

BACHELOR OF TECHNOLOGY

Computer Science and Engineering

COURSE STRUCTURE & SYLLABUS

(Batches admitted from the Academic Year 2022 -2023)



MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

Accredited by NBA & NAAC with 'A' Grade, UGC, Govt. of India

Affiliated to JNTUH, Approved by AICTE, ISO 9001:2015 Certified Institution

Maisammaguda, Dhullapally, Secunderabad, Kompally-500100

COURSE STRUCTURE (R22)

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COURSE STRUCTURE

I Year B. Tech – I Semester (I Semester)

S. No	Course Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	2200BS01	Linear Algebra and Differential Equations	3	1	0	4	40	60
2	2205ES01	Programming for Problem Solving	3	0	0	3	40	60
3	2202ES01	Basic Electrical Engineering	3	1	0	4	40	60
4	2200BS07	Engineering Chemistry	3	0	0	3	40	60
5	2205ES61	Programming for Problem Solving Lab	0	0	3	1.5	40	60
6	2202ES61	Basic Electrical Engineering Lab	0	0	2	1	40	60
7	2200BS62	Engineering Chemistry Lab	0	0	2	1	40	60
8	2203ES61	Engineering Workshop	1	0	3	2.5	40	60
9	2200MC01	Environmental Science	1	0	0	0	100	0
10		Induction Programme	-	-	-	-	-	-
		TOTAL	14	2	10	20	420	480

I Year B. Tech – II Semester (II Semester)

S. No	Course Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	2200BS03	Advanced Calculus and Transform Techniques	3	1	0	4	40	60
2	2205ES02	Python Programming	3	0	0	3	40	60
3	2200BS05	Applied Physics	3	1	0	4	40	60
4	2200HS01	English	2	0	0	2	40	60
5	2203ES01	Computer Aided Engineering Graphics	1	0	4	3	40	60
6	2200BS61	Applied Physics Lab	0	0	3	1.5	40	60
7	2205ES62	Python Programming Lab	0	0	3	1.5	40	60
8	2200HS61	English Language and Communications Lab	0	0	2	1	100	0
9	2200MC02	French Language	2	0	0	0	100	0
		TOTAL	14	2	12	20	480	420

Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

II Year B. Tech – I Semester (III Semester)

S.No	Course Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	2200BS04	Probability & Statistics	3	1	0	4	40	60
2	2200HS03	Managerial Economics and Financial Analysis	3	0	0	3	40	60
3	2205PC01	Data Structures and Algorithms	3	0	0	3	40	60
4	2205PC02	Operating Systems	3	0	0	3	40	60
5	2205PC03	Discrete Mathematics	3	0	0	3	40	60
6	2205PC61	Data Structures and Algorithms lab	0	0	3	1.5	40	60
7	2205PC62	Operating System Lab	0	0	3	1.5	40	60
8	2205PR01	Innovative Product Development-1	0	0	2	1	40	60
9	2200MC03	Human values and Professional Ethics	2	0	0	0	100	0
		TOTAL	17	1	8	20	420	480

**Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree*

II Year B. Tech – II Semester (IV Semester)

S.No	Course Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	2204ES01	Analog & Digital Electronic Circuits	3	0	0	3	40	60
2	2205PC07	Design and Analysis of Algorithms	3	1	0	3	40	60
3	2205PC04	Object Oriented Programming through Java	3	0	0	3	40	60
4	2205PC06	Formal Language & Automata Theory	3	0	0	4	40	60
5	2205PC08	Database Management Systems	3	0	0	3	40	60
6	2205PC63	Object Oriented Programming through Java Lab	0	0	3	1.5	40	60
7	2205PC64	Database Management Systems Lab	0	0	3	1.5	40	60
8	2205PR02	Innovative Product Development-2	0	0	2	1	40	60
9	2200MC04	Indian Constitution *	2	0	0	0	100	0
		TOTAL	17	1	8	20	420	480

**Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree*

III Year B. Tech – I Semester (V Semester)

S.No	Course Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	2205PC09	Compiler Design	3	0	0	3	40	60
2	2205PC10	Computer Networks	3	0	0	3	40	60
3	2200HS05	Design Thinking	2	0	0	1	40	60
4		Professional Elective-I	3	0	0	3	40	60
	2267PE02	Distributed Systems						
	2262PE15	Cyber Security Essentials						
	2205PE01	Software engineering						
	2266PE11	Knowledge engineering						
	2205PE02	Computer Graphics						
	2212PE01	Mobile Computing						
5		Professional Elective-II	3	0	0	3	40	60
	2212PE04	Distributed Database						
	2262PE09	Security Incident and Response Management						
	2205PE03	Software Testing Methodologies						
	2266PE12	Artificial Intelligence						
	2266PE07	Computer Vision						
	2212PE03	Information Retrieval Systems						
6		Open Elective – I	3	0	0	3	40	60
7	2205PC65	Compiler Design Lab	0	0	3	1.5	40	60
8	2205PC66	Computer Networks Lab	0	0	3	1.5	40	60
9	2205PR03	Innovative Product Development-3	0	0	2	1	40	60
10	2200MC05	Technical Communication and Soft Skills*	2	0	0	0	100	0
		TOTAL	19	0	8	20	460	540

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

III Year B. Tech – II Semester (VI Semester)

S.No	Course Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	2200HS02	Professional English	3	0	0	3	40	60
2	2266PC02	Machine Learning	3	0	0	3	40	60
3	2212PC01	Full Stack Development	3	1	0	4	40	60
4		Professional Elective – III	3	0	0	3	40	60
	2267PE17	Distributed Computing						
	2262PE13	Social Media Security						
	2205PE05	Software Architecture and Design Patterns						
	2266PE03	Cognitive Computing						
	2205PE11	Image Processing						
	2205PE06	Cloud computing						
5		Open Elective – II	3	0	0	3	40	60
6	2266PC62	Machine Learning Lab	0	0	3	1.5	40	60
7	2212PC61	Full Stack Development Lab	0	0	3	1.5	40	60
8	2205PR04	Innovative Product Development-4	0	0	2	1	40	60
9	2200MC06	Indian Tradition Knowledge*	2	0	0	0	100	0
		TOTAL	15	1	8	20	420	480

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree Industry Oriented Mini Project/ Internship - During Summer Vacation-Evaluation in

IV Year B. Tech – I Semester (VII Semester)

S.No	Course Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	2205PC13	Information Security	3	0	0	3	40	60
2	2212PC02	Devops	3	0	0	3	40	60
3	2200HS04	Fundamentals of Management and Entrepreneurship	2	0	0	2	40	60
4		Professional Elective – IV	3	0	0	3	40	60
	2267PE10	Data Science with R programming						
	2262PE23	Data Privacy & Security						
	2205PE04	Agile Development						
	2266PE05	Large Language Models						
	2205PE07	Block Chain Technology						
	2212PE06	Internet of Things						
5		Open Electives – III	3	0	0	3	40	60
6	2205PC68	Information Security Lab	0	0	2	1	40	60
7	2212PC62	Devops lab	0	0	2	1	40	60
8	2205PR06	Industry Oriented Mini Project / Internship / Skill Development**	0	0	2	1	40	60
9	2205PR05	Innovative Product Development-5	0	0	0	1	40	60
10	2205PR07	Research Project- 1	0	0	1	2	40	60
1	2200MC07	Gender Sensitization*	2	0	0	0	100	0
		TOTAL	16	0	7	20	500	600

*Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree

**Summer between III & IV Year: Mini Project

IV Year B. Tech – II Semester (VIII Semester)

S.No	Course Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1		Professional Elective – V	3	0	0	3	40	60
	2267PE11	Data Wrangling						
	2262PE19	Database Security						
	2205PE08	Software Process and Project Management						
	2266PE08	Natural Language Processing						
	2266PE09	Game Theory						
	2212PE05	Human Computer Interaction						
2		Professional Elective – VI	3	0	0	3	40	60
	2212PE07	Graph Theory						
	2262PE17	Digital forensics						
	2205PE09	Software quality assurance and Testing						
	2266PE06	Gen AI						
	2266PE10	Augmented Reality and virtual Reality						
	2205PE12	Robotics						
3		Open Electives-IV	3	0	0	3	40	60
4	2205PR08	Technical Seminar	2	0	0	1	100	0
5	2205PR09	Innovation Startup & Entrepreneurship	0	0	8	2	50	100
6	2205PR10	Research Project-2	0	0	10	8	50	100
		Research methodology & Intellectual Property Rights	2	0	0	0	100	0
		TOTAL	11	0	18	20	420	380

Semester	I-I	I-II	II-I	II-II	III-I	III-II	IV-I	IV-II	TOTAL
Credits	20	20	20	20	20	20	20	20	160

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PROFESSIONAL ELECTIVES

Professional Elective-I	Professional Elective-II	Professional Elective-III	Professional Elective-IV	Professional Elective-V	Professional Elective-VI
2267PE02 Distributed Systems	2212PE04 Distributed Database	2267PE17 Distributed computing	2267PE10 Data Science with R Programming	2267PE11 Data Wrangling	2212PE07 Graph Theory
2262PE15 Cyber security Essentials	2262PE09 Security Incident and Response Management	2262PE13 Social Media Security	2262PE23 Data Privacy & Security	2262PE19 Database Security	2262PE17 Digital Forensics
2205PE01 Software Engineering	2205PE03 Software Testing Methodologies	2205PE05 Software Architecture and Design Patterns	2205PE04 Agile Development	2205PE08 Software Process and Project Management	2205PE09 Software Quality Assurance & Testing
2266PE11 Knowledge Engineering	2266PE12 Artificial Intelligence	2266PE03 Cognitive Computing	2266PE05 Large Language Models	2266PE08 Natural Language Processing	2266PE06 Generative AI
2205PE02 Computer Graphics	2266PE07 Computer Vision	2205PE11 Image Processing	2205PE07 Block Chain Technology	2266PE09 Game Theory	2266PE10 Augmented Reality and Virtual Reality
2212PE01 Mobile Computing	2212PE03 Information Retrieval Systems	2205PE06 Cloud Computing	2212PE06 Internet of Things	2212PE05 Human Computer Interaction	2205PR10 Robotics

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Dept.	Open Elective-I	Open Elective-II	Open Elective-III	Open Elective-IV
CSE	1.Fundamentals of DBMS (2205OE01) 2. Computer Organization & Operating Systems (2205OE02)	1. Data Structures Using Python (2205OE03) 2.Advanced Compiler Design (2205OE04)	1. Java Programming (2205OE05) 2. Case Tools & Software Testing (2205OE06)	1. Data and Knowledge Mining(2205OE07) 2. Full Stack Web Application Development(2205OE08)
IT	1. Advanced Computer Architecture (2212OE01) 2. Advanced Operating Systems (2212OE02)	1. Embedded Systems (2212OE04) 2. Scripting Languages (2212OE03)	1. Advanced Computer Networks (2212OE05) 2. Advanced Algorithms (2212OE06)	1.Computational Complexity (2212OE07) 2.Robotic Process Automation(2212OE08)
AIML	1. Knowledge representation and Reasoning (2266OE01) 2. Neural Networks (2266OE02)	1. Advanced Artificial Intelligence (2266OE03) 2. Reinforcement Learning (2266OE04)	1. Deep Learning Using Python (2266OE05) 2. Edge Analytics (2266OE06)	1. Cognitive computing & Applications (2266OE07) 2. Quantum Computing (2266OE08)
DS	1. Computer Oriented Statistical Methods (2267OE01) 2.Data Visualization Techniques (2267OE02)	1. Data Wrangling using Python (2267OE03) 2.Data Science Tools (2267OE04)	1.Big Data Architecture(2267OE05) 2. Data Science Applications (2267OE06)	1. Business Analytics (2267OE07) 2. Big Data Management(2267OE08)
CS	1.Ethical hacking(2262OE01) 2. Cyber security essentials(2262OE02)	1. Cloud Security Essentials (2262OE03) 2. Vulnerability assessment and penetration testing (2262OE04)	1. Social media security (2262OE05) 2. Authorization and Authentication (2262OE06)	1. Cyber Security and laws(2262OE08) 2. Security incident and response management (2262OE07)
ECE	1. Computer Organization (2204OE01) 2.Sensors & Actuators(2204OE02)	1.Principles of Electronic Communication(2204OE03) 2.Image Processing (2204OE04)	1.Principles of Computer Communication and Network(2204OE05) 2. Pattern Recognition (2204OE06)	1.5G Technology (2204OE07) 2. RTOS and System Programming (2204OE08)

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VISION OF THE INSTITUTE

- Visualizing a great future for the intelligentsia by imparting state-of the art Technologies in the field of Engineering and Technology for the bright future and prosperity of the students.
- To offer world class training to the promising Engineers.

MISSION OF THE INSTITUTE

- To nurture high level of Decency, Dignity and Discipline in women to attain high intellectual abilities.
- To produce employable students at National and International levels by effective training programmes.
- To create pleasant academic environment for generating high level learning attitudes.

VISION OF THE DEPARTMENT

- To produce globally competent professionals in the field of Computer Science and Engineering.
- To attain academic and research excellence in advanced technologies of Computer Science and Engineering by promoting a creative environment for learning and innovation.

MISSION OF THE DEPARTMENT

- To impart holistic technical education using the best of infrastructure, outstanding technical and teaching expertise, training students into competent and confident engineers with excellent communication skills, to face the global challenges of the future technological advancements.
- To evolve into centre of excellence of computer science and engineering through creative and innovative practices in teaching-learning, promoting academic excellence to produce world class professionals, making the students psychologically strong and emotionally balanced with social consciousness, ethical values and trans-disciplinary research capabilities.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**PEO1 - Professional Enhancement**

To Provide the students with strong fundamental and advanced knowledge in Mathematics, Science and Engineering with respect to Computer Science and Engineering discipline with an emphasis to solve Engineering problems.

PEO2 - Core Competence

To Prepare the students through well - designed curriculum to excel in various programmes in Computer Science and Engineering, to meet the needs of the industry and for higher education pursuit.

PEO3 - Technical Accomplishments

To Train the students with intensive and extensive engineering knowledge and skill to analyze, design and create novel products and solutions in the field of Computer Science and Engineering.

PEO4 - Professionalism

To inculcate in students professional attitude, multidisciplinary approach, ethics, team work, communication, ability to relate computer engineering issues with societal needs and contribute towards nation building.

PEO5 - Learning Environment

To provide students with an academic environment that inculcates the spirit of excellence, creativity, innovation, leadership, lifelong learning, ethical codes and guidelines to become a successful professional in Computer Science and Engineering.

PROGRAM OUTCOMES (PO's)

PO 1: Engineering knowledge- Apply mathematics, logical, statistical, and scientific principles, emphasizing computing and information processing.

PO 2: Problem Analysis- Identify and analyze the user needs and take them in to account for Selection, Creation, Evaluation and Administration of Computer-based systems.

PO 3: Design/Development of Solutions- Understand software engineering and Testing principles and apply them to design, develop, implement and deploy with extensive security features.

PO 4: Conduct Investigations of Complex Problems- Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.

PO 5: Modern Tool Usage- Apply information technology principles and practices to a variety of problems, with the understanding of social, professional and ethical issues.

PO 6: The engineer and society-ability to understanding of professional, cultural and social responsibilities.

PO 7: Environment and sustainability- Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Ethics- Apply ethical principles, responsibility and norms of the engineering practice.

PO 9: Individual and teamwork-An ability to function on multi-disciplinary teams.

PO 10: Communication- Ability to communicate and present effectively.

PO 11: Project Management and Finance-Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.

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

PROGRAM SPECIFIC OBJECTIVES(PSO's)

PSO1: The ability to analyze, design, code and test application specific or complex engineering problems in Cryptography and Network Security, Design and Analysis of Algorithm, Computer Networks, Data Mining, Cloud Computing, Mobile Computing, Cloud Computing, Internet of Things (IoT), Data Science, Artificial Intelligence, Machine Learning, Cyber Security, Block chain Technology, and Big Data by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

PSO2: The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues, relevant to professional engineering practice through life-long learning.

PSO3: Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team, in appreciation of professional ethics and societal responsibilities.

**I - B.TECH SYLLABUS
(CSE)**

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200BS01): LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS**B.Tech I Year I Semester****L T P C**
3 1 0 4**Course Objectives:**

To learn:

- Types of Matrices and their properties, concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and Eigenvectors and to reduce the quadratic form to canonical form.
- Methods of solving the linear differential equations of first order, equations solvable for p, y and x.
- Methods of solving the linear differential equations of higher order.
- Partial differentiation, concept of total derivative, finding maxima and minima of function of two and three variables.

Course Outcomes:

After learning the contents of this paper, the student must be able to

- Identify and classify different types of matrices, determine the rank and inverse of non singular matrices and solve systems of linear equations using various methods.
- Evaluate the Eigen values and Eigenvectors and reduce the quadratic form to canonical form using orthogonal transformations.
- Identify whether the given differential equation of first order is exact or not and solve the first order differential equations.
- Solve higher differential equation and apply the concept of differential equation to real world problems.
- Define partial derivative, total derivative, functional dependence, compute them for functions of multiple variables.
- Find the extreme values of functions of two variables with/ without constraints.

UNIT-I:

Matrices: Types of Matrices, Symmetric; Skew-symmetric; Hermitian; Skew-Hermitian; Orthogonal matrices; Unitary Matrices; Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; Solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration Method.

UNIT-II:

Eigen Values and Eigen Vectors: Eigen values and Eigenvectors and their properties; Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); Finding inverse and powers of a matrix by Cayley-Hamilton Theorem; Linear Transformation and Orthogonal Transformation; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to Canonical form by Orthogonal Transformation.

UNIT-III:

First Order ODE: Exact, Linear and Bernoulli's equations; Newton's law of cooling, Law of Natural Growth and Decay; Equations not of first degree: Equations solvable for p, y and x, Clairaut's type.

UNIT-IV:

Ordinary Differential Equations of Higher Order: Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^x , $\sin ax$, $\cos ax$, polynomials in x, $e^{ax}V(x)$ and $x V(x)$, Method of Variation of Parameters.

UNIT-V:

Multivariable Calculus: Definitions of Limit and Continuity. Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables and three variables using method of Lagrange's multipliers.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publishers, 4th Edition, 2014.

REFERENCES:

1. [Michael Greenberg](#), Advanced Engineering Mathematics, Pearson Education, 2nd Edition, 1998.
2. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons,
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2017.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN**(2205ES01): PROGRAMMING FOR PROBLEM SOLVING****B.Tech. I Year I Sem****L T P C****3 1 0 4****Course Objectives:**

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

Course Outcomes: The student will learn

- Differentiate between primary components of a computer system and an Understanding on algorithms designing.
- Transform structured algorithms and flowcharts to solve problems and construct program solutions
- Apply control structures and looping to design logical flows and demonstrate usage of arrays and strings for efficient data manipulation.
- Implement functions to develop reusable code and evaluate the impact of storage classes and scope on program behaviour.
- Analyse and utilize data structures and pointers to create modular and memory-efficient code.
- Construct file handling operations and compare basic searching and sorting algorithms

UNIT I:

Introduction: Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems.

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming.

Introduction to C Programming Language:

Structure of a C program, Identifiers, variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators- Arithmetic operators, relational and logical operators, increment and decrement operators, Bitwise operators, conditional operator, assignment operator, expressions and precedence, Expression evaluation, type conversion, typedef, The main method and command line arguments.

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.

UNIT II:

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do while loops

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays.

Strings: Introduction to strings, handling strings as array of characters, basic string

Functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

UNIT – III

Functions: Designing structured programs, declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries, Passing 1-D arrays, 2-D arrays to functions

Recursion: Simple programs, such as Finding Factorial, Fibonacci series, Towers of Hanoi etc.,

Limitations of Recursive functions. Storage Classes - extern, auto, register, static, scope rules, block structure.

UNIT IV:

Structures: Defining structures, initializing structures, unions, Array of structures \

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, pointers to pointers ,Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type and bit- fields.

Dynamic Memory Management functions, Preprocessing Directives,

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef .

UNIT – V

File Handling: Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions

Introduction to Algorithms: Algorithms for finding roots of quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number, etc. Basic searching in an array of elements (linear and binary search te...

TEXTBOOKS:

1. Computer Science: A Structured Programming Approach Using C, B. A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh, Second Edition, Oxford University Press.

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
2. Programming with C, B. Gottfried, 3rd edition, Schaum's outlines, McGraw Hill Education (India) Pvt Ltd.
3. C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press. Basic computation and Programming with C, Subrata Saha and S. Mukherjee.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN (2202ES01) BASIC ELECTRICAL ENGINEERING

B.Tech. I Year I Sem**L T P C**
3 1 0 4**Course Objectives:**

- To introduce the concepts of electrical circuits and its components
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
- To study and understand the different types of DC/AC machines and Transformers.
- To import the knowledge of various electrical installations.
- To introduce the concept of power, power factor and its improvement. To introduce the concepts of electrical circuits and its components.
- To understand DC circuits and AC single phase & three phase circuits.

Course Outcomes:

- Understand and solve the DC circuits using fundamental theorems and time-domain analysis to design and troubleshoot the practical DC circuits.
- Analyze and apply AC circuit principles such as phasor representation, power calculations, and power factor to optimize the efficiency of electrical systems.
- Evaluate voltage and current relationships in three-phase circuits to design the balanced three-phase systems.
- Assess transformer principles and operations including equivalent circuit analysis, efficiency, and three phase connections to enhance the performance of power distribution systems.
- Demonstrate knowledge of three-phase induction motors, DC motors, and synchronous generators for effective industrial application.
- Identify and evaluate components of low-tension switchgear and battery systems to ensure safe and efficient electrical installations in various applications.

UNIT-I: D.C. Circuits

Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT-II: A.C. Circuits

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series RL- C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III: Transformers

Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV: Electrical Machines

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-

speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

UNIT-V: Electrical Installations

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

TEXT-BOOKS/REFERENCE-BOOKS:

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
2. D.C. Kulshreshtha, "Basic Electrical Engineering", Mc GrawHill, 2009.
3. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
4. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010.
5. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200BS07) ENGINEERING CHEMISTRY****B.Tech. I Year I Sem****L T P C
3 0 0 3****Course Objectives:**

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of electrochemistry, corrosion and water treatment which are essential for the Engineers and in industry.

Course Outcomes:

- Understand the knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
- Apply to know the modern technology and interpret different problems involved in industrial utilization of water.
- Apply the required principles and concepts of electrochemistry to predict the behaviour of a system under different variables
- Analyze the underlying causes and consequences of corrosion, distinguishing between various corrosion types and evaluate advanced corrosion control strategies
- Understand the knowledge of configurational and conformational analysis of molecules and reaction mechanisms.
- Understand the required skills to get clear concepts on basic spectroscopy and application to medical and other fields.

UNIT - I:

Molecular structure and Theories of Bonding: Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N₂, O₂ and F₂ molecules. π molecular orbitals of butadiene and benzene.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

UNIT - II:

Water and its treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Potable water and its specifications. Boiler troubles: Scales and Sludges, Priming and Foaming, Caustic Embrittlement. Steps involved in treatment of water – Disinfection of water by chlorination and ozonation. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems.

UNIT - III:

Electrochemistry and corrosion: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – Calomel, Quinhydrone and Glass electrode. Nernst equation, Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – Primary: Lithium cell , secondary batteries : Lead – acid storage battery and Lithium ion battery, Fuel cells: H₂-O₂ Fuel cell, CH₃OH-O₂ Fuel cell.

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application: Galvanising , Tinning, Metal Cladding, Electro-deposition, Electroless plating of Nickel.

UNIT - IV:

Stereochemistry, Reaction Mechanism and synthesis of drug molecules: Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation analysis of n- butane.

Substitution reactions: Nucleophilic substitution reactions: Mechanism of SN₁, SN₂ reactions.

Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownik off and anti Markownik off's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using KMnO₄ and chromic acid. Reduction reactions: Reduction of carbonyl compounds using LiAlH₄ & NaBH₄. Hydroboration of olefins. Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

UNIT – V:

Spectroscopic techniques and applications: Principles of electronic spectroscopy: Beer Lamberts law, Numerical problems, types of electronic excitations , applications of UV – Visible spectroscopy. IR Spectroscopy: Principle, Modes of vibrations, selection rules, Force Constant ,Some common organic functional groups Wave number regions (C-H, NH₂, OH, - COOH, C=O, C≡ N, C=C, C≡ C), applications of IR Spectroscopy, ¹H-NMR(NMR Spectroscopy), Principles of NMR spectroscopy, chemical shift, Chemical shifts of some organic protons , Introduction to Magnetic resonance imaging.

TEXT BOOKS:

- Physical Chemistry, by P.W. Atkins
- Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
- Fundamentals of Molecular Spectroscopy, by C.N. Banwell
- Organic Chemistry: Structure and Function by K.P.C. Volhardt and N.E. Schore, 5th Edition.
- University Chemistry, by B.M. Mahan, Pearson IV Edition.
- Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN**(2205ES61) PROGRAMMING FOR PROBLEM SOLVING LAB****B.Tech. I Year I Sem****L T P C****0 0 3 1.5****Course Objectives:**

The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs.
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To write programs using the Dynamic Memory Allocation concept.
- To create, read from and write to text and binary files.

Course Outcomes:

- Formulate the algorithms and translate it to a working and correct program
- Identify and correct logical syntax errors encountered during execution
- Represent and manipulate data with arrays, strings and structures
- Use pointers of different types
- Create, read and write to and from simple text and binary files
- Modularize the code with functions so that they can be reused

Practice sessions:

1. Write a simple program that prints the results of all the operators available in C (including pre/ post increment, bitwise and/or/not, etc.). Read required operand values from standard input.
2. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.

Simple numeric problems:

- a) Write a program to find the max and min from the three numbers.
- b) Write the program for the simple, compound interest.
- c) Write program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.

- d) Write a program that prints a multiplication table for a given number and the number Rows in the table.

For example, for a number 5 and rows = 3, the output should be: 5 x 1 = 5

5 x 2=10

5 x 3=15

- e) Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:

- i) A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formulas

= $ut + (1/2)at^2$ where u and a are the initial velocity in m/sec ($= 0$) and acceleration in m/sec^2 ($= 9.8m/s^2$)).

ii) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators $+$, $-$, $*$, $/$, $\%$ and use Switch Statement)

iii) Write a program that finds if a given number is a prime number.

iv) Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.

v) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

vi) Write a C program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.

vii) Write a C program to find the roots of a Quadratic equation.

viii) Write a C program to calculate the following, where x is a fractional value. $1 - x/2 + x^2/4 - x^3/6$

ix) Write a C program to read in two numbers, x and n , and then compute the sum of this Geometric progression: $1 + x + x^2 + x^3 + \dots + x^n$. For example : if n is 3 and x is 5, then the program computes $1 + 5 + 25 + 125$.

Arrays and Pointers and Functions:

a) Write a C program to find the minimum, maximum and average in an array of integers.

b) Write a function to compute mean, variance, Standard Deviation, sorting of n elements in single dimension array.

c) Write a C program that uses functions to perform the following:

i. Addition of Two Matrices

ii. Multiplication of Two Matrices

iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.

d) Write C programs that use both recursive and non-recursive functions. To find the factorial of a given integer.

i) To find the GCD (greatest common divisor) of two given integers.

ii) To find x^n

e) Write a program for reading elements using pointer into array and display the values using array.

f) Write a program for display values reverse order from array using pointer.

g) Write a program through pointer variable to sum of n elements from array

a) Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.

b) Write a C program that converts a number ranging from 1 to 50 to Roman equivalent

c) Write a C program that uses functions to perform the following operations:

- To insert a sub-string into a given main string from a given position.

- To delete n Characters from a given position in each string.

d) Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)

e) Write a C program that displays the position of a character ch in the string S or -1 if S doesn't contains.

f) Write a C program to count the lines, words and characters in a given text.

Structures & Unions:

- a) Write a C program that uses functions to perform the following operations using Structure
 - Reading a complex number
 - Writing Complex Number
 - Addition of 2 Complex Numbers
 - Multiplication of two complex numbers
- b) Write a C program to store information of 5 students using structures.
- c) Write a C program to Access all structures members using pointer structure variable.
- d) Write a C program to access members of union?

Files

- a) Write a C program to display the contents of a file to standard output device.
- b) Write a C program which copies one file to another, replacing all lowercase characters with their upper case equivalents.
- c) Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
- d) Write a C program that does the following:
 - e) It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line.(hint: convert the strings using atoi function). Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function).The program should then read all 10 values and print them back.
 - f) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

Miscellaneous:

- a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.

- b. Write a C Program to construct a pyramid of numbers as follows:1

```

      *      1      1      *
    * *    2 3    2 2    * *
  * * *  4 5 6    3 3 3    * * *
    *
                        4 4 4 4    * * * *
  
```

- c. Write a C Program implement Student Data Base System Using Files & Structures.

Sorting and Searching:

- a. Write a C program that uses non recursive function to search for a Key value in a given list of integers using linear search method.
- b. Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using binary search method.
- c. Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
- d. Write a C program that sorts the given array of integers using selection sort in descending order.
- e. Write a C program that sorts the given array of integers using insertion sort in ascending order.

- f. Write a C program that sorts a given array of names.

Suggested Reference Books for solving the problems:

- i. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- ii. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)
- iii. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
- iv. R.G. Dromey, How to solve it by Computer, Pearson(16th Impression)
- v. Programming in C, Stephen G. Kochan, Fourth Edition, and Pearson Education.
- vi. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200BS62) ENGINEERING CHEMISTRY LAB****B.Tech. I Year I Sem****L T P C
0 0 3 1.5****Course Objectives:**

The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

- Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
- To determine the rate constant of reactions from concentrations as a function of time.

Course Outcomes:

- Ability to perform experiments illustrating the principles of chemistry relevant to the study of science and engineering.
- To record the amount of hardness and chloride content in water and interpret the significance of its presence in water.
- Understand the kinetics of a reaction from a change in concentration of reactants or products as a function of time.
- To evaluate and report the amount of analyte by using instruments like conductimetry, potentiometry and pH metry.

List of Experiments:

1. Determination of total hardness of water by complex metric method using EDTA
2. Determination of chloride content of water by Argentometry
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe^{2+} by Potentiometry using KMnO_4
7. Determination of rate constant of acid catalysed hydrolysis of methylacetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography calculation of R_f values. eg ortho and para nitrophenols
10. Determination of acid value of coconut oil
11. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Determination of partition coefficient of acetic acid between n-butanol and water.
14. Determination of surface tension of a given liquid using stalagmo meter.

Experiments beyond syllabus:

1. Preparation of Nylon-6:6.
2. Estimation of Fe^{2+} by Dichrometry.

References

- Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
- An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
- Vogel's text book of practical organic chemistry 5th edition
- Text book on Experiments and calculations in Engineering chemistry – S.S. Dara

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN**(2202ES61) BASIC ELECTRICAL ENGINEERING LAB****B.Tech. I Year I Sem****L T P C****0 0 2 1****Course Objectives:**

- To analyze a given network by applying various electrical laws and network theorems
- To know the response of electrical circuits for different excitations

Course Outcomes:

- Get an exposure to basic electrical laws.
- Understand the response of different types of electrical circuits to different excitations.

Course Outcomes:

- Demonstrate classification of semiconductors with calculation of energy band gap.
- Explain the characteristics and critical values of simple electronic circuits like solar cell, Laser diode and light emitting diode.
- Calculation of the physical values like Planks constant using principles of optical phenomenon.
- Demonstrate the electric and magnetic field effects involved in Stewart and Gee's Experiment and Hall Effect experiment.
- Demonstrate how to calculate the numerical aperture and bending losses associated with fibers.
- Calculate the dielectric constant of a capacitor using RC circuit.

List of experiments/demonstrations:

1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Transient Response of Series RL and RC circuits using DC excitation
4. Transient Response of RLC Series circuit using DC excitation
5. Resonance in series RLC circuit
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single Phase Transformer
8. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
9. Three Phase Transformer: Verification of Relat.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2203ES61) ENGINEERING WORKSHOP****B.Tech. I Year I Sem****L T P C****1 0 3 2.5****Course Objectives:**

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipment and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at workplace.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joint

Course Outcomes:

- Identify and make use of various tools to perform a range of basic manufacturing operations in different trades to make/repair engineering components with workshop safety regulations.
- Illustrate knowledge of various trade operations based on requirements of the job.
- Illustrate knowledge of various trade tools based on requirements of the job.
- Interpret and establish residential wiring circuits according to given specifications and circuit diagram.
- Demonstrate working principles of power tools in different trades to use and to make with them engineering components.
- Develop model various basic prototypes to explore its functions and features of a innovative system.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

- i) Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
- ii) Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
- iii) Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
- iv) Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
- v) Welding Practice – (Arc Welding & Gas Welding)
- vi) House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
- vii) Black Smithy – (Round to Square, Fan Hook and S-Hook)

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working

Experiments beyond the Syllabus:

Machine Shop-{lathe machine, drilling machine}

TEXT BOOKS:

Workshop Practice /B. L. Juneja /Cen gage Workshop Manual / K. Venu gopal /Anuradha.

REFERENCE BOOKS:

Work shop Manual - P. Kannaiah/ K. L. Narayana/SciTech Workshop Manual / Venkat Reddy/BSP

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200MC01) ENVIRONMENTAL SCIENCE**B.Tech. I Year I Sem****L T P C****1 0 0 0****Course Objectives:**

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies based on ecological principles and environmental regulations which in turn helps in sustainable development
- Develop critical-thinking skills, analyze real-world problems, and understand the power of narrative to create sustainable solutions for local and global communities.
- Understand the scarcity of natural resources and will be able to replace them with alternative energy resources for the sustainability of environmental society & economy.
- Recognize the type of biodiversity along the values & conservation biodiversity and know about the bio geo graphical regions.
- Categorize the types of environmental pollution & the various treatment technologies for the diminution of environmental pollutants and contaminants.
- Summarize the global environmental issues to create awareness about the international conventions and protocols for extenuating global environmental issues.

Unit-1:**Understand the importance**

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, Bio magnifications, ecosystem value, services and carrying capacity, Field visits.

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 resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

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. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of

pollution, drinking water quality standards. **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:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC- Go initiatives.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wildlife 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). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon lifestyle.

TEXTBOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Raja gopalan , Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
 2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHIL earning Pvt. Ltd.
 3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
 4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
 5. Textbook of Environmental Science and Technology - Dr. M.Anji Reddy 2007, BS Publications.
- Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200BS03) ADVANCED CALCULUS & TRANSFORM TECHNIQUES**B.Tech I Year II Sem****L T P C**
3 1 0 4**Course Objectives:** To learn

- Geometrical approach to the mean value theorems, their application to the mathematical problems and Evaluation of improper integrals using Beta and Gamma functions
- Evaluation of multiple integrals and their applications.
- The physical quantities involved in engineering field related to vector valued functions and their applications to line, surface and volume integrals.
- A periodic function by Fourier series and a non-periodic function by Fourier transform and properties.
- Properties of Laplace transforms, solving ordinary differential equations using Laplace transforms techniques. Also, Z- transform of a sequence and properties.

Course Outcomes: After learning the contents of this paper the student must be able to

- Solve the applications on mean value theorems and evaluate the improper integrals using Beta and Gamma functions
- Evaluate the multiple integrals and apply the concept to find areas, volumes.
- Find the directional derivatives, Irrotational and Solenoidal functions and angle between the surfaces. Evaluate the line, surface and volume integrals and converting them from one to another.
- Express any periodic function in terms of sines and cosines and express a non-periodic function as integral transform.
- Use the Laplace transform techniques for solving ODE's
- Use z – transforms for solving difference equations.

UNIT-I:

Differential Calculus: Rolle's mean value theorem (without proof), Lagrange's Mean value theorem (without proof) with their Geometrical Interpretation, Cauchy's Mean value Theorem (without proof). Definition of Improper Integral; Definition of Beta and Gamma functions, properties, relation between them and evaluation of integrals using Beta and Gamma functions.

UNIT-II:

Multiple Integrals: Evaluation of Double Integrals (Cartesian); Change of order of integration (only Cartesian form); Evaluation of Triple Integrals. Areas (by double integrals) and Volumes (by double integrals and triple integrals).

UNIT-III:

Vector Differentiation: Vector point functions and Scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Scalar potential functions. Solenoidal function and Irrotational vector.

Vector Integration: Line and Surface integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

UNIT – IV

Fourier series: Introduction, Fourier series definition, Dirichlet's conditions, Even and odd functions.

Fourier Transforms: Fourier integral theorem (without proof), Fourier sine and cosine integrals, sine and cosine transforms, properties, inverse Fourier transforms.

UNIT – V**Laplace Transforms:**

Definition of Laplace transform, Laplace transform of standard functions, First shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t", Laplace transforms of integrals of functions, Unit step function, Periodic function.

Inverse Laplace transform by Partial fractions, Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transforms.

Z- transforms: Z- transforms inverse z-transforms, properties, damping rule, shifting rule, convolution theorem, solution of difference equation by z-transforms.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publishers, 4th Edition, 2014.

REFERENCES:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. Staff, E. B. and A. D. Snider, Fundamentals of Complex Analysis, Pearson.
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN (2205ES02) PYTHON PROGRAMMING

B.Tech. I Year II Sem**L T P C****3 0 0 3****Course Objectives:**

This course will enable students to

- Learn Syntax and Semantics and create Functions in Python.
- Handle Strings and Files in Python.
- Understand Lists, Dictionaries and Regular expressions in Python.
- Implement Object Oriented Programming concepts in Python.
- Build GUI Programming in Python.
- Learn Syntax and Semantics and create Functions in Python.
- To understand Data types, control structure and looping mechanisms.

Course Outcomes:

- Examine Python syntax and semantics and acquire a foundational understanding programming including essential coding concepts
- A comprehensive understanding of Python's data types, operators, control structures, and looping mechanisms, enabling them to write efficient and effective Python code.
- Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
- Demonstrate proficiency in handling Strings and File Systems.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Implement exemplary applications related to Graphical User Interface (GUI) in Python.

UNIT I

PYTHON Programming Introduction, History of Python, Python is Derived from?, Python Features, Python Applications, Why Python is Becoming Popular Now a Day?, Existing Programming Vs Python Programming, Writing Programs in Python, Top Companies Using Python, Python Programming Modes, Interactive Mode Programming, Scripting Mode Programming, Flavors in Python, Python Versions, Download & Install the Python in Windows & Linux, How to set Python Environment in the System?, Anaconda - Data Science Distributor, Downloading and Installing Anaconda, Jupyter Notebook & Spyder, Python IDE - Jupyter Notebook Environment, Python IDE – Spyder Environment, Python Identifiers(Literals), Reserved Keywords, Variables, Comments, Lines and Indentations, Quotations, Assigning Values to Variables.

UNIT II

Data Types in Python, Mutable Vs Immutable, Fundamental Data Types: int, float, complex, bool, str, Number Data Types: Decimal, Binary, Octal, Hexa Decimal & Number Conversions, Inbuilt Functions in Python, Data Type Conversions, Priorities of Data Types in Python, Python Operators, Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Slicing & Indexing, Forward Direction Slicing with +ve Step, Backward Direction Slicing with Step, Decision Making Statements, if Statement, if-else Statement, elif Statement, Looping

Statements, Why we use Loops in python?, Advantages of Loops for Loop, Nested for Loop, Using else Statement with for Loop, while Loop, Infinite while Loop, Using else with Python while Loop, Conditional Statements, break Statement, continue Statement, Pass Statement.

UNIT III

Advanced Data Types: List, Tuple, Set, Frozen set, Dictionary, Range, Bytes & Byte array, None, List Data Structure, List indexing and splitting. Updating List values, List Operations, Iterating a List, Adding Elements to the List, Removing Elements from the List, List Built-in Functions, List Built-in Methods, Tuple Data Structure, Tuple Indexing and Splitting, Tuple Operations, Tuple Inbuilt Functions, Where use Tuple, List Vs Tuple, Nesting List and Tuple, Set Data Structure, Creating a Set, Set Operations, Adding Items to the Set, Removing Items from the Set, Difference Between discard() and remove(), Union of Two Sets, Intersection of Two Sets, Difference of Two Sets, Set Comparisons, Frozen set Data Structure, Dictionary Data Structure, Creating the Dictionary, Accessing the Dictionary Values, Updating Dictionary Values, Deleting Elements Using del Keyword, Iterating Dictionary, Properties of Dictionary Keys, Built-in Dictionary Functions, Built-in Dictionary Methods, List Vs Tuple Vs Set Vs Frozenset Vs Dictionary Range, Bytes, Byte array & None

UNIT IV

Python Functions, Advantage of Functions in Python, Creating a Function, Function Calling, Parameters in Function, Call by Reference in Python, Types of Arguments, Required Arguments, Keyword Arguments, Default Arguments, Variable-Length Arguments, Scope of Variables, Python Built-in Functions, Python Lambda Functions, String with Functions, Strings Indexing and Splitting String Operators, Python Formatting Operator, Built-in String Functions, Python File Handling, Opening a File, Reading the File, Read Lines of the File, Looping through the File, Writing the File, Creating a New File Using with Statement with Files, File Pointer Position, Modifying File Pointer Position Renaming the File & Removing the File, Writing Python Output to the Files File Related Methods, Python Exceptions, Common Exceptions, Problem without Handling Exceptions, except Statement with no Exception, Declaring Multiple Exceptions, Finally Block, Raising Exceptions, Custom Exception.

UNIT V

Python Packages, Python Libraries, Python Modules, Collection Module, Math Module, OS Module, Random Module, Statistics Module, Sys Module, Date & Time Module, Loading the Module in our Python Code, import Statement, from-import Statement, Renaming a Module, Regular Expressions, Command Line Arguments, Object Oriented Programming (OOPs), Object-oriented vs Procedure-oriented Programming languages, Object, Class, Method, Inheritance, Polymorphism, Data Abstraction, Encapsulation, Python Class and Objects, Creating Classes in Python, Creating an Instance of the Class, Python Constructor, Creating the Constructor in Python, Parameterized Constructor, Non-Parameterized Constructor, In-built Class Functions, In-built Class Attributes, Python Inheritance, Python Multi-Level Inheritance, Python Multiple Inheritance, Method Overriding, Data Abstraction in Python, Graphical User Interface (GUI) Programming, Python Tkinter, Tkinter Geometry, pack() Method, grid() Method, place() Method, Tkinter Widgets.

TEXTBOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson

REFERENCE BOOK:

1. Programming Languages, A.B. Tucker, R.E. Noonan, TMH.
2. Programming Languages, K. C. Loudon and K A Lambert., 3rd edition, Cengage Learning.
3. Programming Language Concepts, C Ghezzi and M Jazayeri, Wiley India.
4. Programming Languages 2nd Edition Ravi Sethi Pearson.
5. Introduction to Programming Languages Arvind Kumar Bansal CRC Press.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200BS05) APPLIED PHYSICS**B.Tech. I Year II Sem****L T P C****3 1 0 4****Course Objectives:**

- Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
- Students will be able to demonstrate competency and understanding of the concepts. found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics.
- The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
- To study applications in engineering like memory devices, transformer core and electromagnetic machinery.

