **Course Objectives:** | | | | | | | |
| This course will enable students to:   * To make the students to get awareness on environment. * To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life. * To save earth from the inventions by the engineers. | | | | | | | |
| **Course Outcomes(CO):** | | | | | | | |
| **On completion of this course, student will be able to**   * Recognize the knowledge about environment, natural resources and different techniques involved in its conservation. * Describe the information about different eco-systems and its functions. * Explain the different types of bio-diversity along with values and conservation methods. * Predict various environmental pollutions and able to design the environmental friendly process in engineering. * Apply the sustainable development concepts in life, society and industry. | | | | | | | |
| **Syllabus** | | | | | | **Total Hours:48** | |
| **Module-I** | |  | | | | **10Hrs** | |
| Definitions , components of Environment, Scope and Importance –Need for Public Awareness  Renewable and non-renewable resources –Forest resources – Use and over – exploitation, deforestation,– Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. | | | | | | | |
| **Module-II** | | **Ecosystems** | | | | **9Hrs** | |
| Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers– Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the followingecosystem   * 1. Grassland ecosystem. b. Desertecosystem | | | | | | | |
| **Module-III** | | **Biodiversity And Its Conservation** | | | | **10Hrs** | |
| Introduction Definition: genetic, species and ecosystem diversity – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values –– India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching ,Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity | | | | | | | |
| **Module-IV** | | **Environmental Pollution** | | | | **9Hrs** | |
| Definition, Cause, effects and control measures of :   1. Air pollution 2. Water pollution 3. Noise pollution   Solid Waste Management : Causes, effects and control measures of urban and industrial wastes | | | | | | | |
| **Module-V** | | **Social Issues and The Environment** | | | | **10Hrs** | |
| From Unsustainable to Sustainable development – Urban problems related to energy –Environment Protection Act. – Air (Prevention and Control of Pollution) act  Definition, Cause, effects and control measures of : Global warming, Acid rain, Ozone layer depletion  Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain –Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc. | | | | | | | |
| Text Books:  1. Text book of Environmental Studies for Undergraduate Courses- Erach Bharucha for University Grants Commission, Universities Press. 2. Environmental Studies- Kaushik & kaushik, New Age Pubilishers. | | | | | | | |
| Reference Books:  1. Environmental studies- R.Rajagopalan, Oxford University Press 2. Comprehensive Environmental studies- J.P.Sharma, Laxmi publications. | | | | | | | |
| **Web References:**  https://onlinecourses.nptel.ac.in/noc23\_hs155/preview | | | | | | | |