Course Outcomes:

- Understand the fundamental concepts of black body radiation, quantum physics and Quantum behavior of matter in its atomic and subatomic state.
- Classify the energy bands of semiconductors, interpret the direct and indirect band gap semiconductors, identify the type of semiconductor using Hall Effect and identify the applications of semiconductors in electronic devices
- Classify different optoelectronic devices and their applications in modern technology
- Understand the basic concepts of LASER light Sources, identifies the engineering applications of lasers, classify optical fibres based on refractive index profile and mode of propagation and identify the applications of optical fibers in various fields.
- Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
- Exposed to the phenomena of electromagnetism and also to have exposure on magnetic materials and dielectric materials.

UNIT-I: Quantum Mechanics:

Introduction to quantum physics, Black body radiation, Photoelectric effect, Compton effect experiment and Compton shift, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Wave function and its physical significance, Schrodinger's time independent wave equation, Particle in one dimensional box.

UNIT-II: Semiconductor Physics:

Intrinsic and Extrinsic semiconductors, Fermi level in intrinsic and extrinsic semiconductors, calculation of carrier concentration in intrinsic and extrinsic semiconductors, Carrier generation and recombination, Carrier transport: diffusion and drift, Hall effect: determination of Hall coefficient and experiment, Hall voltage, direct and indirect band gap semiconductors, p-n junction diode: energy band diagram for open and closed circuits, Zener diode and its V-I Characteristics and applications.

UNIT-III:

Optoelectronics: Radiative and non-radiative recombination mechanisms in semiconductors, LED and Device structure, Materials, Characteristics and figures of merit, Semiconductor photo detectors: Solar cell, PIN and Avalanche and their structure, Materials, working principle and Characteristics and applications.

UNIT-IV: Lasers and Fiber Optics:

Lasers: Characteristics of Lasers, interaction of radiation with matter: stimulated absorption, spontaneous and stimulated emission, Einstein's relations, Principle and working of Laser: Population inversion, Pumping mechanisms, Types of Lasers: Ruby laser, He-Ne laser, Semiconductor lasers, Applications of laser. Fiber Optics: Introduction Optical fiber, Optical fiber as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, mode and transmission of signal through Step and Graded index fibers, Losses associated with optical fibers, Applications of optical fibers in communication system (block diagram) and in other fields.

UNIT-V: Dielectric and Magnetic Properties of Materials

Electric dipole, dipole moment, dielectric constant, polarizability, electric displacement, electric susceptibility, types of polarization: electronic, ionic and orientation (qualitative) polarizations, calculation of polarizabilities of electronic and ionic polarization, Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics, Piezo electrics and Pyro electrics, Applications of dielectrics, Magnetization, field intensity, magnetic field induction, permeability and susceptibility, Bohr magneton, Classification of magnetic materials on the basis of magnetic moment, hysteresis curve based on domain theory, soft and hard magnetic materials, applications of magnetic materials.

TEXTBOOKS:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learning.
2. Halliday and Resnick, Physics - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S.Chand

REFERENCES:

1. Richard Robinett, Quantum Mechanics
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc.(1995).
3. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and DeepakGuptha on NPTEL4. "Semiconductor Physics And Devices", Mc Graw Hill, 4th Edition by Donald Neamen
5. Introduction to Solid State Physics by Charles kittel, wiley student edition.
6. S.M. Sze, Semiconductor Devices: Physics and Technology, wiley (2008)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200HS01) ENGLISH**B.Tech. I Year II Sem****L T P C**
2 0 0 2**INTRODUCTION**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students. In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

Course Objectives:

The course will help to

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Enhance competencies in writing essays and gist of the passage in words.
- Equip students to study academic subjects more effectively and critically, using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in various professional situations.
- Study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus
- To develop a core vocabulary and expressions for use in simple conversation

Course Outcomes:

- Use English Language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in various contexts and different cultures
- The students will be able to understand meaning of words, phrases and sentences in context.
- Acquire basic proficiency in English including reading and listening,
- Understand and express simple narratives, descriptions and day to day conversations.

UNIT –I

‘The Raman Effect’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes.

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and its Importance- Techniques for Effective Reading.

Basic Writing Skills: Sentence Structures - Use of Phrases and Clauses in Sentences-Importance of Proper Punctuation- Techniques for writing precisely – Paragraph writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II

‘Ancient Architecture in India’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Homonyms, Homophones and Homographs. Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject- verb Agreement.

Reading: Improving Comprehension Skills – Techniques for Good Comprehension

Writing: Format of a Formal Letter-Writing Formal Letters - E.g., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III

‘Blue Jeans’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses and Question Tags

Reading: Sub-skills of Reading- Skimming and Scanning

Writing: Nature and Style of Sensible Writing- Defining- Describing Objects, Places and Events – Classifying- Providing Examples or Evidence, E-mail writing and practices.

UNIT –IV

‘What Should You Be Eating’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Idioms and phrases, Phrasal Verbs and One word substitutions

Grammar: Active voice and Passive voice- Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-Précis Writing.

UNIT –V

‘How a Chinese Billionaire Built Her Fortune’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Standard Abbreviations in English and Technical Vocabulary and their usage

Grammar: Reported speech and Common Errors in English

Reading: Reading Comprehension-Exercises for Practice

Writing: Report writing - Introduction – Characteristics of a Report – Categories of Reports, Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Prescribed Textbook:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

References:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press

MALLAREDDYENGINEERINGCOLLEGEFORWOMEN
(2203ES01) COMPUTER AIDED ENGINEERING GRAPHICS
B.Tech I Year II Semester

L T P C
1 0 4 3

Course Objectives:

- To enable the students with various concepts like Dimensioning, Conventions and standards related to working drawing to become professionally efficient and to introduce fundamental concepts of curves used in engineering.
- Students are capable to understand the Orthographic Projections of Points and Lines and are able to improve their visualization skills so that they can apply these skills in developing the new products.
- Understands and becomes efficient in applying the concept of Orthographic Projections of Points, Lines and Planes in industrial applications.
- Can employ freehand 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideas graphically.
- Analyze a drawing and can efficiently communicate ideas graphically and Draw the 3D views using CAD.

Course Outcomes:

- Demonstrate proficiency in using AutoCAD software to create, edit, and manipulate 2D engineering drawings..
- Apply the concepts of engineering drawing for sketching conic sections and cycloids
- Analyze position of points and lines for representing their orthographic projections..
- Sketch orthographic projections of planes and solids to analyze their different orientations.
- Apply the principle of projections for sketching the isometric views.
- Interpret the given orthographic projections to convert isometric view and vice versa

UNIT-I:**Introduction to AutoCAD Software:**

The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line, The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

Introduction to Engineering Drawing:

Principles of Engineering drawing and their significance, Conventions, Drawing Instruments
Engineering Curves: Construction of Ellipse, Parabola and Hyperbola – General and Special methods; Cycloidal curves- Epicycloids and Hypocycloids.

UNIT-II:

Orthographic Projections, Projections of Points & Straight Lines: Principles of Orthographic Projections – Conventions; Projections of Points in all positions; Projections of lines Parallel to one Plane and Perpendicular to other Plane and Vice-versa - Inclined to one Plane and Parallel to other Plane and Vice-versa - Surface inclined to both the Planes.

UNIT-III:

Projections of Planes: Projections of Planes- Surface Parallel to one Plane and Perpendicular to other Plane and Vice-versa – Surface Inclined to one Plane and Parallel to other Plane and Vice versa - Surface Inclined to both the Planes.

UNIT-IV:

Projections of Regular Solids: Projections of Regular Solids-Parallel to one Plane and Perpendicular to other Plane and vice-versa- inclined to one Plane and Parallel to other Plane and vice-versa- Inclined to both the Planes– Prisms, Pyramids, Cylinder and Cone.**P**

UNIT-V:

Isometric Projections: Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and Compound Solids. Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions Introduction to Solid Modeling: Creation of simple solid models relevant to the domain.

TEXTBOOKS

1. Engineering Drawing, N.D. Bhatt – N.D. Bhatt & V.M Panchal, 48th Edition, 2005Charotar Publishing House, and Gujarat.
2. "Computer Aided Engineering Drawing “by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Premkumar Fifth edition, New Age International Publishers. Engineering Drawing by K. Venu Gopal & V. Prabu Raja New Age Publications.

REFERENCES

1. Engineering drawing – P.J. Shah .S. Chand Publishers.
2. Engineering Drawing / Basant Agarwal and Mc Agarwal / McGraw Hill
3. Engineering Drawing- Johle/Tata Macgraw Hill Book Publisher.
4. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200BS61) APPLIED PHYSICS LAB**

B.Tech. I Year II Sem**LT P C****0 0 3 1.5****Course outcome:**

- Understand the fundamental concepts of black body radiation, quantum physics and Quantum behavior of matter in its atomic and subatomic state.
- Classify the energy bands of semiconductors, interpret the direct and indirect band gap semiconductors, identify the type of semiconductor using Hall Effect and identify the applications of semiconductors in electronic devices.
- Classify different optoelectronic devices and their applications in modern technology.
- Understand the basic concepts of LASER light Sources, identifies the engineering applications of lasers, classify optical fibres based on refractive index profile and mode of propagation and identify the applications of optical fibres in various fields.
- Design, characterization, and study of properties of material help the students to prepare new materials for various engineering applications.
- Exposed to the phenomena of electromagnetism and to have exposure on magnetic materials and dielectric materials.

List of Experiments:

Note: Any 8 Experiments to be performed

1. Energy gap of a PN junction diode

To determine the energy band gap of a semiconductor p-n junction diode

2. Solar Cell

Characteristics of a given Solar Cell

3. Light Emitting Diode

To study the VI characteristics of a Light Emitting Diode

4. Stewart and Gee's Experiment

To determine the magnetic induction at the center and at several points on the axis of circular coil

5. HALL Effect Experiment

Determination of hall coefficient and Hall voltage

To calculate the Hall coefficient and the carrier concentration of the sample material.

6. Photoelectric Effect

To determine the work function of a given material.

7. LASER

To study the characteristics of LASER diode Sources.

8. A) Optical Fiber Numerical Aperture

To determine the numerical Aperture (NA) of the given optical fiber

B) Optical Fiber Bending Loss

To determine the loss caused in optical fibers in dB due to macro bending of the fiber

9. A) LCR series Circuit

To study the frequency response of LCR series circuits and to determine the Resonant Frequency.

B) LCR Parallel Circuit

To study the frequency response of LCR parallel circuits and to determine the Resonant Frequency.

10. R-C Circuit :To determine the time constant of the given RC circuit

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205ES62) PYTHON PROGRAMMING LAB**B.Tech. I Year II Sem****L T P C**
0 0 3 1.5**Course Objectives:**

- Introduce core programming basics and program design with functions using Python programming language.
- To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To understand the high-performance programs designed to strengthen the practical expertise.
- Implement Object Oriented Programming concepts in Python.
- Build GUI Programming in Python.
- Handle Strings and Files in Python.

Course Outcomes:

- Understand basic Python programs to perform arithmetic operations, input/output operations, and string manipulations.
- Apply programming techniques to develop mathematical problem solving skills.
- Utilize control structures and data types to manipulate and process data.
- Demonstrate the ability to define and call functions to encapsulate code for specific tasks, enhancing code reusability
- Develop skills in debugging and testing their programs to identify and resolve errors.
- Awareness to the basic concepts of object-oriented programming (OOP) in Python, laying the foundation for more advanced programming techniques.

Week 1:

1. Python program to print "Hello Python"
2. Write a program that computes and prints the result of $512 - 282 / 47 \cdot 48 + 5$. It is roughly .1017.
3. Ask the user to enter a number. Print out the square of the number but use the sep optional argument to print it out in a full sentence that ends in a period. Sample output is shown below. Enter a number: 5 The square of 5 is 25.
4. Ask the user to enter a number x. Use the sep optional argument to print out x, 2x, 3x, 4x, and 5x, each separated by three dashes, like below. Enter a number: 7 .7---14---21---28---35

Week 2:

1. Write a program that asks the user to enter three numbers (use three separate input Statements). Create variables called total and average that hold the sum and average of the three numbers and print out the values of total and average.
2. A lot of cell phones have tip calculators. Write one. Ask the user for the price of the meal and the percent tip they want to leave. Then print both the tip amount and the total bill with the tip included. Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5, between 2000 and 3200 (both included). The

numbers obtained should be printed in a comma-separated sequence on a single line. Hints: Consider use range (#begin, #end) method

3. Write a program that calculates and prints the value according to the given formula: $Q = \text{Square root of } [(2 * C * D)/H]$ Following are the fixed values of C and H: C is 50. H is 30. D is the variable whose values should be input to your program in a comma-separated sequence, let us assume. The following comma separated input sequence is given to the program: 100,150,180 The Output of the program.

Hint: If the output received is in decimal form, it should be rounded off to its nearest value. (For example, if the output received is 26.0, it should be printed as 26) 18, 22, 24 should be:

Week 3:

1. Write a program that asks the user to enter a length in centimeters. If the user enters a negative length, the program should tell the user that the entry is invalid. Otherwise, the program should convert the length to inches and print out the result. There are centimeters in an inch.
2. Ask the user for a temperature. Then ask them what units, Celsius or Fahrenheit, the temperature is in. Your program should convert the temperature to the other unit. The conversions are $F = 9/5 C + 32$ and $C = 5/9 (F - 32)$
3. Ask the user to enter a temperature in Celsius. The program should print a message based on the temperature:
 - If the temperature is less than -273.15, print that the temperature is invalid because it is below absolute zero.
 - If it is exactly -273.15, print that the temperature is absolute 0.
 - If the temperature is between -273.15 and 0, print that the temperature is below freezing.
 - If it is 0, print that the temperature is at the freezing point.
 - If it is between 0 and 100, print that the temperature is in the normal range.
 - If it is 100, print that the temperature is at the boiling point.
 - If it is above 100, print that the temperature is above the boiling point.
4. Write a program that asks the user how many credits they have taken. If they have taken 23 or less, print that the student is a freshman. If they have taken between 24 and 53, print that they are a sophomore. The range for juniors is 54 to 83, and for seniors it is 84 and over.

Week 4:

1. A year is a leap year if it is divisible by 4, except that years divisible by 100 are not leap years unless they are also divisible by 400. Write a program that asks the user for a year and prints out whether it is a leap year or not.
2. Write a multiplication game program for kids. The program should give the player ten randomly generated multiplication questions to do. After each, the program should tell them whether they got it right or wrong and what the correct answer is.

Question 1: $3 \times 4 = 12$

Right!

Question 2: $8 \times 6 = 44$

Wrong.

The answer is 48.

...

...

Question 10: $7 \times 7 = 49$

Right.

3. A jar of Halloween candy contains an unknown amount of candy and if you can guess exactly how much candy is in the bowl, then you win all the candy. You ask the person in charge the following: If the candy is divided evenly among 5 people, how many pieces would be left over?

The answer is 2 pieces. You then ask about dividing the candy evenly among 6 people, and the amount left over is 3 pieces. Finally, you ask about dividing the candy evenly among 7 people, and the amount left over is 2 pieces. By looking at the bowl, you can tell that there are less than 200 pieces. Write a program to determine how many pieces are in the bowl.

4. Write a program that asks the user to enter a value n , and then computes $(1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n}) - \ln(n)$. The $\ln$ function is $\log$ in the math module

Week 5:

1. A number is called a perfect number if it is equal to the sum of all of its divisors, not including the number itself. For instance, 6 is a perfect number because the divisors of 6 are 1, 2, 3, 6 and $6 = 1 + 2 + 3$. As another example, 28 is a perfect number because its divisors are 1, 2, 4, 7, 14, 28 and $28 = 1 + 2 + 4 + 7 + 14$. However, 15 is not a perfect number because its divisors are 1, 3, 5, 15 and $15 \neq 1 + 3 + 5$. Write a program that finds all four of the perfect numbers that are less than 10000.

2. Ask the user to enter 10 test scores. Write a program to do the following:

(a) Print out the highest and lowest scores.

(b) Print out the average of the scores.

(c) Print out the second largest score.

(d) If any of the scores is greater than 100, then after all the scores have been entered, print a message warning the user that a value over 100 has been entered.

(e) Drop the two lowest scores and print out the average of the rest of them

3. Write a program that computes the factorial of a number. The factorial, $n!$, of a number n is the product of all the integers between 1 and n , including n . For instance, $5! = 1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 = 120$. [Hint: Try using a multiplicative equivalent of the summing technique.]

Week 6:

1. Write a program that asks the user for a number and then prints out the sine, cosine, and tangent of that number.

2. The Fibonacci numbers are the sequence below, where the first two numbers are 1, and each number thereafter is the sum of the two preceding numbers. Write a program that asks the user how many Fibonacci numbers to print and then prints that many.

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89 . . .

3. Use a for loop to print a triangle like the one below. Allow the user to specify how high the triangle should be.

*

**

Week 7:

1. Use for loops to print a diamond like the one below. Allow the user to specify how high the diamond should be.

*

*

2. Write a program that asks the user to enter an angle between -180° and 180° . Using an expression with the modulo operator, convert the angle to its equivalent between 0° and 360° .
- 3.(a) One way to find out the last digit of a number is to mod the number by 10. Write a program that asks the user to enter a power. Then find the last digit of 2 raised to that power.
- (b) One way to find out the last two digits of a number is to mod the number by 100. Write a program that asks the user to enter a power. Then find the last two digits of 2 raised to that power.
- (c) Write a program that asks the user to enter a power and how many digits they want. Find the last that many digits of 2 raised to the power the user entered.

Week 8:

1.The GCD (greatest common divisor) of two numbers is the largest number that both are divisible by. For instance, $\text{gcd}(18, 42)$ is 6 because the largest number that both 18 and 42 are divisible by is 6. Write a program that asks the user for two numbers and computes their GCD. Shown below is a way to compute the GCD, called Euclid's Algorithm.

- First compute the remainder of dividing the larger number by the smaller number
- Next, replace the larger number with the smaller number and the smaller number with the remainder.
- Repeat this process until the smaller number is 0. The GCD is the last value of the larger number.

2. Write a program that asks the user to enter a string. The program should then print the following:

- (a) The total number of characters in the string
- (b) The string repeated 10 times
- (c) The first character of the string (remember that string indices start at 0)
- (d) The first three characters of the string
- (e) The last three characters of the string
- (f) The string backwards
- (g) The seventh character of the string if the string is long enough and a message otherwise
- (h) The string with its first and last characters removed
- (i) The string in all caps
- (j) The string with every a replaced with an e
- (k) The string with every letter replaced by a space

Week 9:

1. Write a program that asks the user to enter a string. The program should create a new string called new string from the user's string such that the second character is changed to an asterisk and three exclamation points are attached to the end of the string. Finally, print new string. Typical output is shown below: Enter your string: Qbert Q*ert!!!

2. Write a program that computes the net amount of a bank account based a transaction log from console input. The transaction log format is shown as following: D 100 W 200 D means deposit while W means withdrawal. Suppose the following input is supplied to the program: D 300D 300 W200D 100Then, the output should be: 500

Week 10:

1. A website requires the users to input username and password to register. Write a program to check the validity of password input by users.

Following are the criteria for checking the password:

1. At least 1 letter between [a-z]
2. At least 1 number between [0-9]
1. At least 1 letter between [A-Z]
3. At least 1 character from [!#\$%&']

4. Minimum length of transaction password: 6

5. Maximum length of transaction password: 12

Your program should accept a sequence of comma separated passwords and will check them according to the above criteria. Passwords that match the criteria are to be printed, each separated by a comma.

Example

If the following passwords are given as input to the program:

ABd1234@1,a F1#,2w3E*,2We3345

Then, the output of the program should be:

ABd1234@1

2. Write a program that accepts sequence of lines as input and prints the lines after making all characters in the sentence capitalized

Suppose the following input is supplied to the program:

Hello world

Practice makes perfect

Then, the output should be:

HELLO WORLD

PRACTICE MAKES PERFECT

3. The goal of this exercise is to see if you can mimic the behavior of the in operator and the count and index methods using only variables, for loops, and if statements.

(a) Without using the in operator, write a program that asks the user for a string and a letter and prints out whether the letter appears in the string.

(b) Without using the count method, write a program that asks the user for a string and a letter and counts how many occurrences there are of the letter in the string.

(c) Without using the index method, write a program that asks the user for a string and a letter and prints out the index of the first occurrence of the letter in the string. If the letter is not in the string, the program should say so.

TEXTBOOK:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN**(2200HS61) ENGLISH LANGUAGE AND COMMUNICATIONS LAB****B.Tech. I Year II Sem****L T P C****0 0 2 1**

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize their mother tongue influence
- To train students to use language appropriately for public speaking and interviews
- To foster better understanding of nuances of English language through audio- visual experience and group activities
- To inculcate Neutralization of accent for intelligibility
- To enhance students' speaking skills with clarity and confidence which in turn enhances their employability skills

Course outcome:

- Understand the nuances of English language through audio- visual experience and group activities.
- Neutralize their accent for intelligibility
- Speak with clarity and confidence which in turn enhances their employability skills
- Acquire basic proficiency in LSRW skills, the main pillars of communication
- Achieve expertise in pronunciation, accent and voice modulation
- Students will be able to strengthen their individual and collaborative work strategies

Syllabus**English Language and Communication Skills Lab (ELCS) shall have two parts:**

- a. Computer Assisted Language Learning (CALL) Lab
- b. Interactive Communication Skills (ICS) Lab

Listening Skills**Objectives**

1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content

- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills**Objectives**

1. To involve students in speaking activities in various contexts
 2. To enable students express themselves fluently and appropriately in social and professional contexts
- Oral practice: Just A Minute (JAM) Sessions
 - Describing objects/situations/people
 - Role play – Individual/Group activities
 - Group Discussion – Group activities

The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First Year English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)

Exercise – I CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab:

Understand: Communication at Work Place- Spoken vs. Written language.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave– Introducing Oneself and Others.

Exercise – II CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication.

Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone conversation.

Exercise - III CALL Lab:

Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab:

Understand: Telephonic Etiquette, How to make Formal Presentations.

Practice: Formal Telephone conversation and Formal Presentations.

Exercise – IV CALL Lab:

Understand: Consonant Clusters, Plural and Past tense Markers

Practice: Words often Misspelled – Confused/ Misused.

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks.

Practice: Making a Short Speech – Extempore.

Exercise – V CALL Lab:

Understand: Listening for General and Specific Details.

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Group Discussion and Interview Skills.

Practice: Case study Group Discussions and Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:**1. Computer Assisted Language Learning (CALL) Lab:**

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

- h) Computers with Suitable Configuration
- ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public-Address System, LCD and a projector etc.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200MC02) FRENCH LANGUAGE**B.Tech. I Year II Sem****L T P C**
2 0 0 0**Introduction:**

In view of the growing importance of foreign languages as a communication tool in some countries of the world, French has been identified as one of the most popular languages after English. As a result, French program is introduced to develop the linguistic and communicative skills of engineering students and to familiarize them to the French communication skills. This course focuses on basic oral skills.

Course Objectives:

- To inculcate the basic knowledge of the French language.
- To hone the basic sentence constructions in day-to-day expressions for communication in their vocation.
- Develop study skills and communication skills in various professional situations.
- To hone the basic sentence construction.
- To develop a simple vocabulary and expressions for use in simple conversation
- To help learners tackle new and difficult vocabulary they are likely to encounter in their work place
- To learn functional French that can be used in educational, professional and everyday life.

Course Outcomes

- The students will be able to communicate in French at A1 level.
- The student will have an advantage in the competitive job market.
- This course benefits the graduates when pursuing study opportunities in the countries where French is the official language.
- Students will be able to communicate in French at A1 level. Sentence construction in day to day expressions.
- Communicate confidently in various contexts and different cultures where French is an official language.
- The students will be able to understand meaning of words, phrases and sentences in context.

UNIT - I:

Speaking: Introduction to the French language and culture – Salutations - French alphabet - Introducing people

Writing: Understand and fill out a form

Grammar: The verbs “to be ” and “to have ” in the present tense of the indicative Vocabulary: The numbers from 1 to 20 - Professions - Nationalities

UNIT - II:

Speaking: Talk about one’s family – description of a person - express his tastes and preferences

-express possession - express negation Writing: Write and understand a short message

Grammar: Nouns (gender and number) - Articles - The –er verbs in the present – Possessive adjectives - Qualifying adjectives

Vocabulary: The family – Clothes - Colors - The numbers from 1 to 100 - The classroom.

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time –talk about sports and recreation - express the frequency writing: A letter to a friend

Grammar - The expression of time – Their verbs in the present - The verbs do, go, take, come,

-Adverbs - Reflexive verbs

Vocabulary - The days and months of the year-The sports -Hobbies

UNIT - IV

Speaking: Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops

Writing: A dialogue between a vendor and a customer at the market

Grammar: Verbs “to want”, “to can” - Express capacity / possibility - Express will / desire –the future tense

Vocabulary: The food – Meals - Fruits and vegetables – The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement disagreement

Writing: Descriptions

Grammar: Demonstrative adjectives -Prepositions - The verb 'must' to indicate obligation and necessity in the present

Vocabulary: Seasons – Holidays - The city – Furniture

NOTE: The students are exposed to simple listening and reading activities.

REFERENCE BOOKS

1. Apprenons le Français 1& 2, New SaraswatiHouse,2015
2. A propos, A1, LangersInternational,2010
3. Easy French Step-by-step by Myrna Bell Rochester
4. Ultimate French Beginner-Intermediate (Course book) By Livid Language
5. À L' Aventure: An Introduction to French Language and Franco phone Cultures by Evelyne Charvier-Berman, Anne C. Cummings.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200BS04) PROBABILITY AND STATISTICS

B.Tech. II Year I Sem**L T P C****3 1 0 4****Course Objectives:** To learn.

- A random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type. Study of the Binomial and the Poisson random variables and the Normal random variable and their probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- The types of sampling, Sampling distribution of means, sampling distribution of variance, Estimations of statistical parameters.
- Testing of hypothesis for large samples of few unknown statistical parameters.
- Testing of hypothesis for large samples of few unknown statistical parameters.
- Estimate relation between the functionally related data using method of least squares. Estimate correlation coefficient and coefficient of regression of the given data.

Course Outcomes:

- Apply the foundational principles of probability and discrete distributions to some case studies.
- Analyze continuous probability distributions and apply the normal distribution to real-world data.
- Apply the least squares method to fit data with linear, quadratic, and exponential curves, enabling accurate modelling of relationships and trends in data.
- Understand how to work with samples and populations, use different sampling methods, and calculate key measures like the sample mean, variance, and standard error to make accurate estimates about larger groups.
- Examine statistical hypothesis for large samples.
- Examine statistical hypothesis for small samples.

UNIT – I

Single Random Variable and Probability Distributions: Random Variables: Discrete and Continuous, Discrete Probability distributions: Binomial and poison distributions and their properties. (Without proof) Continuous Probability Distributions: Continuous random variables and their properties (without proof), distribution functions, Normal distribution.

UNIT – II

Sampling Distribution: Definitions of population, sample, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of mean and sampling distribution of variance.

UNIT – III

Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors - critical region, confidence interval, Level of significance, one tailed test, two tailed test.

Large sample tests:

- i. Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)
- ii. Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

UNIT – IV

Small sample tests: Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples. Snedecor's F-distribution and its properties. Test of equality of two population variances. Chi-square distribution, its properties, Chi-square test of goodness of fit.

UNIT – V

Curve Fitting: Curve fitting by the method of least squares- fitting of straight line, parabola and exponential curves.

Correlation and Regression:

Correlation: Coefficient of correlation, Rank correlation (Karl Pearson's coefficient of correlation, Spearman's coefficient of correlation). Regression: Regression coefficient, lines of regression.

TEXTBOOKS:

1. Higher Engineering Mathematics by Dr. B.S Grewal, Khanna Publishers.
2. Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Academic Press.

REFERENCE BOOKS:

1. Mathematics for Engineers by K.B.Datta and M.S.Sriniva, Cengage Publications.
2. Fundamentals of Mathematical Statistics by S C Gupta and V.K. Kapoor.
3. Veerajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi 2010.
4. P.G. Hoel, S .C .Port and C.J. Stone, Introduction to Probability theory, Universal Book Stall, 2003.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN (2200HS03) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

B.Tech. II Year I Sem**L T P C
3 0 0 3****Course Objectives:**

To enable the student to understand and appreciate, with a particular insight, the importance of certain basic issues governing the business operations namely; demand and supply, production function, cost analysis, markets, forms of business organizations, capital budgeting, financial accounting and financial analysis.

Course Outcomes:

- Understand the basic aspects of managerial economics including the nature and scope of demand analysis, the various determinants of demand, elasticity of demand, and demand forecasting.
- Assess production and cost concepts such as production function, laws of returns to scale, and be able to perform break-even analysis for effectiveness in the choice of production and cost minimization strategies.
- Analysis among the three broad categories of business competition (perfect competition, monopoly and monopolistic competition) as well as pricing mechanisms and their applicability within the different business contexts.
- Applying capital budgeting methods that include the Payback Period, ARR, and NPV to evaluate the feasibility of the proposed capital investment projects.
- Applying financial statements including the Trading Account, Profit and Loss Account and the Balance Sheet through the relevant accounting concepts to evaluate an organization's position.
- Analyze financial data using cash flow and fund flow techniques in evaluating the operational position and performance of a firm for effective policy formulation.

UNIT I

Introduction & Demand Analysis: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

UNIT II

Production & Cost Analysis: Production Function - MRTS, Least Cost Combination of Inputs, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) – Managerial Significance.

UNIT III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Pricing: Objectives and Policies of Pricing. Methods of Pricing. Business: Features and evaluation of different forms of Business Organization: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment: Changing Business Environment in cost-liberalization scenario.

UNIT IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of return (ARR) and Net Present Value Method (simple problems).

UNIT V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions - Double-Entry Book Keeping, Journal, Ledger, Trial Balance - Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios.

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

REFERENCES:

- Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2012.
- H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
- Lipsey & Chrystel, Economics, Oxford University Press, 2012.
- Domnick Salvatore: Managerial Economics In a Global Economy, Thomson, 2012.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC01) DATA STRUCTURES AND ALGORITHMS**B.Tech. II Year I Sem****L T P C**
3 0 0 3**Course Outcomes:**

- To impart the basic concepts of data structures and algorithms.
- To understand concepts about searching and sorting techniques
- To understand basic concepts about stacks, queues, lists trees and graphs.

Course Outcomes:

- **Present** foundational data structures along with their operations (insertion, deletion, traversal) and **assess** algorithmic efficiency through asymptotic notations.
- **Implement** and **analyze** searching techniques, including Linear Search and Binary Search, and determine their computational complexity.
- **Implement** and evaluate stack and queue structures and apply them in expression conversion and evaluation problems, assessing algorithm complexity.
- **Implement** and evaluate proficiency with linked list operations (singly, doubly, and circular linked lists) by creating and manipulating lists, stacks, and queues, and analyze the complexity of each operation.
- **Analyze** various tree data structures, such as Binary Trees, Binary Search Trees, AVL Trees, and B-Trees, **implementing** operations and studying their applications and performance.
- **Implement** and compare sorting and hashing algorithms (e.g., Selection Sort, Quick Sort, Hashing), and **apply** graph traversal algorithms to solve complex problems, assessing time and space efficiency.

UNIT-I

Introduction: Basic Terminologies: Elementary Data Organizations. Data Structure Operations: insertion, Deletion, traversal etc. Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. Searching: Linear Search and Binary Search Techniques and their complexity analysis.

UNIT-II

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

UNIT-III

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

UNIT-IV

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

UNIT-V

Sorting and Hashing: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort. Performance and Comparison among all the Methods, Hashing. Graph: Basic Terminologies & Representations, Graph search and traversal algorithms & complexity analysis.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Algorithms, Data Structures, and Problem Solving with C++”, Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
2. “How to Solve it by Computer”, 2nd Impression by R. G. Dromey, Pearson Education.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC02) OPERATING SYSTEMS**B.Tech. II Year I Sem****L T P C**
3 0 0 3**Course Objectives:**

Students will be able:

- To learn the mechanisms of OS to handle processes and threads and their communication.
- To learn the mechanisms involved in memory management in contemporary OS.
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols.
- To know the components and management aspects of concurrency management
- To learn the mechanisms of OS to handle processes and threads and their communication.
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols

Course Outcomes:

- Analyze the architecture, services, and functionalities of various operating systems, including UNIX and Windows, as well as the concept of virtual machines.
- Understand and Analyze the concepts of processes and threads, including their definitions, relationships, states, and transitions, as well as the role of the Process Control Block (PCB) and context switching.
- Design and Evaluate process scheduling foundations and algorithms, including their impact on CPU utilization and performance metrics such as throughput and response time.
- Analyze inter-process communication mechanisms and deadlock management strategies to understand critical sections, race conditions, and prevention techniques.
- Evaluate memory management techniques, including allocation strategies, paging, and virtual memory concepts, to optimize performance and address fragmentation issues.
- Implement I/O hardware management, file management systems, and disk management techniques to optimize performance and efficiency in operating systems.

UNIT - I:

Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.

UNIT - II:

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching.

Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time. Scheduling algorithms: Pre-emptive and Non-pre-emptive, FCFS, SJF, RR. Multiprocessor scheduling: Real Time scheduling: RM and EDF.

UNIT - III:

Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer/Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dining Philosopher Problem etc.

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, and Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

UNIT - IV:

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging.

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault, Working Set, Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

UNIT - V:

I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms

File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks

TEXTBOOKS:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.

REFERENCE BOOKS:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC03) DISCRETE MATHEMATICS

B.Tech. II Year I Sem**L T P C**
3 0 0 3**Course Objectives:**

- Use mathematically correct terminology and notation.
- Construct correct direct and indirect proofs.
- Use division into cases in a proof.
- Use counter examples.
- Apply logical reasoning to solve a variety of problems.
- Use mathematically correct terminology and notation.
- Construct correct direct and indirect proofs.
- Use division into cases in a proof

Course Outcomes:

- Understand and apply the concepts of syntax, semantics, validity, and satisfiability in propositional logic, as well as construct and analyse truth tables, logical equivalence, and rules of inference.
- Understand set operations, relations, and functions, including Cartesian products, bijective functions, inverse and composite functions, and the distinction between finite, countable, and uncountable sets.
- Apply mathematical induction to prove theorems and solve problems, and apply the division algorithm, Euclidean algorithm, and the fundamental theorem of arithmetic to determine prime numbers and the greatest common divisor.
- Illustrate the need of algebraic structures such as semigroups, monoids, groups, rings, and fields, and apply concepts like congruence relation, quotient structures, Boolean algebra, and the duality principle in problem-solving.
- Analyse elementary combinatorics, including basic counting techniques, the inclusion-exclusion principle, and permutations and combinations, both with and without repetition, to solve combinatorial problems.
- Understand and apply graph theory concepts such as connectivity, paths, cycles, subgraphs, isomorphism, Eulerian and Hamiltonian walks, graph coloring, and tree structures to analyze and solve real-world problems, including shortest path determination and articulation points.

UNIT-I

Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, Normal Forms, Disjunctive and Conjunctive Normal Form, The use of Quantifiers.

UNIT-II

Sets, Relation, and Function: Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets.

Mathematical Induction: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers,

UNIT-III

Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Abelian Group, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function.

UNIT-IV

Elementary Combinatory: Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutations, and combinations With Repetition and Without Repetition.

UNIT-V

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi- connected component and Articulation Points, Shortest distances.

TEXTBOOKS:

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw–Hill
2. Susanna S. Epp, Discrete Mathematics with Applications, 4th edition, Wadsworth Publishing Co. Inc.
3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw–Hill.

REFERENCE BOOKS:

1. J.P. Tremblay and R. Manohar, “Discrete Mathematical Structure and It’s Application to Computer Science”, TMG Edition, Tata McGraw-Hill
2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum’s Outlines Series, Seymour Lipschutz, Marc Lipson,
3. Discrete Mathematics, Tata McGraw–Hill

L T P C
0 0 3 1.5

- b) Delete an element from a binary search tree.
- c) Search for a key element in a binary search tree.

Week 7:

Write a C & Python program that uses recursive functions to traverse the given binary search tree in a) Preorder b) in order and c) post order.

Week 8:

Write a C & Python program to perform the following operations.

- i) Insertion into a B-tree
- ii) Deletion from a B-tree

Week 9:

Write a C & Python program to construct AVL tree and perform the following operation.

- a) Insertion into an AVL-tree

Week 10:

Write a C & Python program to implement hash table and perform the following operations.

- a) Inserting a key-value pair b) Deleting a key-value pair

Week 11:

Write a C & Python program for implementing the following sorting methods.

- a) Merge sort b) Heap sort

Week 12:

Write a C & Python program to implement the following sorting techniques.

- i) Bubble sort ii) Selection sort
- iii) Quicksort iv) Insertion sort

Week 13:

Write a C & Python program to implement the Graph Traversal Techniques.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC62) OPERATING SYSTEMS LAB**B.Tech. II Year I Sem****L T P C**
0 0 3 1.5**Course Objectives:**

- To understand the functionalities of various layers of OSI model
- To explain the difference between hardware, software; operating systems, programs and files.
- Identify the purpose of different software applications.

Course Outcomes:

- Apply CPU scheduling algorithms to optimize system performance
- Implement file allocation and organization strategies to manage storage efficiently
- Develop programs to simulate contiguous memory allocation and page replacements
- Apply Deadlock Avoidance and Prevention algorithms to ensure system reliability
- Develop programs to simulate disk scheduling and memory management algorithms
- Apply synchronization techniques to solve producer-consumer and dining philosopher's problems

Week 1: Simulate the following CPU scheduling algorithms. a) Round Robin b) SJF c) FCFS d) Priority.

Week 2: Simulate all file allocation strategies

a) Sequential b) Indexed c) Linked.

Week 3: Simulate MVT and MFT.

Week 4: Write a C program to simulate the following contiguous memory allocation techniques

a) Worst fit b) Best fit c) First fit.

Week 5: Simulate all File Organization Techniques

a) Single level directory b) Two level c) Hierarchical d) DAG.

Week 6: Simulate Bankers Algorithm for Dead Lock Avoidance.

Week 7: Simulate Bankers Algorithm for Dead Lock Prevention.

Week 8: Write a C program to simulate disk scheduling algorithms.

a) FCFS b) SCAN c) C-SCAN

Week 9: Simulate all page replacement algorithms

a) FIFO b) LRU c) LFU

Week 10: Simulate Paging Technique of memory management.

Week 11: Write a C program to simulate producer-consumer problem using semaphores.

Week 12: Write a C program to simulate the concept of Dining-philosophers problem.

REFERENCE BOOKS:

- An Introduction to Operating Systems, P.C.P Bhatt, 2nd edition, PHI.
- Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition , PHI

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200MC03) HUMAN VALUES AND PROFESSIONAL ETHICS

B.Tech. II Year I Sem**L T P C**
2 0 0 0**Course Objective:**

- To enable the students to imbibe and internalize the Values and Ethical Behavior in the personal and Professional lives. Present foundational data structures along with their operations (insertion, deletion, traversal) and assess algorithmic efficiency through asymptotic notations.
- Understand and articulate key human values such as integrity, respect, empathy, and justice, and their relevance in personal and professional contexts.
- Encourage a sense of social responsibility by discussing the ethical implications of professional practices and corporate behavior.
- Improve interpersonal and communication skills necessary for discussing and addressing ethical issues in the workplace.

Course Outcome:

- Evaluate the concepts of human values, including self-exploration and natural acceptance, and assess their role in fostering happiness and prosperity as fundamental human aspirations..
- Analyze the principles of harmony in family and society, including values such as trust and respect, and develop strategies to promote a harmonious, universally unified society.
- Differentiate between personal and professional ethics, including ethical dilemmas, and apply concepts of life skills and emotional intelligence to navigate ethical decisions in a professional context.
- Interpret the ethical responsibilities and moral values in engineering practices by examining real-world case studies, and evaluate the impact of professional codes of conduct on workplace norms and accountability
- Analyzation of global ethical issues, including sustainable development, technology globalization, and corporate governance, and propose solutions to address these challenges in a professional setting.
- Assess the ethical implications of emerging global concerns—such as media, war, and bioethics—and develop frameworks for ethical decision-making regarding intellectual property rights and environmental sustainability.

UNIT - I:

Introduction to Human Values: Need, basic Guidelines, Content and Process for Value Education, Self Exploration - 'Natural Acceptance' and Experiential Validation. Continuous Happiness and Prosperity - A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities. Understanding Happiness and Prosperity correctly

UNIT - II:

Understanding Harmony in the Family and Society: Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the harmony in the society (society being an extension of family). Visualizing a universal harmonious order in society - Undivided Society (AkhandSamaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT – III:

Introduction to Professional Ethics: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

UNIT – IV:

Professional Practices in Engineering: Workplace Rights & Responsibilities, Professions and Norms of Professional Conduct, Norms of Professional Conduct vs. Profession; Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession. Central Responsibilities of Engineers – The Centrality of Responsibilities of Professional Ethics; lessons from 1979 American Airlines DC-10 Crash and Kansas City Hyatt Regency Walk away Collapse.

UNIT – V:

Global issues in Professional Ethics: Introduction – Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Depletion, Pollution, Ethics in Manufacturing and Marketing, Media Ethics, War Ethics, Bio Ethics, Intellectual Property Rights.

TEXTBOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
3. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press 2015.

REFERENCE BOOKS:

1. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.
2. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
3. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4e, Cengage learning, 2015.
4. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 200

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2204ES01) ANALOG & DIGITAL ELECTRONICS CIRCUITS**B.Tech. II Year II Sem****L T P C**
3 1 0 4**Course Outcomes:**

- Analyze the characteristics and behavior of a P-N junction diode, including its VI characteristics, resistance levels, and breakdown mechanisms.
- Evaluate the performance of rectifiers and filters, comparing different filter configurations and voltage regulation using a Zener diode.
- Examine the working principles and configurations of Bipolar Junction Transistors (BJT) and compare their amplifier characteristics.
- Assess various transistor biasing techniques and stabilization methods to ensure reliable circuit operation under varying conditions.
- Investigate the operation and characteristics of Junction Field Effect Transistors (JFET) and Metal-Oxide-Semiconductor Field Effect Transistors (MOSFET).
- Compare the advantages, limitations, and applications of BJT and FET devices in amplifier and switching circuits.

UNIT -I

Junction Diode: P-N Junction as a Diode, Diode Equation, Volt- Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

UNIT -II

Rectifiers and Filters : The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters, π - Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode.

UNIT -III

Bipolar Junction Transistor: The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, BJT Specifications, BJT Hybrid Model, Comparison of CB, CE, and CC Amplifier Configurations.

UNIT -IV

Transistor Biasing and Stabilization: Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector – Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in V_{BE} and β , Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability, Analysis of a Transistor Amplifier Circuit using h- Parameters.

UNIT -V

Field Effect Transistor: The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes, Comparison of BJT and FET.

TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed., 1998, TMH
2. Electronic Devices and Circuits – David A. Bell, 5Ed ,Oxford.

REFERENCE BOOKS:

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed.,2008, TMH.
2. Electronic Devices and Circuits - K. Lal Kishore, 2ndEd.,2005,BSP.
- 3.Electronic Devices and Circuits–S.Salivahanan, N.Suresh Kumar, A.Vallavaraj,2ndEd., 2008,TMH.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC07) DESIGN AND ANALYSIS OF ALGORITHMS

B.Tech. II Year II Sem**L T P C**
3 0 0 3**Course Objectives:**

- To analyze performance of algorithms.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
- Prerequisites (Subjects) Data structures, Mathematical foundations of computer science.

Course Outcomes:

- Understand algorithm efficiency through time and space complexity analysis
- Use divide-and-conquer techniques for sorting and matrix multiplication
- Able to synthesize disjoint set operations and Understand Tree Traversal method
- Apply Greedy Algorithms and Dynamic Programming concept to solve various problems
- Apply Backtracking, Branch and Bound concept to solve various problems.
- Recognize and classify NP-Hard and NP-Complete problems by analyzing non-deterministic algorithms, Cook's theorem, and complexity classes.

UNIT - I

Introduction-Algorithm definition, Algorithm Specification, Performance Analysis-Space complexity, Time complexity, probabilistic analysis Randomized Algorithms.

Divide and conquer- General method, applications - Binary search, Merge sort, Quick sort, Strassen's Matrix Multiplication.

UNIT - II

Disjoint set operations- union and find algorithms, Efficient non-recursive binary tree traversal algorithms, spanning trees, graph traversals- BFS and DFS, AND/OR graphs, Game Tree, Connected Components and Spanning trees, Bi-connected components

UNIT - III

Greedy method- General method, applications- Knapsack problem, Job sequencing with dead lines, Minimum cost spanning trees, Single source shortest path problem.

Dynamic Programming- General Method, applications- All pairs shortest path problem, Optimal binary search trees, 0/1 knapsack problem, Reliability design, Traveling sales person problem.

UNIT - IV

Backtracking-General method, applications-The 8-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles. Branch and Bound- General Method, applications-0/1 Knapsack problem, LC Branch and Bound solution, traveling sales person problem.

UNIT - V

NP- Hard and NP-Complete problems- Basic concepts, Non-deterministic algorithms, NP- Hard and NP-Complete classes, Cook's theorem.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Raja sekharan, Universities Press.
2. Design and Analysis of Algorithms, P. H. Dave, H. B. Dave, 2nd edition, Pearson Education.

REFERENCE BOOKS:

1. Algorithm Design: Foundations, Analysis and Internet examples, M. T. Goodrich and R. Tomassia, John Wiley and sons.
2. Design and Analysis of Algorithms, S. Sridhar, Oxford Univ. Press
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson Education.
4. Foundations of Algorithms,, R. Neapolitan and K. Naimipour, 4th edition, Jones and Bartlett Student edition.
5. Introduction to Algorithms, 3rd Edition, T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, PHI

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC04) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

B.Tech. II Year II Sem**L T P C**
3 0 0 3**Course Objective:**

- The objective of this course is to provide object-oriented concepts through which robust, secured and reusable software can be developed.
- To understand object-oriented principles like abstraction, encapsulation, inheritance and 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 understand the implementation of packages and interfaces.
- To understand the concepts of exception handling, multithreading and collection classes.
- To understand the design of Graphical User Interface using applets and swing controls.

Course Outcomes:

- Understand the fundamental principles of object-oriented thinking, including agents, communities, classes, instances, and the significance of inheritance and method binding.
- Create simple Java programs utilizing data types, variables, operators, control flow structures, and basic I/O operations, as well as understanding memory management concepts.
- Design and implement class hierarchies using inheritance, apply the super keyword, and utilize polymorphism through method overloading and overriding in practical scenarios.
- Apply exception handling techniques to manage errors in Java applications, analyze multithreading concepts by creating and synchronizing threads effectively.
- Understand and apply the Java Collections Framework to manipulate data structures, and illustrate file handling capabilities using byte and character streams, along with relevant utility classes.
- Create interactive GUI applications using Swing components, manage event handling, and understand the differences between AWT and Swing, including layout management techniques.

UNIT-I

Object-oriented thinking- A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. An Overview of Java -History of Java, comments, Data types, Variables, Constants, Scope and Lifetime of variables, Operators, Type conversion and casting, Enumeration, Control flow - blockscope, conditional statements, loops, break and continue statements, simple java standalone programs, arrays, console input and output, classes, methods, constructors, static, this keyword, recursion, exploring string classes and garbage collection.

UNIT – II

Inheritance–Inheritance hierarchy, super keyword, preventing inheritance: final classes and methods, the Object class and its methods.

Polymorphism–dynamic binding, Constructor and method overloading, method overriding, abstract classes.

Interfaces-Interfaces Vs Abstract Classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface, inner class.

UNIT-III

Packages-Defining, creating and accessing a package, CLASSPATH, Access modifiers, importing packages. Exception Handling-Dealing with errors, benefits of exception handling, the classification of exceptions - exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, creating own exception subclasses.

UNIT-IV

Multithreading – Differences between multiple processes and multiple threads, thread lifecycle, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication-producer consumer problem Collection Framework in Java – Introduction to java collections, Overview of java collection framework, Commonly used collection classes-Array List, Linked List, HashSet, TreeSet, Map- Hash Map, Tree Map, Legacy Classes-Vector, Stack , Hashtable.

UNIT-V

Other Utilities-Scanner, String Tokenizer, Random, Date. Files-Streams-Byte Streams, Character Streams, Text input/output, Binary input output , File Management using File class. Applets – Inheritance hierarchy for applets, differences between applets and applications, Life cycle of an applet and Passing parameters to applets. GUI Programming - Swing -The AWT class hierarchy, Introduction to Swing, Swing Vs AWT, Hierarchy for Swing components, Overview of Swing components – J Button, J Label, J Text Field, J Check Box, Radio Button, J Text Area, etc simple Swing applications, Layout managers– Flow Layout, Border Layout, Grid Layout and Grid bag Layout.

Event Handling-Events, Event sources, Event classes, Event Listeners, Delegation event model, Handling Mouse and Key events, Adapter classes.

TEXTBOOKS:

1. Java Fundamentals–A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education
1. Java for Programmers, P.J. Deitel and H.M. Deitel, PEA(or) Java: How to Program , P.J. Deitel and H.M. Deitel, PHI
3. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
4. Thinking in Java, Bruce Eckel, PE
5. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.
6. Design Patterns Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC06) FORMAL LANGUAGE AND AUTOMATA THEORY

B.Tech. II Year II Sem

L	T	P	C
3	0	0	4

Course Objective:

The purpose of this course is to acquaint the student with an overview of the theoretical foundations of computer science from the perspective of formal languages.

- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- Explain deterministic and non-deterministic machines.
- Comprehend the hierarchy of problems arising in the computer sciences.
- To employ finite state machines to solve problems in computing
- To explain deterministic and non-deterministic machines
- To comprehend the hierarchy of problems arising in the computer sciences.

Course Outcomes:

- Students will be able to construct and analyze finite automata, as well as evaluate Deterministic and Non-deterministic Finite automata applications.
- Students will be able to construct deterministic finite automata (DFA) and nondeterministic finite automata (NFA) from given regular expressions, as well as convert DFAs and NFAs into equivalent regular expressions. Additionally, they will evaluate the efficiency and applicability of these conversions in various computational contexts
- Students will be able to apply the pumping lemma to demonstrate the properties of regular languages and context-free languages, analyze the implications of the lemma on language classification, and construct formal proofs to establish whether given languages are regular or context-free.
- Students will be able to construct context-free grammars for specified languages, analyze and generate parse trees from given strings, design and implement pushdown automata that recognize context-free languages.
- Students will be able to design Turing machines to solve specific computational problems, and analyze their capabilities in relation to decidability and complexity within the context of formal languages.
- Students will be able to articulate the concepts of decidability and undecidability, assess various computational problems to determine their solvability, and construct formal proofs that demonstrate the undecidability of specific languages and problems.

UNIT - I

Introduction to Finite Automata: Structural Representations, Central Concepts of Automata Theory and its Applications. Deterministic Finite Automata, Nondeterministic Finite Automata, Finite Automata with Epsilon-Transitions. Moore and Mealy machine. Equivalence and minimization of FSM.

UNIT - II

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Pumping Lemma for Regular Languages, Applications of the Pumping Lemma, Closure Properties of Regular Language. Equivalence of FA and Regular expression.

UNIT - III

Context-Free Grammars: Definition, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Sentential Forms, Parse Trees, Minimization of Context-Free Grammar, Ambiguity in Grammars and Languages.

UNIT - IV

Push Down Automata: Construction of Pushdown Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata. Normal Forms for Context-Free Grammars, Closure Properties of Context-Free Languages. Types of Normal Forms and its conversations.

UNIT - V

Introduction to Turing Machines: Turing Machine, Programming Techniques for Turing Machines, Extensions to the basic Turing Machine, Restricted Turing Machines, Universal Turing Machine(UTM).

Undecidability : A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines, Post's Correspondence Problem, Intractable Problems: The Classes P and NP, NP- Complete Problem. Rice's Theorem.

TEXTBOOKS:

1. Introduction to Automata Theory, Languages, and Computation, 3rd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage Learning.
3. Kamala Krithivasan and Rama R, Introduction to Formal Languages, Automata Theory and Computation, Pearson Education, 2009.

REFERENCE BOOKS:

1. Introduction to Languages and the Theory of Computation, John C Martin, TMH.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. A Text book on Automata Theory, P. K. Srimani, Nasir S. F. B, Cambridge University.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC08) DATABASE MANAGEMENT SYSTEMS**B.Tech. II Year II Sem****LT PC**
3 0 0 3**Course Objectives:**

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

Course Outcomes:

1. Analyze the architecture and purpose of database systems, including database languages and data retrieval methods, to understand their role in data management and application domains.
2. Design entity-relationship (ER) models and develop conceptual schemas for database systems, effectively representing entities, relationships, and attributes in complex, large-scale enterprise databases.
3. Construct relational database schemas by transforming ER models into the relational model, enforcing integrity constraints, and creating views to ensure logical data consistency and accessibility.
4. Develop complex SQL queries, including nested queries and triggers, and apply normalization techniques to refine schema design, ensuring data integrity and minimizing redundancy in database applications.
5. Evaluate transaction management and concurrency control protocols, such as lock-based and timestamp-based protocols, to ensure atomicity, isolation, and durability in multi-user database environments.
6. Implement storage and indexing mechanisms, including B+ trees and ISAM, to optimize data access and storage efficiency, facilitating efficient query processing and database performance.

UNIT – I:

Introduction: Database System Applications, Purpose of Database Systems, View of Data, Database Languages – DDL, DML, Relational Databases, Database Design, Database Architecture, Data Mining and Information Retrieval, Database Users and Administrators, History of Database Systems.

Introduction to Data base design: Database Design and ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises.

UNIT – II:

Relational Model: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design: ER to Relational, Introduction to Views, Destroying /Altering Tables and Views. Relational Algebra and Calculus: Preliminaries, Relational Algebra, Relational calculus– Tuple relational Calculus, Domain relational calculus.

UNIT – III:

SQL: Queries, Constraints, Triggers: Form of Basic SQL Query, UNION, INTERSECT, and EXCEPT, Nested Queries, Aggregate Operators, NULL values, Natural JOINS, Complex Integrity Constraints in

SQL, Triggers and Active Data bases.. Schema Refinement and Normal Forms: Introduction to Schema Refinement, Functional Dependencies - Reasoning about FDs, Normal Forms, Properties of Decompositions, Normalization, Schema Refinement in Database Design, Other Kinds of Dependencies.

UNIT – IV:

Transaction Management: Transactions, Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability.

UNIT V:

Concurrency Control: Lock-Based Protocols, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols. Recovery System-Failure Classification, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with loss of non-volatile storage, Remote Backup systems. Storage and Indexing: Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing, Index Data Structures, Comparison of File Organizations. Tree-Structured Indexing: Intuition for tree Indexes, Indexed Sequential Access Method (ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

TEXTBOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, Mc GrawHill Education (India) Private Limited, 3rd Edition. \
2. Data base System Concepts, A. Silberschatz, Henry. F. Korth, S. Sudarshan, McGrawHill Education(India) Private Limited l, 6th edition.(Part of UNIT-I,UNIT-IV)

REFERENCE BOOKS:

1. Database Systems, 6th edition, R Elmasri, Shamkant B.Navathe, Pearson Education.
2. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning.
3. Introduction to Database Management, M. L. Gillenson and others, Wiley Student Edition.
4. Database Development and Management, Lee Chao, Auerbach publications, Taylor& Francis Group.
5. Introduction to Database Systems, C. J. Date, Pearson Education.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC63) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB**

B.Tech. II Year II Sem**L T P C
0 0 3 1.5****Course Objectives:**

- To prepare students to become familiar with the Standard Java technologies ofJ2SE
- To prepare students to excel in Object Oriented programming and to succeed as a Java Developer through global rigorous education.
- To provide Students with a solid foundation in OOP fundamentals required to solve programming problems and to learn Advanced Java topics like J2ME, J2EE, JSP and JavaScript
- To train Students with good OOP programming breadth so as to comprehend, analyze, designed create novel products and solutions for the real-life problems.
- To inculcate in students professional and ethical attitude, multidisciplinary approach and an ability to relate java programming issues to broader application context.
- To provide student with an academic environment aware of excellence, written ethical codes and guidelines and lifelong learning needed for a successful professional career.

Course Outcomes:

- Understand OOP concepts such as classes, objects, inheritance, polymorphism and encapsulation..
- Apply OOP principles to design and implement solutions to programming problems effectively.
- Implement exception handling mechanisms to manage runtime errors and ensure robust program execution.
- Create and manage threads, ensuring safe and efficient concurrent programming.
- Analyze commonly used Java libraries and APIs, including the Collections Framework, Java I/O, and other utility classes.
- Design and create GUIs using Java Swing, incorporating event handling for user interactions.

Week 1:

- a) Write a java program to find the Fibonacci series using recursive and non-recursive functions.
- b) Write a java program to multiply two given matrices.

Week 2:

- a) Write a java program for Method overloading and Constructor overloading.
- b) Write a java program to display the employee details using Scanner class.
- c) Write a java program that checks whether a given string is palindrome or not.

Week 3:

- a) Write a java program to represent Abstract class with example.
- b) Write a java program to implement Interface using extends keyword.

Week 4:

- a) Write a java program to create user defined package.

Week 5:

- a) Write a java program to create inner classes.
- b) Write a java program for creating multiple catch blocks.
- c) Write a Java Program for creating User Defined Exception.

Week 6:

- a) Write a java program for producer and consumer problem using Threads.
- b) Write a Java program that implements a multi-thread application that has three threads.

Week 7:

- a) Write a java program to implement all file operations.
- b) Write a Java Program to list all the files in a directory including the files present in all its sub directories.

Week 8:

- a) Write a java program to represent Array List class.
- b) Write a Java program loads phone no, name from a text file using Hash table.

Week 9:

- a) Write an applet program that displays a simple message.
- b) Write a Java program compute factorial value using Applet.
- c) Write a program for passing parameters using Applet.

Week 10:

Write a java program for handling Mouse events and Key events.

Week 11:

Write a java program that works as a simple calculator. Use a Grid Layout arrange Buttons for digits and for the + - * % operations. Add a text field to display the result.

TEXTBOOK/ REFERENCE BOOKS:

1. Java Fundamentals – A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.
2. Java for Programmers, P.J. Deitel and H.M. Deitel, PEA (or) Java: How to Program ,P.J.Deitel and H.M. Deitel, PHI

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC64) DATABASE MANAGEMENT SYSTEMS LAB

B.Tech. II Year II Sem**L T P C**
0 0 3 1.5**Course Objectives:**

Students will have the ability to:

- Keep abreast of current developments to continue their own professional development.
- To engage themselves in lifelong learning of Database management systems theories and technologies this enables them to pursue higher studies.
- To interact professionally with colleagues or clients located abroad and the ability to overcome challenges that arises from geographic distance, cultural differences, and multiple languages in the context of computing.
- Develop team spirit, effective work habits, and professional attitude in written and oral forms, towards the development of database applications.

Course Outcomes:

1. Design entity-relationship (E-R) models to represent complex database systems, accurately identifying entities, attributes, and various types of keys to enhance data integrity and efficiency.
2. Construct and manipulate relational database tables using DDL and DML commands in MySQL, effectively implementing normalized data structures to manage and persistently store essential data.
3. Formulate and execute advanced SQL queries involving subqueries, joins, views, and aggregate functions to retrieve, manipulate, and analyze data from multiple tables, addressing complex data requirements.
4. Develop PL/SQL procedures and triggers to automate tasks, enforce data integrity, and apply business rules, ensuring robust and dynamic database applications.
5. Apply normalization principles (1NF, 2NF, 3NF) to decompose tables, minimize redundancy, and enhance database structure, ensuring consistency and reducing data anomalies.
6. Demonstrate the use of transaction control operations (COMMIT, ROLLBACK, SAVEPOINT) and access control commands (GRANT, REVOKE) to manage database permissions, data integrity, and recovery, maintaining secure and efficient database systems.

.Experiment 1: E-R Model

Analyze the problem carefully and come up with the entities in it using software design tool. Identify what data has to be persisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

Experiment 2: Installation of Mysql and practicing DDL, commands.

Installation of MySql. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

Example for creation of a normalized "Passenger" table.

```
CREATE TABLE Passenger ( Passport_id INTEGER PRIMARY KEY, Name VARCHAR(50)
NotNULL,
```

```
AgeInteger Not NULL, Sex Char,
```

```
Address VARCHAR (50) Not NULL);
```

Similarly create all other tables.

Note: Detailed creation of tables is given at the end.

Experiment 3: Practicing DML commands

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE-deletes all records from a table, the space for the records remain

Inserting values into "Bus" table:

Insert into Bus values (1234,'hyderabad', 'tirupathi'); Insert into Bus values (2345,'hyderabad' 'Banglore');
Insert into Bus values (23,'hyderabad','Kolkata'); Insert into Bus values (45,'Tirupathi','Banglore'); Insert
into Bus values (34,'hyderabad','Chennai');

Inserting values into "Passenger" table:

Insert into Passenger values (1, 45,'ramesh', 45,'M','abc123'); Insert into Passenger values (2, 78,'geetha',
36,'F','abc124'); Insert into Passenger values (45, 90,' ram', 30,'M','abc12'); Insert into Passenger values
(67, 89,' ravi', 50,'M','abc14'); Insert into Passenger values (56, 22,'seetha', 32,'F','abc55');

Few more Examples of DML commands:

Select * from Bus; (selects all the attributes and display) UPDATE BUS SET Bus No = 1 WHERE BUS
NO=2;

Experiment 4: Querying

In this week you are going to practice queries(along with sub queries) using ANY, ALL, IN, Exists, NOT
EXISTS, UNION, INTERSECT, Constraints etc.

Practice the following Queries:

Display unique PNR_no of all Passengers. Display all the names of male passengers. Display the ticket
numbers and names of all the passengers.

Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'. Find the names of
passengers whose age is between 30 and 45.

Display all the passengers names beginning with 'A' Display the sorted list of passengers names

Experiment 5: Aggregate Functions and Number Functions, Nested Query and Co-related Queries You
are going to practice queries using Aggregate functions and number functions (COUNT, SUM, AVG,
and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

Write a Query to display the Information present in the Passenger and cancellation tables. Hint: Use
UNION Operator.

Display the number of days in a week on which the 9W01 bus is available.

Find number of tickets booked for each PNR_no using GROUP BY CLAUSE. Hint: Use GROUP BY on
PNR_No.

Find the distinct PNR numbers that are present.

Find the number of tickets booked by a passenger where the number of seats is greater than 1.Hint: Use
GROUP BY, WHERE and HAVINGCLAUSES.

Find the total number of cancelled seats.

Nested Query and Co-related Queries

Use the tables sailors, reserves, boats for implementing the following Sailors (sid: integer, sname: string,
rating: integer, age: real);

Boats(bid: integer, bname: string, color: string); Reserves(sid: integer, bid: integer, day: date).

- Find the names of sailors who have reservedboat103.
- Find the name and the age of the youngestsailor
- Find the names and ratings of sailor whose rating is better than some sailor called Horatio.
- Find the names of sailors who have reserved allboats

Experiment 6: VIEWS and JOIN

In this week, we are going to implement views and also perform various operations like alter, update and delete commands.

View:

Write a query to execute and verify the SQL commands using Views (Use Employee Table)

(a) Alter (b) Update (c) Delete

Join:

Write a query to execute and verify the SQL commands using Join (Use Customer Table)

(a) Inner join, (b).Left join, (c).Right join (d).Full join

Experiment 7: Triggers

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

Eg: CREATE TRIGGER up d check BEFORE UPDATE ON passenger FOR EACH ROW BEGIN
IF NEW.Ticket N0 > 60 THEN SET

New.Ticket no = Ticket no; ELSE SET New.Ticket no = 0; END IF;
END;

Experiment 8: Procedures

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

Eg: CREATE PROCEDURE myProc()BEGIN.

SELECT COUNT(Tickets) FROM Ticket WHERE age>=40; End;

Experiment 9: Cursors

In this week you need to do the following: Declare a cursor that defines a result set.

Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done.

CREATE PROCEDURE myProc (in_customer_id INT) BEGIN DECLARE v_id INT; DECLARE
v_nameVARCHAR(30);

DECLAREclCURSORFORSELECTppno,nameFROMPassengerWHEREppno=in_customer_id; OPENcl;
FETCH cl

into v_id, v_name; Close cl; END Tables BUS

Bus No: Varchar:

PK (Primary key) Source: Varchar Destination:

Varchar DeptTime: VarcharPassenger

PPNO: Varchar(15)) :

PK Name:

Varchar (15) Age: int (4) Sex: Char (10) : Male/Female Address: VarChar(20)

Passenger Tickets

PPNO: Varchar (15)) : FK Ticket No: Numeric (9)

Reservation

PNR_No: Numeric (9) :

PK Journey date :date time(8) No_of_seats : int (8) Address: Varchar(50) Contact_No: Numeric (9) —>
Should not be less than 9 and Should not accept any other character other than Integer Status: Char (2)
: Yes / No

Cancellation

PNR_No: Numeric(9):

FK Journey_date:datetime (8) No_of_seats : int (8) Address : Varchar (50)

Contact_No: Numeric (9) —> Should not be less than 9 and should not accept any other character other
than Integer

Status: Char (2) : Yes / No

Ticket

Ticket No: Numeric(9):

PK Journey date: date time(8) Age : int (4)

Sex:Char(10) :Male/Female

Source :Varchar Destination :Varchar Dep_time :Varchar

Experiment 10: Normalization

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.

For the above table in the First normalization we can remove the multi valued attribute Ticket_id and place it in another table along with the primary key of passenger.

First Normal Form: The above table can be divided into two tables as shown below.

Passenger

Name Age Sex Address PassportID

Passport_idTicket_id

You can do these cond and third normal forms if required. And how Normalizedtables are given at the end.

Experiment 11: PL/SQL Programs

In this week, you are going to learn and work on PL/SQL procedures.

- Write a PL/SQL procedure to find the average of marks?
- Write a PL/SQL procedure to find the factorial of a number?
- Write a PL/SQL code to calculate tax for an employee of an organization–XYZ and to display his/her name & tax, by creating table under employee database as below. Employee_salaryEmp_no Basic HRA DA Total_deduction

Net_salary Gross_salary

Experiment 12: Revoke/Grant/Commit/Rollback

In this week, you need to do the following: Declare a table that defines a result set using revoke, grant, save point, commit, rollback operations Consider the following tables namely “DEPARTMENTS” and “EMPLOYEES” Their schemas are as follows, Departments (dept_no , dept_name , dept_location); Employees (emp_id , emp_name , emp_salary);

1. Develop a query to grant all privileges of employee table into department table
2. Develop a query to grant some privileges of employee table into department table
3. Develop a query to revoke all privileges of employee table from department table
4. Develop a query to revoke some privileges of employees table from department table
5. Write a query to implement the save point
6. Write a query to implement the commit
7. Write a query to implement rollback

REFERENCE BOOKS:

1. Introduction to SQL, Rick F. Vander Lans, Pearson education..
2. Oracle PL/SQL, B. Rosenzweig and E. Silvestrova, Pearson education.
3. Oracle PL/SQL Programming, Steven Feuerstein, SPD.
4. SQL & PL/SQL for Oracle 10g, B lack Book, Dr. P. S. Deshpande, Dream Tech
5. Oracle Database 11g PL/ SQL Programming, M. Mc Laughlin TMH
6. SQL Fundamentals, J.J. Patrick, Pearson Education

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN (2200MC04) INDIAN CONSTITUTION

B.Tech. II Year II Sem

L T P C
2 0 0 0

Course Objective:

- To enable the students to be aware of emergence and evolution of Indian Constitution, to Understand their fundamental rights and duties and to understand the structure and composition of Election Commission To enable the students to be aware of emergence and evolution of Indian Constitution
- Understand their fundamental rights and duties
- Understand the structure and composition of Election Commission.

Course Outcome:

- Students will be able articulate key principles of the Indian Constitution.
- To learn their Rights and Responsibilities as an Indian citizen.
- Analyze the structure of government
- Develop research skills by exploring constitutional amendments and their implications on society.
- will be proficient in understand Emergency provisions
- To understand the structure and composition of Election Commission of India

UNIT –I

Meaning and Importance of Constitution, Evolution of the constitution of India. Salient features of the constitution of India

UNIT –II

Scheme of fundamental rights, fundamental duties and its legal status. The Directive Principles of State Policy- Significance and implementation

UNIT –III

Government of the Union : President of India – Election and Powers, Prime Minister and Council of Ministers, Lok Sabha – Composition and Powers, Rajya Sabha – Composition and Powers

UNIT –IV

The historical perspectives of the constitutional amendments in India. Emergency provisions: National Emergency, President Rule, Financial Emergency, Local self-government- Constitutional scheme in India

UNIT –V

Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

TEXTBOOKS:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. M. P. Jain, HULaw, 7th Edn., Lexis Nexis, 2014.

REFERENCES:

1. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015
2. 'Indian Administration' by Avasti and Avasti

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC09) COMPILER DESIGN****B.Tech. III Year I Sem****L T P C****3 0 0 3****Course Objectives:**

To provide an initial Understanding of language translators, Knowledge of various techniques used in compiler construction and use of the automated tools available in compilers construction.

Course Outcomes:

- Demonstrate the ability to design a compiler given a set of language features.
- Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
- Acquire skills in using lex tool & yacc tool for developing a scanner and parser.
- Design and implement LL and LR parsers
- Design algorithms to do code optimization in order to improve the performance of a program in terms of space and time complexity.
- Design algorithms to generate machine code.

UNIT-I

Language Translation: Basics, Necessity, Steps involved in atypical language processing system, Types of translators, Compilers: Overview and Phases of a Compiler, Pass and Phases of translation, boot strapping, data structures in compilation.

Lexical Analysis (Scanning): Functions of Lexical Analyzer, Specification of tokens: Regular expressions and Regular grammars for common PL constructs. Recognition of Tokens: Finite Automata in recognition and generation of tokens. Scanner generators: LEX-Lexical Analyzer Generators.

UNIT-II

Syntax Analysis (Parsing): Functions of a parser, Classification of parsers. Context free grammars in syntax specification.

Top-down parsing-Definition, types of top – down parsers: Back tracking, Recursive descent, Predictive, LL (1), Preprocessing the grammars to be used in top – down parsing, Error recovery, and Limitations.

Bottom up-parsing: Definition, types of bottom-up parsing, Handle pruning. Shift Reduce parsing, LR parsers: LR(0), SLR, CALR and LALR parsing, Error recovery, Handling ambiguous grammar, Parser generators: YACC yet another compile.

UNIT-III

Semantic analysis: Attributed grammars, Syntax directed definition and Translation schemes, Type checker: functions, type expressions, type systems, types checking of various constructs.

Intermediate Code Generation: Functions, different intermediate code forms – syntax tree, DAG, Polish notation, and Three address codes. Translation of different source language constructs into intermediate code.

Symbol Tables: Definition, contents, and format store present names in a Symbol table. Different approaches used in the symbol table implementation for block structured and non-block structured languages, such as Linear Lists, Self-Organized Lists, and Binary trees, Hashing based STs.

UNIT-IV

Runtime Environment: Introduction, Activation Trees, Activation Records, Control stacks. Run time storage organization: Static, Stack and Heap storage allocation. Storage allocation for arrays, strings, and records etc.

Code optimization: goals and Considerations for Optimization, Scope of Optimization: Local optimizations, DAGs, Loop optimization, Global Optimizations. Common optimization techniques: Folding, Copy propagation, Common Sub expression eliminations, Code motion, Frequency reduction, Strength reduction etc.

UNIT–V

Control flow and Data flow analysis: Flow graphs, Data flow equations, global optimization: Redundant sub expression elimination, Induction variable eliminations, Live Variable analysis. Object code generation: Object code forms, machine dependent code optimization, register allocation and assignment generic code generation algorithms, DAG for register allocation.

TEXTBOOKS:

1. Compilers, Principle, Techniques, and Tools. –Alfred. VAho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman; 2nd Edition, Pearson Education.
2. Modern Compiler implementation in C, -Andrew N. Appel Cambridge University Press.

REFERENCES:

1. lex & yacc – John R Levine, Tony Mason, Doug Brown; O'reilly.
2. Compiler Construction-LOUDEN, Thomson.
3. Engineering a compiler–Cooper & Linda, Elsevier
4. Modern Compiler Design–Dick Grune, Henry E. Bal, Criel TH Jacobs, Wiley Drearech

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC10) COMPUTER NETWORKS**B. Tech. III Year I Sem****L T P C**
3 0 0 3**Course Objectives:**

- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.

Course Outcomes:

- Describe the essential aspects of data communication models and interconnection devices such as OSI and ISO models, different connection types and topologies, and different protocols.
- Apply a variety of multiplexing and switching techniques in order to assess the capabilities in terms of different media technologies at the physical layer and their various implementations.
- Make use of error detection and correction methods such as LRC, CRC as well as Hamming code in order to improve the reliability of the data link layer, flow control and error control strategies in channels with noise and channels without noise.
- Interpret the functions of network layer protocols in terms of ICMP, IGMP, and routing protocols so as to understand their influence on logical addressing, address mapping, and routing processes in an internetwork.
- Compare transport layer services in terms of process-to-process data delivery and traffic control, congestion control, and quality of service (QoS) between UDP and TCP protocols using specific scenarios on the transport layer.
- Implement network based applications using an application layer protocol such as DNS, SMTP, FTP, HTTP while providing secure communication using mechanisms like PGP and SSH.

UNIT– I

Data Communications: Components – Direction of Data flow – Networks – Components and Categories– Types of Connections – Topologies– Protocols and Standards – ISO / OSI model, Physical layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks and Virtual Circuit Networks.

UNIT–II

Data link layer: Introduction, Framing, and Error – Detection and Correction – Parity – LRC – CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols. 111 Medium Access sub layer: ALOHA, CSMA/CD, LAN – Ethernet IEEE802.3, IEEE802.5 – IEEE802.11, Random access, Controlled access

UNIT–III

Network layer: Logical Addressing, Internet working, Tunneling, Address mapping, ICMP, IGMP, Forwarding, Uni-Cast Routing Protocols, Multicast Routing Protocols.

UNIT–IV

Transport Layer: Process to Process Delivery, UDP and TCP protocols, Data Traffic, Congestion, Congestion Control, QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.

UNIT– V

Application Layer: Domain name space, DNS in internet, electronic mail, SMTP, FTP, WWW, HTTP, SNMP, Security – PGP – SSH

TEXTBOOKS:

1. "Data Communications and Networking" by Forouzan
2. "Computer Networks" by Andrew S. Tanenbaum and David J. Wetherall
3. "Data Communications and Networking" by Grover and Sharma

REFERENCES:

1. "Computer Networks" by A. K. Singh
2. "Data Communications" by H. C. Sharma
3. "Networking Fundamentals" by A. K. Singh
4. "TCP/IP Protocol Suite" by Forouzan
5. "Network Security Essentials" by William Stallings
6. "Computer Networks and the Internet" by Douglas E. Comer

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200HS05) DESIGN THINKING

B.Tech. III Year I Sem**L T P C**
3 0 0 3**Course Objectives:**

- Inculcate the fundamental concepts of design thinking
- Develop the students as a good designer by imparting creativity and problem solving ability
- Conceive, conceptualize, design and demonstrate innovative ideas using prototypes

Course Outcomes:

1. **Analyze** the principles of design thinking and contrast them with engineering thinking to understand their distinct applications and importance.
2. **Identify and Apply** the Human-Centered Design (HCD) process by empathizing, defining, ideating, prototyping, testing, and iterating to solve real-world problems.
3. **Design** effective ideation, prototyping, and testing strategies, utilizing brainstorming techniques and user validation methods to develop innovative solutions.
4. **Compare** various methods of innovation and evaluate their effectiveness in product design and strategic innovation through case studies.
5. **Optimize** business processes using design thinking principles, addressing challenges such as growth, predictability, and maintaining relevance.
6. **Integrate** design thinking into business and strategic innovation to redefine corporate approaches and meet industry needs effectively

UNIT– I**INTRODUCTION TO DESIGN THINKING**

An insight into Design, origin of Design thinking, Design thinking Vs Engineering thinking, importance of Design thinking, Design Vs Design thinking, understanding Design thinking and its process models, application of Design thinking

UNIT– II**EMPATHIZE IN DESIGN THINKING:**

Human - Centered Design (HCD) process - Empathize, Define, Ideate, Prototype and Test and Iterate.
Role of Empathy in design thinking, methods and tools of empathy, understanding empathy tools.
Explore define phase state users' needs and problems using empathy methods

UNIT– III**IDEATION, PROTOTYPING AND TESTING:**

Ideation methods, brain storming, advantages of brain storming, methods and tools of ideations, prototyping and methods of prototyping, user testing methods, Advantages and disadvantages of user Testing/ Validation

UNIT– IV**PRODUCT INNOVATION:**

Design thinking for strategic innovation, Definition of innovation, art of innovation, teams for innovation, materials and innovation in materials, definition of product and its classification.
Innovation towards product design Case studies

UNIT–V**DESIGN THINKING IN BUSINESS PROCESSES:**

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business–Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs.

TEXTBOOKS:

1. Change by design, Tim Brown, 2009, Harper Collins
2. Engineering design, George E Dieter, 4th Revised edition, 2009 McGraw Hill.

REFERENCES:

1. Design Thinking for Strategic Innovation, Idris Mootee, 2013, John Wiley & Sons
2. Design Thinking-The Guidebook – Facilitated by the Royal Civil service Commission, Bhutan
3. Design Methods: A Structured Approach for Driving Innovation in Your Organization, Vijay Kumar, First Edition, 2012, Wiley
4. Human-Centered Design Toolkit: An Open-Source Toolkit to Inspire New Solutions in the Developing World, IDEO, Second Edition, 2011, IDEO

e-Resources & other digital material:

1. <https://www.interactiondesignn.ora/literature/topics/design-thinking>
2. <https://www.interactiondesignn.prq/literature/article/how-tq-<eve'op-anempath\capproach-in-design-think>

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC65) COMPILER DESIGN LAB**

B.Tech. III Year I Sem

**L T P C
0 0 3 1.5**

Course Objectives:

- To provide an Understanding of the language translation peculiarities by designing complete translator for mini language

Course Outcomes:

- Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript and XML
- Apply client-server principles to develop scalable and enterprise web applications.
- Ability to design, develop, and implement a compiler for any language.
- Able to use lex and yacc tools for developing a scanner and a parser.
- Able to design and implement LL and LR parsers.
- Apply the techniques used in compiler construction.

RECOMMENDED SYSTEM / SOFTWARE REQUIREMENTS

1. Intel based desktop PC with minimum of 166MHz or faster processor with at least 64 MB RAM and 100 MB free disk space.
2. C ++ Compiler and JDK kit, Lex or Flex and YACC tools (Unix/Linux utilities)

LIST OF EXPERIMENTS

1. Design a lexical analyzer for the given language. The lexical analyzer should ignore
1. Redundant space, tabs and new lines, comments etc.
2. Implement the lexical analyzer using JLex, flex or other lexical analyzer generating tools.
3. Design Predictive Parser for the given language
4. Design a LALR bottom-up parser for the given language
5. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.
6. A program to generate machine code from the abstract syntax tree generated by the parser.

REFERENCES

1. Modern compiler implementation in C, Andrew w. Appel, Revised Edn, Cambridge University Press
2. Principles of Compiler Design. – A.V Aho, J.D Ull man; Pearson Education.
3. lex & yacc - John R Levine, Tony Mason, Doug Brown; O'reilly.
4. Compiler Construction - LOUDEN, Thomson.
5. Engineering a compiler – Cooper& Linda, Elsevier
6. Modern Compiler Design – Dick Grune, Henry E. Bal, Criel TH Jacobs, Wiley Drearetech

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC66) COMPUTER NETWORKS LAB**

B.Tech. III Year I Sem**L T P C
0 0 3 1.5****Course Objectives:**

- To understand the functionalities of various layers of OSI model
- To understand the operating System functionalities

Course Outcomes:

- Implement and demonstrate data link layer framing techniques, such as character stuffing, bit stuffing, and character framing, to ensure data integrity in network communication.
- Analyze error detection methods by implementing CRC-12, CRC-16, and CRC-32 on a dataset and examining their effectiveness in identifying transmission errors.
- Implement and demonstrate the Stop-and-Wait protocol to illustrate a basic reliable data transmission method in computer networks.
- Apply Dijkstra's algorithm to calculate the shortest path in a network graph, evaluating the efficiency of path computation for network routing.
- Construct routing tables for a subnet graph with given delays by implementing distance vector and OSPF protocols, demonstrating routing table accuracy at each node.
- Implement DES and RSA algorithms to encrypt and decrypt text data, showcasing basic cryptographic techniques for secure communication.

System/Software Requirement

Intel based desktop PCs LAN connected with minimum of 166MHZ or faster processor with at least 64MB RAM and 100MB free disk space

Computer Networks Lab:

1. Implement the data link layer framing methods such as character, character stuffing, and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC.
3. Implement Stop and wait protocol.
4. Implement Dijkstra's algorithm to compute the shortest path through a graph.
5. Take an example sub net graph with weight syndicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm
6. To implement Open Shortest Path First (OSPF) Routing Protocol.
7. Take a 64bit playing text and encrypt the same using DES algorithm.
8. Using RSA algorithm encrypts a text data and decrypt the same.

REFERENCES:

1. Data Communications and Networking–Behrouza. Forouzan, 4th Edition Mc Graw Hill Education, 2006.
2. Computer Networking: Atop
3. Down Approach Featuring the Internet, James F. Kurose, K.W. Ross, 3rd Edition, Pearson Education.
4. Data communication and Networks–Bhusan Trivedi, Oxford University Press 2016.
5. An Engineering Approach to Computer Networks–S. Keshav, 2nd Edition, Pearson Education.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200MC05) TECHNICAL COMMUNICATION AND SOFT SKILLS**

B.Tech. III Year I Sem**L T P C
2 0 0 0****Course Objectives:**

- To make the students recognize the role of Technical English in the academic and professional fields.
- To improve language proficiency and develop the required professional skills.
- To equip students with tools to organize, comprehend, draft short and long forms of technical work.

Course Out comes:

- The students will be able to understand information which assists in completion of the assigned job tasks more successfully.
- Students will also be able to adhere to ethical norms of scientific communication.
- Students will be able to strengthen their individual and collaborative work strategies
- The students will be able to understand information which assists in completion of the assigned job tasks more successfully.
- Students will also be able to adhere to ethical norms of scientific communication
- Students will be able to strengthen their individual and collaborative work strategies

Introduction:

Technical Communication and Soft skills focuses on enhancing students' communication. A thorough drilling grammar exercises is given. Various technical writing styles and skills are developed.

The future placement needs of the students are met by giving them an exposure to group discussions and mock interviews.

The students harness these skills under the guidance of instructor whose constant evaluation helps in the professional development. This course fulfills the need of the aspirants in acquiring and improving the skills required for placements and professional success.

UNIT 1 - Personal Evaluation

Self-Assessment and Self- Awareness - Self-Esteem - Perception and Attitudes –Values and Beliefs
Time Management-Concord

UNIT 2 - Professional Communication

Extempore - Oral Presentations – Presentation Aids- Email Writing, Business Letter Writing – Memo Writing - Transformation of Sentences

UNIT 3 - Career Planning

Group Discussion, Interviews - Leadership Skills & Team Building - Personal Goal setting and Career Planning - Complex Problem Solving - Creativity - Role and Responsibilities of an Engineer – Tenses

UNIT 4 - Technical Writing

Principles of Effective Writing - Editing Strategies to Achieve Appropriate Technical Style – Technical Report Writing – Voice

UNIT 5 - Ethics and Responsibilities

Personality Development in Social and Office Settings – Netiquettes - Work Culture and Cubicle Etiquettes - Correction of Sentences

TEXTBOOKS:

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.

REFERENCES:

1. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
2. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi 2012.
3. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York. (ISBN:07828357-4)
4. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
5. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN0402213)

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200HS02) PROFESSIONAL ENGLISH**

B.Tech. III Year II Sem**L T P C
3 0 0 3****Introduction:**

English is a tool for global communication and is the dominant language which is sweeping almost all the fields in the world. It has become a necessity for people to speak in English comfortably, if they want to enter the global work force. Hence, the course is designed to help the students to meet the global standards. Each unit focuses on English skill-set to improve: Interview skills, giving presentations and professional etiquette.

Course Objectives:

- To enrich students to express themselves appropriately and fluently in professional contexts.
- To enhance their employability through regular participation in group discussions and interview skills.
- To lay foundation with writing strategies for the future work place needs.
- To acquaint students with different components of professional presentation skills.
- Demonstrate problem solving skills, decision-making skills, analytical skills.
- Comprehend and apply the pre-interview preparation techniques for successful interview.

Course Outcomes:

Students will be able to:

- Draft coherent and unified paragraphs with adequate supporting details.
- Demonstrate problem solving skills, decision-making skills, analytical skills.
- Comprehend and apply the pre-interview preparation techniques for successful interview.
- Achieve expertise in writing resume and cover letter formats.
- Understand the steps of writing 'Reports and Abstract'.
- Understand and express simple narratives, descriptions and day to day conversations..

UNIT- I: Focus on language

Parts of speech – nominal compounds, noun phrases – relative pronoun – adjective – numerical, comparison and contrast, collocation and word combinations – verb – preposition and relative conjunction– connectives, expressions of purpose and function, cause and effect– articles adjectives – sentence pattern – tenses – voice – rewriting the sentences in impersonal/abbreviated passive grammatical structures - concord - sentence level verb noun agreement – gerund writing infinitive into gerund imperative rewriting imperative in to recommendation using should, word formation - varied grammatical function of the same word affixes – prefix and suffix, number prefix, negative prefix reported speech – editing strategies conditional structures - real, unreal, no possibility, zero condition. Writing formal definition abbreviation and acronym - idioms and phrases varieties of English – British versus American.

UNIT – II: Listening Skills

Comprehension practice - vocabulary development - familiarity to varied types of spoken English and accents - developing ability to understand audio and video media - aiming at overcoming barriers to listening - listening to documentaries, radio news broadcasts, TV news telecasts - active listening in discussions and to lectures - taking notes while listening - extracting information from listening.

UNIT – III: Speaking Skills

Oral practice - role play - interplay - seminar – trans coding visual into oral - participating in short and longer conversation - voice record, replay, correction of intonation, pronunciation and flow of speech - phonemes - vowels, consonants, stress, rhythm, intonation – group discussion – participative learning- acquiring proficiency, fluency, accuracy in oral communication - speaking practice - developing confidence - extempore speech – learning professional/conversational etiquette – Oral presentation skills.

UNIT – IV: Reading Skills

Vocabulary extension – improving vocabulary – intensive reading – reading strategies – identifying topic sentence – guessing meaning from content – picking out specific information, professional reading – reading practice – predicting the content, critical and analytical reading, reading articles in English newspapers, sports magazines, encyclopedias – reading aloud, use of stress and intonation – reading and comprehending technical materials – cloze reading.

UNIT – V: Writing Skills

Discourse cohesion - improving writing skills, avoiding common grammatical errors in academic writing - extending the hints - writing shorter sentences - punctuation - dialogue writing - paragraph writing, problems and solutions, achieving coherence, transition words, sequence words - essays of descriptive and argumentative - writing instructions, use of imperatives - jumbled sentences into sequential paragraph using linguistic clues - report writing - technical reports, industry visit reports, events reports - writing recommendations - letter writing - formal and informal letters, e-mail writing - job application and resume, permission for in-plant training, business correspondence letters, calling for quotation, placing order, lodging complaint, persuasive letters - assignment writing - mini-project – telephonic etiquette- transcoding - transferring of information from text to pictorial/graphical representation and vice versa.

TEXTBOOKS:

1. Practical English Usage. Michael Swan.OUP.1995.
2. Remedial English Grammar. F. T. Wood.Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book.2001

REFERENCEBOOKS:

1. Study Writing. Liz Hamp – Lyons and Ben Heasley. Cambridge University Press.2006.
2. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press.2011.
3. Exercises in Spoken English. Parts. I – III. CIEFL, Hyderabad. Oxford University Press.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2266PC02) MACHINE LEARNING**B.Tech. III Year II Sem****L T P C**
3 0 0 3**Course Objectives:**

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.

Course outcomes:

- Ideate various learning models (geometric, probabilistic, logic) and analyze key concepts like generalization, error, bias, and variance in learning processes.
- Apply linear and nonlinear classification techniques (e.g., logistic regression, perceptrons, and support vector machines) and assess model performance considering generalization and overfitting.
- Implement and evaluate distance-based models (e.g., k-means clustering, k-nearest neighbours, hierarchical clustering) and advanced techniques such as ensemble learning (e.g., bagging, boosting).
- Construct and analyze decision trees and rule-based models for classification, regression, and association rule mining, understanding their use in predictive and descriptive modeling.
- Develop algorithms for passive and active reinforcement learning (e.g., temporal-difference learning, policy search), and evaluate their application in real-world scenarios like game playing and robotics.
- Examine and apply the principles of model validation and regularization in various learning techniques to mitigate overfitting and enhance model reliability.

UNIT I**FOUNDATIONS OF LEARNING**

Components of learning – learning models – geometric models – probabilistic models – logic models
Grouping and grading – learning versus design – types of learning – supervised unsupervised
Reinforcement – theory of learning – feasibility of learning – error and noise – training versus testing
Theory of generalization – generalization bound – approximation generalization trade off – bias and
Variance – learning curve

UNIT II**INTRODUCTION TO TECHNOLOGY LANDSCAPE**

Linear classification – univariate linear regression – multivariate linear regression –regularized
regression – Logistic regression – perceptron's – multilayer neural networks –learning neural net-works
structures – support vector machines – soft margin SVM – going beyond linearity – generalization and
over fitting – regularization – validation.

UNIT III**DISTANCE-BASED MODELS**

Nearest neighbor models – K-means – clustering around methods – silhouettes – hierarchical clustering
– k-d trees – locality sensitive hashing – non-parametric
Regression – ensemble learning – bagging and random forests – boosting – Meta learning

UNIT IV**TREE AND RULE MODELS**

Decision trees – learning decision trees – ranking and probability estimation trees –regression tree–

Clustering trees – learning ordered rule lists – learning unordered rule lists–descriptive rule learning
– Association rule mining – first-order rule learning

UNIT V**REINFORCEMENT LEARNING**

Passive reinforcement learning – direct utility estimation – adaptive dynamic programming–
temporal\difference learning – active reinforcement learning – exploration – learning an action utility
Function – Generalization in reinforcement learning – policy search –applications in game playing
Applications in robot control.

TEXTBOOKS:

1. P. Flach, “Machine Learning: The art and science of algorithms that make sense of data”,
2. Cambridge University Press, 2012. (UNIT-I to IV)
3. M. Mohri, A. Rostamizadeh, and A. Talwalkar, “Foundations of Machine Learning”, MIT
4. Press, 2012. (UNITV)

REFERENCE BOOKS:

1. Y. S. Abu-Mostafa, M. Magdon-Ismail, and H-T. Lin, “Learning from Data”, AML Book-Publishers,
2012.
2. K. P. Murphy, “Machine Learning: A probabilistic perspective”, MIT Press, 2012.
3. M. Bishop, “Pattern Recognition and Machine Learning”, Springer, 2007.
4. T. M. Mitchell, “Machine Learning”, Mc Graw Hill, 1997.
5. S. Russel and P. Norvig, “Artificial Intelligence: A Modern Approach”, Third Edition,
Prentice Hall, 2009.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2212PC01) FULL STACK DEVELOPMENT**

B.Tech. III Year II Sem**L T P C
3 1 0 4****Course Objectives:**

- Understand the basics of full-stack development and the various technologies involved.
- Develop skills in Node.js, Mongo DB, Express, and Angular/React to build robust web applications.
- Design and implement a full-stack application using the MERN (Mongo DB, Express, React, Node.js) stack.
- Understand the importance of No SQL databases and their applications.
- Develop problem-solving skills using the full-stack development approach.

Course Outcomes:

- Understand the core components of full stack development, including web development frameworks, MVC architecture, and various stacks like MERN, and the roles of Express, Angular, Node, and MongoDB
- Demonstrate foundational skills in Node.js by setting up a Node environment, managing packages, and developing simple applications with event handling, timers, and HTTP services.
- Apply NoSQL concepts in MongoDB, including database management, access control, and user account creation, and connect MongoDB to Node.js for creating data-driven applications.
- Configure and implement Express routes and handle HTTP requests, while building interactive front-end components with Angular and TypeScript, using data binding and built-in directives.
- Build React applications with components and state management, utilizing the React Router for navigation, and integrate modularization using Webpack.
- Design and deploy a complete MERN stack application, incorporating server-side rendering, RESTful APIs, and a dynamic front-end for real-world full stack projects.

UNIT – I**BASICS OF FULL STACK**

Understanding the Basic Web Development Framework – User – Browser – Webserver – Backend Services – MVC Architecture – Understanding the different stacks –The role of Express– Angular– Node – Mongo DB – React

UNIT – II**NODE JS**

Basics of Node JS – Installation – Working with Node packages – Using Node package manager
Creating a simple Node.js application – Using Events – Listeners –Timers – Callbacks – Handling Data I/O – Implementing HTTP services in Node.js

UNIT – III**MONGO DB**

Understanding No SQL and Mongo DB – Building Mongo DB Environment – User accounts –Access Control – Administering databases – Managing collections – Connecting to MongoDBfromNode.js – Simple applications

UNIT –IV**EXPRESS AND ANGULAR**

Implementing Express in Node.js – Configuring routes – Using Request and Response objects –Angular – Typescript – Angular Components – Expressions – Data binding – Built-in directives

UNIT – V**REACT**

MERN STACK – Basic React applications – React Components – React State – Express REST APIs – Modularization and Web pack – Routing with React Router – Server-side rendering.

TEXTBOOKS:

1. Brad Dayley, Brendan Dayley, Caleb Dayley, ‘Node.js, Mongo DB and Angular Web Development’, Addison-Wesley, Second Edition, 2018
2. Vasan Subramanian, ‘Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node’, Second Edition, Apress, 2019.

REFERENCES:

1. Chris Northwood, ‘The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer’, Apress; 1st edition, 2018.
2. Kirupa Chinnathambi, ‘Learning React: A Hands-On Guide to Building Web Applications Using React and Redux’, Addison-Wesley Professional, 2nd edition, 2018.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2266PC62) MACHINE LEARNING LAB

B.Tech. III Year II Sem**L T P C**
0 0 3 1.5**Course Objective:**

- The objective of this lab is to get an overview of the various machine learning.
- This lab is to learn the machine learning techniques and can able to demonstrate those using python.

Course Outcomes:

1. Apply Bayes' theorem to calculate conditional probabilities, implementing probabilistic reasoning in Python to solve classification and decision-making tasks.
2. Extract and analyze structured data from databases using Python, preparing datasets for machine learning applications to enable effective data-driven insights.
3. Develop predictive models using k-nearest neighbors (KNN) and k-means clustering, and assess the classification of new data points based on proximity and clustering outcomes.
4. Evaluate the performance of different machine learning algorithms, including linear regression and Naïve Bayes, in predicting outcomes and classifying data, demonstrating an understanding of model accuracy and bias.
5. Design and implement a genetic algorithm, showcasing optimization techniques by exploring solutions to complex problems through simulated evolution and natural selection.
6. Construct and train a neural network for text classification using a back-propagation algorithm, effectively categorizing finite words and improving classification accuracy through iterative learning.

List of Experiments

1. The probability that it is Friday and that a student is absent is 3 %. Since there are 5 school days in a week, the probability that it is Friday is 20 %. What is the probability that a student is absent given that today is Friday? Apply Baye's rule in python to get the result. (Ans:15%)
2. Extract the data from database using python
3. Implement k-nearest neighbors classification using python

Given the following data, which specify classifications for nine combinations of VAR1 and VAR2 predict a classification for a case where VAR1=0.906 and VAR2=0.606, using the result of k-means clustering with 3 means (i.e., 3centroids)

VAR1	VAR2	CLASS
1.713	1.586	0
0.180	1.786	1
0.353	1.240	1
0.940	1.566	0
1.486	0.759	1
1.266	1.106	0
1.540	0.419	1
0.459	1.799	1
0.773	0.186	1

5. The following training examples map descriptions of individuals onto high, medium and low credit-worthiness. Medium skiing design single twenties no -> high Risk high golf trading married forties yes -> low Risk low speed way transport married thirties yes -> med Risk medium football banking single thirties yes -> low Risk highflying media married fifties yes -> high Risk low football security single twenties no -> med Risk medium golf media single thirties yes -> med Risk medium golf transport married forties yes -> low Risk high skiing banking single thirties yes -> high Risk low go l fun employed married forties yes -> high Risk Input attributes are (from left to right) income, recreation, job, status, age-group, home-owner. Find the unconditional probability of 'golf' and the conditional probability of 'single' given 'med Risk' in the dataset?
6. Implement linear regression using python.
7. Implement Naïve Bayes theorem to classify the English text
8. Implement an algorithm to demonstrate the significance of genetic algorithm
9. Implement the finite words classification system using Back-propagation algorithm

TEXTBOOKS:

1. Machine Learning – Tom M. Mitchell, MGH
2. Fundamentals of Speech Recognition by Lawrence Rabiner and Biing – Hwang Juang.

REFERENCE BOOK:

1. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis

**MALLAREDDYENGINEERINGCOLLEGEFORWOMEN
(2212PC61) FULL STACK DEVELOPMENT LAB**

B.Tech. III Year II Sem**L T P C
0 0 3 1.5****Course Objectives**

- To implement Forms, inputs and Services using AngularJS
 - To develop a simple web application using Nodejs; Angular JS and Express
 - To implement data models using MongoDB
- Course Outcomes: Develop a fully functioning website and deploy on a web server.

Course Outcomes

1. **Design and Implement** a fully functional AngularJS form with validation features to enhance user input reliability and interface interactivity.
2. **Analyze** and **Evaluate** the performance of AngularJS modules and controllers by creating and implementing them in various application scenarios.
3. **Assess** and **Resolve** error handling strategies in AngularJS applications to improve robustness and user experience in case of unexpected behaviors.
4. **Develop** and **Apply** custom directives in AngularJS to encapsulate reusable components, enhancing application modularity and maintainability.
5. **Create** a full-stack web application using Express, Node.js, and AngularJS, demonstrating the ability to integrate front-end and back-end technologies effectively.
6. **Implement** and **Demonstrate** CRUD operations on MongoDB, showcasing proficiency in database interactions within a web application context.

LIST OF EXPERIMENTS

1. Develop a Form and validate using AngularJS
2. Create and implement modules and controllers in AngularJS
3. Implement Error Handling in AngularJS
4. Create and implement Custom directives
5. Create a simple web application using Express, Node JS and Angular JS
6. Implement CRUD operations on MongoDB
7. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
8. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation using chart.js
9. Create a TODO application in react with necessary components and deploy it into git hub.
10. (A). Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman) (B). For the above application create authorized end points using JWT (JSON Web Token)

REFERENCES

1. Brad Dayley, Brendan Dayley, Caleb Dayley, 'Node.js, MongoDB and Angular Web
2. Development', Addison-Wesley, Second Edition, 2018
3. Vasan Subramanian, 'Pro MERN Stack, Full Stack Web App Development with Mongo,
4. Express, React, and Node', Second Edition, Apress, 2019.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200MC06) INDIAN TRADITION KNOWLEDGE**

B.Tech. III Year II Sem**L T P C
2 0 0 0****Course Objectives:**

- To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.

Course Outcomes:

1. **Evaluate and Compare:** Critically evaluate the differences and similarities between traditional knowledge and indigenous knowledge, as well as between traditional knowledge and Western/formal knowledge systems, and assess their implications for contemporary society.
2. **Analyze:** Analyze the historical impacts of social change on traditional knowledge systems, identifying key factors that have influenced their evolution and significance in modern contexts.
3. **Design and Propose:** Design a comprehensive protection strategy for traditional knowledge that considers its value in the global economy, integrating governmental and non-governmental roles in safeguarding these systems.
4. **Interpret and Apply:** Interpret various legal frameworks and policies, such as the Biological Diversity Act and the Protection of Traditional Knowledge Bill, and apply this knowledge to real-world scenarios involving the protection of traditional knowledge.
5. **Develop Strategies:** Develop effective strategies for increasing the protection of traditional knowledge through intellectual property rights and non-IPR mechanisms, and formulate recommendations for policy enhancements in the context of global legal forums.
6. **Synthesize:** Synthesize knowledge about traditional knowledge applications across sectors such as agriculture, medicine, and biotechnology to propose innovative solutions that leverage traditional practices for sustainable development and biodiversity management.

UNIT I: Introduction to traditional knowledge:

Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT II: Protection of traditional knowledge:

The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT III: Legal framework and TK:

A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001(PVPFR Act);

B: The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indicators act 2003.

UNIT IV: Traditional knowledge and intellectual property:

Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge,

Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT V: Traditional knowledge in different sectors:

Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Text Books:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.

Reference Books:

1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
2. "Knowledge Traditions and Practices of India" Kapil Kapoor¹, Michel Danino²

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC13) INFORMATION SECURITY**

B.Tech. IV Year I Sem

L T P C

3 0 0 3

Prerequisites

- A Course on “Computer Networks” and a course on Mathematics

Course Objectives

- To understand the fundamentals of Cryptography
- To understand various key distribution and management schemes
- To understand how to deploy encryption techniques to secure data in transit across data networks
- To apply algorithms used for secure transactions in real world applications

Course Outcomes

- Students will be able articulate key principles of the Indian Constitution.
- To learn their Rights and Responsibilities as an Indian citizen.
- Analyze the structure of government
- Develop research skills by exploring constitutional amendments and their implications on society.
- will be proficient in understand Emergency provisions
- To understand the structure and composition of Election Commission of India.

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.

Classical Encryption Techniques, DES, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operation, Blowfish, Placement of Encryption Function, Traffic Confidentiality, key Distribution, Random Number Generation.

UNIT - II

Public key Cryptography Principles, RSA algorithm, Key Management, Diffie Hellman Key Exchange, Elliptic Curve Cryptography.

Message authentication and Hash Functions, Authentication Requirements and Functions, Message Authentication, Hash Functions and MACs Hash and MAC Algorithms SHA-512, HMAC.

UNIT - III

Digital Signatures, Authentication Protocols, Digital signature Standard, Authentication Applications, Kerberos, X.509 Directory Authentication Service. Email Security: 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.

Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT – V

Intruders, Viruses and Worms Intruders, Viruses and related threats Firewalls: Firewall Design Principles, Trusted Systems, Intrusion Detection Systems.

Text Book:

- Cryptography and Network Security (principles and approaches) by William Stallings Pearson Education, 4th Edition.

Reference Books:

- Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
- Principles of Information Security, Whitman, Thomson.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2212PC02) DEVOPS**

B. Tech IV year I Sem**L T P C
3 0 0 3****Course Objectives:**

- The main objectives of this course are to:
- Describe the agile relationship between development and IT operations.
- Understand the skill sets and high-functioning teams involved in Devops and related methods to reach a continuous delivery capability.
- Implement automated system update and Devops lifecycle.

Course Outcomes:

On successful completion of this course, students will be able to:

- Identify components of Devops environment.
- Describe Software development models and architectures of Devops.
- Apply different project management, integration, and testing and code deployment tool.
- Investigate different Devops Software development models.
- Assess various Devops practices.
- Collaborate and adopt Devops in real-time projects.

UNIT - I

Introduction: Agile development model, Devops, and ITIL. Devops process and Continuous Delivery, Release management, Scrum, Kanban, delivery pipeline, bottlenecks, examples

UNIT - II

Software development models and Devops: Devops Lifecycle for Business Agility, Devops, and Continuous Testing. Devops influence on Architecture: Introducing software architecture, the monolithic scenario, Architecture rules of thumb, the separation of concerns, Handling database migrations, Micro services, and the data tier, Devops, architecture, and resilience.

UNIT - III

Introduction to project management: The need for source code control, The history of source code management, Roles and code, source code management system and migrations, Shared authentication, Hosted Git servers, Different Git server implementations, Docker intermission, Gerrit, The pull request model, Git Lab.

UNIT - IV

Integrating the system: Build systems, Jenkins build server, Managing build dependencies, Jenkins plugins, and file system layout, The host server, Build slaves, Software on the host, Triggers, Job chaining and build pipelines, Build servers and infrastructure as code, Building by dependency order, Build phases, Alternative build servers, Collating quality measures.

UNIT - V

Testing Tools and automation: Various types of testing, Automation of testing Pros and cons, Selenium

- Introduction, Selenium features, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development Deployment of the system: Deployment systems, Virtualization

stacks, code execution at the client, Puppet master and agents, Ansible, Deployment tools: Chef, Salt Stack and Docker

Text Books:

- Joakim Verona. Practical Devops, Second Edition. Ingram short title; 2nd edition (2018). ISBN10: 1788392574 2. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wiley publications. ISBN: 9788126579952

Reference Book:

- Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. Addison Wesley; ISBN-10.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200HS04) FUNDAMENTALS OF MANAGEMENT AND
ENTREPRENEURSHIP**

B.Tech. IV Year I Sem**L T P C****3 0 0 3****COURSE OBJECTIVES**

- To provide engineering and science students with an accelerated introduction to the basics of management.
- The course provides a framework that will enhance a person's effectiveness in the business world and make familiarize management language.
- To understand the management concepts and applications of concepts in practical aspects of business and development of managerial skills.
- To provide the student with a clear understanding of Entrepreneurship.
- To give hands on experience on how to generate ideas, evaluate business model.

COURSE OUTCOMES

1. Analyze different management theories and approaches (Classical, Behavioral, Systems, and Contingency) to evaluate their relevance and applicability in contemporary organizational contexts.
2. Design a comprehensive planning framework for an organization that incorporates various types of plans and decision-making processes, and implement organizational structures that optimize efficiency and effectiveness.
3. Assess various leadership styles and motivational theories (e.g., Needs Hierarchy, Two-Factor Theory) to apply appropriate strategies for enhancing team performance and driving organizational success.
4. Develop strategies for entrepreneurship by evaluating the characteristics and skills required for successful entrepreneurs, and formulate risk reduction and growth strategies suitable for small businesses in the Indian economy.
5. Create a detailed business plan utilizing the Lean Canvas model, addressing key components such as marketing strategies, financial projections, and human resource planning to ensure a viable venture startup.
6. Synthesize knowledge across management disciplines to construct a holistic view of entrepreneurship that incorporates creativity, opportunity discovery, and effective resource management for launching and sustaining a new business venture.

UNIT-I**INTRODUCTION TO MANAGEMENT**

Definition, Nature and Scope, Functions, Managerial Roles, Levels of Management, Managerial Skills; Evolution of Management Thought- Classical Approach- Scientific and Administrative Management; The Behavioral approach; The Systems Approach; Contingency Approach.

UNIT- II**PLANNING AND ORGANIZING**

Planning – Planning Process, Types of Plans, Decision making and Steps in Decision Making; Principles of Organization: Span of control, organizational Design & Organizational Structures; Departmentalization, Delegation; Centralization, Decentralization.

UNIT-III**LEADING, MOTIVATION AND CONTROLLING**

Leadership, Power and Authority, Leadership Styles; Behavioral Leadership, Situational Leadership, Leadership Skills. Motivation – Types; Motivational Theories – Needs Hierarchy Theory, Two Factor Theory, Theory X and Theory Y. Controlling– basic control process – control techniques.

UNIT-IV**NATURE OF ENTREPRENEURSHIP**

Characteristics and skills of an entrepreneur, Entrepreneur scenario in India and abroad. Types of entrepreneur, types of ownership, Small business in Indian economy. Risk Reduction strategies. Strategies for growth. Financial aspects: sources of rising capital, schemes of Department of Industries (DIC), KVIC, SIDBI, NABARD, NSIC, IFCI and IDBI.

UNIT-V**CREATING AND STARTING THE VENTURE**

Creativity and the business idea (Self-discovery, Opportunity discovery); Developing the business plan (Business model – Lean canvas by Alexander Osterwalder); Marketing plan (Customer & Solution- Value proposition, Marketing & Sales); Financial plan (Validation, money), Human Resource Plan (Team).

TEXT BOOKS

- Management Fundamentals, Robert N Lussier, 5e, Cengage Learning, 2013.
- Fundamentals of Management, Stephen P. Robbins, Pearson Education, 2009.
- Principles and Practice of Management, L. M. Prasad, Sultan Chand & Sons, 2012.
- Entrepreneurship- Robert D Hisrich, Michael P Peters, Dean A Shepherd, TMH.2009.

REFERENCES

- Essentials of Management, Koontz Kleihrich, Tata Mc – Graw Hill.
- Management Essentials, Andrew DuBrin, 9e, Cengage Learning, 2012.
- Entrepreneurship- Rajeev Roy, Oxford, 2011.
- Intellectual Property- Deborah E.Bouchoux, Cengage, 2012.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2212PC62) DEVOPS LAB**

B.Tech. IV Year I Sem**L T P C
0 0 3 1.5****Course Objectives:**

- Develop a sustainable infrastructure for applications and ensure high scalability.
- DevOps aims to shorten the software development lifecycle to provide continuous delivery with high-quality.

Course Outcomes:

1. **Design and Implement** a user registration form for an event, demonstrating the ability to integrate user input validation and secure data handling practices.
2. **Analyze and Evaluate** version control strategies by exploring Git and GitHub commands, assessing their impact on source code management and collaboration in software development.
3. **Synthesize and Apply** best practices in source code management through hands-on experimentation with GitHub, enabling effective tracking of changes in the user registration form project.
4. **Establish and Demonstrate** a continuous integration and development pipeline using Jenkins, illustrating the importance of automation in maintaining code quality and deployment efficiency.
5. **Develop and Deploy** a simple containerized application using Docker, showcasing proficiency in containerization technologies and their application in modern software development environments.
6. **Integrate and Automate** the management of containerized applications with Kubernetes, applying advanced orchestration techniques to ensure efficient scaling and reliability in deployment.

List of Experiments:

- Write code for a simple user registration form for an event.
- Explore Git and GitHub commands.
- Practice Source code management on GitHub. Experiment with the source code in exercise 1.
- Jenkins installation and setup, explore the environment.
- Demonstrate continuous integration and development using Jenkins.
- Explore Docker commands for content management.
- Develop a simple containerized application using Docker.
- Integrate Kubernetes and Docker
- Automate the process of running containerized application for exercise 7 using Kubernetes. 10.
- Install and Explore Selenium for automated testing.
- Write a simple program in JavaScript and perform testing using Selenium.
- Develop test cases for the above containerized application using selenium.

TEXT BOOKS:

- Joakim Verona., Practical DevOps, Packt Publishing, 2016.

REFERENCE BOOKS:

- Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wiley publications.
- Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. Addison Wesley.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PC68) INFORMATION SECURITY LAB**

B.Tech. IV Year I Sem**L T P C
0 0 3 1.5****Course Objective:**

The student should be made:

- To learn different cipher techniques
- To implement the algorithms DES, RSA, MD5, SHA-1
- To use network security tools and vulnerability assessment tools

Course Outcomes:

- Perform encryption and decryption using various substitution techniques (Caesar cipher, Playfair cipher, Hill cipher, and Vigenère cipher), demonstrating the ability to apply cryptographic methods in practical scenarios.
- Execute encryption and decryption using transposition techniques such as Rail Fence and Row & Column transformations, illustrating proficiency in manipulating data for secure communications.
- Analyze and apply the DES and AES algorithms in practical applications, evaluating their effectiveness and security features in protecting sensitive information.
- Implement the RSA algorithm using HTML and JavaScript, creating a functional web-based application that showcases public key cryptography principles.
- Implement the Diffie-Hellman Key Exchange algorithm for specific problem sets, assessing the security and efficiency of the key exchange process in establishing secure communications.
- Analyze the functionality of intrusion detection systems (e.g., Snort) and automated attack and penetration tools (e.g., N-Stalker), assessing their effectiveness in identifying vulnerabilities and protecting systems against threats.

LIST OF EXPERIMENTS:

- Perform encryption, decryption using the following substitution techniques
 - Caesar cipher
 - Playfair cipher
 - Hill Cipher
 - Vigenere cipher
- Perform encryption and decryption using following transposition techniques Rail fence - Row & Column Transformation
- Apply DES algorithm for practical applications.
- Apply AES algorithm for practical applications
- Implement RSA Algorithm using HTML and JavaScript
- Implement the Diffie-Hellman Key Exchange algorithm for a given problem.
- Calculate the message digest of a text using the SHA-1 algorithm
- Implement the SIGNATURE SCHEME - Digital Signature Standard.
- Demonstrate intrusion detection system (ids) using any tool eg. Snort or any other s/w.
- Automated Attack and Penetration Tools Exploring N-Stalker, a Vulnerability Assessment Tool.
- Defeating Malware - Building Trojans, Rootkit Hunter

Text Book:

- Cryptography and Network Security (principles and approaches) by William Stallings Pearson Education, 4th Edition.

Reference Books:

- Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
- Principles of Information Security, Whitman, Thomson.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2200MC07) GENDER SENSITIZATION****IV Year B.Tech I Sem****L T P C
2 0 0 0****Course Objectives:**

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Course Outcomes:

1. Analyze foundational gender concepts and terminology to evaluate how societal attitudes and early socialization practices contribute to gender roles, biases, and expectations.
2. Critically assess the implications of sex selection, declining sex ratios, and demographic consequences, exploring the complexities of gender beyond binary definitions to address discrimination in diverse cultural contexts.
3. Evaluate the division of labor and the invisibility of domestic work, demonstrating an understanding of how economic and political structures influence the valuation of labor across genders.
4. Examine types of gender-based violence from a human rights perspective, and propose actionable strategies to counter sexual harassment and domestic violence, enhancing awareness and advocacy.
5. Critique the representation of gender in film, media, and literature, identifying stereotypes and biases that perpetuate gender inequality and exploring ways to encourage gender-sensitive media content.
6. Apply frameworks for just relationships that promote equality, applying case studies from popular literature and notable figures to highlight real-world examples of gender-sensitive and respectful interaction

UNIT-I

Understanding gender

Gender: Why Should We Study It? (Towards a World of Equals: Unit-1) Socialization: Making Women, Making Men (Towards a World of Equals: Unit-2) Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT-II

Gender and biology

Missing Women: Sex Selection and Its Consequences (Towards a World of Equals: Unit -4) Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit -10) Two or Many? Struggles with Discrimination.

UNIT-III

Gender and labour

House work: the Invisible labor (Towards a World of Equals: Unit-3) "My Mother doesn't Work. "Share the Load. "Women's Work: It's Politics and Economics (Towards a World of Equals: Unit-7) Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

UNIT-IV

Issues of violence

Sexual Harassment: Say No! (Towards a World of Equals: Unit-6)

Sexual Harassment, not Eve-teasing – Coping with Everyday Harassment – Further Reading: “Chupulu”.

Domestic Violence: Speaking Out (Towards a World of Equals: Unit-8) Is Home a Safe Place? When Women Unite [Film].Rebuilding Lives. Additional Reading: New Forums for Justice. Thinking about Sexual Violence (Towards a World of Equals: Unit – 11) Blaming the Victim- “I Fought for my Life....”-Additional Reading: The Caste Face of Violence.

UNIT-V

Gender: co-existence

Just Relationships: Being Together as Equals (Towards a World of Equals: Unit -12) Mary Komand Onler.

Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks- The Brave Heart.

Textbook:

- All the five Units in the Textbook, “Towards a World of Equals: A Bilingual Textbook on Gender” written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by Telugu AkFademi, Hyderabad, Telangana State in the year 2015.
- Note: Since it is an Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

Reference Books:

- Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012 Abdulali Sohaila. “I Fought For My Life...and Won.” Available on line at:

<http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/>

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2267PE02) DISTRIBUTED SYSTEMS
PROFESSIONAL ELECTIVE – I

III Year B.Tech I Sem

L T P C

3 0 0 3

Prerequisites:

- A course on “Operating Systems”.
- A course on “Computer Organization & Architecture”.

Course Objectives:

- To provide an insight into Distributed systems.
- To introduce concepts related to Peer to Peer Systems, Transactions and Concurrency control, Security and Distributed shared memory.

Course Outcomes:

1. Analyze the key characteristics and architectural models of distributed systems to evaluate the challenges and opportunities in resource sharing and networked environments.
2. Apply knowledge of time synchronization methods and global state coordination to design solutions for distributed mutual exclusion, consensus, and multicast communication.
3. Evaluate interprocess communication protocols, including Internet Protocol APIs and UNIX IPC, to develop robust and efficient client-server and group communication models.
4. Design distributed objects and remote invocation mechanisms using frameworks such as Java RMI, demonstrating an understanding of event handling and data marshalling techniques.
5. Construct distributed file systems and name services with attention to architecture, consistency, and reliability, implementing case studies like the Sun Network File System and Global Name Service.
6. Analyze the concepts of transaction management and concurrency control in distributed environments, comparing methods such as locking, timestamp ordering, and distributed deadlock resolution to develop fault-tolerant and atomic distributed transactions

UNIT - I

Characterization of Distributed Systems: Examples of Distributed systems, Resource sharing and web, challenges.

System models: Architectural and Fundamental models, Networking and Internetworking, Inter – process Communication Distributed objects and Remote Invocation: Communication between distributed objects, RPC, Events and notifications, Case study – Java RMI.

UNIT - II

Operating System Support- OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture. Distributed File Systems-Introduction, File Service architecture.

UNIT - III

Peer to Peer Systems– Napster and its legacy, Peer to Peer middleware. Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and

logical clocks, global states, distributed debugging. Coordination and Agreement- Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT - IV

Transactions and Concurrency Control- Introduction, Transactions, Nested Transactions, Locks, and Optimistic concurrency control, Timestamp ordering. Distributed Transactions-Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks: Transaction recovery.

UNIT - V

Replication: Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data. Distributed shared memory: Design and Implementation issues, Consistency models.

TEXTBOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S. Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

REFERENCE BOOKS:

1. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.
2. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani and Mukesh Sing hal, Cambridge, rp 2010.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2262PE15) CYBER SECURITY ESSENTIALS
PROFESSIONAL ELECTIVE-1

B.Tech III YEAR I Sem**L T P C**
3 0 0 3**Course Objectives:**

- Understand the field of digital security and concepts of access control mechanism.
- To introduce keywords and jargons involved in securing browser.
- Understanding network basic and familiarize on security of network protocols.
- Awareness and understanding on cyber-attacks and data privacy.

Course Outcomes:

1. Analyze and evaluate the cyber security needs of an organization.
2. Understand Cyber Security Regulations and Roles of International Law.
3. Design and develop a security architecture for an organization.
4. Understand fundamental concepts of data privacy attacks.
5. Evaluate the effectiveness of different cybersecurity strategies and defenses in real-world scenarios.
6. Analyze potential threats and vulnerabilities within a system or network, identifying areas of weakness that may be exploited.

UNIT I:

Basics of digital security, protecting personal computers and devices, protecting devices from Virus and Malware, Identity, Authentication and Authorization, need for strong credentials, keeping credentials secure, protecting servers using physical and logical security.

UNIT II:

World Wide: Web (www), the Internet and the HTTP protocol, security of browser to web server interaction.

UNIT III:

Networking basics (home network and large-scale business networks), Networking protocols, Security of protocols, sample application hosted on-premises.

UNIT IV:

Introduction to cyber-attacks, application security (design, development and testing), operations security, monitoring, identifying threats and remediating them.

UNIT V:

Principles of data security - Confidentiality, Integrity and Availability, Data Privacy, Data breaches, preventing attacks and breaches with security controls, Compliance standards, Computer Ethics.

TEXTBOOKS:

Sammons, John, and Michael Cross. The basics of cyber safety: computer and mobile device safety made easy. Elsevier, 2016.

REFERENCES:

1. Charles P. P fleeger, Shari Lawrence, P fleeger Jonathan Margulies; Security in Computing, Pearson Education Inc . 5th Edition, 2015
2. Brooks, Charles J., Christopher Grow, Philip Craig, and Donald Short. Cyber security essentials. John Wiley & Sons, 2018

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PE01) SOFTWARE ENGINEERING
PROFESSIONAL ELECTIVE – I**

III Year B.Tech I Sem

L T P C

3 0 0 3

Course Objectives:

The students will be able.

- To comprehend the various software process models.
- To understand the types of software requirements and SRS document.
- To know the different software design and architectural styles.
- To learn the software testing approaches and metrics used in software development.
- To know about quality control and risk management.

Course Outcomes:

- Identify and apply the Framework activities for a Given Project.
- Illustrate a Process Model to apply for given Project requirements.
- Implement and Solve Various System Models for a Given Scenario.
- Analyze Various Testing techniques for a Given Project.
- Evaluate Various Risks in Project Development.
- Create Various Knowledge-based techniques and Skills in the development of Software Products.

UNIT - I:

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths. A Generic view of process: Software engineering- A layered technology, a process framework, Process patterns, and process assessment. Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process, Agility and Agile Process model, Extreme Programming, Other process models of Agile Development and Tools

UNIT - II:

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document. Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. System models: Context Models, Behavioral models, Data models, Object models, structured methods. UML Diagrams.

UNIT - III:

Design Engineering: Design process and Design quality, Design concepts, the design model. Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design. Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution. Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT - IV:

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging. Product

metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance. Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT - V:

Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan. Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, The Capability Maturity Model Integration (CMMI), Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:

1. Software engineering A practitioner's Approach, Roger S Pressman, 6th edition. McGraw Hill International Edition.
2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
4. Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.
5. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
6. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley & Sons Ltd.
7. Software Engineering3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
8. Introduction to Software Engineering, R. J. Leach, CRC Press. Course.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2266PE11) KNOWLEDGE ENGINEERING
PROFESSIONAL ELECTIVE – I

III Year B.Tech I Sem

L T P C
3 0 0 3

Course Objectives:

- To understand the basics of Knowledge Engineering.
- To discuss methodologies and modeling for Agent Design and Development.
- To design and develop ontologies.
- To apply reasoning with ontologies and rules.
- To understand learning and rule learning.

Course Outcomes:

- Evaluate various reasoning approaches under uncertainty, including abductive and probabilistic reasoning, and critique the effectiveness of intelligent agents and mixed-initiative reasoning in uncertain environments.
- Develop complex problem-solving frameworks using reusable ontologies, inquiry-driven analysis, and assumption-based reasoning, and assess their impact on evidence-based and believability assessments.
- Construct ontologies by defining concepts, generalization hierarchies, and object features, and apply modeling-based methodologies for ontology specification and domain concept elicitation.
- Analyze production system architectures for ontology-driven reasoning, including synthesis and reduction rules, and implement rule and ontology matching to support hypothesis generation with incomplete knowledge.
- Formulate solutions using machine learning techniques and design generalization and specialization rules for adaptive problem-solving in contexts involving rule learning and refinement.
- Integrate ontology-based reasoning with advanced rule learning, synthesize hypotheses through partial knowledge, and design systems capable of hypothesis testing and analysis in knowledge-driven applications.

UNIT I

REASONING UNDER UNCERTAINTY 6 Introduction – Abductive reasoning – Probabilistic reasoning: Enumerative Probabilities – Subjective Bayesian view – Belief Functions – Baconian Probability – Fuzzy Probability – Uncertainty methods - Evidence-based reasoning – Intelligent Agent – Mixed-Initiative Reasoning – Knowledge Engineering.

UNIT II

METHODOLOGY AND MODELING 6 Conventional Design and Development – Development tools and Reusable Ontologies – Agent Design and Development using Learning Technology – Problem Solving through Analysis and Synthesis – Inquiry-driven Analysis and Synthesis – Evidence-based Assessment – Believability Assessment – Drill-Down Analysis, Assumption-based Reasoning, and What-If Scenarios.

UNIT III

ONTOLOGIES – DESIGN AND DEVELOPMENT 6 Concepts and Instances – Generalization Hierarchies – Object Features – Defining Features – Representation – Transitivity – Inheritance – Concepts as Feature Values – Ontology Matching. Design and Development Methodologies – Steps in Ontology Development – Domain Understanding and Concept Elicitation – Modelling-based Ontology Specification.

UNIT IV

REASONING WITH ONTOLOGIES AND RULES 6 Production System Architecture – Complex Ontology-based Concepts – Reduction and Synthesis rules and the Inference Engine – Evidence-based hypothesis analysis – Rule and Ontology Matching – Partially Learned Knowledge – Reasoning with Partially Learned Knowledge

UNIT V

LEARNING AND RULE LEARNING 6 Machine Learning – Concepts – Generalization and Specialization Rules – Types – Formal definition of Generalization. Modelling, Learning and Problem Solving – Rule learning and Refinement – Overview – Rule Generation and Analysis – Hypothesis Learning.

TEXT BOOKS:

1. Gheorghe Tecuci, Dorin Marcu, Mihai Boicu, David A. Schum, Knowledge Engineering Building Cognitive Assistants for Evidence-based Reasoning, Cambridge University Press, First Edition, 2016. (Unit 1 – Chapter 1 / Unit 2 – Chapter 3,4 / Unit 3 – Chapter 5, 6 / Unit 4 - 7 , Unit 5 – Chapter 8, 9)

REFERENCE:

1. Ronald J. Brachman, Hector J. Levesque: Knowledge Representation and Reasoning, Morgan Kaufmann, 2004.
2. Ela Kumar, Knowledge Engineering, I K International Publisher House, 2018.
3. John F. Sowa: Knowledge Representation: Logical, Philosophical, and Computational Foundations, Brooks/Cole, Thomson Learning, 2000.
4. King , Knowledge Management and Organizational Learning , Springer, 2009.
5. Jay Liebowitz, Knowledge Management Learning from Knowledge Engineering, 1st Edition, 2001

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PE02) COMPUTER GRAPHICS
PROFESSIONAL ELECTIVE – 1

B.Tech. III Year I Sem

L T P C

3 0 0 3

Course Objectives:

The student should be made to:

- Understand the two dimensional and three-dimensional graphics and their transformations.
- Gain knowledge about graphics hardware devices and software used.
- Learn illumination and color models.
- Understand the three-dimensional graphics and their transformations.
- Learn clipping techniques.
- Understand Animation methodology

Course Outcomes:

- Recognize major applications and components of computer graphics, including display devices and input tools.
- Use algorithms to draw lines, circles, and ellipses, and apply various area-fill techniques for shape filling.
- Execute transformations such as translation, scaling, and rotation, and use clipping algorithms to display selected parts of objects within a view.
- Represent 3D shapes with polygons and curves, and apply transformations to create and modify 3D models.
- Apply surface detection techniques, including depth-buffer and back-face detection, to manage visible surfaces in a 3D scene.
- Create simple animations using key frame techniques and motion specifications for smooth transitions and effects.

UNIT I:

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, and raster-scan systems, random scan systems, graphics monitors and workstations and input devices.

Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms.

Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood- fill algorithms.

UNIT II:

2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix Representations and homogeneous coordinates, composite transforms, transformations between Coordinate systems. 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 III:

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces. Basic illumination models, polygon

Rendering methods. Composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and General projection transforms and clipping.

UNIT IV:

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth Sorting, BSP-tree methods, area sub-division and octree methods

Illumination and Color Model: Light sources – basic illumination models – halftone patterns and dithering techniques; Properties of light – Standard primaries and chromaticity diagram; Intuitive colour Concepts – RGB colour model – YIQ colour model – CMY colour model – HSV colour model – HLS colour model; Colour selection.

UNIT V:

Computer animation: Design of animation sequence, general computer animation functions, raster Animation, computer animation languages, key frame systems, motion specifications

TEXTBOOKS:

1. “Computer Graphics C version”, Donald Hearn and M. Pauline Baker, Pearson education.
2. “Computer Graphics Principles & practice”, second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.

REFERENCE BOOKS:

1. “Computer Graphics Second edition”, Zhigandxiang, Roy Plastock, Schaum’s outlines, Tata Mc Graw hill edition.
2. “Procedural elements for Computer Graphics”, David F Rogers, Tata Mc Graw hill, 2nd edition.
3. “Principles of Interactive Computer Graphics”, Neuman and Sproul, TMH.
4. “Principles of Computer Graphics”, Shalini, Govil-Pai, Springer

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2212PE01) MOBILE COMPUTING
PROFESSIONAL ELECTIVE – I

III Year B.Tech I Sem

L T P C
3 0 0 3

Course Objectives

- To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
- To understand the typical mobile networking infrastructure through a popular GSM protocol
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Net-work Layer & Transport Layer
- To understand the database issues in mobile environments & data delivery models.
- To understand the ad hoc networks and related concepts.
- To understand the platforms and protocols used in mobile environment.

Course Outcomes:

1. Analyze the fundamental principles of wireless communication, including signal propagation, modulation techniques, and medium access control, to assess the challenges and limitations of mobile computing environments.
2. Evaluate various telecommunication systems such as GSM, GPRS, UMTS, and satellite communication, comparing their architectures, protocols, and data services to determine their applicability in different scenarios.
3. Design wireless LAN and mobile network configurations by applying knowledge of IEEE 802.11 standards, Bluetooth, and mobile IP protocols to address connectivity needs in infrastructure and ad-hoc networks.
4. Develop optimized solutions for mobile transport layer protocols, such as TCP/IP, Mobile TCP, and Indirect TCP, to enhance reliability and data flow in mobile networks, considering specific protocol adaptations.
5. Examine database management techniques, including hoarding, caching, and client-server adaptation, to resolve issues related to transaction processing, data recovery, and quality of service in mobile environments.
6. Create mobile applications using platforms like Android, Symbian OS, and WAP 2.0 by integrating mobile file systems, web protocols, and platform-specific development tools, demonstrating proficiency in mobile application development.

UNIT I:**WIRELESS COMMUNICATION**

Introduction - Frequencies and Regulations - Signals - Antennas - Propagation Ranges and Effects – Multipath Propagation - Effects of Mobility - Multiplexing - Modulation and Shift Keying - Spread Spectrum - Frequency Hopping and Direct Sequence- Medium Access Control – Specialized MAC – SDMA-FDMA-TDMA-CDMA- Mobile Computing– Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices

UNIT II:**TELECOMMUNICATION SYSTEMS**

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT- - UMTS and IMT- 2000-Architecture, User Equipment, RNS, UTRAN, Node B, RNC functions - W- CDMA -HSPA+, HSUPA, HSDPA+ - Satellite systems History Applications Basics Routing Localization Hand over Examples

UNIT III:

Wireless LAN and Mobile Network Layer Wireless LAN -Infrared vs radio transmission Infrastructure and ad-hoc network 205- IEEE802.11-HIPER LAN-Bluetooth Mobile Network Layer Mobile IP-Dynamic host configuration protocol- Mobile ad-hoc networks.

UNIT IV:**Mobile Transport Layer & Database issues:**

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Data Base Issues: Database Hoarding & Caching Techniques, Client-Server Computing &Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT V: Mobile Application Development:

File Systems- World wide web- Wireless application protocol (version 1.x)- i-mode- - WAP 2.0- Mobile Platform- Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices, Android.

TEXT BOOKS:

1. Jochen Schiller, “Mobile Communications”, Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, “Mobile Computing”, Oxford University Press, 2007, ISBN: 0195686772.

REFERENCE BOOKS:

1. Stojmenovic and Cacute, “Handbook of Wireless Networks and Mobile Computing”, Wiley,2002, ISBN 0471419028.
2. Reza Behravanfar, “Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML”, ISBN: 0521817331, Cambridge University Press, Oct2004.

MALLAREDDYENGINEERINGCOLLEGE FORWOMEN
(2212PE04) DISTRIBUTED DATABASE
PROFESSIONAL ELECTIVE – II

III Year B. Tech II Sem

L T P C

3 0 0 3

Prerequisites:

1. A course on “Database Management Systems”

Course Objectives:

- The purpose of the course is to enrich the previous knowledge of database systems and expose the need for distributed database technology to confront the deficiencies of the centralized database systems.
- Introduce basic principles and implementation techniques of distributed database systems.
- Equip students with principles and knowledge of parallel and object-oriented databases.
- Topics include distributed DBMS architecture and design; query processing and optimization; distributed transaction management and reliability; parallel and object database management systems.

Course Outcomes:

1. Evaluate the key architectural models and design strategies for Distributed Database Management Systems (DDBMS), including fragmentation and allocation, to recommend optimal design solutions for distributed environments.
2. Analyze complex distributed query processing and decomposition techniques to optimize localization of distributed data and apply algorithms for efficient distributed query optimization.
3. Formulate strategies for distributed transaction management by applying advanced concurrency control algorithms and deadlock management techniques to ensure transaction integrity and serializability.
4. Assess the reliability and fault-tolerance mechanisms in DDBMS, including protocols for managing site failures and network partitioning, to enhance the resilience of distributed systems.
5. Develop parallel database system architectures with a focus on data placement, query processing, and load balancing to improve the performance and scalability of distributed data processing.
6. Design distributed object-oriented database solutions, applying object-oriented concepts such as inheritance, object identity, and persistence to compare and contrast the functionality of OODBMS and ORDBMS models.

UNIT – I

Introduction: Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem Areas. Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDMBS Architecture. Distributed Database Design: Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation.

UNIT - II

Query processing and decomposition: Query processing objectives, characterization of Query processors, layers of query processing, query decomposition, localization of distributed data.

Distributed query Optimization: Query optimization, centralized query optimization, distribute Query optimization algorithms.

UNIT - III

Transaction Management: Definition, properties of transaction, types of transactions, distributed Concurrency Control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency Control Algorithms, deadlock Management.

UNIT - IV

Distributed DBMS Reliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning. Parallel Database Systems: Parallel database system architectures, parallel data placement, parallel query processing, load balancing, database clusters.

UNIT - V

Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing. Object Oriented Data Model: Inheritance, object identity, persistent programming languages, and persistence of Objects, comparison OODBMS and ORDBMS

TEXTBOOKS:

1. M. Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2. Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill.

REFERENCE BOOK:

1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: "Database Systems: The Complete Book", Second Edition, Pearson International Edition

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2262PE09) SECURITY INCIDENT AND RESPONSE MANAGEMENT
PROFESSIONAL ELECTIVE – II**

III Year B.Tech II Sem

**L T P C
3 00 3**

Course Objectives:

- Introduce preparation of inevitable incident and incident detection and characterization.
- To get an exposure to live data collection, Forensic.
- To gain duplication knowledge on data analysis including Windows and Mac OS Systems.

Course Outcomes:

- Learn how to handle the incident response management.
- Perform live data collection and forensic duplication.
- Identify network evidence.
- Analyze data to carry out investigation.
- Apply incident response techniques to simulate real-world scenarios, such as phishing attack mitigation, malware analysis, and threat containment procedures.
- Design a comprehensive incident response plan that includes protocols for detection, containment, eradication, recovery, and post-incident analysis.

UNIT - I

Introduction: Preparing for the inevitable incident: Real world incident, IR management incident Handbook, Pre-incident preparation, Preparing the Organization for Incident Response, Preparing the IR team, preparing the Infrastructure for Incident Response. Incident Detection and Characterization: Getting the investigation started on the right foot, collecting initial facts, Maintenance of Case Notes, Understanding Investigative Priorities. Discovering the scope of incident: Examining initial data, Gathering and reviewing preliminary evidence, determining a course of action, Customer data loss Scenario, Automated clearing fraud scenario.

UNIT - II

Data Collection: Live Data Collection: When to perform live response, selecting a live response tool, What to collect, collection best practices, live data collection on Microsoft Windows Systems, Live Data Collection on Unix-Based Systems. Forensic Duplication: Forensic Image Formats, Traditional duplication, live system duplication, Duplication of Enterprise Assets.

UNIT - III

Network Evidence: The case for network monitoring, Types for network monitoring, Setting Up a Network Monitoring System, Network Data, Analysis, Collect Logs Generated from Network Events. Enterprise Services: Network Infrastructure Services, Enterprise Management Applications, Web Servers, Database Servers

UNIT - IV

Data Analysis: Analysis Methodology: Define Objectives, Know your data, Access your data,

analyses your data, Evaluate Results. Investigating Windows Systems: NTFS and File System Analysis, Prefetch, Event logs, Scheduled Tasks, The Windows Registry, Other Artifacts of Interactive Sessions, Memory Forensics, Alternative Persistence Mechanisms.

UNIT - V

Investigating Mac OS X Systems: HFS+ and File System Analysis, Core Operating systems data. Investigating Applications: What is Application Data?, Where is application data stored?, General Investigation methods, Web Browser, Email Clients, Instant Message Clients.

TEXTBOOKS:

1. “Incident Response and Computer Forensics”, Jason T. Luttgens, Mathew Pepe and Kevin Mandia, 3rd Edition, Tata McGraw-Hill Education.
2. “Cyber Security Incident Response-How to Contain, Eradicate, and Recover from Incidents”, Eric. C. Thompson, Apress.

REFERENCE BOOKS:

1. “The Computer Incident Response Planning Handbook: Executable Plans for Protecting Information at Risk”, N.K. McCarthy, Tata McGraw-Hill.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PE03) SOFTWARE TESTING METHODOLOGIES
(PROFESSIONAL ELECTIVE - II)**

III Year B.Tech. CSE II-Sem

**LT P C
3 0 0 3**

Prerequisites

A course on “Software Engineering”

Course Objectives:

- To provide knowledge of the concepts in software testing such as testing process, criteria, Strategies and methodologies.
- To develop skills in software test automation and management using latest tools.
- To comprehend the various software process models.
- To understand the types of software requirements and SRS documents.
- To know the different software designs and architectural styles.
- To learn the software testing approaches and metrics used in software development.
- To know about quality control and risk management

Course Outcomes:

- Evaluate different testing methodologies, including path testing, transaction flow testing, and dataflow testing, to categorize their strengths, weaknesses, and appropriate application contexts.
- Develop and implement effective test cases based on domain testing and dataflow testing strategies, ensuring thorough coverage of functional and structural requirements.
- Utilize logic-based testing techniques, such as decision tables and state graphs, to create robust test plans that ensure comprehensive testing of software specifications.
- Construct and analyze graph matrices for software systems, applying reduction algorithms and identifying relationships within state graphs to enhance testability.
- Demonstrate proficiency in using testing tools (e.g., JMeter or WinRunner) to perform load testing and analyze system performance under various conditions.
- Synthesize testing results into comprehensive reports that critique the effectiveness of testing strategies employed, highlighting areas for improvement and ensuring adherence to quality assurance standards.

UNIT - I

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT - II

Transaction Flow Testing: transaction flows, transaction flow testing techniques. Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing. Domain Testing: domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT - III

Paths, Path products and Regular expressions: path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection. Logic Based Testing: overview, decision tables, path expressions, kv charts, specifications.

UNIT - IV

State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips.

UNIT - V

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

Textbooks:

1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools, Dr. K. V. K. K. Prasad, Dreamtech.

Reference Books:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing Techniques, SPD (Oreille)
3. Software Testing in the Real World, Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing, Meyers, John Wiley

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2266PE12) ARTIFICIAL INTELLIGENCE
PROFESSIONAL ELECTIVE – II**

III Year B.Tech II Sem

**L T P C
3 0 0 3**

Prerequisites:

- A course on “Computer Programming and Data Structures”
- A course on “Advanced Data Structures”
- A course on “Design and Analysis of Algorithms”
- A course on “Mathematical Foundations of Computer Science”
- Some background in linear algebra, data structures and algorithms, and probability will all be helpful

Course Objectives:

- To learn the distinction between optimal reasoning Vs. human like reasoning
- To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
- To learn different knowledge representation techniques.
- To understand the applications of AI, namely game playing, theorem proving, and machine learning.

Course Outcomes:

- Students gain an advanced understanding of AI algorithms, architectures, and models, equipping them with the technical foundation necessary for building sophisticated AI systems.
- A significant emphasis is placed on AI ethics, promoting responsible design and decision-making that considers privacy, inclusivity, and sustainable development.
- By engaging in complex scenarios, students learn to apply AI to solve real-world challenges in fields like healthcare, finance, and environmental management.
- The course promotes adaptive learning, preparing students to innovate and respond to AI's evolving landscape and its role in modern society.
- Collaboration is a cornerstone, as students work in teams, leveraging collective knowledge to advance AI projects and applications.
- Graduates will learn to create AI systems that produce meaningful, real-world impacts, focusing on both digital and tangible contributions that benefit communities.

UNIT - I

Problem Solving by Search-I: Introduction to AI, Intelligent Agents Problem Solving by Search –II: Problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform cost search, Depth-first search, Iterative deepening Depth-first search, Bidirectional search, Informed (Heuristic) Search Strategies: Greedy best-first search, A* search,

UNIT - II

Problem Solving by Search-II and Propositional Logic Adversarial Search: Games, Optimal Decisions in Games, Alpha–Beta Pruning, Imperfect Real-Time Decisions.

Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, the Structure of Problems.

Propositional Logic: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, **Propositional Theorem Proving:** Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and backward chaining, Effective Propositional Model Checking, Agents Based on Propositional Logic.

UNIT - III

Logic and Knowledge Representation First-Order Logic: Representation, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.

Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

Knowledge Representation: Ontological Engineering, Categories and Objects, Events. Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.

UNIT - IV

Planning Classical Planning: Definition of Classical Planning, Algorithms for Planning with State-Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.

Planning and Acting in the Real World: Time, Schedules, and Resources, Hierarchical Planning, Planning and Acting in Nondeterministic Domains, Multi agent planning.

UNIT - V

Uncertain knowledge and Learning Uncertainty: Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use, Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference in Bayesian Networks, Relational and First-Order Probability, Other Approaches to Uncertain Reasoning; Dempster-Shafer theory.

Learning: Forms of Learning, Supervised Learning, Learning Decision Trees.

Knowledge in Learning: Logical Formulation of Learning, Knowledge in Learning, Explanation-Based Learning, Learning Using Relevance Information, Inductive Logic Programming.

TEXTBOOK:

1. Artificial Intelligence A Modern Approach, Third Edition, Stuart Russell and Peter Norvig, Pearson Education.

.REFERENCE BOOKS:

1. Artificial Intelligence, 3rd Edn, E. Rich and K.Knight (TMH)
2. Artificial Intelligence, 3rd Edn., Patrick Henry Winston, Pearson Education.
3. Artificial Intelligence, Shivani Goel, Pearson Education.
4. Artificial Intelligence and Expert systems – Patterson, Pearson Education

**MALLAREDDY ENGINEERING COLLEGE FOR WOMEN
(2266PE07) COMPUTER VISION
PROFESSIONAL ELECTIVE – II**

III Year B.Tech II Sem

**L T P C
3 0 0 3**

Course Objectives:

- Understand computer vision concepts ,Apply computer vision techniques for image processing tasks
- Develop new algorithms to solve computer vision problems
- Understand the ethical implications of large datasets

Course Outcomes:

- Demonstrate on the concepts underlying computer vision, its history, and applications, and describe basic graphic techniques such as image filtering and rendering
- Explore image recognition and filtering techniques such as edge, corner, and blob detection, and compare them with annotations such as SIFT, SURF, and ORB.
- Make use of feature recognition and classification techniques using algorithms such as template matching, SVM, Random Forest, and CNNs to classify and recognize features in images
- Review techniques for visual sensitivity, image segmentation, and object segmentation techniques to distinguish objects in complex images, such as through depth estimation and clustering
- Design and implement deep learning models for computer vision tasks by utilizing CNNs and transfer learning to solve specific problems in classification, detection, and segmentation.
- Assess the role of advanced computer vision and deep learning techniques, exploring current architectures and evaluating their effectiveness in various real-world applications.

UNIT I:

Introduction to Computer Vision

-Definition and scope of computer vision, History and evolution of computer vision, Applications and importance of computer vision, Overview of computer vision pipeline ,Image representation (pixels, bit depth, etc.), Image filtering (blur, threshold, etc.)

UNIT II

Image Features and Descriptors, Edge detection (Canny, Sobel, etc.), Corner detection (Harris, Shi-Tomasi, etc.), Blob detection (SIFT, SURF, etc.), Descriptor extraction (SIFT, SURF, ORB, etc.), Feature matching and tracking, Image feature extraction techniques

UNIT III

Object Recognition and Classification, Introduction to machine learning in computer vision, Object recognition techniques (template matching, feature matching, etc.), Classification

algorithms (SVM, Random Forest, CNN, etc.), Object detection techniques (R-CNN, YOLO, SSD, etc.), Image classification techniques

UNIT IV

Scene Understanding and Segmentation, Scene understanding techniques (depth estimation, optical flow, etc.), Image segmentation techniques (trees holding, clustering, etc.), Object segmentation techniques, Scene parsing and understanding, Image restoration and enhancement

UNIT V

Deep Learning in Computer Vision, Introduction to deep learning (CNN, RNN, etc.), Applications of deep learning in computer vision (image classification, object detection, segmentation, etc.), Convolutional Neural Networks (CNNs) for computer vision, Transfer learning and fine-tuning, Deep learning architectures for computer vision tasks

Reference books:

- Computer Vision: Algorithms and Applications by Richard Szeliski
- Computer Vision: Models, Learning, and Inference by Simon Prince
- Computer Vision: A Modern Approach by David Forsyth and Jean Ponce
- Introductory Techniques for 3-D Computer Vision by Emanuele Trucco and Alessandro Verri
- Multiple View Geometry in Computer Vision by Richard Hartley and Andrew Zisserman
- Practical Deep Learning for Cloud, Mobile & Edge by Siddha Ganju, Meher Kasam, and Anirudh Koul
- Concise Computer Vision: An Introduction to Theory and Algorithms by unknown author
- Computer Vision: Principles, Algorithms, Applications, Learning by unknown author
- Deep Learning for Vision Systems by unknown author
- Modern Computer Vision with Pytorch by unknown author

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2212PE03) INFORMATION RETRIEVAL SYSTEMS
PROFESSIONAL ELECTIVE – II**

III Year B.Tech II Sem

**L T P C
3 0 0 3**

Course Objectives:

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

Course Outcomes:

- Understand the major features of information retrieval systems, the general purpose of the systems, databases and digital libraries.
- Apply cataloging and indexing including stemming and incorporating different types of data structures to retrieve information.
- Evaluate automatic indexing and clustering methods to improve retrieval and organization of documents.
- Implement appropriate user search strategies and deploy measures of similarity, relevance feedback and information visualization in order to improve the effectiveness of searching.
- Review and contrast different text search algorithms for searching large datasets efficiently.
- Design audio, graph, image and video retrieval systems and solve the particular problems of multimedia data.

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

Data Warehouses Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities, Miscellaneous Capabilities

UNIT - II

Cataloging and Indexing: History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction.

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 - III

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 – IV

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 – V

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

TEXTBOOK:

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

REFERENCE BOOKS:

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.

**MALLAREDDYENGINEERINGCOLLEGEFORWOMEN
(2267PE17) DISTRIBUTED COMPUTING
PROFESSIONAL ELECTIVE – III**

III Year B.Tech II Sem

**L T P C
3 0 0 3**

Course Objectives:

- To introduce the computation and communication models of distributed systems
- To illustrate the issues of synchronization and collection of information in distributed systems
- To describe distributed mutual exclusion and distributed deadlock detection techniques
- To elucidate agreement protocols and fault tolerance mechanisms in distributed systems
- To explain the cloud computing models and the underlying concepts

Course Outcomes:

- Evaluate distributed system architectures, focusing on message-passing, shared memory systems, and design challenges
- Apply logical time and synchronization to establish message ordering and maintain global states.
- Design and implement mutual exclusion and deadlock detection algorithms for resource coordination.
- Develop consensus and agreement algorithms to enhance fault tolerance in distributed systems.
- Implement checkpointing and rollback recovery for resilient, consistent distributed applications.
- Assess cloud computing models, virtualization, and scalability to design efficient cloud solutions.

UNIT I:

Introduction: Definition-Relation to Computer System Components – Motivation – Message - Passing Systems versus Shared Memory Systems – Primitives for Distributed Communication – Synchronous versus Asynchronous Executions – Design Issues and Challenges; A Model of Distributed Computations: A Distributed Program – A Model of Distributed Executions – Models of Communication Networks – Global State of a Distributed System.

UNIT II:

Logical Time: Physical Clock Synchronization: NTP – A Framework for a System of Logical Clocks

Scalar Time – Vector Time; Message Ordering and Group Communication: Message Ordering Paradigms – Asynchronous Execution with Synchronous Communication – Synchronous Program Order on Asynchronous System – Group Communication – Causal Order – Total Order; Global State and Snapshot Recording Algorithms: Introduction – System Model and Definitions – Snapshot Algorithms for FIFO Channels

UNIT III:

Distributed Mutual exclusion Algorithms: Introduction – Preliminaries – Lamport’s algorithm – Ricart Agrawala’s Algorithm — Token-Based Algorithms – Suzuki- Kasami’s Broadcast Algorithm; Deadlock Detection in Distributed Systems: Introduction – System Model – Preliminaries – Models of Deadlocks – Chandy- Misra -Haas Algorithm for the AND model and OR Model.

UNIT IV:

Consensus and Agreement Algorithms: Problem Definition – Overview of Results – Agreement in a Failure-Free System (Synchronous and Asynchronous) – Agreement in Synchronous Systems with Failures; Check pointing and Rollback Recovery: Introduction – Background and Definitions – Issues in Failure Recovery – Checkpoint-based Recovery – Coordinated Check pointing Algorithm for Asynchronous Check pointing and Recovery

UNIT V:

CLOUD COMPUTING Definition of Cloud Computing – Characteristics of Cloud – Cloud Deployment Models – Cloud Service Models – Driving Factors and Challenges of Cloud – Virtualization – Load Balancing – Scalability and Elasticity – Replication – Monitoring – Cloud Services and Platforms: Compute Services – Storage Services – Application Services.

TEXTBOOKS:

1. "Distributed Systems: Concepts and Design" by George C. Fenny
2. "Distributed Systems: Principles and Paradigms" by Andrew S. Tanenbaum and Maarten van Steen
3. "Distributed Computing: Principles, Algorithms, and Systems" by Ajay D. Kshem kalyani and Mukesh Singhal

REFERENCE BOOKS:

1. "Distributed Systems" by S. K. Sharma
2. "Distributed Computing" by S. K. Singh
3. "Cloud Computing: Principles, Systems and Applications" by P. Krishna et al.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2262PE13) SOCIAL MEDIA SECURITY
PROFESSIONAL ELECTIVE – III**

III Year B.Tech II Sem

**L T P C
3 0 0 3**

Course Outcomes:

- Analyze the various security concerns associated with different social media platforms, evaluating the types of threats and attacks that users and organizations may encounter in these digital environments.
- Assess the effectiveness of security features across popular social media platforms, synthesizing information about privacy settings, authentication methods, and data protection policies to recommend best practices for secure usage.
- Investigate specific threats and attacks commonly faced on social media, including phishing, identity theft, and cyberbullying, and develop strategies for prevention and response to these malicious activities.
- Formulate comprehensive security measures and best practices for social media account management, including password management, two-factor authentication, and safe browsing habits, to enhance overall user security.
- Evaluate advanced social media security topics, including forensics, monitoring, and threat detection, and create a framework for ethical hacking and penetration testing tailored to social media environments.
- Design an integrated security strategy for an organization's social media presence, incorporating risk assessment, incident response planning, and employee training to mitigate risks and enhance the security posture against evolving threats.

Course Objectives:

- Understand the fundamentals of social media security and privacy
- Identify and explain types of social media threats and attacks
- Analyse and evaluate social media security features and policies
- Develop and implement secure social media practices
- Investigate and analyse social media security incidents
- Understand legal and ethical implications of social media security

UNIT 1: Introduction to Social Media Security, Overview of social media platforms and their security concerns, Types of threats and attacks on social media, Importance of social media security, Basic security measures for social media accounts

UNIT 2: Social Media Platforms and Their Security Features, Security features of popular social media platforms (Facebook, Twitter, Instagram, etc.), Privacy settings and data protection policies, Authentication and authorization mechanisms, Vulnerabilities and limitations of social media platforms

UNIT 3: Threats and Attacks on Social Media, Types of attacks (phishing, spear phishing, malware, etc.), Social engineering tactics, Identity theft and online harassment, Cyberbullying and online hate speech

UNIT 4: Security Measures and Best Practices, Password management and two-factor authentication, Encryption and secure communication, Safe browsing habits and avoiding online scams, Regular updates and patch management

UNIT 5: Advanced Social Media Security Topics, Social media forensics and investigation, Social media monitoring and analytics, Advanced threat detection and mitigation, Ethical hacking and penetration testing for social media

Reference books:

1. "Social Media Security: Leveraging Social Networking While Mitigating Risk" by Michael Cross
2. "Social Media: A Reference Handbook: A Reference Handbook" by Kelli S. Burns
3. "The Routledge Handbook of Privacy and Social Media" by Sabine Trepte and Philipp Masur
4. "Social Media and Security" by Springer Link
5. "Data Privacy, Social Media, Surveillance: 13 Best Books for You" by George Orwell

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PE05) SOFTWARE ARCHITECTURE AND DESIGN PATTERNS
PROFESSIONAL ELECTIVE – III**

III Year B.Tech II Sem

**L T P C
3 0 0 3**

Course Objectives:

- To understand the concept of patterns and the Catalog.
- To discuss the Presentation tier design patterns and their effect on: sessions, client access, validation and consistency.
- To understand the variety of implemented bad practices related to the Business and Integration tiers.
- To highlight the evolution of patterns.

Course Outcomes:

- Outline core concepts of software architecture, including architectural patterns, reference models, structures, and views.
- Design software architectures with a focus on quality attributes, and create comprehensive documentation for future reference and reconstruction.
- Apply evaluation techniques like ATAM and CBAM to make informed architectural design decisions.
- Describe the role of software product lines and off-the-shelf components in building flexible, scalable systems.
- Apply design patterns, such as abstract factory, singleton, and observer, to effectively address software design problems.
- Analyze case studies, such as Air Traffic Control and the World Wide Web, to understand architectural solutions for interoperability, availability, and product line development.

UNIT - I

Envisioning Architecture The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views. Creating an Architecture Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT - II

Analyzing Architectures Architecture Evaluation, Architecture design decision making, ATAM, CBAM.

UNIT - III

Moving from one system to many Software Product Lines, Building systems from off the shelf components, Software architecture in future.

UNIT - IV

Patterns Pattern Description, organizing catalogs, role in solving design problems, Selection and usage. Creational and Structural patterns Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, flyweight, Proxy.

UNIT - V

Behavioral patterns Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy, template method, visitor. Case Studies A-7E – A case study in utilizing architectural structures, The World Wide Web - a case study in interoperability, Air Traffic Control – a case study in designing for high availability, Celsius Tech – a case study in product line development

TEXTBOOKS:

1. Software Architecture in Practice, second edition, Len Bass, Pau Clements & Rick Kazman, Pearson Education, 2003.
2. Design Patterns, Erich Gamma, Pearson Education, 1995.

REFERENCE BOOKS:

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. Software Design, David Budgen, second edition, Pearson education, 2003
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.
5. Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education, 2006
6. J2EE Patterns, Deepak Alur, John Crupi & Dan Malks, Pearson education, 2003.
7. Design Patterns in C#, Steven John metsker, Pearson education, 2004.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2266PE03) COGNITIVE COMPUTING
PROFESSIONAL ELECTIVE – III**

III Year B.Tech II Sem

**L T P C
3 0 0 3**

Prerequisites: Probability theory

Course Objectives:

- To provide an understanding of the central challenges in realizing aspects of human cognition.
- To provide a basic exposition to the goals and methods of human cognition.
- To develop algorithms that use AI and machine learning along with human interaction and feedback to help humans make choices/decisions.
- To support human reasoning by evaluating data in context and presenting relevant findings along with the evidence that justifies the answers.

Course Outcomes:

- Understand and discuss what cognitive computing is, and how it differs from traditional Approaches
- Analyze the business implications of cognitive computing
- Apply natural language technologies to business problems
- Develop applications for Watson.
- Analyze the case studies of cognitive computing
- Apply AI in Real-World Cognitive Systems.

UNIT - I

Introduction to Cognitive Science: Understanding Cognition, IBM's Watson, Design for Human Cognition, Augmented Intelligence and Cognition Modeling Paradigms: Declarative/ logic-based computational cognitive modeling, connectionist models of cognition, Bayesian models of cognition, a dynamical systems approach to cognition

UNIT - II

Cognitive Models of memory and language, computational models of episodic and semantic memory, modeling psycholinguistics

UNIT - III

Cognitive Modeling: modeling the interaction of language, memory and learning, modeling select aspects of cognition classical models of rationality, symbolic reasoning and decision making

UNIT - IV

Formal models of inductive generalization, causality, categorization and similarity, the role of analogy in problem solving, Cognitive Development Child concept acquisition. Cognition and

Artificial cognitive architectures such as ACT-R, SOAR, Open Cog, Copy Cat, Memory Networks

UNIT – V

Deep Q A Architecture, Unstructured Information Management Architecture (UIMA), Structured Knowledge, Business Implications, Building Cognitive Applications, Application of Cognitive Computing and Systems

TEXTBOOKS:

1. The Cambridge Handbook of Computational Psychology by Ron Sun (ed.), Cambridge University Press.
2. Formal Approaches in Categorization by Emmanuel M. Pathos, Andy J. Wills, Cambridge University Press.

REFERENCE BOOKS:

1. Judith S. Hurwitz, Marcia Kaufman, Adrian Bowles Cognitive Computing and Big Data Analytics, Wiley

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PE11) IMAGE PROCESSING
PROFESSIONAL ELECTIVE – III**

III Year B.Tech II Sem

**L T P C
3 0 0 3**

Prerequisites:

- Students are expected to have knowledge in linear signals and systems, Fourier Transform, basic linear algebra, basic probability theory and basic programming techniques; knowledge of Digital Signal Processing is desirable.
- A course on “Computational Mathematics”.
- A course on “Computer Oriented Statistical Methods”.

Course Objectives:

- Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts.
- The topics include image acquisition; sampling and quantization; preprocessing; enhancement; restoration; segmentation; and compression.

Course Outcomes:

- Examine the principles of digital image formation, including the role of scanners and digital cameras, and evaluate concepts such as gray levels, sampling, and quantization to understand their impact on image quality.
- Implement various image enhancement techniques in both the spatial and frequency domains, utilizing point processing, histogram processing, and spatial filtering to improve the visual quality of images.
- Design and apply restoration algorithms based on degradation models, including inverse filtering and constrained least squares restoration, to recover degraded images and analyze their effectiveness.
- Execute image segmentation techniques to detect discontinuities and perform edge linking and thresholding, assessing the accuracy and effectiveness of region-oriented segmentation methods.
- Analyze different image compression methods, including error-free and lossy compression, by evaluating redundancies and fidelity criteria, and compare their performance based on efficiency and image quality.
- Integrate knowledge from various image processing techniques to design and implement comprehensive solutions for real-world imaging problems, demonstrating an understanding of the trade-offs between enhancement, restoration, segmentation, and compression.

UNIT - I

Digital Image Fundamentals: Digital Image through Scanner, Digital Camera. Concept of Gray Levels. Gray Level to Binary Image Conversion. Sampling and Quantization. Relationship between Pixels. Imaging Geometry. 2D Transformations-DFT, DCT, KLT and SVD.

UNIT - II

Image Enhancement in Spatial Domain Point Processing, Histogram Processing, Spatial Filtering, Enhancement in Frequency Domain, Image Smoothing, Image Sharpening.

UNIT - III

Image Restoration Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT - IV

Image Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region Oriented Segmentation.

UNIT - V

Image Compression Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Source Encoder and Decoder, Error Free Compression, Lossy Compression.

TEXTBOOK:

1. Digital Image Processing: R.C. Gonzalez & R. E. Woods, Addison Wesley/ Pearson Education, 2nd Ed, 2004.

REFERENCE BOOKS:

1. Fundamentals of Digital Image Processing: A. K. Jain, PHI.
2. Digital Image Processing using MATLAB: Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins: Pearson Education India, 2004.
3. Digital Image Processing: William K. Pratt, John Wiley, 3rd Edition, 2004.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PE06) CLOUD COMPUTING
PROFESSIONAL ELECTIVE – III**

III Year B.Tech II Sem

**L T P C
3 0 0 3**

Course Objectives:

- This course provides an insight into cloud computing.
- Topics covered include- distributed system models, different cloud service models, service
- Oriented architectures, cloud programming and software environments, resource management.
- This course provides an insight into cloud computing.
- Topics covered include- distributed system models, different cloud service models, service-oriented architectures, cloud programming and software environments, resource management.

Course Outcomes:

- Demonstrates knowledge of various computing paradigms, including cloud, distributed, and emerging technologies like bio and quantum computing.
- Understands cloud computing fundamentals, including motivation, principles, and key deployment models in modern technology.
- Analyzes cloud architecture, covering infrastructure, application management, and migration processes to develop cloud solutions.
- Analyzes IaaS, PaaS, and SaaS cloud service models, noting their features, applications, and limitations for effective use.
- Compares major cloud providers and their tools, understanding key service offerings in the cloud computing ecosystem.
- Compares major cloud providers and their tools, understanding key service offerings in the cloud computing ecosystem.

UNIT -I

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio Computing, Mobile Computing, Quantum Computing, Optical Computing, Nano Computing.

UNIT-II

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models

UNIT-III

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT-IV

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service.

Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

UNIT - V

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue Service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Salesforce, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjrasoft, Aneka Platform

Textbooks:

1. Essentials of cloud Computing: K. Chandrasekhar, CRC Press, 2014

REFERENCE BOOKS:

1. Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffrey C. Fox, Jack J. Donga Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumara swamy, Shahed Latif, O'Reilly, SPD, 2011.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2267PE10) DATA SCIENCE WITH R PROGRAMMING
PROFESSIONAL ELECTIVE –IV**

IV Year B.Tech I Sem

**L T P C
3 0 0 3**

Course Objectives:

- Data Science is a fast-growing interdisciplinary field, focusing on the analysis of data to extract knowledge and insight.
- This course will introduce students to the collection.
- Preparation, analysis, modelling and visualization of data, covering both conceptual and ds practical issues.
- Examples and case studies from diverse fields will be presented, and hands- on use of statistical and data manipulation software will be included.

Course Outcomes:

- Critically assess the stages within the data science process, evaluate their interdependencies, and formulate strategies for effective problem-solving within each stage.
- Design and configure a suitable software environment for Python and R, implement advanced techniques for data manipulation, and evaluate the effectiveness of these configurations for different types of data.
- Apply advanced data manipulation and visualization techniques using tools like Pandas and Matplotlib, synthesize insights from visual representations, and justify choices of specific tools and techniques for given data scenarios.
- Construct data science applications by integrating multiple data science techniques, analyze their performance, and refine the application to improve effectiveness and accuracy.
- Examine and critique a variety of data science projects, identify common challenges and practices, and propose improvements based on analysis and evaluation of project outcomes.
- Evaluate and select appropriate R-modeling methods, such as linear and logistic regression, justify the choice based on data characteristics, and develop a strategy for model evaluation and refinement

UNIT I:

Defining Data Science and Big data, Benefits and Uses, facets of Data, Data Science Process. History and Overview of R, Getting Started with R, R Nuts and Bolts

UNIT II:

The Data Science Process: Overview of the Data Science Process-Setting the research goal, Retrieving Data, Data Preparation, Exploration, Modeling, data Presentation and Automation. Getting Data in and out of R, Using reader package, Interfaces to the outside world.

UNIT III:

Machine Learning: Understanding why data scientists use machine learning-What is machine learning and why we should care about, Applications of machine learning in data science, where it is used in data science, The modeling process, Types of Machine Learning-Supervised and Unsupervised.

UNIT IV:

Handling large Data on a Single Computer: The problems we face when handling large data, General Techniques for handling large volumes of data, Generating programming tips for dealing with large datasets.

UNIT V:

Subsetting R objects, Vectorised Operations, Managing Data Frames with the dplyr, Control structures, functions, Scoping rules of R, Coding Standards in R, Loop Functions, Debugging, Simulation. Case studies on preliminary data analysis.

TEXTBOOKS:

1. DavyCielen, Arno.D.B.Maysman, Mohamed Ali, “Introducing Data Science” Manning Publications, 2016.
2. Roger D. Peng, “R Programming for DataScience” Lean Publishing, 2015.

REFERENCE BOOKS:

1. Nina Zumel, John Mount, “Practical Data Science with R”, Manning Publications, 2014.
2. Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, AbhijitDasgupta, “PracticalData Science Cookbook”, Packt Publishing Ltd., 2014.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2262PE23) DATA PRIVACY AND SECURITY
PROFESSIONAL ELECTIVE –IV**

IV Year B.Tech I Sem

**L T P C
3 0 0 3**

Prerequisites:

- Basic understanding of computer systems and networks
- Familiarity with programming concepts and data structures
- Completion of introductory courses in computer science and engineering
- Basic knowledge of cryptography and security principles

Course Objectives:

- To introduce students to the concepts and principles of data privacy and security
- To develop skills in designing and implementing secure data systems, and analyze and evaluate data privacy and security threats and vulnerabilities.
- To apply data privacy and security principles to real-world scenarios
- To prepare students for careers in data privacy and security, cyber security, and related fields
- To provide a foundation for further study in advanced data privacy and security topics
- To foster critical thinking, problem-solving, and ethical awareness in data privacy and security

Course Outcomes:

- **Evaluate and Interpret:** Evaluate the implications of data privacy laws and regulations (such as GDPR and HIPAA) on organizational practices and interpret the ethical considerations surrounding data privacy in computing and society.
- **Analyze and Classify:** Analyze various types of data privacy threats and vulnerabilities, classifying them based on their potential impact on organizations and individuals, while examining real-world cases of data breaches.
- **Design and Implement:** Design and implement robust data protection mechanisms, including access control and authentication techniques, encryption methods, and secure data transmission protocols, to mitigate identified threats.
- **Assess and Develop:** Assess the challenges of maintaining data privacy in emerging technologies (such as cloud computing, AI, and IoT) and develop strategies to address these challenges while ensuring compliance with relevant privacy standards.
- **Create and Propose:** Create comprehensive data privacy and security frameworks based on industry standards (such as NIST and ISO 27001) and propose best practices for data privacy and security throughout the software development lifecycle.
- **Conduct and Present:** Conduct a thorough analysis of case studies related to data privacy and security implementations, presenting findings on successful strategies and lessons learned for future applications in diverse organizational contexts.

UNIT I: Introduction to Data Privacy- Overview of data privacy and security- Importance of data privacy in computing and society- Data privacy laws and regulations (GDPR, HIPAA, etc.)- Basic concepts: confidentiality, integrity, availability (CIA triad)

UNIT II: Data Privacy Threats and Vulnerabilities- Types of data privacy threats (hacking, phishing, malware, etc.)- Data breaches and attacks (SQL injection, cross-site scripting, etc.)- Vulnerabilities in data storage and transmission- Human factors in data privacy threats (social engineering, etc.)

UNIT III: Data Privacy Protection Mechanisms- Access control and authentication techniques

- Encryption and decryption methods (AES, RSA, etc.)- Data anonymization and pseudonymization- Secure data storage and transmission protocols (HTTPS, TLS, etc.)

UNIT IV: Data Privacy in Emerging Technologies- Data privacy in cloud computing and big data- Data privacy in artificial intelligence and machine learning- Data privacy in internet of things (IoT) and edge computing- Data privacy in block chain and distributed ledger technology

UNIT V: Implementing Data Privacy and Security- Case studies in data privacy and security implementation- Data privacy and security frameworks and standards (NIST, ISO 27001, etc.)

- Data privacy and security testing and evaluation- Best practices for data privacy and security in software development

TEXTBOOKS:

1. "Data Privacy and Security" by David Salomon ¹
2. "Principles of Information Security" by Michael E. Whitman and Herbert J. Mattord ²
3. "Guide to Data Privacy: Models, Technologies, Solutions" ³

REFERENCE BOOKS:

1. "Data Privacy: A run book for engineers" by Nishant Bhajaria ⁴
2. "Cyber Security and Privacy" by NPTEL ²
3. "Information Theory, Coding Theory, Data Structures" (online resource) ⁵
4. "Data Privacy and Security: A Practical Approach" by Markus Jakobsson
5. "Privacy and Data Protection: Principles and Practice" by Daniel J. Weitzner

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PE04) AGILE DEVELOPMENT
PROFESSIONAL ELECTIVE –IV**

IV Year B.Tech I Sem

**L T P C
3 0 0 3**

Course Objectives:

The objectives of this subject are to:

- Organize Agile Software Development, Extreme Programming and Software Development Rhythms.
- Describe their unique features relative to traditional software practices.
- Examine their applications in the real world and address their impacts on developing software.

Course Outcomes:

- Analyze various Agile methods, including XP, SCRUM, and Feature-Driven Development, to identify their core principles, practices, and suitability for different project contexts.
- Develop project plans and frameworks that incorporate Agile methodologies, particularly focusing on Extreme Programming practices such as test-first coding and pair programming, to enhance team collaboration and software quality.
- Apply Agile modeling practices to create and update models that effectively capture project requirements and enhance communication among stakeholders, addressing common misconceptions in Agile modeling.
- Examine the compatibility and integration challenges between Agile methods and traditional frameworks like RUP and PRINCE2, proposing solutions to enhance Agile adoption in hybrid project environments.
- Analyze common obstacles faced in Agile software development, such as management resistance and contractual difficulties, and develop strategies to mitigate these challenges to ensure successful project execution.
- Demonstrate proficiency in using Agile development tools, such as Eclipse, to streamline project workflows, enhance productivity, and facilitate effective communication within Agile teams.

UNIT - I

Introduction: Agile Methods, Agile Manifesto, and Agile Modeling Introduction, What Is Agile, The Agile Manifesto, Agile Methods, XP: Extreme Programming, DSDM, SCRUM, Feature-Driven Development, Modeling Misconceptions, Agile Modeling, Tools of Misconceptions, Updating Agile Models

UNIT - II

Extreme Programming: Introduction, Core XP Values, The Twelve XP Practices, About Extreme Programming, Planning XP Projects, Test First Coding, Making Pair Programming Work

UNIT - III

Agile Modeling and XP: Introduction, The Fit, Common Practices, Modeling Specific Practices, XP Objections to Agile Modeling, Agile Modeling and Planning XP Projects, XP Implementation Phase.

UNIT - IV

Feature-Driven Development: Introduction, Incremental Software Development, Regaining Control: The Motivation behind FDD, Planning an Iterative Project, Architecture Centric, FDD and XP.

UNIT - V

Agile Methods with RUP and PRINCE2 and Tools and Obstacles: Agile Modeling and RUP, FDD and RUP, Agile Methods and Prince2, Tools to Help with Agile Development, Eclipse: An Agile IDE, Obstacles to Agile Software Development, Management Intransigence, The Failed Project Syndrome, Contractual Difficulties, Familiarity with Agility.

TEXTBOOKS:

1. Agile software construction, 1/e, John hunt, springer, 2005.
2. Agile and Iterative Development: a manager's guide, Addison-Wesley Craig Larman, [Pearson Education] - 2004.

REFERENCE BOOKS:

1. The Art of Agile Development, Pearson, Robert C. Martin, Juli, James Shore, Chromatic, 2013, O'Reilly Media.
2. Agile Testing, Elisabeth Hendrickson, Quality Tree Software Inc 2008.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2266PE05) LARGE LANGUAGE MODELS
PROFESSIONAL ELECTIVE –IV**

IV Year B.Tech I Sem

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Prerequisites:

- Basic understanding of programming concepts (Python or similar)
- Familiarity with natural language processing (NLP) fundamentals
- Completion of introductory courses in computer science and engineering
- Basic knowledge of machine learning and deep learning concepts

Course Objectives:

- To introduce students to the concepts and architectures of large language models
- To develop skills in implementing and fine-tuning pre-trained language models
- To analyze and evaluate the performance of large language models on various NLP tasks
- To design and develop applications using large language models
- To apply ethical considerations and potential biases in large language models
- To prepare students for careers in NLP, AI, and related fields, and provide a foundation for further study in advanced NLP topics

Course Outcomes:

- Understand Transformer Architecture To solve training based problems
- Analyze Language Modeling Techniques.
- Examine Tokenization Methods.
- Evaluate Model Complexity and Efficiency.
- Optimize Training and Fine-Tuning Strategies.
- Critically Assess Model Benchmarks

UNIT I: Introduction to Large Language Models- Overview of natural language processing (NLP) and language models- History and evolution of large language models- Types of language models: transformer-based, recurrent neural network (RNN), and hybrid models- Applications of large language models: language translation, text summarization, chat bots, and more

UNIT II: Transformer-Based Language Models- In-depth analysis of transformer architecture and its variants- BERT, RoBERTa, and other pre-trained language models- Fine-tuning and adapting transformer models for specific NLP tasks- Advantages and limitations of transformer-based models.

UNIT III: Training and Evaluation of Large Language Models- Large-scale dataset preparation and preprocessing- Model training and optimization techniques- Evaluation metrics

and methodologies for language models- Common challenges and pitfalls in training large language models.

UNIT IV: Advanced Topics in Large Language Models- Multimodal language models and vision-language integration- Explainability and interpretability techniques for language models - Ethical considerations and potential biases in large language models- Future directions and research opportunities in the field.

UNIT V: Applications and Project Development- Hands-on project development using large language models- Applications in computer vision, speech recognition, and other areas- Case studies and industry applications of large language models- Best practices for deploying and maintaining large language models in real-world scenarios

TEXTBOOKS:

1. "Hands-On Large Language Models" by O'Reilly ¹
2. "Build a Large Language Model (From Scratch)" by Manning Publications ²
3. "Natural Language Processing with Transformers" by Lewis Tunstall and Leandro von Werra
4. "Transformers for Natural Language Processing and Computer Vision" by Denis Rothman ³
5. "Hands-On Large Language Models: Language Understanding and Generation" by Jay Alammar and Maarten Grootendorst ³

REFERENCE BOOKS:

1. "Quick Start Guide to Large Language Models: Strategies and Best Practices for Using Chat GPT and Other LLMs" by Addison-Wesley Data & Analytics Series ³
2. "Building LLM Powered Applications: Create intelligent apps and agents with large language models" by Valentina Alto ³
3. "Demystifying the Power of Large Language Models: A deep dive into large language models" by Theophilus Siameh ³
4. "Mastering Large Language Models with Python: Unleash the Power of Advanced Natural Language Processing for Enterprise Innovation and Efficiency" by Raj Arun R ³
5. "Generative AI with Lang Chain: Build large language model (LLM) apps with Python, Chat GPT and other LLMs" by Ben Auffarth ³

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PE07) BLOCKCHAIN TECHNOLOGY
PROFESSIONAL ELECTIVE –IV**

IV Year B.Tech I Sem

**L T P C
3 0 0 3**

Prerequisites:

- Knowledge in information security and applied cryptography.
- Knowledge in Computer Networks

Course Objectives:

- To learn the fundamentals of Block chain and various types of block chain and consensus mechanisms.
- To understand the public block chain system, Private block chain system and consortium block chain.
- Able to know the security issues of block chain technology.

Course Outcomes:

- Analyze the fundamental components of blockchain technology, including its origin, types, and consensus mechanisms, to assess its impact on decentralization and distribution.
- Evaluate public blockchain systems, particularly Bitcoin and Ethereum, and their applications, including the development and characteristics of smart contracts within these ecosystems.
- Design and implement solutions using private and consortium blockchain systems, demonstrating an understanding of their key characteristics, use cases, and algorithms like Byzantine Fault Tolerance.
- Assess security challenges in blockchain technology, including identity management, regulatory compliance, and safeguarding smart contracts, proposing solutions to enhance security and privacy.
- Ideate various applications of blockchain across industries such as finance, healthcare, and supply chain management, identifying potential benefits and limitations of blockchain technology.
- Develop blockchain applications using Python and Hyperledger Fabric, demonstrating proficiency in blockchain programming and the ability to create practical solutions using blockchain frameworks.

UNIT-I

Fundamentals of Block chain: Introduction, Origin of Block chain, Block chain Solution Components of Block chain, Block in a Block chain, The Technology and the Future.

Blockchain Types and Consensus Mechanism: Introduction, Decentralization and Distribution, Types of Block chain, Consensus Protocol.

Crypto currency, Bitcoin, Altcoin and Token: Introduction, Bitcoin and the Crypto currency ,Crypto currency Basics, Types of Crypto currencies, Crypto currency Usage.

UNIT-II

Public Block chain System: Introduction, Public Block chain, Popular Public Block chains, TheBitcoin Block chain, Ethereum Block chain.

Smart Contracts: Introduction, Smart Contract, Characteristics of a Smart Contract, Types of Smart Contracts, Types of Oracles, Smart Contracts in Ethereum, Smart Contracts in Industry.

UNIT-III

Private Block chain System: Introduction, Key Characteristics of Private Block chain, Need of Private Block chain, Private Block chain Examples, Private Block chain and Open Source, E- commerce Site Example, Various Commands (Instructions) in E-commerce Block chain, Smart Contract in Private Environment, State Machine, Different Algorithms of Permissioned Block chain, Byzantine Fault, Multichain.

Consortium Block chain: Introduction, Key Characteristics of Consortium Block chain, Need of Consortium Block chain, Hyper ledger Platform, Overview of Ripple, Overview of Corda .Initial Coin Offering: Introduction, Block chain Fundraising Methods, Launching an ICO, Investing in an ICO, Pros and Cons of Initial Coin Offering, Successful Initial Coin Offerings, Evolution of ICO, ICO Platforms.

UNIT-IV

Security in Block chain: Introduction, Security Aspects in Bit coin, Security and Privacy Challenges of Block chain in General, Performance and Scalability, Identity Management and Authentication, Regulatory Compliance and Assurance, Safeguarding Block chain Smart Contract (DApp), Security Aspects in Hyper ledger Fabric.

Applications of Block chain: Introduction, Block chain in Banking and Finance, Block chain in Education, Block chain in Energy, Block chain in Healthcare, Block chain in Real-estate, Block chain In Supply Chain, The Block chain and Io T. Limitations and Challenges of Block chain.

UNIT-V

Block chain Case Studies: Case Study 1, Retail, Case Study 2, Banking and Financial Services, Case Study 3, Healthcare, Case Study 4, Energy and Utilities.

Block chain Platform using Python: Introduction, Learn How to Use Python Online Editor, Basic Programming Using Python, and Python Packages for Block chain.

Block chain platform using Hyper ledger Fabric: Introduction, Components of Hyper ledger Fabric Network, Chain codes from Developer.ibm.com, Block chain Application Using Fabric Java SDK.

Textbooks:

1. Ambadas, Arshad Sarfarz Ariff, Sham “Block chain for Enterprise Application Developers”, Wiley
2. Andreas M. Antonopoulos, “Mastering Bitcoin: Programming the Open Block chain”, O’Reilly

Reference Books:

1. Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, Mc Graw Hill.
2. Blockchain: Blueprint for a New Economy, Melanie Swan, O’Reilly.

Online Learning Resources:

1. <https://github.com/blockchainedindia/resources>
2. Hyper ledger Fabric - <https://www.hyperledger.org/projects/fabric>
3. Zero to Block chain - An IBM Redbooks course, by Bob Dill, David Smits
<https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/crse0401.htm>
4. <https://nptel.ac.in/courses/106105184>
5. https://onlinecourses.nptel.ac.in/noc22_cs44/preview

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2212PE06) INTERNET OF THINGS
PROFESSIONAL ELECTIVE –IV**

IV Year B.Tech I Sem**L T P C
3 0 0 3****Course Objectives:**

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices

Course Outcomes:

- Identify and apply IOT Protocols and IOT Communication model.
- Illustrate Network function virtualization.
- Implement and Solve Language Features of Python.
- Analyze Classification of sensor Networks and MAC layer.
- Evaluate IOT Physical Devices and End Points.
- Create and Designing a RESTful Web API.

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 – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific Iots – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

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-NETCONF, YANG, SNMP NETOPEER

UNIT - III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT - IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, and reading input from pins.

UNIT – V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework designing a RESTful web API

TEXTBOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2267PE11) DATA WRANGLING
PROFESSIONAL ELECTIVE –V**

IV Year B.Tech II Sem

**L T P C
3 0 0 3**

Course Outcomes:

- **Analyze** the concept and steps involved in the data wrangling process, **evaluate** the Python basics required, and **design** a data wrangling workflow based on specific data requirements.
- **Evaluate** various parsing techniques for Excel and PDF files, **compare** their effectiveness in handling diverse file types, and **construct** an approach to deal with uncommon file formats.
- **Compare and contrast** relational databases (MySQL/PostgreSQL) with non-relational (NoSQL) databases, **analyze** their suitability for various data storage and retrieval scenarios, and **justify** the choice for a given application.
- **Examine** the operations involved in data formatting and cleaning in Python, **assess** their impact on data quality, and **apply** these techniques to prepare data for advanced analysis.
- **Utilize** Python libraries to identify outliers and correlations within a dataset, **interpret** the findings, and **visualize** the data effectively to enhance analytical insights.
- **Critically evaluate** web scraping and crawling techniques based on different website models, **select** the most appropriate method, and **develop** a Python-based solution for automated data collection from the web.

UNIT I:

INTRODUCTION TO DATA WRANGLING: Data Wrangling- Importance of Data Wrangling -How is Data Wrangling performed- Tasks of Data Wrangling-Data Wrangling Tools- Introduction to Python-Python Basics-Data Meant to be Read by Machines-CSV Data-JSON Data-XML Data.

UNIT II:

WORKING WITH EXCEL FILES AND PDFS: Installing Python Packages-Parsing Excel Files- Parsing Excel Files -Getting Started with Parsing-PDFs and Problem Solving in Python- Programmatic Approaches to PDF Parsing-Converting PDF to Text-Parsing PDFs Using Pdf miner- Acquiring and Storing Data-Databases: A Brief Introduction-Relational Databases: MySQL and Postage SQL-Non-Relational Databases: No SQL-When to Use a Simple File-Alternative Data Storage.

UNIT III:

DATA CLEANUP: Why Clean Data?- Data Cleanup Basics-Identifying Values for Data Cleanup-Formatting Data-Finding Outliers and Bad Data-Finding Duplicates-Fuzzy Matching-Reg Ex Matching-Normalizing and Standardizing the Data-Saving the Data-Determining suitable Data Cleanup-Scripting the Clean-up Testing with New Data

UNIT IV:

DATA EXPLORATION AND ANALYSIS: Exploring Data-Importing Data-Exploring Table Functions-Joining Numerous Datasets-Identifying Correlations-Identifying Outliers-Creating Groupings-Analyzing Data-Separating and Focusing the Data, Presenting Data-Visualizing the Data-Charts-Time-Related Data-Maps-Interactive-Words-Images, Video, and Illustrations-Presentation Tools-Publishing the Data-Open Source Platforms

UNIT V:

WEB SCRAPING: What to Scrape and How-Analyzing a Web Page-Network/Timeline-Interacting with JavaScript-In-Depth Analysis of a Page-Getting Pages-Reading a Web Page-Reading a Web Page with LXML-XPath-Advanced Web Scraping-Browser-Based Parsing-Screen Reading with Selenium-Screen Reading with Ghost.PySpidering the Web-Building a Spider with Scrapy-Crawling Whole Websites with Scrapy.

TEXTBOOKS:

1. Data Wrangling with Python, Jacqueline Kazil& Katharine Jarmul, O'Reilly Media, Inc,2016
2. Data Wrangling with Python: Creating actionable data from raw sources,,Dr. TirthajyotiSarkar, Shubha deep Packt Publishing Ltd,2019.

REFERENCE BOOKS:

1. Hands-On Data Analysis with Pandas, Stefanie Molin, Packt Publishing Ltd,2019
2. Practical Data Wrangling, Allan Visochek, Packt Publishing Ltd,2017
3. Principles of Data Wrangling: Practical Techniques for Data Preparation, TyeRattenbury, Joseph M. Hellerstein, Jeffrey Heer, Sean Kandel, Connor Carreras, , O'Reilly Media, Inc,2017

**MALLAREDDYENGINEERINGCOLLEGFORWOMEN
(2262PE19) DATABASE SECURITY
PROFESSIONAL ELECTIVE –V**

IV Year B.Tech II Sem

**L T P C
3 0 0 3**

Prerequisites:

- Basic understanding of computer systems and networks
- Familiarity with programming languages (e.g. Python, Java, C++)
- Completion of introductory courses in computer science and engineering
- Basic knowledge of database management systems and web development

Course Objectives:

- To introduce students to the concepts and principles of web and database security
- To develop an understanding of security threats and vulnerabilities in web and database systems
- To design and implement secure web and database applications
- To develop skills in security testing and vulnerability assessment
- To apply security standards and compliance regulations to web and database systems
- To prepare students for careers in web and database security and related fields, and provide a foundation for further study in advanced security topics

Course Outcomes:

- **Evaluate and Analyze** various web security threats and vulnerabilities, demonstrating an understanding of their implications on web applications and the importance of implementing robust security protocols such as SSL/TLS and HTTPS.
 - **Design and Implement** secure coding practices in web application development by identifying common vulnerabilities like SQL injection and cross-site scripting (XSS), and applying effective countermeasures through input validation and sanitization.
 - **Assess and Recommend** database security measures by analyzing potential threats and vulnerabilities, implementing access control and authentication strategies, and utilizing encryption techniques to ensure data protection.
 - **Integrate and Apply** advanced security mechanisms such as Intrusion Detection and Prevention Systems (IDPS) and Security Information and Event Management (SIEM) systems to enhance the overall security posture of web applications and databases.
 - **Conduct and Report** comprehensive security assessments and audits on web and database systems, utilizing penetration testing methodologies and vulnerability management practices to identify weaknesses and suggest remediation strategies.
 - **Formulate and Develop** a security incident response plan, emphasizing compliance with industry standards and regulations (e.g., OWASP, PCI-DSS), and establishing protocols for disaster recovery to ensure organizational resilience in the face of security breaches.
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UNIT I:

Introduction to Web Security

- Overview of web security threats and vulnerabilities
- Web application security risks and countermeasures
- Security protocols: SSL/TLS, HTTPS
- Web security standards and compliance

UNIT II:

Web Application Security

- Common web application vulnerabilities: SQL injection, cross-site scripting (XSS), cross-site request forgery (CSRF)
- Input validation and sanitization
- Secure coding practices for web development
- Web application firewalls (WAFs) and security testing

UNIT III:

Database Security

- Database security threats and vulnerabilities
- Database access control and authentication
- Encryption and decryption techniques
- Secure database design and implementation

UNIT IV:

Advanced Security Topics

- Secure socket layer (SSL) and transport layer security (TLS)
- Secure/multipurpose internet mail extensions (S/MIME)
- Intrusion detection and prevention systems (IDPS)
- Security information and event management (SIEM) systems

UNIT V:

Security Assessment and Compliance

- Web and database security assessment and auditing
- Vulnerability management and penetration testing
- Compliance with security standards and regulations (e.g. OWASP, PCI-DSS)
- Security incident response and disaster recovery

TEXTBOOKS:

1. "Web Security, Privacy & Commerce" by O'Reilly Media
2. "Database Security" by Raghu Ramakrishnan
3. "Security in Computing" by Charles P. Pfleeger
4. "Web Application Security" by OWASP
5. "Database Systems: The Complete Book" by Hector Garcia-Molina

REFERENCE BOOKS:

1. "Web Security Testing Cookbook" by Paco Hope
2. "SQL Injection Attacks and Defense" by Justin Clarke
3. "Web Application Security Consortium (WASC) Threat Classification"
4. "Database Security and Auditing" by Ron Ben-Natan
5. "Comprehensive Security Controls for Database Management Systems" by NIST

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PE08) SOFTWARE PROCESS & PROJECT
MANAGEMENT**

PROFESSIONAL ELECTIVE –V

IV Year B.Tech II Sem

**L T P C
3 0 0 3**

Course Objectives:

- To acquire knowledge on software process management.
- To acquire managerial skills for software project development.
- To understand software economics.

Course Outcomes:

- Evaluate and differentiate between various Agile methodologies, including Extreme Programming (XP), SCRUM, and Feature-Driven Development (FDD), to identify their unique characteristics, advantages, and applicability in diverse project scenarios.
- Design and articulate detailed project plans that incorporate Agile principles and practices, emphasizing XP values such as test-first coding and pair programming to foster collaboration and enhance software quality.
- Apply Agile modeling techniques to create, maintain, and update effective models that capture project requirements and address misconceptions, facilitating better communication among stakeholders throughout the development lifecycle.
- Critically assess the integration of Agile methods with traditional project management frameworks like RUP and PRINCE2, proposing strategies to harmonize Agile practices within these established methodologies.
- Analyze the common obstacles to Agile software development, such as management resistance and contractual issues, and devise actionable strategies to overcome these challenges, ensuring successful Agile adoption.
- Demonstrate proficiency in using Agile development tools (e.g., Eclipse) to enhance productivity, streamline workflows, and facilitate effective communication and collaboration within Agile teams, ultimately contributing to successful project outcomes.

UNIT – I

Software Process Maturity Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process, Process Reference Models Capability Maturity Model (CMM), CMMI, PCMM, PSP, TSP).

UNIT – II

Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction

phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model-based software architectures.

UNIT - III

Workflows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, minor milestones, periodic status assessments, Process Planning Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning.

UNIT - IV

Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation. Project Control and process instrumentation, The seven-core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.

UNIT - V

CCPDS-R Case Study and Future Software Project Management Practices, Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXTBOOKS:

1. Managing the Software Process, Watts S. Humphrey, Pearson Education
2. Software Project Management, Walker Royce, Pearson Education

REFERENCE BOOKS:

1. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000 R22 B.Tech. CSE Syllabus JNTU Hyderabad Page 136 of 154
2. Process Improvement essentials, James R. Persse, O'Reilly, 2006
3. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006
4. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
2. Software Engineering Project Management, Richard H. Thayer & Edward Yourdon, 2nd edition, Wiley India, 2004.
3. Agile Project Management, Jim Highsmith, Pearson education, 2004.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2266PE08) NATURAL LANGUAGE PROCESSING
PROFESSIONAL ELECTIVE –V**

IV Year B.Tech II Sem

**L T P C
3 0 0 3**

COURSE OBJECTIVES:

- Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.
- To understand linguistic phenomena and learn to model them with formal grammars.
- To Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems.
- To learn how to manipulate probabilities, construct statistical models over strings and trees
- To estimate parameters using supervised and unsupervised training methods.
- To design, implement, and analyze NLP algorithms. Able to design different language modeling Techniques.

COURSE OUTCOMES:

- **Analyze and Evaluate** the structure and components of words and documents by applying various morphological models and assessing their effectiveness in natural language processing tasks, considering the complexities and challenges involved.
- **Construct and Implement** hidden Markov models utilizing forward and Viterbi algorithms, demonstrating proficiency in training these models through Expectation-Maximization (EM) methods for applications in lexical syntax and natural language parsing.
- **Design and Execute** parsing algorithms to analyze syntactic structures in natural language, utilizing treebanks for data-driven syntax representation and resolving ambiguities through advanced modeling techniques, including multilingual considerations.
- **Develop and Integrate** semantic parsing systems that interpret meaning through predicate-argument structures and meaning representation systems, employing software tools to facilitate effective semantic analysis.
- **Critically Assess and Formulate** discourse processing techniques that enhance cohesion and reference resolution in natural language, analyzing discourse structure to improve the overall coherence of language models.
- **Synthesize and Adapt** language models through the evaluation and implementation of N-gram models, conducting parameter estimation and adaptation techniques while addressing language-specific challenges and multilingual issues in language modeling.

UNIT – I:

Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches

UNIT – II:

Lexical Syntax: Hidden Markov Models (Forward and Viterbi algorithms and EM training).
Syntax Analysis: Parsing Natural Language, Tree banks: A Data-Driven Approach to Syntax,
Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolution
in Parsing, Multilingual Issues

UNIT – III:

Semantic Parsing: Introduction, Semantic Interpretation, System Paradigms, Word Sense
Systems, Software.

UNIT – IV:

Predicate-Argument Structure, Meaning Representation Systems, Software. Discourse
Processing: Cohesion, Reference Resolution, Discourse Cohesion and Structure

UNIT – V:

Language Modeling: Introduction, N-Gram Models, Language Model Evaluation, Parameter
Estimation, Language Model Adaptation, Types of Language Models, Language-Specific
Modeling Problems, Multilingual and Cross lingual Language Modeling

TEXTBOOKS:

1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel
M. Bikel and Imed Zitouni, Pearson Publication.
2. Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S. Tiwary.

REFERENCE BOOKS:

Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, Pearson
Publications.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2266PE09) GAME THEORY
PROFESSIONAL ELECTIVE –V

IV Year B.Tech II Sem

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Course Objectives:

The course will explain in depth the standard equilibrium concepts (such as Nash equilibrium, Sub game-Perfect Nash Equilibrium, and others) in Game Theory.

Course Outcomes:

- **Evaluate and Distinguish** various concepts in game theory, including Nash Equilibrium, bounded rationality, and strategic games, by analyzing examples and illustrating their relevance to competitive equilibrium in economic contexts.
- **Analyze and Apply** mixed, correlated, and evolutionary equilibria concepts by employing rationalizability and the iterated elimination of dominated actions to derive optimal strategies in complex game scenarios.
- **Synthesize and Construct** models of knowledge in game theory, assessing how common knowledge impacts agreement and disagreement among rational agents, and apply these concepts to real-world situations like the Electronic Mail Game.
- **Develop and Demonstrate** strategies for extensive games with perfect information, including the formulation of subgame perfect equilibria and the interpretation of strategies, while exploring notable finite horizon games through practical examples.
- **Critically Analyze** repeated games by contrasting infinitely repeated and finitely repeated games, and by applying concepts such as trigger strategies and the various perfect folk theorems to elucidate the implications of punishment and reward structures on player behavior.
- **Formulate and Assess** complex bargaining strategies within the context of game theory, particularly through the lens of alternating offers, evaluating the conditions for achieving subgame perfect equilibria and their implications for real-world negotiation scenarios.

UNIT - I

Introduction- Game Theory, Games and Solutions Game Theory and the Theory of Competitive Equilibrium, Rational Behavior, The Steady State and Deductive Interpretations, Bounded Rationality Terminology and Notation. Nash Equilibrium- Strategic Games, Nash Equilibrium Examples Existence of a Nash Equilibrium, Strictly Competitive Games, Bayesian Games: Strategic Games with Imperfect Information.

UNIT - II

Mixed, Correlated, and Evolutionary Equilibrium - Mixed Strategy Nash Equilibrium, Interpretations of Mixed Strategy Nash Equilibrium, Correlated Equilibrium, Evolutionary Equilibrium, Rationalizability and Iterated Elimination of Dominated Actions - Rationalizability Iterated Elimination of Strictly Dominated Actions, Iterated Elimination of Weakly Dominated Actions.

UNIT - III

Knowledge and Equilibrium -A Model of Knowledge Common Knowledge, Can People Agree to Disagree? Knowledge and Solution Concepts, The Electronic Mail Game

UNIT - IV

Extensive Games with Perfect Information -Extensive Games with Perfect Information Sub game Perfect Equilibrium Two Extensions of the Definition of a Game the Interpretation of a Strategy, Two Notable Finite Horizon Games, Iterated Elimination of Weakly Dominated, Strategies Bargaining Games – Bargaining and Game Theory, A Bargaining Game of Alternating Offers Sub game Perfect Equilibrium Variations and Extensions.

UNIT - V

Repeated Games - The Basic Idea Infinitely Repeated Games vs.\ Finitely Repeated Games, Infinitely Repeated Games: Definitions Strategies as Machines Trigger Strategies: Nash Folk, Theorems Punishing for a Limited Length of Time: A Perfect Folk Theorem for the Limit of Means Criterion Punishing the Punisher: A Perfect Folk Theorem for the Overtaking Criterion, Rewarding Players Who Punish: A Perfect Folk Theorem for the Discounting Criterion The Structure of Sub game Perfect Equilibria Under the Discounting Criterion Finitely Repeated Game.

TEXT BOOKS:

1. A course in Game Theory, M. J. Osborne and A. Rubinstein, MIT Press
2. Game Theory, Roger Myerson, Harvard University Press
3. Game Theory, D. Fudenberg and J. Tirole, MIT Press

REFERENCE BOOKS:

1. Theory of Games and Economic Behavior, J. von Neumann and O. Morgenstern, New York: John Wiley and Sons.
2. Games and Decisions, R.D. Luce and H. Raiffa, New York: John Wiley and Sons.
3. Game Theory, G. Owen, 2nd Edition, New York: Academic Press.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2212PE05) HUMAN COMPUTER INTERACTION
PROFESSIONAL ELECTIVE –V**

IV Year B.Tech II Sem

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Course Objectives:

To gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design in general, and alternatives to traditional "keyboard and mouse" computing; become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans; be able to apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation; appreciate the importance of a design and evaluation methodology that begins with and maintains a focus on the user; be familiar with a variety of both conventional and non-traditional user interface paradigms, the latter including virtual and augmented reality, mobile and wearable computing, and ubiquitous computing; and understand the social implications of technology and their ethical responsibilities as engineers in the design of technological systems. Finally, working in small groups on a product design from start to finish will provide you with invaluable team-work experience.

Course Outcomes:

- Understand the fundamental principles of user-centered design, including graphical user interfaces and their role in effective Human-Computer Interaction.
- Apply screen design principles to create structured, visually pleasing interfaces that facilitate efficient navigation and data retrieval.
- Analyze user interface components such as text, icons, colors, and multimedia to optimize the overall user experience.
- Evaluate HCI designs through usability engineering techniques, utilizing heuristics, design standards, and user evaluation methods to enhance usability.
- Develop cognitive and physical models to inform interface design, using goal-task hierarchies and linguistic models for effective user interaction.
- Construct and assess applications of emerging HCI technologies, including augmented reality and ubiquitous computing, to solve complex real-world interaction challenges.

UNIT - I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT - II

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business junctions. Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of Information – focus and emphasis – presentation information simply and meaningfully – information Retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT- III

Windows – New and Navigation schemes selection of window, selection of devices based and Screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses Problems, choosing colors.

UNIT- IV

HCI in the software process: The software life cycle Usability engineering Iterative design and Prototyping Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, choosing an evaluation Method. Universal design, Universal design principles Multi-modal interaction

UNIT- V

Cognitive models Goal and task hierarchies Design Focus: GOMS saves money Linguistic models The Challenge of display-based systems Physical and device models Cognitive architectures Ubiquitous Computing and augmented realities Ubiquitous computing applications research Design Focus: Ambient Wood – augmenting the physical Virtual and augmented reality Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization Design Focus: Getting the size right.

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dream Tech. Units 1, 2, 3
2. Human – Computer Interaction. Alan Dix, Janet Fincay, GreGoryd, Abowd, Russell Bealg, Pearson Education Units 4,5

REFERENCE BOOKS:

1. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen , Pearson Education.
4. Human –Computer Interaction, D. R. Olsen, Cengage Learning.
5. Human –Computer Interaction, Smith - Atakan, Cengage Learning.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2212PE07) GRAPH THEORY
PROFESSIONAL ELECTIVE –VI

IV Year B. Tech II Sem

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Course Objectives:

- Define graphs and their components.
- Identify and explain graph terminology.
- Analyze and apply graph traversal algorithms.
- Design and implement shortest path algorithms.
- Evaluate the complexity of graph algorithms.
- Apply graph theory to real-world problems.
- Analyze and explain graph properties and structures.

Course Outcomes:

- **Evaluate and Distinguish** between different types of graphs and their representations by analyzing the properties of simple, weighted, directed, and undirected graphs, and demonstrating proficiency in graph terminology and basic operations.
- **Analyze and Interpret** graph structures and properties by investigating concepts such as connectivity, paths, cycles, and centrality measures, and applying these concepts to solve problems related to graph connectivity and shortest paths.
- **Apply and Construct** various graph algorithms, including traversal algorithms (BFS, DFS), shortest path algorithms (Dijkstra's, Bellman-Ford), and minimum spanning tree algorithms (Kruskal's, Prim's), to real-world scenarios, demonstrating the ability to implement these algorithms effectively.
- **Synthesize and Assess** advanced topics in graph theory, including graph coloring, planarity, and network analysis, by developing solutions for community detection and clustering problems within diverse applications.
- **Design and Evaluate** solutions for network flow problems using algorithms such as Ford-Fulkerson and Edmonds-Karp, while exploring the implications of maximum flow and minimum cut theorems in practical contexts.
- **Investigate and Propose** applications of graph theory in various domains, including computer networks, social network analysis, and computational biology, by formulating strategies for scheduling, resource allocation, and recommendation systems that leverage graph-based approaches.

UNIT 1:

Introduction to Graph Theory, Definition and history of graph theory,- Basic terminology (graphs, Vertices, edges, degree, etc.), Types of graphs (simple, weighted, directed, undirected), Graph Representation (adjacency matrix, adjacency list), Basic graph operations (union, intersection, Complement)

UNIT 2:

Graph Structures and Properties, Connectivity (paths, cycles, connected components) Distance And shortest paths (BFS, DFS), Graph diameter and radius, Centrality measures (degree, closeness, between ness), Graph isomorphism and auto orphisms.

UNIT 3:

Graph Algorithms, Traversal algorithms (BFS, DFS), Shortest path algorithms (Dijkstra's, Bellman-Ford), Minimum spanning tree algorithms (Kruskal's, Prim's), Maximum flow algorithms (Ford-Fulkerson, Edmonds-Karp), Network flow problems (max flow, min cut)

UNIT 4:

Advanced Graph Topics, Graph coloring and chromatic numbers, Planarity and non-planarity, Graph decomposition (trees, forests, cycles), Network analysis (centrality, community detection), Graph Clustering and clustering algorithms

UNIT 5:

Applications of Graph Theory, Computer networks and network protocols, Social network analysis, Recommendation systems, Scheduling and resource allocation, Computational biology and bio informatics

Textbooks:

1. Graph Theory" by Bondy and Murty
2. "Graph Theory" by Diestel
3. "Introduction to Graph Theory" by Doug West
4. "A Walk Through Combinatorics" by Miklos Bona
5. "Pearls in Graph Theory: A Comprehensive Introduction" by Nora Hartsfield and Gerhard Ringel

Reference books:

1. "Graph Theory" by Bondy and Murty.
2. "Graph Theory" by Diestel.
3. "Introduction to Graph Theory" by Doug West.
4. "A Walk Through Combinatorics" by Miklos Bona.
5. "Pearls in Graph Theory: A Comprehensive Introduction" by Nora Hartsfield and Gerhard Ringel.
6. "Graph Theory And Its Applications" by Jonathan L. Gross and Jay Yellen.
7. "Graph Theory" by Narsingh Deo.
8. "Modern Graph Theory" by Bollobás.
9. "Graph Theory: Modeling, Applications, and Algorithms" by Geir Agnarsson and Raymond Greenlaw.
10. "Graph Theory and Complex Networks: An Introduction" by van Steen.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2262PE17) DIGITAL FORENSICS
PROFESSIONAL ELECTIVE –VI**

IV Year B. Tech II Sem

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Course Objectives:

- To analyze how to conduct a digital forensics investigation and validate forensics data.

Course Outcomes:

- Describe what is a Digital Investigation is, the sources of digital evidence, and the limitations of forensics.
- Explain how to design software to support forensics.
- Describe the legal requirements for use of seized data.
- Describe the process of evidence seizure from the time when the requirement was identified to the disposition of the data.
- Investigate and solve complex cases involving e-mail and mobile device forensics by analyzing the roles of clients and servers, performing detailed e-mail investigations, and executing proper acquisition procedures for mobile devices to uncover digital evidence.
- Design and demonstrate effective forensic strategies for working with Windows and DOS systems, including understanding file systems, exploring Microsoft file structures, and navigating the complexities of NTFS disks and whole disk encryption to enhance forensic analysis.

UNIT- I

Digital forensics concepts: What is forensics? Branches and applications of digital forensics. Overview of forensics principles: scientific method, evidence principles, documentation, reporting & testimony. Sociological and Legal Aspects of Digital Forensics Introduction to Incident - Incident Response Methodology –Steps - Activities in Initial Response, Phase after detection of an incident

UNIT – II

Initial Response and forensic duplication, Initial Response & Volatile Data Collection from Windows system -Initial Response & Volatile Data Collection from Unix system – Forensic Duplication: Forensic Duplication: Forensic Duplicates as Admissible Evidence, Forensic Duplication Tool Requirements, Creating a Forensic. Duplicate/Qualified Forensic Duplicate of a Hard Drive

UNIT – III

Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, Using network tools, examining the honey net project.

UNIT – IV

Current Forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software
E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail Forensic tools. Cell phone and mobile device forensics: Understanding mobile device forensics, Understanding acquisition procedures for cell phones and mobile devices.

UNIT - V

Working with Windows and DOS Systems: understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.

TEXTBOOKS

1. Incident Response and computer forensics, Kevin Mandia, Chris Prosise, Tata McGrawHill, 2006.
2. Computer Forensics, Computer Crime Investigation, John R. Vacca, Firewall Media, New Delhi.
3. Computer Forensics and Investigations, Nelson, Phillips Enfinger, Steuart, cengage.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PE09) SOFTWARE QUALITY ASSURANCE & TESTING
PROFESSIONAL ELECTIVE –VI**

IV Year B.Tech II Sem

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Course Outcomes:

- Analyze the components of Software Quality Assurance (SQA) systems and assess the impact of various quality standards (e.g., ISO 9000, CMM, Six Sigma) on software quality management in different organizational contexts.
- Design and formulate structured software testing strategies that incorporate risk minimization, cost-effectiveness, and management support, ensuring alignment with organizational goals and software quality objectives.
- Apply various software testing techniques, including black-box, white-box, static, and regression testing, to develop a systematic approach to validating software functionality and performance.
- Demonstrate the ability to select, install, and utilize software testing tools (e.g., Load Runner, WinRunner, JUnit) effectively, assessing their advantages and limitations in the context of different testing environments.
- Conduct a comprehensive software testing process, from test planning and verification to acceptance testing and post-implementation analysis, ensuring thorough documentation and analysis of test results.
- Critically evaluate the specialized testing responsibilities associated with various software development methodologies, including the testing of client/server systems, and propose tailored testing approaches to enhance software reliability and quality.

UNIT - I

Software Quality Assurance and Standards: The Software Quality challenge, what is Software Quality, Software Quality factors, the components of Software Quality Assurance system, Software Quality Metrics, Costs of Software Quality, Quality Management Standards, Management and its role in Software Quality Assurance, SQA unit and other actors in SQA system. - (Chapters: 1-4, 21, 23, 25, 26) of T3 Quality Standards: ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom Baldrige, 3 Sigma, 6 Sigma and other latest quality standards (Refer Internet and R11, R12, R13).

UNIT - II

Software Testing Strategy and Environment: Minimizing Risks, Writing a Policy for Software Testing, Economics of Testing, Testing-an organizational issue, Management Support for Software Testing, Building a Structured Approach to Software Testing, Developing a Test Strategy Building Software Testing Process: Software Testing Guidelines, workbench concept, Customizing The Software Testing Process, Process Preparation checklist - (Chapters: 2,3) of T1 Software Testing Techniques: Dynamic Testing – Black Box testing techniques, White Box testing techniques, Static testing, Validation Activities, Regression testing -(Chapters: 4, 5, 6, 7, 8) of T2

UNIT - III

Software Testing Tools: Selecting and Installing Software Testing tools – (Chapter 4) of T1. Automation and Testing Tools - (Chapter 15) of T2 Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools, J Metra, JUNIT and Cactus. (Refer Internet and R9, R10)

UNIT - IV

Process Seven Step Testing Process – I: Overview of the Software Testing Process, Organizing of Testing, Developing the Test Plan, Verification Testing, Validation Testing.

UNIT - V

Seven Step Testing Process – II: Analyzing and Reporting Test results, Acceptance and Operational Testing, Post-Implementation Analysis Specialized Testing Responsibilities: Software Development Methodologies, Testing Client/Server Systems

TEXT BOOKS:

1. Effective Methods for Software Testing, Third edition, William E. Perry, Wiley India, 2009
2. Software Testing – Principles and Practices, Naresh Chauhan, Oxford University Press, 2010.
3. Software Quality Assurance – From Theory to Implementation, Daniel Galin, Pearson Education, 2009.

REFERENCES:

1. Testing Computer Software, Cem Kaner, Jack Falk, Hung Quoc Nguyen, Wiley India, rp2012.
2. Software Testing – Principles, Techniques and Tools, M.G.Limaye, Tata McGraw-Hill, 2009.
3. Software Testing - A Craftsman's approach, Paul C. Jorgensen, Third edition, Auerbach Publications, 2010.
4. Foundations of Software Testing, Aditya P. Mathur, Pearson Education, 2008.
5. Software Testing and Quality Assurance – Theory and Practice, Kshirasagar Naik, Priyadashi Tripathy, Wiley India, 2010.
6. Software Testing, Ron Patton, Second edition, Pearson Education, 2006.
7. Software Testing and Analysis – Process, Principles and Techniques, Mauro Pezze, Michal Young, Wiley India, 2008.
7. Software Testing Techniques, Boris Beizer, Second edition, Wiley India, 2006
8. Foundations of Software Testing, Dorothy Graham, et al., Cengage learning, 2007, rp 2010.
9. Software Testing - Effective Methods, Tools and Techniques, Renu Rajani, Pradeep Oak, Tata McGraw-Hill, rp2011.
10. Software Automation Testing Tools for Beginners, Rahul Shende, Shroff Publishers and Distributors, 2012.
11. Software Testing Tools, K.V.K.K. Prasad, Dream Tech Press, 2008.
12. Software Testing Concepts and Tools, Nageswara Rao Pusuluri, Dream Tech press, 2007.

13. Software Quality Assurance, Milind Limaye, Tata McGraw-Hill, 2011.
14. Software Quality – Theory and Management, Alan C. Gillies, Second edition, Cengage Learning, 2009.
15. Software Quality – A Practitioner’s approach, Kamna Malik, Praveen Choudhary, Tata McGrawHill, 2008.
16. Software Quality Models and Project Management in a Nutshell, Shailesh Mehta, Shroff Publishers and Distributors, 2010.
17. Software Quality Engineering – Testing, Quality Assurance and Quantifiable Improvement, JeffTian, Wiley India, 2006.
18. Software Quality, Mordechai Ben-Menachem/Garry S. Marliss, Cengage Learning, 2010.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2266PE06) GENERATIVE AI
PROFESSIONAL ELECTIVE –VI**

IV Year B.Tech II Sem

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Course Objectives:

- To familiarize students on the concept of Generative Modelling
- To understand the encoding & decoding mechanisms in Variational Auto encoders.
- To gain knowledge on Generative Adversarial Networks.
- To learn the fundamentals of Autoregressive models & Transformers.
- To assess the emerging market of Generative Artificial Intelligence.

Course outcomes:

- **Evaluate and Distinguish** between generative and discriminative modeling approaches by analyzing their applications in artificial intelligence, identifying the core principles of generative modeling, and articulating their relevance in current AI advancements.
- **Construct and Analyze** Variational Autoencoders (VAEs) by implementing their architecture, training processes, and evaluation methods, while applying learned concepts to generate novel data such as images or other relevant outputs, as demonstrated in case studies.
- **Design and Assess** Generative Adversarial Networks (GANs), including deep convolutional GANs and Wasserstein GANs, by developing a robust understanding of their architecture, training methodologies, and loss functions, thereby enabling students to critically evaluate the effectiveness of various GAN configurations.
- **Implement and Synthesize** Autoregressive Models and Transformer architectures by utilizing Long Short-Term Memory (LSTM) networks and Transformer models to process text data, tokenization, and training, culminating in the generation of contextualized outputs such as language or imagery.
- **Analyze and Project** the timeline and evolution of generative AI from foundational models to current advancements, enabling students to critically assess the implications of large language models and other generative applications in various domains including education, industry, and ethical considerations.
- **Propose and Critique** future directions for generative AI technologies, discussing their potential impact on everyday life and professional environments, while addressing ethical challenges and considerations, fostering a forward-thinking approach to the integration of generative AI in society.

UNIT – I:

Generative Modeling: Generative Modeling, Generative Versus Discriminative Modeling, The rise of Generative Modeling, Generative Modeling and AI, Building a Generative Model, Core Probability Theory, Generative Model Taxonomy, Case Study: The Generative Deep Learning Codebase, Cloning the Repository, Using Docker, Running on a GPU.

UNIT - II:

Variational Auto encoders (VAE): Introduction, Auto encoders: Architecture, The Encoder, The Decoder, Joining the Encoder to the Decoder, Training & Analysis of the Auto Encoder, Case Study – The Variational Art Exhibition, VAE: Building a VAE, Analysis of the VAE, Case Study – Using VAE to generate faces.

UNIT – III:

Generative Adversarial Networks (GAN): Introduction, Deep Convolutional GAN (DCGAN): Discriminator, Generator, Training & Analysis of DCGAN, Case Study - Wasserstein GAN with Gradient Penalty (WGAN - GP): Wasserstein Loss, The Lipschitz Constraint, Weight Clipping, The Gradient Penalty (GP) Loss, Training & Analysis of the WGAN - GP.

UNIT - IV:

Autoregressive Models & Transformers: Introduction, Long Short-Term Memory Network (LSTM): The Recipes Dataset, Working with Text Data, Tokenization, Creating the Training Set, The LSTM Architecture, The Embedding Layer, The LSTM Layer, The LSTM Cell, Training & Analysis of the LSTM, Transformers – Introduction, GPT: The Wine Reviews, Dataset, Attention, Queries, Keys, and Values, Multiread Attention, Causal Masking, the Transformer Block, Positional Encoding, Training & Analysis of GPT.

UNIT - V:

Timeline & Future Scope of Generative AI: 2014–2017: The VAE and GAN Era, 2018–2019: The Transformer Era, 2020–2022: The Big Model Era, The Current State of Generative AI: Large Language Models (LLM's), Text-to-Code Models, Text-to-Image Models, Other Applications, The Future of Generative AI: Generative AI in Everyday Life, Generative AI in the Workplace, Generative AI in Education, Generative AI Ethics and Challenges.

TEXTBOOK:

1. GENERATIVE DEEP LEARNING Teaching Machines to Paint, Write, Compose and Play David Foster - O'Reilly - 2nd Edition.

REFERENCES:

Generative AI in Practice – Bernard Marr – Wiley

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2266PE10) AUGMENTED REALITY AND VIRTUAL REALITY
PROFESSIONAL ELECTIVE –VI**

IV Year B.Tech II Sem

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Course objectives:

- The objective of this course is to provide a foundation to the fast-growing field of AR and make the students aware of the various AR devices.
- To give historical and modern overviews and perspectives on virtual reality. It describes the fundamentals of sensation, perception, technical and engineering aspects of virtual reality systems.

Course Outcomes:

- **Analyze and Compare** the foundational concepts and historical development of augmented reality (AR) with related technologies, effectively distinguishing between real and virtual worlds, and evaluating the diverse applications of AR across various industries.
- **Design and Demonstrate** augmented reality experiences by integrating essential components such as scene generators, tracking systems, and displays, utilizing appropriate AR devices, and showcasing the technical functionality in practical applications.
- **Evaluate and Synthesize** the principles of virtual reality (VR), including its definitions, history, and the physiological impact on human perception, while assessing the key elements that contribute to an immersive VR experience through various input and output interfaces.
- **Develop and Implement** effective visual, aural, and haptic representations of virtual environments, utilizing case studies such as the GHOST software development toolkit to create a cohesive representation that enhances user interaction and engagement within VR.
- **Investigate and Critique** the principles of visual perception in the context of VR, including depth, motion, and color perception, applying advanced rendering techniques like ray tracing and shading models to improve the realism and efficiency of virtual experiences.
- **Propose Innovations** in AR and VR technologies by exploring cutting-edge research and trends, addressing current challenges in visual rendering, latency, and user experience, and discussing the implications of these innovations for future applications in entertainment, education, and industry.

UNIT - I:

Introduction to Augmented Reality: What Is Augmented Reality - Defining augmented reality, history of Augmented reality, The Relationship between Augmented Reality and Other Technologies-Media, Technologies, Other Ideas Related to the Spectrum between Real and Virtual Worlds, applications of Augmented reality Augmented Reality Concepts-How Does Augmented Reality Work? Concepts Related to Augmented Reality, Ingredients of an Augmented Reality Experience.

UNIT - II:

AR Devices & Components: AR Components – Scene Generator, Tracking system, monitoring system, Display, Game scene. AR Devices – Optical See- Through HMD, Virtual retinal systems, monitor bases systems, Projection displays, Video see-through systems.

UNIT - III:

Introduction to Virtual Reality: Defining Virtual Reality, History of VR, Human Physiology and Perception, Key Elements of Virtual Reality Experience, Virtual Reality System, Interface to the Virtual World-Input & output- Visual, Aural & Haptic Displays, Applications of Virtual Reality

UNIT - IV:

Representing the Virtual World: Representation of the Virtual World, Visual Representation in VR, Aural Representation in VR and Haptic Representation in VR, Case Study: GHOST (General Haptics Open Software Toolkit) software development toolkit.

UNIT - V:

Visual Perception & Rendering: Visual Perception - Perception of Depth, Perception of Motion, Perception of Color, Combining Sources of Information, Visual Rendering -Ray Tracing and Shading Models, Rasterization, Correcting Optical Distortions, Improving Latency and Frame Rates.

TEXTBOOKS:

1. Allan Fowler-AR Game Developmentll, 1st Edition, A press Publications, 2018, ISBN 978- 1484236178
2. Augmented Reality: Principles & Practice by Schmalstieg / Hollerer, Pearson Education India;
First edition (12 October 2016), ISBN-10: 9332578494

REFERENCE BOOKS:

- Virtual Reality, Steven M. LaValle, Cambridge University Press, 2016.
- Understanding Virtual Reality: Interface, Application and Design, William R Sherman and Alan B Craig, (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San Francisco, CA, 2002.
- Developing Virtual Reality Applications: Foundations of Effective Design, Alan B Craig, William R Sherman and Jeffrey D Will, Morgan Kaufmann, 2009.
- Designing for Mixed Reality, Kharis O'Connell Published by O'Reilly Media, Inc., 2016, ISBN: 9781491962381.
- Sanni Siltanen- Theory and applications of marker-based augmented reality. Julkaisija – Utgivare Publisher. 2012. ISBN 978-951-38-7449-0.
- Gerard Jounghyun Kim, "Designing Virtual Systems: The Structured Approach", 2005.

**MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2205PR10) ROBOTICS
PROFESSIONAL ELECTIVE –VI**

IV Year B.Tech II Sem

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Course Objectives:

- The goal of the course is to familiarize the students with the concepts and techniques in robotic engineering, manipulator kinematics, dynamics and control, chose, and incorporate robotic technology in engineering systems
- Make the students acquainted with the theoretical aspects of Robotics
- Enable the students to acquire practical experience in the field of Robotics through design projects and case studies.
- Make the students to understand the importance of robots in various fields of engineering.
- Expose the students to various robots and their operational details.

Course Outcomes:

- **Evaluate and Interpret** the key components and architectures of industrial robotics, including various types of robotic arms, their degrees of freedom, and the design considerations for end effectors, while assessing their current and future applications in automation and robotics.
- **Analyze and Apply** motion analysis techniques, including rotation matrices and homogeneous transformations, to solve problems related to manipulator kinematics, and demonstrate proficiency in calculating forward and inverse kinematics for robotic manipulation scenarios.
- **Construct and Formulate** differential transformations and Jacobians for robotic manipulators, applying Lagrange-Euler and Newton-Euler formulations to develop solutions for dynamic problems and trajectory planning, ensuring effective obstacle avoidance and path planning strategies.
- **Design and Compare** various robot actuators, including pneumatic, hydraulic, and electric stepper motors, and critically assess the performance of feedback components such as position and velocity sensors, enhancing understanding of their roles in robotic systems.
- **Implement and Demonstrate** robotic applications in manufacturing processes, including material handling, welding, and assembly, by conducting practical experiments that highlight the efficiency and effectiveness of robotics in industrial settings.
- **Propose Innovations** in robotic applications by integrating theoretical knowledge with practical insights to address challenges in automation, enhancing the capabilities of robots in manufacturing processes, and exploring potential advancements in the field.

UNIT – I

Introduction: Automation and Robotics, CAD/CAM and Robotics – An overview of Robotics – present and future applications. Components of the Industrial Robotics: common types of arms. Components, Architecture, number of degrees of freedom –

Requirements and challenges of end effectors, Design of end effectors, Precision of Movement: Resolution, Accuracy and Repeatability, Speed of Response and Load Carrying Capacity.

UNIT – II

Motion Analysis: Basic Rotation Matrices, Equivalent Axis and Angle, Euler Angles, Composite Rotation Matrices. Homogeneous transformations as applicable to rotation and translation – problems. Manipulator Kinematics-H notation-H method of Assignment of frames- H Transformation Matrix, joint coordinates and world coordinates, Forward and inverse kinematics – problems on Industrial Robotic Manipulation.

UNIT – III

Differential transformation of manipulators, Jacobians – problems. Dynamics: Lagrange – Euler and Newton – Euler formations – Problems Trajectory planning and avoidance of obstacles, path planning, Slew motion, joint interpolated motion – Straight line motion.

UNIT - IV

Robot actuators and Feedback components: Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors, comparison of Actuators, Feedback components: position sensors – potentiometers, resolvers, encoders – Velocity sensors, Tactile and Range sensors, Force and Torque sensors.

UNIT - V

Robot Application in Manufacturing: Material Transfer - Material handling, loading and unloading- Processing - spot and continuous arc welding & spray painting - Assembly and Inspection.

TEXTBOOKS:

1. Industrial Robotics / Groover M P /Mc Graw Hill
2. Introduction to Industrial Robotics / Ramachandran Nagarajan / Pearson

REFERENCE BOOKS:

1. Robot Dynamics and Controls / Spony and Vidya sagar / John Wiley
2. Robot Analysis and control / Asada ,Slotine / Wiley Inter-Science

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
FUNDAMENTALS OF DBMS(22050E01)
(OPEN ELECTIVE - I)

III Year B.Tech. I Sem

L T P C
3 0 0 3

Course Objectives:

- To understand the basic concepts and the applications of database systems
- To Master the basics of SQL and construct queries using SQL
- To understand the relational database design principles
- To become familiar with the basic issues of transaction processing and concurrency control
- To become familiar with database storage structures and access techniques

Course Outcomes:

- Evaluate the key architectural models and design strategies for Distributed Database Management Systems (DDBMS), including fragmentation and allocation, to recommend optimal design solutions for distributed environments.
- Analyze complex distributed query processing and decomposition techniques to optimize localization of distributed data and apply algorithms for efficient distributed query optimization.
- Formulate strategies for distributed transaction management by applying advanced concurrency control algorithms and deadlock management techniques to ensure transaction integrity and serializability.
- Assess the reliability and fault-tolerance mechanisms in DDBMS, including protocols for managing site failures and network partitioning, to enhance the resilience of distributed systems.
- Develop parallel database system architectures with a focus on data placement, query processing, and load balancing to improve the performance and scalability of distributed data processing.
- Design distributed object-oriented database solutions, applying object-oriented concepts such as inheritance, object identity, and persistence to compare and contrast the functionality of OODBMS and ORDBMS models.

UNIT I:

Data Database: File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS. DBMS Languages – Database users and DBA, Distributed databases.

UNIT II:

DATABASE DESIGNER MODEL: Objects, Attributes and its Type. Entity set and Relationship set – Design Issues of ER model – Constraints, Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas.ER Diagram Notations-Goals of ER Diagram-Weak Entity Set-Views.

UNIT III:

STRUCTURED QUERY LANGUAGE SQL: Overview, The Form of Basic SQL Query - UNION, INTERSECT, and EXCEPT– joins -Nested queries - correlated and uncorrelated-Aggregate Functions, Null values.

UNIT IV:

DEPENDENCIES AND NORMAL FORMS: Importance of a good schema design,:- Problems encountered with bad schema designs, Motivation for normal forms-functional dependencies,-Armstrong's axioms for FD's - Closure of a set of FD's,-Definitions of 1NF,2NF,3NF and BCNF - Decompositions and desirable properties.

UNIT V:

TRANSACTIONS: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability, Serializability by Locks –Locking Systems with Several Lock Modes – Concurrency Control by Timestamps, validation.

TEXTBOOKS:

1. Abraham Silber schatz, Henry F. North, S. Sudarshan, "Database System Concepts ", McGraw-Hill, 6th Edition ,2210.
2. Fundamental of Database Systems, by Elmasri, Nava the, Somayajulu, and Gupta, Pearson Education.

REFERENCES:

1. Raghu Ramakrishnan, Johannes Gehrke,"Database Management System", McGraw Hill. ,3rd Edition 2207.
- 2.Elmasri & Navathe, "Fundamentals of Database System," Addison-Wesley Publishing, 5th Edition, 2208.
- Date. C.J ,“An Introduction to Database”, Addison – Wesley Pub Co, 8th Edition, 2206

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
COMPUTER ORGANIZATION AND OPERATING SYSTEMS(22050E02)
(OPEN ELECTIVE - I)

III Year B. Tech. I Sem**L T P C**
3 0 0 3**Course Objectives:**

- To understand the structure of a computer and its operations.
- To understand the RTL and Micro-level operations and control in a computer.
- Understanding the concepts of I/O and memory organization and operating systems.

Course Outcomes:

- Able to use micro-level operations to control different units in a computer.
- Able to use Operating systems in a computer.
- Analyze the architecture, services, and functionalities of various operating systems, including UNIX and Windows, as well as the concept of virtual machines.
- Understand and analyze the concepts of processes and threads, including their definitions, relationships, states, and transitions, as well as the role of the Process Control Block (PCB) and context switching.
- Design and Evaluate process scheduling foundations and algorithms, including their impact on CPU utilization and performance metrics such as throughput and response time.
- Analyze inter-process communication mechanisms and deadlock management strategies to understand critical sections, race conditions, and prevention techniques.

UNIT - I:

Basic Structure of Computers: Computer Types, Functional Unit, Basic OPERATIONAL Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi Computers, Data Representation, Fixed Point Representation, Floating – Point Representation. Register Transfer Language and Micro Operations: Register Transfer Language, Register Transfer Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit, Instruction Codes, Computer Registers Computer Instructions – Instruction Cycle, Memory – Reference Instructions, Input – Output and Interrupt, STACK Organization, Instruction Formats, Addressing Modes, DATA Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

UNIT - II:

Micro Programmed Control: Control Memory, Address Sequencing, And Micro program Examples, Design of Control Unit, Hard Wired Control, Microprogrammed Control The Memory System: Basic Concepts of Semiconductor RAM Memories, Read-Only Memories, Cache Memories Performance Considerations, Virtual Memories Secondary Storage, Introduction to RAID.

UNIT - III:

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer Modes, Priority Interrupt, Direct Memory Access, Input –Output Processor (IOP),

Serial Communication; Introduction to Peripheral Components, Interconnect (PCI) Bus, Introduction to Standard Serial Communication Protocols like RS232, USB, IEEE 1394.

UNIT - IV:

Operating Systems Overview: Overview of Computer Operating Systems Functions, Protection and Security, Distributed Systems, Special Purpose Systems, Operating Systems Structures- Operating System Services and Systems Calls, System Programs, Operating Systems Generation Memory Management: Swapping, Contiguous Memory Allocation, Paging, Structure of The Page Table, Segmentation, Virtual Memory, Demand Paging, Page-Replacement Algorithms, Allocation of Frames, Thrashing Case Studies - UNIX, Linux, Windows Principles of Deadlock: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock.

UNIT - V:

File System Interface: The Concept of a File, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection. File System Implementation: File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free-Space Management.

TEXT BOOKS:

1. Computer Organization – Carl Hama her, ZvonksVranesic, Safe Zaky, Vth Edition, McGraw,Hill.
2. Computer Systems Architecture – M. Moris Mano, IIIrd Edition, Pearson
3. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, John Wiley.

REFERENCES:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI
3. Fundamentals of Computer Organization and Design - Sivaraama Dandamudi Springer Int. Edition.
4. Operating Systems – Internals and Design Principles, Stallings, sixth Edition–2009, Pearson Education.
5. Modern Operating Systems, Andrew S Tanenbaum 2nd Edition, PHI.
6. Principles of Operating Systems, B.L. Stuart, Cengage Learning, India Edition

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
DATA STRUCTURES USING PYTHON(22050E03)
(OPEN ELECTIVE –II)

III Year B.Tech. II Sem

L T P C

3 0 0 3

Course Objectives:

- To import the basic concepts of data structures and algorithms.
- To understand concepts about searching and sorting techniques
- To understand basic concepts about stacks, queues, lists trees and graphs.
- To enable them to write algorithms for solving problems with the help off fundamental data Structures.

Course Outcomes:

At the end of the course the students are able to:

- For a given Algorithm student will able to analyze the algorithms to determine time & computation complexity and justify the correctness.
- For a given Search problem (Linear Search and Binary Search) student will able to implement it.
- For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
- Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.
- Found national data structures along with their operations (insertion, deletion, traversal) and assess algorithmic efficiency through asymptotic notations.
- Implement and analyze searching techniques, including Linear Search and Binary Search, and determine their computational complexity.

UNIT–I

Introduction: Basic Terminologies: Elementary Data Organizations. Data Structure Operations: insertion, deletion, traversal etc. Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. Searching: Linear Search and Binary Search Techniques implementation using C & Python and their complexity analysis.

UNIT-II

Stack ADT, definition, operations, array and linked implementations in C, applications- infix to postfix conversion, Postfix expression evaluation, Queue ADT, definition and operations, array and linked Implementation sin C, Circular queues-Insertion and deletion operations.

UNIT-III

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Max Priority Queue ADT – implementation - Max Heap-Definition, Insertion in to a Max Heap, Deletion from a MaxHeap.

UNIT-IV

Searching - Linear, Search, Binary. Search, Static Hashing - Introduction, Hash tables, hash functions, Overflow Handling. Sorting – Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

UNIT-V

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations - Adjacency matrix, Adjacency lists, Graph traversals – DFS and BFS. Search Trees –Binary Search Trees, Definition, Operations - Searching, Insertion and Deletion, AVL Trees – Definition and Examples, B-Trees - Definition, Comparison of Search Trees.

TEXT BOOKS:

Fundamentals of Data structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan.

Data structures A Programming Approach with C, D., S.Kushwaha and, A.K. Misra, PHI.

REFERENCE BOOKS:

1. Data structures: A Pseudocode Approach with C, 2nd edition, R. F. Gilbert and B. A. Frozen, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M. A. Weiss, Pearson.
3. Data Structures using C, A. M. Tanenbaum, Y. Langsam, M. J. Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R. Kruse, C. L. Tondoo, D. B. Leung, Pearson.
5. Data Structures and Algorithms made easy in JAVA, 2nd Edition, Narsimha Karumanchi, Career Monk Publications.
6. Data Structures using C, R. Tarija, Oxford University Press.
7. Data Structures. Lipschutz, Schism's Outlines, TMH.
8. Data structures using C, A. K. Sharma, 2nd edition, Pearson..
9. Data Structures using C & C++, R. Shukla, Wiley India.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
ADVANCED COMPILER DESIGN(22050E04)
(OPEN ELECTIVE - II)

III Year B.Tech. II Sem

L T P C

3 0 0 3

Course Objectives:

The purpose of this course is to acquaint the student with an overview of the theoretical foundations of computer science from the perspective of formal languages.

- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- Explain deterministic and non-deterministic machines.
- Comprehend the hierarchy of problems arising in the computer sciences.
- To provide an initial Understanding of language translators,
- Knowledge of various techniques used in compiler construction and also use of the automated tools available in compilers construction.

Course Outcomes:

- Graduate should be able to understand the concept of abstract machines and their power to recognize the languages.
- Attains the knowledge of language classes & grammars relationship among them with the help of Chomsky hierarchy .Demonstrate the ability to design a compiler given a set of language features.
- Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
- Acquire skills in using lex tool & yak tool for developing a scanner and parser.
- Design and implement LL and LR parsers
- Design algorithms to do code optimization in order to improve the performance of a program in terms of space and time complexity.

UNIT – I:

Introduction to Finite Automata: Structural Representations, Central Concepts of Automata Theory and its Applications. Deterministic Finite Automata, Nondeterministic Finite Automata, Finite Automata with Epsilon-Transitions.

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Closure Properties of Regular Language. Equivalence of FA and Regular Expression.

UNIT- II:

Context-Free Grammars: Definition, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Sentential Forms, Parse Trees, Minimization of Context-Free Grammar, Ambiguity in Grammars and Languages.

Compilers: Overview and Phases of a Compiler, Pass and Phases of translation, boot strapping .Lexical Analysis (Scanning): Functions of Lexical Analyzer, Specification of tokens: Regular expressions and Regular grammars for common PL constructs. Recognition of Tokens: Finite Automata in recognition and generation of tokens.

UNIT– III:

Syntax Analysis (Parsing) :Functions of a parser, Classification of parsers. Context free grammars in syntax specification, benefits and usage in compilers. Top down parsing –Definition, types of top down parsers: Backtracking, Recursive descent, Predictive, LL (1), Preprocessing the grammars to be used in top down parsing, Error recovery, and Limitations. Bottom up parsing: Definition, types of bottom up parsing, Handle pruning. Shift Reduce parsing, LR parsers: LR(0), SLR, CALR and LALR parsing.

UNIT– IV:

Semantic analysis: Attributed grammars, Syntax directed definition and Translation schemes, Type checker: functions, type expressions, type systems, types checking of various constructs. Intermediate Code Generation: Functions, different intermediate code forms- syntax tree, DAG, Polish notation, and Three address codes. Translation of different source language constructs into intermediate code.

UNIT -V:

Control flow and Data flow analysis: Flow graphs, Data flow equations, global optimization: Redundant sub expression elimination, Induction variable eliminations, Live Variable analysis Object code generation: Object code forms, machine dependent code optimization, register allocation and assignment generic code generation algorithms, DAG for register allocation.

TEXT BOOKS:

1. Introduction to Automata Theory, Languages, and Computation, 3rd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage Learning.
3. Compilers, Principle, Techniques, and Tools. – Alfred.VAho, Monica S.Lam, Ravi Sethi,Jeffrey D. Ullman ; 2nd Edition, Pearson Education.
4. Modern Compiler implementation in C , - Andrew N.Appel Cambridge University Press

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
JAVA PROGRAMMING(22050E05)
(OPEN ELECTIVE - III)

B.Tech. IV Year I Sem.

L T P C
3 0 0 3

Course Objectives:

To introduce the object-oriented programming concepts.

- To understand object oriented programming concepts and apply them solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes.
- To introduce the implementation of packages and interfaces
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

Course Outcomes:

- Able to solve real world problems using OOP techniques. Able to understand the use of abstract classes.
- Able to solve problems using java collection frame work and I/O classes. Able to develop multi-threaded applications with synchronization.
- Able to develop applets for web applications. Able to design GUI based applications
- Demonstrate the ability to design a compiler given a set of language features.
- Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
- Acquire skills in using lax tool & yaks tool for developing a scanner and parser. Design and implement LL and LR parsers.

UNIT-I:

OOP Concepts:-Data abstraction, encapsulation, inheritance, Benefits of Inheritance, Polymorphism, classes and objects, Procedural and object oriented programming paradigms, The software development process.

Java Programming- History of Java, comments, Data types, Variables, Constants, Scope and Lifetime of variables, Operators, Type conversion and casting, Enumerated types, Control flow-block scope, conditional statements, loops, break and continue statements, simple java standalone programs, arrays, console input and output, constructors, methods, static fields and methods, access control, this reference, overloading methods and constructors, recursion, exploring string class.

Memory Management – garbage collection

UNIT-II

Inheritance – Inheritance hierarchy, super keyword, preventing inheritance: final classes and methods, the Object class and its methods. Polymorphism –dynamic binding, method Over riding, abstract classes and methods. Interfaces –Interfaces Vs Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface.

UNIT-III

Exception handling- Dealing with errors, benefits of exception handling, the classification of exceptions - exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, creating own exception subclasses.

Multithreading – Differences between multiple processes and multiple threads, thread lifecycle, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer pattern.

UNIT-IV

Collection Framework working Java: Introduction to java collections, Overview of java collection framework, commonly used collection classes- Array List, Vector, Hash table and Stack.

Files-Streams-Byte, streams, Character streams, Text input/output, Binary input/output File management using File class.

UNIT-V

GUI Programming with Swing: The AWT class hierarchy, Introduction to Swing, Swing Vs AWT, Hierarchy for Swing components, Overview of some Swing components–Button, Label, J Text Field, Text Area, simple Swing applications, Layout management –Layout manager types–border, grid and flow.

Event Handling- Events, Event sources, Event classes, Event Listeners, Delegation event model, Examples: Handling Mouse and Key events, Adapter classes.

Applets – Inheritance hierarchy for applets, differences between applets and applications, Lifecycle of an applet, passing parameters to applets.

TEXT BOOKS:

Java Fundamentals–A Comprehensive Introduction, Herbert Schildt and Dale Skrien.

REFERENCE BOOKS:

1. Java for Programmers. J. Dixieland H. M. Deitel, PEA (or) Java: How-to Program, P. J. Deitel and H. M. Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.3. Thinking in Java, Bruce Eckel, PE
3. Programming Java, S. Malhotra and S. Choudhary, Oxford Universities
4. Design Patterns Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
CASE TOOLS AND SOFTWARE TESTING(22050E06)
(OPEN ELECTIVE - III)

IV Year B.Tech. I Sem**L T P C**
3 0 0 3**COURSE OBJECTIVES:**

The student should be made to:

- Expose the criteria for test cases.
- Learn the design of test cases.
- Be familiar with test management and test automation techniques.
- Be exposed to test metric sand measurements.

COURSE OUTCOMES:

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

- Design test cases suitable for a software development for different domains.
- Identify suitable tests to be carried out.
- Prepare test planning based on the document.
- Document test plan sand test cases designed.
- Use of automatic testing tools.
- Develop and validate test plan.

UNIT – I**INTRODUCTION:**

Testing as an Eng

ineering Activity – Testing as a Process – Testing axioms – Basic definitions

Software Testing Principles – The Tester’s Role in a Software Development Organization –

Origins of Defects–Cost of defects–Defect Classes–The Defect Repository and Test Design

Defect Examples Developer / Tester Support of Developing a Defect Repository – Defect Prevention strategies.

UNIT- II:**TEST CASE DESIGN**

Test case Design Strategies–Using Black Bod Approach to Test Case Design– Random Testing

Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning –

State based testing–Cause - effect graphing – Compatibility testing – user documentation testing

Domain testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. Structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing– Evaluating Test Adequacy Criteria.

UNIT- III:**LEVELS OF TESTING**

The need for Levers of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests –

The Test Harness–Running the Unit tests and Recording results– Integrationtests– DesigningIntegrationTests–IntegrationTestPlanning–Scenariotesting– DefectbasheliminationSystemTesting – Acceptance testing – Performance testing – Regression Testing – Internationalizationtesting–Ad-hoctesting–Alpha,BetaTests–TestingOOsystems– UsabilityandAccessibilitytesting – Configuration testing – Compatibility testing – Testing the documentation – Website testing.

UNIT– IV:**TEST MANAGEMENT**

People and organizational issues in testing – Organization structures for testing teams – testingservices–TestPlanning–TestPlanComponents–TestPlanAttachments–LocatingTestItems test management – test process – Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building attesting Group.

UNIT – V:**TEST AUTOMATION**

Software test automation – skill needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation Test metric sand measurements– project, progress and productivity metrics

TEXT BOOKS:

- Srinivasan Desikan and Gopala swamy Ramesh, “Software Testing – Principles and Practices”, Pearson Education, 2206.
- Ron Patton, “Software Testing”, Second Edition, Sams Publishing, Pearson Education, 2207.

REFERENCES:

1. Ilene Burnstein,“Practical Software Testing” ,Springer International Edition, 2203.
2. Edward Kit, ”Software Testing in the Real World–Improving the Process”, Pearson Education,1995.
3. Boris Beizer,”Software Testing Techniques”–2ndEdition, Van Nostrand Reinhold, New York, 1990.
4. Aditya P.Mathur, “Foundations of Software Testing_ Fundamental Algorithms and Techniques”, Dorling Kindersley (India) Pvt. Ltd Pearson Education, 2208

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
DATA AND KNOWLEDGE MINING(22050E07)
(OPEN ELECTIVE - IV)

IV Year B. Tech. II –Sem

L T P C
3 0 0 3

Course Objectives:

- To learn data knowledge mining concepts and understand data preprocessing methods
- To analyze association rule in data set and identify the frequent patterns
- To understand classification methods and evaluate classification algorithms
- To implement practical and theoretical understanding of the clustering techniques in data mining
- To develop the abilities of critical analysis in real-time data mining application with its the strengths and limitations

Course Outcomes:

- Ability to perform the preprocessing of data and apply knowledge mining technique son it.
- Ability to identify the association rules in data set and find out the frequent items in real-time transactions
- Ability the classify there all time dataset using Classification algorithms
- Ability to solve real-world problems in business and scientific information.
- Ability to use data Clustering methods
- Ability to analyze the real world data mining applications.

UNIT–I Data Knowledge Mining Introduction:

Introduction - What is Data Mining, Definition, Knowledge Discovery from Data process steps, Challenges, Data Mining Tasks; Data Preprocessing - Data Cleaning, Missing data, Dimensionality Reduction, Attribute Subset Selection, Data Transformation; Measures of Similarity and Dissimilarity.

UNIT–II: Association Rules:

Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation, APRIORI Algorithm, The Partition Algorithms, FP-Growth Algorithms.

UNIT–III: Classification:

Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision Trees-Decision tree Induction, Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction; Naive-Bayes Classifier, Bayesian Belief Networks.

UNIT–IV: Clustering

Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering -K -Means Algorithm, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Specific techniques, Key Issues in Hierarchical Clustering, Strengths and Weakness.

UNIT: V Data Mining Applications

Data Mining for Financial Data Analysis, Data Mining for Retail and Telecommunication Industries–Data Mining in Science and Engineering–Data Mining for Intrusion Detection and Prevention – Data Mining and Recommender Systems.

TEXTBOOKS:

- Data Mining- Concepts and Techniques-Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2nd Edition, 2006.
- Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbach, Pearson Education.

REFERENCEBOOKS:

- Data Mining Techniques, Arun K. Pujari, 3rd Edition, Universities Press.
- Data Mining Principles & Applications
- T. V. Suresh Kumar, Eswar Reddy, Jagadish Skillman, Elsevier.
- Data Mining, Vikram Pudi, P. Radha Krishna, Oxford University Press
- Data Mining Techniques and Applications, Hongbo Du, Cengage India Publishing

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
FULL STACK WEB APPLICATION DEVELOPMENT(22050E08)
(OPEN ELECTIVE - IV)

B. Tech IV Year II Sem**L T P C**
3 0 0 3**Course Objectives:**

- Understand the basics of full-stack development and the various technologies involved.
- Develop skills in Node.js, Mongo DB, Express, and Angular/React to build robust web applications.
- Design and implement a full-stack application using the MERN (Mongo DB, Express, React, Node.js) stack.
- Understand the importance of No SQL databases and their applications.
- Develop problem-solving skills using the full-stack development approach.

Course Outcomes:

- Ability to design and develop a full-stack web application using Node.js, Mongo DB, Express, and Angular/React.
- Understanding of the MVC architecture and its implementation in full-stack development.
- Familiarity with No SQL databases and their integration with Node.js.
- Ability to implement REST full APIs using express and consume them in Angular/React applications.
- Understanding of the importance of modularization, routing, and server-side rendering in full-stack development.
- Describe the foundational concepts of the Internet, including its protocols, history, and essential components like web servers, browsers, and URLs, for understanding the infrastructure of web applications.

UNIT – I: BASICS OF FULL STACK

Understanding the Basic Web Development Framework – User – Browser – Webserver – Backend Services – MVC Architecture – Understanding the different stacks –The role of Express– Angular – Node – Mongo DB – React

UNIT – II: NODE JS

Basics of Node JS – Installation – Working with Node packages – Using Node package manager –Creating a simple Node.js application – Using Events – Listeners –Timers – Call backs – Handling Data I/O – Implementing HTTP services in Node.js

UNIT – III: MONGO DB

Understanding No SQL and Mongo DB – Building Mongo DB Environment – User accounts – Access control – Administering databases – Managing collections – Connecting to MongoDB from Node.js – simple applications

UNIT – IV: EXPRESS AND ANGULAR

Implementing Express in Node.js – Configuring routes – Using Request and Response objects – Angular – Typescript – Angular Components – Expressions – Data binding – Built-in directives

UNIT – V: REACT

MERN STACK – Basic React applications – React Components – React State – Express REST APIs – Modularization and Web pack – Routing with React Router – Server-side rendering.

TEXTBOOKS:

1. Brad Day ley, Brendan Daley, Caleb Daley, ‘Node.js, MongoDB and Angular Web Development’, Addison-Wesley, Second Edition, 2018
2. Vasan Subramanian, ‘Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node’, Second Edition, A press, 2019.

REFERENCES:

1. Chris Northwood, ‘The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer’,Apress; 1st edition, 2018.
2. Kirupa Chinnathambi, ‘Learning React: A Hands-On Guide to Building Web Applications Using React and Redux’, Addison-Wesley Professional, 2nd edition, 2018.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
ADVANCED COMPUTER ARCHITECTURE (22120E01)
(OPEN ELECTIVE - I)

III Year B.Tech. I Sem

L T P C
3 0 0 3

Course Objectives:

- To impart the concepts and principles of parallel and advanced computer architectures.
- To develop the design techniques of Scalable and multithreaded Architectures
- To Apply the concepts and techniques of parallel and advanced computer architectures to design modern computer systems

Course Outcomes:

- Analyze various parallel computer models, program partitioning techniques, and system interconnect architectures to assess their impact on computing performance.
- Evaluate the principles of scalable performance and apply performance metrics and measures to determine the efficiency of parallel processing systems.
- Design effective memory hierarchy and pipeline systems, including superscalar and vector processors, to enhance computational throughput.
- Examine the architectures of multiprocessors, multi-computers, and SIMD systems to propose optimized solutions for parallel and scalable processing.
- Critique the mechanisms of cache coherence, synchronization, and message-passing in parallel architectures to ensure data consistency and efficient communication.
- Develop scalable and multithreaded architectures using latency-hiding techniques and multithreading principles to solve computationally intensive tasks.

UNIT - I

Theory of Parallelism, Parallel computer models, The State of Computing, Multiprocessors and Multi computers, Multi vector and SIMD Computers, PRAM and VLSI models, Architectural development tracks, Program and network properties, Conditions of parallelism, Program partitioning and Scheduling, Program flow Mechanisms, System interconnect Architectures.

UNIT - II

Principals of Scalable performance, Performance metrics and measures, Parallel Processing applications, Speed up performance laws, Scalability Analysis and Approaches, Hardware Technologies, Processes and Memory Hierarchy, Advanced Processor Technology, Superscalar and Vector Processors, Memory Hierarchy Technology, Virtual Memory Technology.

UNIT – III

Bus Cache and Shared memory, Backplane bus systems, Cache Memory organizations, Shared Memory Organizations, Sequential and weak consistency models, Pipelining and superscalar techniques, Linear Pipeline Processors, Non-Linear Pipeline Processors, Instruction Pipeline design, Arithmetic pipeline design, superscalar pipeline design.

UNIT – IV

Parallel and Scalable Architectures, Multiprocessors and Multi computers, Multiprocessor system interconnects, cache coherence and synchronization mechanism, Three Generations of Multi computers, Message-passing Mechanisms, Multi vector and SIMD computers, Vector Processing Principals, Multi vector Multiprocessors, Compound Vector processing, SIMD computer Organizations, The connection machine CM-5.

UNIT – V

Scalable, Multithreaded and Dataflow Architectures, Latency-hiding techniques, Principals of Multithreading, Fine-Grain Multi computers, Scalable and multithreaded Architectures, Dataflow and hybrid Architectures.

TEXT BOOK:

1. Advanced Computer Architecture Second Edition, Kai Hwang, Tata McGraw Hill Publishers.

REFERENCE BOOKS:

1. Computer Architecture, Fourth edition, J. L. Hennessy and D.A. Patterson. ELSEVIER.
2. Advanced Computer Architectures, S.G. Shiva, Special Indian edition, CRC, Taylor & Francis.
3. Introduction to High Performance Computing for Scientists and Engineers, G. Hager and G. Wellein, CRC Press, Taylor & Francis Group.
4. Advanced Computer Architecture, D. Sima, T. Fountain, P. Kacsuk, Pearson education.
5. Computer Architecture, B. Parhami, Oxford Univ. Press

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN**ADVANCED OPERATING SYSTEMS (22120E02)****(OPEN ELECTIVE - I)****III Year B.Tech. I Sem****L T P C****3 0 0 3****Course Objectives:**

- To study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open source operating systems)
- Hardware and software features that support these systems.

Course Outcomes:

- Understand the design approaches of advanced operating systems
- Analyze the design issues of distributed operating systems.
- Evaluate design issues of multi-processor operating systems.
- Identify the requirements Distributed File System and Distributed Shared Memory.
- Formulate the solutions to schedule the real time applications. Analyze the architecture, services, and functionalities of various operating systems, including UNIX and Windows, as well as the concept of virtual machines.
- Understand and analyze the concepts of processes and threads, including their definitions, relationships, states, and transitions, as well as the role of the Process Control Block (PCB) and context switching. Analyze, understand

UNIT – I

Architectures of Distributed Systems: System Architecture Types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Primitives. Theoretical Foundations: Inherent Limitations of a Distributed System, Lamport's Logical Clocks, Vector Clocks, Causal Ordering of Messages, Termination Detection.

UNIT - II

Distributed Mutual Exclusion: The Classification of Mutual Exclusion Algorithms, Non-Token – Based Algorithms: Lamport's Algorithm, The Ricart Agrawala Algorithm, Maekawa's Algorithm, Token-Based Algorithms: Suzuki-Kasami's Broadcast Algorithm, Signal's Heuristic Algorithm, Raymond's Heuristic Algorithm.

UNIT - III

Distributed Deadlock Detection: Preliminaries, Deadlock Handling Strategies in Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized- Deadlock – Detection Algorithms, Distributed Deadlock Detection Algorithms, Hierarchical Deadlock Detection Algorithms/

UNIT - IV

Multiprocessor System Architectures: Introduction, Motivation for multiprocessor Systems, Basic Multiprocessor System Architectures Multi Processor Operating Systems: Introduction, Structures of Multiprocessor Operating Systems, Operating Design Issues, Threads, Process Synchronization, Processor Scheduling. Distributed File Systems: Architecture, Mechanisms for Building Distributed File Systems, Design Issues

UNIT - V

Distributed Scheduling: Issues in Load Distributing, Components of a Load Distributed Algorithm, Stability, Load Distributing Algorithms, and Requirements for Load Distributing, Task Migration, and Issues in task Migration Distributed Shared Memory: Architecture and Motivation, Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, and Design Issues

TEXT BOOK:

1. Advanced Concepts in Operating Systems, Mukesh Singhal, Niranjana G. Shivaratri, Tata McGraw-Hill Edition 2001

REFERENCE BOOK:

1. Distributed Systems: Andrew S. Tanenbaum, Maarten Van Steen, Pearson Prentice Hall, Edition – 2, 2007

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN**EMBEDDED SYSTEMS(22120E04)****(OPEN ELECTIVE –II)****III Year B. Tech. II –Sem****L T P C****3 0 0 3****Course Objectives:**

To provide an overview of principles of Embedded System:

- To provide a clear understanding of role of firmware, operating systems in correlation with hardware systems.

Course Outcomes:

- Expected to understand the selection procedure of processors in the embedded domain.
- Design procedure of embedded firm ware. Expected to visualize the role of real-time operating systems in embedded systems.
- Expected to evaluate the correlation between task synchronization and latency issues
- Develop critical-thinking skills, analyze real-world problems, and understand the power of narrative to create sustainable solutions for local and global communities.
- Understand the scarcity of natural resources and will be able to replace them with alternative energy resources for the sustainability of environmental society & economy.
- Recognize the type of biodiversity along the values & conservation biodiversity and know about the biogeographical regions.

UNIT - I

Introduction to Embedded Systems: Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification of Embedded Systems, Major application areas, Purpose of Embedded Systems, Characteristics and Quality attributes of Embedded Systems.

UNIT – II

The Typical Embedded System: Core of the Embedded System, Memory, Sensors and Actuators, Communication Interface, Embedded Firmware, Other System components.

UNIT - III

Embedded Firmware Design and Development: Embedded Firmware Design, Embedded Firmware Development Languages, Programming in Embedded C.

UNIT – IV

RTOS Based Embedded System Design: Operating System basics, Types of Operating Systems, Tasks, Process, Threads, Multiprocessing and Multi-tasking, Task Scheduling, Threads-Processes-Scheduling putting them together, Task Communication, Task Synchronization, Device Drivers, How to choose an RTOS

UNIT - V

Integration and Testing of Embedded Hardware and Firmware: Integration of Hardware and Firmware, Boards Bring up The Embedded System Development Environment: The Integrated Development Environment (IDE), Types of files generated on Cross-Compilation, Disassembler/DE compiler, Simulators, Emulators and Debugging, Target Hardware Debugging, Boundary Scan.

TEXT BOOKS:

- Shibu K V, “Introduction to Embedded Systems”, Second Edition, Mc Graw Hill.

REFERENCES:

- Raj Kamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill 2. Frank Vahid and Tony Givargis, “Embedded Systems Design” A Unified Hardware/Software Introduction, John Wiley
- Lyla, “Embedded Systems” –Pearson
- David Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
SCRIPTING LANGUAGES (22120E03)
(OPEN ELECTIVE - II)

III Year B Tech. II Sem

L T P C
3 0 0 3

Course Objectives:

- This course introduces the script programming paradigm
- Introduces scripting languages such as Perl, Ruby and TCL. Learning TCL

Course Outcomes:

- Comprehend the differences between typical scripting languages and typical system and application programming languages.
- Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.
- Acquire programming skills in scripting language Identify and apply the tools and technologies enabling web services, benefits and challenges of using web services
- Illustrate SOAP communication and messaging and Implement and Solve anatomy of WSDL definition document and WSDL bindings.
- Analyze Various Discovering Web Services and role of service discovery in a SOA.
- Evaluate and apply Creating Java client for a Web service.

UNIT - I :

Introduction: Ruby, Rails, The structure and Execution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Webservers, SOAP and web services Ruby Tk – Simple Tk Application, widgets, Binding events, Canvas, scrolling

UNIT - II :

Extending Ruby: Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby Type 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, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware Applications, Dirty Hands Internet Programming, security Issues.

UNIT - V

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, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk-Visual Tool Kits, Fundamental Concepts of Tk by example, Events and Binding, Perl-Tk.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3. "Programming Ruby" The Pragmatic Programmers guide by Dave Thomas Second edition

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J. Lee and B. Ware (Addison Wesley) Pearson Education.
2. Perl by Example, E. Quigley, Pearson Education.
3. Programming Perl, Larry Wall, T. Christiansen and J. Or want, O'Reilly, SPD.
4. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
5. Perl Power, J. P. Flynt, Cengage Learning

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
ADVANCED COMPUTER NETWORKS(22120E05)
(OPEN ELECTIVE - III)

B.Tech. IV Year I Sem.

L T P C
3 0 0 3

Course Objectives:

- To understand the details of web services technologies like WSDL, UDDI, SOAP
- To learn how to implement and deploy web service client and server
- To explore interoperability between different frameworks

Course Outcomes:

- Basic details of WSDL, UDDI, SOAP
- Implement WS client and server with interoperable systems
- Describe the essential aspects of data communication models and interconnection devices such as OSI and ISO models, different connection types and topologies, and different protocols.
- Apply a variety of multiplexing and switching techniques in order to assess the capabilities in terms of different media technologies at the physical layer and their various implementations.
- Make use of error detection and correction methods such as LRC, CRC as well as Hamming code in order to improve the reliability of the data link layer, flow control and error control strategies in channels with noise and channels without noise.
- Interpret the functions of network layer protocols in terms of ICMP, IGMP, and routing protocols so as to understand their influence on logical addressing, address mapping, and routing processes in an internetwork.

UNIT – I

Evolution and Emergence of Web Services - Evolution of distributed computing, Core distributed computing technologies – client/server, CORBA, JAVA RMI, Microsoft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA). Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services. Web Services Architecture – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication models, basic steps of implementing web services.

UNIT - II

Fundamentals of SOAP – SOAP Message Structure, SOAP encoding, Encoding of different data types, SOAP message exchange models, SOAP communication and messaging, Java and Axis, limitations of SOAP.

UNIT - III

Describing Web Services – WSDL – WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL.

UNIT – IV

Discovering Web Services – Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI – UDDI registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, Publishing API, Publishing, searching and deleting information in a UDDI Registry, limitations of UDDI.

UNIT - V

Web Services Interoperability – Means of ensuring Interoperability, Overview of .NET, creating a .NET client for an Axis Web Service, creating Java client for a Web service, Challenges in Web Services Interoperability. Web Services Security – XML security framework, Goals of Cryptography, Digital signature, Digital Certificate, XML Encryption.

TEXT BOOK:

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.

REFERENCE BOOKS:

1. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier
2. Building Web Services with Java, 2nd Edition, S. Graham and others, Pearson Edn.
3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SPD. 4. Web Services, G. Alonso, F. Casati and others, Springer.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
ADVANCED ALGORITHMS (22120E06)
(OPEN ELECTIVE - III)

IV Year B.Tech. I – Sem

L T P C
3 0 0 3

Course Objectives:

- Introduces the recurrence relations for analyzing the algorithms
- Introduces the graphs and their traversals.
- Describes major algorithmic techniques (divide-and-conquer, greedy, dynamic programming, Brute Force, Transform and Conquer approaches) and mention problems for which each technique is appropriate;
- Describes how to evaluate and compare different algorithms using worst-case, average-case and best-case analysis.
- Introduces string matching algorithms
- Introduces linear programming.

Course Outcomes:

- Analyze the role of algorithms in computing and solve recurrence relations using probabilistic analysis and randomized approaches.
- Design and evaluate efficient sorting techniques, including heap sort, quick sort, and linear time sorting algorithms.
- Apply dynamic programming and greedy techniques to solve real-world optimization problems like matrix chain multiplication, Huffman codes, and graph algorithms.
- Construct and analyze advanced structures such as sorting networks and matrix operations for solving complex computational problems.
- Implement string-matching algorithms, including Rabin-Karp and Knuth-Morris-Pratt, to efficiently search patterns in text.
- Assess NP-completeness and develop approximation algorithms to address computationally hard problems like vertex cover and traveling salesperson.

UNIT - I

Introduction: Role of Algorithms in computing, Order Notation, Recurrences, Probabilistic Analysis and Randomized Algorithms. Sorting and Order Statistics: Heap sort, Quick sort and Sorting in Linear Time. Advanced Design and Analysis Techniques: Dynamic Programming- Matrix chain Multiplication, Longest common Subsequence and optimal binary Search trees.

UNIT - II

Greedy Algorithms - Huffman Codes, Activity Selection Problem. Amortized Analysis. Graph Algorithms: Topological Sorting, Minimum Spanning trees, Single Source Shortest Paths, Maximum Flow algorithms.

UNIT - III

Sorting Networks: Comparison Networks, Zero-one principle, bionic Sorting Networks, Merging Network, and Sorting Network. Matrix Operations- Strassen's Matrix Multiplication, Inverting matrices, solving system of linear Equations

UNIT - IV

String Matching: Naive String Matching, Rabin-Karp algorithm, matching with finite Automata, Knuth Morris - Pratt algorithm.

UNIT- V

NP-Completeness and Approximation Algorithms: Polynomial time, polynomial time Verification, NP-Completeness and reducibility, NP-Complete problems. Approximation Algorithms- Vertex cover Problem, Travelling Sales person problem

TEXT BOOK:

1. Introduction to Algorithms," T.H. Carmen, C.E. Leadsperson, R.L. Rivets, and C. Stein, Third Edition, PHI.

REFERENCE BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.
2. Design and Analysis Algorithms - Parag Himanshu Dave, Himanshu Bhalchandra Dave Publisher: Pearson
3. Algorithm Design: Foundations, Analysis and Internet examples, M.T. Goodrich and R. Tomassia, John Wiley and sons.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
COMPUTATIONAL COMPLEXITY(22120E07)
(OPEN ELECTIVE - IV)

IV Year B Tech. II Sem

L T P C
3 0 0 3

Course Objectives:

- Introduces to theory of computational complexity classes
- Discuss about algorithmic techniques and application of these techniques to problems.
- Introduce to randomized algorithms and discuss how effective they are in reducing time and space complexity. Discuss about Graph based algorithms and approximation algorithms
- Discuss about search trees

Course Outcomes:

- Ability to classify decision problems into appropriate complexity classes
- Ability to specify what it means to reduce one problem to another, and construct reductions for simple examples.
- Ability to classify optimization problems into appropriate approximation complexity classes.
- Ability to choose appropriate data structure for the given problem.
- Ability to choose and apply appropriate design method for the given problem.
- Demonstrates knowledge of various computing paradigms, including cloud, distributed, and emerging technologies like bio and quantum computing.

UNIT – I

Computational Complexity: Polynomial time and its justification, Nontrivial examples of polynomial-time algorithms, the concept of reduction (reducibility), Class P Class NP and NP-Completeness, The P versus NP problem and why it's hard.

UNIT - II

Algorithmic paradigms: Dynamic Programming – Longest common subsequence, matrix chain multiplication, knapsack problem, Greedy – 0-1 knapsack, fractional knapsack, scheduling problem, Huffman coding, MST, Branch-and-bound – travelling sales person problem, 0/1 knapsack problem, Divide and Conquer – Merge sort, binary search, quick sort.

UNIT - III

Randomized Algorithms: Finger Printing, Pattern Matching, Graph Problems, Algebraic Methods, Probabilistic Primality Testing, De-Randomization Advanced Algorithms.

UNIT - IV

Graph Algorithms: Shortest paths, Flow networks, Spanning Trees; Approximation algorithms, Randomized algorithms. Approximation algorithms: Polynomial Time Approximation Schemes.

UNIT - V

Advanced Data Structures and applications: Decision Trees and Circuits, B-Trees, AVL Trees, Red and Black trees, Dictionaries and tries, Maps, Binomial Heaps, Fibonacci Heaps, Disjoint sets, Union by Rank and Path Compression

TEXT BOOKS:

1. T. Cormen, C. Leiserson, R. Rivest and C. Stein, Introduction to Algorithms, Third Edition, McGraw-Hill, 2009.
2. R. Motwani and P. Raghavan, Randomized Algorithms, Cambridge University Press, 1995.
3. J. J. McConnell, Analysis of Algorithms: An Active Learning Approach, Jones & Bartlett Publishers, 2001.
- 4 D. E. Knuth, Art of Computer Programming, Volume 3, Sorting and Searching, Second Edition, Addison-Wesley Professional, 1998.
5. S. Dasgupta, C. H. Papadimitriou and U. V. Vazirani, Algorithms, McGraw-Hill, 2008.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN**ROBOTIC PROCESS AUTOMATION(22120E08)****(OPEN ELECTIVE - IV)****B. Tech. IV Year II Sem****L T P C****3 0 0 3****Course Objectives:**

Aim of the course is to make learners familiar with the concepts of Robotic Process Automation.

Course Outcomes:

- Identify and understand Web Control Room and Client Introduction.
- Understand how to handle various devices and the workload.
- Understand Bot creators, Web recorders and task editors.
- **Evaluate and interpret** the key components and architectures of industrial robotics, including various types of robotic arms, their degrees of freedom, and the design considerations for end effectors, while assessing their current and future applications in automation and robotics.
- **Analyze and Apply** motion analysis techniques, including rotation matrices and homogeneous transformations, to solve problems related to manipulator kinematics, and demonstrate proficiency in calculating forward and inverse kinematics for robotic manipulation scenarios.
- **Construct and Formulate** differential transformations and Jacobians for robotic manipulators, applying Lagrange-Euler and Newton-Euler formulations to develop solutions for dynamic problems and trajectory planning, ensuring effective obstacle avoidance and path planning strategies.

UNIT – I

Introduction to Robotic Process Automation & Bot Creation Introduction to RPA and Use cases – Automation Anywhere Enterprise Platform – Advanced features and capabilities – Ways to create Bots.

UNIT – II

Web Control Room and Client Introduction - Features Panel - Dashboard (Home, Bots, Devices, Audit, Workload, Insights) - Features Panel – Activity (View Tasks in Progress and Scheduled Tasks) - Bots (View Bots Uploaded and Credentials).

UNIT - III

Devices (View Development and Runtime Clients and Device Pools) - Workload (Queues and SLA Calculator) - Audit Log (View Activities Logged which are associated with Web CR) - Administration (Configure Settings, Users, Roles, License and Migration) - Demo of Exposed API's – Conclusion – Client introduction and Conclusion.

UNIT – IV

Bot Creator Introduction – Recorders – Smart Recorders – Web Recorders – Screen Recorders - Task Editor – Variables - Command Library – Loop Command – Excel Command – Database Command - String Operation Command - XML Command.

UNIT - V

Terminal Emulator Command - PDF Integration Command - FTP Command - PGP Command - Object Cloning Command - Error Handling Command - Manage Windows Control Command - Workflow Designer - Report Designer.

TEXT BOOKS:

1. Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool – Ui Path: Create Software robots. with the leading RPA tool – Ui Path Kindle Edition.

REFERENCES:

1. Robotic Process Automation A Complete Guide - 2020 Edition Kindle Edition

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
KNOWLEDGE REPRESENTATION AND REASONING(22660E01)
(OPEN ELECTIVE - I)

III Year B.Tech. I-Sem

L T P C
3 0 0 3

Course outcome:

- **Analyze** the evolution, types, and characteristics of knowledge-based expert systems to understand their role in decision-making processes.
- **Evaluate** various knowledge representation schemes, including logic, rules, and semantic networks, to develop robust rule-based systems.
- **Design** expert system architectures using appropriate methods of inference, expert system shells, and AI programming languages for effective problem-solving.
- **Apply** conceptual data analysis and plausible reasoning techniques to handle uncertainty in expert systems and implement pattern matching and modular design strategies.
- **Critique** different production-rule programming approaches, comparing their effectiveness through case studies and practical applications.
- **Develop** expert systems by integrating suitable tools, languages, and methodologies, demonstrating their application in real-world scenarios through comprehensive case studies.

UNIT – I:

An Introduction to Knowledge Engineering, the history of knowledge-based expert systems, Types of Knowledge based systems, Characteristics of current expert systems, Basic concepts for building expert systems.

UNIT – II:

Knowledge Representation & Reasoning- Logic, Rules & representation, Developing Rules based system & Semantic Networks, Knowledge Acquisition, Knowledge representation schemes.

UNIT – III:

Building the Expert System, architecture of expert systems, Constructing an expert system, methods of inference. Expert systems shells, Development of environments, Use of AI Language.

UNIT – IV:

Conceptual data analysis; plausible reasoning techniques, Tools for building expert systems. Reasoning under uncertainty, Introduction to Clips, Pattern matching, Modular design and execution control.

UNIT – V:

Production-rule programming, Issues and case studies. Comparing different Approaches. Language and Tools for Knowledge Engineering, Expert system design examples, A Case Study in Knowledge Engineering.

TEXT BOOKS:

1. Joseph C Giarratano, Gary D Riley, Expert Systems – Principles & Programming, Third Edition, Course Technology Publishers.
2. Simon Kendal & Malcolm Creen, An Introduction to Knowledge Engineering, Springer Publishers, 2007.

REFERENCE BOOKS:

1. Buchanan, B. B. & Shortliffe, E. H. Building Expert Systems with Production Rules: The Mycin Experiments. Addison-Wesley Publishing Company
2. Davis, R. & Lenat, D. B. Knowledge-Based Systems in Artificial Intelligence. McGraw-Hill International Book Company
3. Hayes-Roth, F., Waterman, D. A. & Lenat, D. B. (eds) Building Expert Systems. Addison Wesley Publishing Company, Inc.
4. Torsun, I. S. Expert Systems: State of the Art, Addison-Wesley Publishing Company

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
NEURAL NETWORKS(22660E02)
(OPEN ELECTIVE - I)

III Year B.Tech. I-Sem

L T P C
3 0 0 3

Course Objectives:

- To understand Fuzzy set and logic control.
- To analyze Adaptive Fuzzy Systems.
- To understand the operation of Artificial Neural Networks.
- To understand mapping and recurrent networks operation.
- To observe various case studies.

Course Outcomes:

- Able to understand Fuzzy set and logic control.
- Able to analyze Adaptive Fuzzy Systems.
- Able to Understand the operation of Artificial Neural Networks.
- Able to understand mapping and recurrent networks operation.
- Able to observe various case studies.
- Deconstruct different associated models like Hopfield networks and Boltzmann machines, focusing on their structure, function, and applications in neural computation.

UNIT – I:

Fuzzy Set Theory and Fuzzy Logic Control: Basic concepts of fuzzy sets- Operations on fuzzy sets Fuzzy relation equations- Fuzzy logic control Fuzzification –Defuzzification- Knowledge base- Decision making logic Membership functions – Rule base.

UNIT – II:

Adaptive Fuzzy Systems: Performance index- Modification of rule base- Modification of membership functions- Simultaneous modification of rule base and membership functions- Genetic algorithms Adaptive fuzzy system Neuro fuzzy systems.

UNIT – III:

Artificial Neural Networks: Introduction- History of neural networks- multilayer perceptions- Back algorithm and its Variants- Different types of learning, examples.

UNIT – IV:

Mapping and Recurrent Networks: Counter propagation –Self organization Map- Congnitrone and Neocognitrone- Hopfield Net- Kohonen Nets- Grossberg Nets- Art-I, Art-II reinforcement learning .

UNIT – V:

Case Studies: Application of fuzzy logic and neural networks to Measurement- Control- Adaptive Neural Controllers – Signal Processing and Image Processing.

TEXT BOOK:

1. Vallum B.R And Hayagriva V.R C++, Neural networks and Fuzzy logic, BPB Publications, New Delhi, 1996.

REFERENCE BOOKS:

1. Fuzzy logic & Neural Networks/ Chennakesava R. Alavala/ New Age International, 2008.
2. Neural Networks for control, Millon W. T, Sutton R.S and Werbos P. J, MIT Press 1992.
3. Fuzzy sets Fuzzy logic, Klir, G. J and Yuan B.B Prentice Hall of India Pvt. Ltd., New Delhi.
4. Neural Networks and Fuzzy systems, Kosko.. Prentice hall of India Pvt. Ltd., New Delhi 1994.
5. Introduction to Fuzzy control, Dirankov D. Hellendoorn H, Reinfrank M., Narosa Publications House, New Delhi 1996.
6. Introduction to Artificial Neural systems, Zurada J. M Jaico Publishing House, New Delhi 1994.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
ADVANCED ARTIFICIAL INTELLIGENCE(22660E03)
(OPEN ELECTIVE –II)

III Year B.Tech. II –Sem

L T P C
3 0 0 3

Course Objectives:

- Introduce and define the meaning of Intelligence and explore various paradigms for knowledge encoding in computer systems.
- Introduce subfields of AI such as NLP, Game Playing, Bayesian Models, etc.

Course Outcomes:

- Identify problems where artificial intelligence techniques are applicable.
- Understand the relation between AI & various domains.
- Apply selected basic AI techniques; judge applicability of more advanced techniques.
- Participate in the design of systems that act intelligently and learn from experience.
- Evaluate and Distinguish between generative and discriminative modeling approaches by analyzing their applications in artificial intelligence, identifying the core principles of generative modeling, and articulating their relevance in current AI advancements.
- Construct and Analyze Variational Autoencoders (VAEs) by implementing their architecture, training processes, and evaluation methods, while applying learned concepts to generate novel data such as images or other relevant outputs, as demonstrated in case studies.

UNIT - I:

Introduction to AI: Introduction to Artificial Intelligence, History of AI, Logic and Computation, Artificial Intelligence Languages, Multi Agent Systems

UNIT – II:

State Space Search and Heuristic Search Techniques: Defining problems as State Space search, Production systems and characteristics, Hill Climbing, Breadth first and depth first search, Best first search.

UNIT – III:

Knowledge Representation and Reasoning : Representations and Mappings, Approaches to knowledge representation, Representing simple facts in logic, Computable functions and predicates, Procedural vs Declarative knowledge, Logic Programming, Forward vs backward reasoning.

UNIT – IV:

Symbolic Logic and Statistical Reasoning, Symbolic Logic: Non-monotonic Reasoning, Logics for non-monotonic reasoning Statistical Reasoning: Probability and Bayes Theorem, Certainty factors, Probabilistic Graphical Models, Bayesian Networks, Markov Networks, Fuzzy Logic.

UNIT – V:

Important Applications: Introduction to Natural Language Processing, Hopfield Networks, Neural Networks, Recurrent Networks, Symbolic AI.

TEXT BOOKS:

1. Artificial Intelligence' R B Mishra, PHI.
2. Artificial Intelligence: A Modern Approach, Stuart Russel, Peter Norvig.
3. Artificial Intelligence, 2nd Edition, Rich and Knight.

REFERENCES:

1. Artificial Intelligence: A Modern Approach, Stuart Russel, Peter Norvig.
2. Artificial Intelligence, 2nd Edition, Rich and Knight.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
REINFORCEMENT LEARNING(22660E04)
(OPEN ELECTIVE - II)

III Year B.Tech. II-Sem

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Course Objectives:

- Knowledge on fundamentals of reinforcement learning and the methods used to create agents that can solve a variety of complex tasks.

Course Outcomes:

- **Apply** the principles of probability and linear algebra to analyze stochastic multi-armed bandit problems and implement algorithms like UCB and Thompson Sampling.
- **Evaluate** Markov Decision Processes and reward models to determine optimal policies using Bellman's optimality operator and iterative methods.
- **Implement** reinforcement learning techniques, including model-based algorithms and Monte Carlo methods, to address prediction and control problems.
- **Analyze** model-free control algorithms, such as Q-learning and Sarsa, to solve reinforcement learning problems with bootstrapping and TD(0) methods.
- **Design** advanced reinforcement learning strategies, including n-step returns, TD(λ), and policy gradient methods, for practical applications requiring generalization.
- **Develop** function approximation techniques and explore advanced methods like tile coding, experience replay, and Fitted Q Iteration through case studies.

UNIT – I:

Basics of probability and linear algebra, Definition of a stochastic multi-armed bandit, Definition of regret, Achieving sublinear regret, UCB algorithm, KL-UCB, Thompson Sampling.

UNIT – II:

Markov Decision Problem, policy, and value function, Reward models (infinite discounted, total, finite horizon, and average), Episodic & continuing tasks, Bellman's optimality operator, and Value iteration & policy iteration

UNIT – III:

The Reinforcement Learning problem, prediction and control problems, Model-based algorithm, Monte Carlo methods for prediction, and Online implementation of Monte Carlo policy evaluation

UNIT – IV:

Bootstrapping; TD(0) algorithm; Convergence of Monte Carlo and batch TD(0) algorithms; Model-free control: Q-learning, Sarsa, Expected Sarsa.

UNIT – V:

n-step returns; TD(λ) algorithm; Need for generalization in practice; Linear function approximation and geometric view; Linear TD(λ). Tile coding; Control with function

approximation; Policy search; Policygradient methods; Experience replay; Fitted Q Iteration; Case studies.

TEXT BOOKS:

1. “Reinforcement learning: An introduction,” First Edition, Sutton, Richard S., and Andrew G.Barto, MIT press 2020.
2. “Statistical reinforcement learning: modern machine learning approaches,” First Edition, Sugiyama, Masashi. CRC Press 2015.

REFERENCE BOOKS:

1. “Bandit algorithms,” First Edition, Lattimore, T. and C. Szepesvári. Cambridge University Press.2020.
2. “Reinforcement Learning Algorithms: Analysis and Applications,” Boris Belousov, Hany Abdulsamad, Pascal Klink, Simone Parisi, and Jan Peters First Edition, Springer 2021.
3. Alexander Zai and Brandon Brown “Deep Reinforcement Learning in Action,” First Edition, Manning Publications 2020.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
DEEP LEARNING USING PYTHON(2266OE05)
(OPEN ELECTIVE - III)

B.Tech. IV Year I Sem.

L T P C
3 0 0 3

Course Objectives:

- To acquire the knowledge of Deep Learning Concepts
- To gain knowledge to apply Optimization strategies.
- To be capable of performing experiments in deep learning using real world data
- To improve the performance of the deep learning.
- To learn supervised and unsupervised models.

Course Outcomes:

- Ability to select the Learning Networks in modeling real world systems.
- Build own deep learning project.
- Differentiate between machine learning, deep learning and artificial Intelligence.
- Ability to use an efficient algorithm for Deep Models.
- Ability to learn deep neural network implementation using the Tensor Flow and Keras.
- Ability to learn deeply.

UNIT - I:

Introduction to Deep Learning: History of Deep Learning, Introduction to Tensor Flow: Computational Graph, Creating a graph, Gradient Descent, Tensor Board, Keras Perceptron's: What is a Perceptron, XOR Gate.

UNIT - II:

Activation Functions: Sigmoid, ReLU, Hyperbolic Fns, SoftMax

UNIT -III:

Backpropagation: Optimization and Regularization, Overfitting and Capacity, Cross Validation, Feature Selection, Regularization, Hyper parameters.

UNIT – IV:

Introduction to Convolution Neural Networks: Kernel filter, Principles behind CNNs, Multiple Filters, CNN applications. Introduction to Recurrent Neural Networks, Introduction to Auto Encoders.

UNIT - V:

Deep learning Applications: ImageNet- Detection –Audio Wave Net,-Natural LanguageProcessing, Bioinformatics-Face Recognition.

TEXT BOOK:

1. Good fellow, Bengio, Y., and Courville, A., Deep Learning, MIT Press, 2016.

REFERENCES:

1. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006.
2. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.
3. Golub, G.,H., and Van Loan,C.,F., Matrix Computations, JHU Press,2013.
4. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education,2004.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN**EDGE ANALYTICS(2266OE06)****(OPEN ELECTIVE - III)****IV Year B.Tech. I –Sem****L T P C****3 0 0 3****Course Objectives:**

- Knowledge on how edge computing and Internet of Things (IoT) can be used as a way to meet application demands in intelligent IoT systems.

Course Outcomes:

- Analyze the purpose, definitions, and use cases of IoT and Edge Computing to distinguish between Edge, Fog, and M2M communication models.
- Evaluate IoT architectures and core modules by applying Metcalfe's and Beckstrom's laws to understand the value of a connected ecosystem in real-world deployments like telemedicine.
- Design IoT applications using Raspberry Pi by configuring its hardware and software, interfacing sensors, and implementing functionalities like web servers, image, and video processing.
- Implement device interfacing and edge-to-cloud communication using protocols like MQTT, detailing its architecture, packet structure, and state transitions through practical examples.
- Develop solutions for industrial and commercial IoT use cases by leveraging Edge Computing frameworks and Raspberry Pi's capabilities.
- Compare various IoT and Edge Computing architectures and solutions to propose optimized approaches for handling complex applications in industrial and commercial scenarios

.UNIT – I:

IoT and Edge Computing Definition and Use Cases: Introduction to Edge Computing Scenario's and Use cases - Edge computing purpose and definition, Edge computing use cases, Edge computing hardware architectures, Edge platforms, Edge vs Fog Computing, Communication Models - Edge, Fog and M2M.

UNIT – II:

IoT Architecture and Core IoT Modules-A connected ecosystem, IoT versus machine-to-machine versus, SCADA, The value of a network and Metcalfe's and Beckstrom's laws, IoT and edge architecture, Role of an architect, Understanding Implementations with examples- Example use case and deployment, Case study – Telemedicine palliative care, Requirements, Implementation, Use case retrospective.

UNIT – III:

Raspberry Pi: Introduction to Raspberry Pi, About the Raspberry Pi Board: Hardware Layout and Pinouts, Operating Systems on Raspberry Pi, Configuring Raspberry Pi, Programming Raspberry Pi, Connecting Raspberry Pi via SSH, Remote access tools, Interfacing DHT Sensor with Pi, Pi as Webserver, PiCamera, Image & Video Processing using Pi.

UNIT – IV:

Implementation of Microcomputer Raspberry Pi and device Interfacing, Edge to Cloud Protocols-Protocols, MQTT, MQTT publish-subscribe, MQTT architecture details, MQTT state transitions, MQTT packet structure, MQTT data types, MQTT communication formats, MQTT 3.1.1 working example..

UNIT – V:

Edge computing with RaspberryPi, Industrial and Commercial IoT and Edge, Edge computing and solutions.

TEXT BOOKS:

1. IoT and Edge Computing for Architects - Second Edition, by Perry Lea, Publisher: Packt Publishing, 2020.
2. Raspberry Pi Cookbook, 3rd Edition, by Simon Monk, Publisher: O'Reilly Media, Inc., 2019.

REFERENCES:

1. Fog and Edge Computing: Principles and Paradigms by Rajkumar Buyya, Satish Narayana Srirama, Wiley publication, 2019, ISBN: 9781119524984.
2. David Jensen, "Beginning Azure IoT Edge Computing: Extending the Cloud to the Intelligent Edge, MICROSOFT AZURE.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
COGNITIVE COMPUTING & APPLICATIONS (2266OE07)
(OPEN ELECTIVE - IV)

IV Year B.Tech. II –Sem

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Course objectives:

- Appealing new model or paradigm for application development using cognitive computing
- To identify and evaluate patterns and complex relationships in large and unstructured data sets.
- Evaluate data in context and presenting relevant findings along with the evidence that justifies the answers.
- To evaluate IBM's Watson question-answering technology.
- To know how solve the case studies of cognitive computing.

Course outcomes:

- **Analyze** the foundational principles of cognitive computing, including artificial intelligence, cognition, and the elements that define cognitive systems, to understand their role in gaining insights from data.
- **Evaluate** the design principles of cognitive systems, such as building the corpus, integrating data, and employing machine learning, to enhance hypothesis generation and visualization services.
- **Apply** natural language processing (NLP) techniques, including lexical analysis, syntactic analysis, and Hidden Markov models, to solve real-world business problems like fraud detection and customer experience enhancement.
- **Examine** the architecture and components of Watson as a cognitive system, including question analysis, hypothesis generation, and scoring, to explore its commercial applications and advancements in AI research.
- **Develop** cognitive solutions for healthcare and other domains by utilizing predictive, text, image, and speech analytics in platforms like IBM Watson and Google TensorFlow.
- **Critique** the effectiveness of cognitive systems in case studies, such as AI for cancer detection and cognitive assistants, to propose innovative approaches for practical applications.

UNIT – I:

Foundations of Cognitive Computing: Cognitive computing as new generation, uses of cognitive systems, what makes system cognitive, gaining insights from data, Artificial intelligence-the foundation, understanding cognition, Understanding complex relationships, the elements of cognitive systems.

UNIT – II:

Design Principles of Cognitive Systems: Components of cognitive systems, Building the Corpus, Bringing data into the cognitive system, Machine learning, Hypothesis generation and scoring, Presentation and visualization services.

UNIT – III:

Natural Language Processing-Support of Cognitive System, The role of NLP in a cognitive system, Understanding linguistics, Phonology, morphology, lexical analysis, syntax and

syntactic analysis, importance of Hidden Markov models, Semantic Web, Applying natural language technologies to business problems, enhancing shopping experience, fraud detection.

UNIT-IV:

Watson as a Cognitive System, Watson defined, Advancing research with a “Grand Challenge”, Preparing Watson for jeopardy ,commercial applications, components of deep QA architecture, Question analysis, hypothesis generation, scoring and confidence generation.

UNIT – V:

CASE STUDIES: Cognitive Systems in health care – Cognitive Assistant for visually impaired– AI for cancer detection, Predictive Analytics - Text Analytics - Image Analytics -Speech Analytics –IBM Watson - Introduction to IBM’s Power AI Platform -Introduction to Google’s Tensor Flow Development Environment.

TEXT BOOKS:

1. Hurwitz, Kaufman, and Bowles, “Cognitive Computing and Big Data Analytics”, Wiley, Indianapolis, 2005.
2. Jerome R. Busemeyer, Peter D. Bruza, “Quantum Models of Cognition and Decision”, Cambridge University Press, 2014.
3. Emmanuel M. Pothos, Andy J. Wills, “Formal Approaches in Categorization”, Cambridge University Press, 2011.
4. Nils J. Nilsson, “The Quest for Artificial Intelligence”, Cambridge University Press, 2009.
5. Neil Stillings, Steven E. Weisler, Christopher H. Chase and Mark H. Feinstein, “Cognitive Science: An Introduction”, MIT Press, 1995.

REFERENCES:

1. Judith Hurwitz, Marcia Kaufman, Adrian Bowles, Cognitive Computing and Big Data Analytics, 1st Edition, Wiley Publisher, 2015.
2. Hurwitz, Kaufman, and Bowles, Cognitive Computing and Big Data Analytics, Wiley, Indianapolis, IN, 2005.
3. Peter Finger, Cognitive Computing: A Brief Guide for Game Changers, Meghan Kiffler Press, 1st Edition, 2015.
4. Kai Hwang, Cloud Computing for Machine Learning and Cognitive Applications, MIT Press Publishers, June 2017.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
QUANTUM COMPUTING(2266OE08)
(OPEN ELECTIVE - IV)

B.Tech. IV Year II Sem.

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Course Objectives:

- To introduce the fundamentals of quantum computing.
- The problem-solving approach using finite dimensional mathematics.

Course Outcomes:

- **Analyze** the foundational concepts of linear algebra, complex numbers, and vector spaces to understand their application in quantum computing.
- **Evaluate** the principles of quantum physics, including quantum states, entanglement, and uncertainty, to explain the theoretical underpinnings of quantum computing.
- **Design** quantum circuits and implement quantum gates using the concepts of quantum architecture and hardware to explore the D-Wave quantum architecture and other hardware models.
- **Apply** quantum algorithms, such as Deutsch's Algorithm, Shor's Algorithm, and Grover's Algorithm, to solve computational problems and demonstrate their advantages over classical algorithms.
- **Critique** the impact of quantum computing on cryptography by analyzing current asymmetric algorithms like RSA and Diffie-Hellman and exploring their vulnerabilities in a quantum context.
- **Develop** insights into topological quantum computing and quantum key distribution (QKD) by addressing challenges such as decoherence and advancing secure communication methods.

UNIT – I:

Introduction to Essential Linear Algebra: Some Basic Algebra, Matrix Math, Vectors and Vector Spaces, Set Theory Complex Numbers: Definition of Complex Numbers, Algebra of Complex Numbers, Complex Numbers Graphically, Vector Representations of Complex Numbers, Pauli Matrice, Transcendental Numbers.

UNIT – II:

Basic Physics for Quantum Computing: The Journey to Quantum, Quantum Physics Essentials, Basic Atomic Structure, Hilbert Spaces, Uncertainty, Quantum States, Entanglement Basic Quantum Theory: Further with Quantum Mechanics, Quantum Decoherence, Quantum Electrodynamics, Quantum Chromodynamics, Feynman Diagram Quantum Entanglement and QKD, Quantum Entanglement, Interpretation, QKE.

UNIT – III:

Quantum Architecture: Further with Qubits, Quantum Gates, More with Gates, Quantum Circuits, The D-Wave Quantum Architecture Quantum Hardware: Qubits, How Many Qubits Are Needed? Addressing Decoherence, Topological Quantum Computing, Quantum Essentials.

UNIT – IV:

Quantum Algorithms: What Is an Algorithm? Deutsch's Algorithm, Deutsch-Jozsa Algorithm, Bernstein-Vazirani Algorithm, Simon's Algorithm, Shor's Algorithm, Grover's Algorithm

UNIT – V:

Current Asymmetric Algorithms: RSA, Diffie-Hellman, Elliptic Curve The Impact of Quantum Computing on Cryptography: Asymmetric Cryptography, Specific Algorithms, Specific Applications.

TEXT BOOKS:

1. Nielsen M. A., Quantum Computation and Quantum Information, Cambridge University Press.
2. Dr. Chuck Easttom, Quantum Computing Fundamentals, Pearson.

REFERENCES:

1. Quantum Computing for Computer Scientists by Noson S. Yanofsky and Mirco A. Mannucci.
2. Benenti G., Casati G. and Strini G., Principles of Quantum Computation and Information, Vol. Basic Concepts, Vol.
3. Basic Tools and Special Topics, World Scientific. Pittenger A. O., An Introduction to Quantum Computing Algorithms.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
COMPUTER ORIENTED STATISTICAL METHODS(2267OE01)
(OPEN ELECTIVE - I)

Pre-requisites: Mathematics courses of first year of study.

Course Objectives:

By the end of this course, students will:

1. **Understand the Fundamentals of Probability Theory** and its applications in real-world scenarios.
2. **Analyze Probability Distributions** for single and multiple random variables in data-driven problems.
3. **Explore Sampling Theory and Statistical Inference** for effective data-driven decision-making.
4. **Apply Estimation and Hypothesis Testing** methods to solve practical case studies.
5. **Understand Stochastic Processes and Markov Chains** for modeling real-world phenomena.
6. **Develop Problem-Solving Skills** by integrating probability, statistics, and stochastic models in various applications.

Course Outcomes :

After completing this course, students will be able to:

1. **Apply Probability Theory** to solve real-world case studies and engineering problems. *(Applying)*
2. **Analyze Random Variables and Their Distributions** to derive meaningful insights. *(Analyzing)*
3. **Implement Sampling Techniques and Statistical Inference** for data analysis and interpretation. *(Applying, Evaluating)*
4. **Apply Estimation Methods and Hypothesis Testing** to validate assumptions in research studies. *(Applying, Evaluating)*
5. **Model and Solve Problems Using Stochastic Processes and Markov Chains** in dynamic environments. *(Applying, Creating)*
6. **Integrate Concepts Across Different Units** to solve complex problems in probability and statistics. *(Creating, Evaluating)*

UNIT - I: Probability Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Baye's Rule, Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions.

UNIT - II: Expectation and discrete distributions Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem. Discrete Probability Distributions: Binomial Distribution, Poisson distribution.

UNIT - III: Continuous and Sampling Distributions Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions. Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, t - Distribution, F Distribution.

UNIT - IV: Sample Estimation & Tests of Hypotheses Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the mean, standard error of a point estimate, prediction interval. Two sample: Estimating the difference between two means, Single sample: Estimating a proportion, Two samples: Estimating the difference between two proportions, Two samples: Estimating the ratio of two variances. Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests concerning a single mean, Two samples: tests on two means, One sample: test on a single proportion. Two samples: tests on two proportions, Two- sample tests concerning variances.

UNIT-V: Stochastic Processes and Markov Chains

Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n-step transition probabilities, Markov chain, Steady state condition, Markov analysis.

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics For Engineers & Scientists, 9th Ed. Pearson Publishers

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
DATA VISUALIZATION TECHNIQUES(2267OE02)
(OPEN ELECTIVE - I)

Course Objectives:

- Understand the Fundamentals of Data Visualization and its significance in different fields.
- Explore Various Visualization Techniques for representing multi-dimensional data.
- Develop Skills in Designing and Processing Data for effective visualization.
- Apply Visualization Techniques in Various Domains such as physical sciences, computer science, mathematics, and medical sciences.
- Utilize Virtualization Methods to enhance research and analytical projects.
- Implement Advanced Visualization Tools and Technologies to interpret complex datasets.

Course Outcomes :

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

1. **Interpret and Visualize Objects in Multiple Dimensions** using appropriate techniques. *(Understanding, Applying)*
2. **Design and Process Data for Effective Virtualization** across different applications. *(Applying, Creating)*
3. **Apply Visualization Techniques** in physical sciences, computer science, applied mathematics, and medical sciences. *(Applying, Analyzing)*
4. **Utilize Virtualization Methods in Research Projects** to enhance data representation and decision-making. *(Applying, Creating)*
5. **Compare and Evaluate Different Visualization Tools** for handling large and complex datasets. *(Evaluating, Analyzing)*
6. **Develop Interactive and Scalable Visual Models** for research and industry applications. *(Creating, Applying)*

UNIT - I

Introduction and Data Foundation: Basics - Relationship between Visualization and Other Fields - The Visualization Process - Pseudo code Conventions - The Scatter plot. Data Foundation - Types of Data - Structure within and between Records - Data Preprocessing - Data Sets

UNIT - II

Foundations for Visualization: Visualization stages - Semiology of Graphical Symbols - The Eight Visual Variables - Historical Perspective - Taxonomies - Experimental Semiotics based on Perception Gibsons Affordance theory – A Model of Perceptual Processing.

UNIT - III

Visualization Techniques: Spatial Data: One-Dimensional Data - Two-Dimensional Data – Three Dimensional Data - Dynamic Data - Combining Techniques. Geospatial Data: Visualizing Spatial Data - Visualization of Point Data -Visualization of Line Data - Visualization of Area Data - Other Issues in Geospatial Data Visualization Multivariate

Data: Point-Based Techniques - Line- Based Techniques - Region-Based Techniques - Combinations of Techniques – Trees Displaying Hierarchical Structures – Graphics and Networks- Displaying Arbitrary Graphs/Networks.

UNIT - IV

Interaction Concepts and Techniques: Text and Document Visualization: Introduction - Levels of Text Representations - The Vector Space Model - Single Document Visualizations - Document Collection Visualizations - Extended Text Visualizations Interaction Concepts: Interaction Operators - Interaction Operands and Spaces - A Unified Framework. Interaction Techniques: Screen Space - Object-Space –Data Space -Attribute Space- Data Structure Space - Visualization Structure - Animating Transformations - Interaction Control

UNIT - V

Research Directions in Virtualizations: Steps in designing Visualizations – Problems in designing effective Visualizations- Issues of Data. Issues of Cognition, Perception, and Reasoning. Issues of System Design Evaluation, Hardware and Applications.

TEXT BOOKS:

1. Matthew Ward, Georges Grinstein and Daniel Keim, —Interactive Data Visualization Foundations, Techniques, Applications, 2010.
2. Colin Ware, —Information Visualization Perception for Design, 2nd edition, Morgan Kaufmann Publishers, 2004.

REFERENCE BOOKS:

1. Robert Spence —Information visualization – Design for interaction, Pearson Education, 2nd Edition, 2007.
2. Alexandru C. Telea, —Data Visualization: Principles and Practice, A. K. Peters Ltd, 2008.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2267OE03) DATA WRANGLING WITH PYTHON

(OPEN ELECTIVE - II)

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COURSE OBJECTIVES:

The students will try to learn:

- I The concept and importance of data wrangling using Python.
- II The data cleaning and formatting techniques using Python.
- III The working with Excel, PDF and with non-relational database not supported by SQL using python.
- IV The application of techniques suitable for Web mining applications.
- V Implement Python-based statistical and visualization libraries to identify patterns and anomalies.
- VI Implement Python frameworks for acquiring, processing, and storing data from the web.

COURSE OUTCOMES:

After successful completion of the course, students should be able to:

- CO 1 **Outline** the concept of and the steps in data wrangling process and the python Remember basics necessary for implementing the data wrangling.
- CO 2 **Summarize** the parsing approaches of the Excel as well as PDF Files for Understand devising techniques to deal with uncommon file types.
- CO 3 **Distinguish** between MySQL/Postgre SQL and NoSQL for storing and Analyze acquiring of data to and from the relational and the non-relational databases respectively.
- CO 4 **Explain** the operations involved in formatting and cleaning the data using Understand Python for subsequent data analysis.
- CO 5 **Make use of** python libraries for identifying outliers and correlations in the Apply data, and visualizing the same efficiently.
- CO 6 **Choose** appropriate method of web scraping and crawling based on web site model Apply for acquiring and storing data from world web within python framework.

SYLLABUS:

Unit I: INTRODUCTION TO DATA WRANGLING

What Is Data Wrangling? Importance of Data Wrangling, how is Data Wrangling performed? Tasks of Data Wrangling, Data Wrangling Tools, Introduction to Python, Python Basics, Data Meant to Be Read by Machines, CSV Data, JSON Data, XML Data.

Unit II: WORKING WITH EXCEL FILES AND PDFS

Installing Python Packages, Parsing Excel Files, Getting Started with Parsing, PDFs and Problem Solving in Python, Programmatic Approaches to PDF Parsing, Converting PDF to Text,

Parsing PDFs Using pdf miner, Acquiring and Storing Data, Databases: A Brief Introduction-Relational Databases: MySQL and PostgreSQL, Non-Relational Databases: NoSQL, When to use a Simple File, Alternative Data Storage.

Unit III: DATA CLEANUP

Why Clean Data? Data Cleanup Basics, Identifying Values for Data Cleanup, Formatting Data, Finding Outliers and Bad Data, Finding Duplicates, Fuzzy Matching, RegEx Matching. Normalizing and Standardizing the Data, Saving the Data, determining suitable Data Cleanup, Scripting the Cleanup, Testing with New Data.

Unit IV: DATA EXPLORATION AND ANALYSIS

Exploring Data, Importing Data, Exploring Table Functions, Joining Numerous Datasets, Identifying Correlations, Identifying Outliers, Creating Groupings, Analyzing Data - Separating and Focusing the Data, Presenting Data, Visualizing the Data, Charts, Time-Related Data, Maps, Interactives, Words, Images, Video, and Illustrations, Presentation Tools, Publishing the Data - Open-Source Platforms.

Unit V: WEB SCRAPING

What to Scrape and How, analyzing a Web Page, Network/Timeline, interacting with JavaScript, In-Depth Analysis of a Page, Getting Pages, Reading a Web Page - Reading a Web Page with LXML and XPath, Advanced Web Scraping - Browser-Based Parsing, Screen Reading with Selenium, Screen Reading with Ghost.Py, Spidering the Web - Building a Spider with Scrapy, Crawling Whole Websites with Scrapy.

V. TEXTBOOKS:

1. Jacqueline Kazil& Katharine Jarmul,” Data Wrangling with Python”, O’Reilly MediaInc., 2016.

VI. REFERENCE BOOKS:

1. Dr. Tirthajyoti Sarkar, Shubhadeep,” Data Wrangling with Python: Creating actionable data from raw sources”, Packt Publishing Ltd., 2019.
2. Stefanie Molin,” Hands-On Data Analysis with Pandas”, Packt Publishing Ltd.,2019
3. Allan Visochek,” Practical Data Wrangling”, Packt Publishing Ltd., 2017
4. TyeRattenbury, Joseph M. Hellerstein, Jeffrey Heer, Sean Kandel, Connor Carreras,” Principles of Data Wrangling: Practical Techniques for Data Preparation”, O’Reilly Media Inc., 2017

VII. WEB REFERENCES:

1. <http://www.gbv.de/dms/ilmenau/toc/827365454.PDF>
2. <https://www.udemy.com/course/data-wrangling-with-python/>
3. <http://www.openculture.com/free-online-data-science-courses>
<https://www.classcentral.com/course/dataanalysiswithpython-11177>

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
DATA SCIENCE TOOLS(220670E4)
(OPEN ELECTIVE - II)

COURSE OBJECTIVES:

1. Study basic tools available for data science and analytics
2. Study usage of Excel tool, R and KNIME tool
3. Student will study usage of various data sources with Excel, R and Knime
4. Student will study working with various Charts
5. Student will learn working with various data type

Course Outcomes:

1. Student will gain ability to use Excel
2. Student will gain ability to use R
3. Student will gain ability to use Knime
4. Student will be able to use various nodes available in knime
5. Student will be able to use various data sources with Knime, R
6. Student will be able to draw various Charts, explore data & data preparation.

UNIT I (Data Science and Various Data Science Tools): Introduction to Data Science- Introduction- Definition - Data Science in various fields - Examples Data Preparation – Data Pre-Processing and Data Wrangling with Techniques. Impact of Data Science - Data Analytics Life Cycle Data Science Toolkit.: Brief Introduction to data science tools: SaS, Apache Spark, BigML, Excel, R-Programming, TensorFlow, KNIME, Tableau, PowerBI etc with advantages and disadvantages.

UNIT-II (R – Programming - I) Introduction to R- Features of R – Environment, How to run R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Conclusion, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes, R Programming Structures, Control Statements, Loops, - Looping Over Nonvector Sets,- If-Else, Arithmetic and Boolean Operators and values, Default Values for Argument, Return Values, Functions are Objects, Recursion, Basic Functions - R help functions - R Data Structures. Vectors: Definition-Declaration - Generating - Indexing - Naming - Adding & Removing elements - Operations on Vectors - Recycling - Special Operators - Vectorized if- then else-Vector Equality – Functions for vectors - Missing values - NULL values - Filtering & Subsetting.

UNIT-III (Working With Excel) Introduction: Data Analysis, Excel Data analysis. Working with range names. Tables. Cleaning Data. Conditional formatting, Sorting, Advanced Filtering, Lookup functions, Pivot tables, Data Visualization, Data Validation. Understanding Analysis tool pack: Anova, correlation, covariance, moving average, descriptive statistics, exponential smoothing, fourier Analysis, Random number generation, sampling, t-test, f-test, and regression.

UNIT-IV (Working with KNIME) KNIME : Organizing your work, Nodes, Meta nodes, Ports, Flow variables, Node views. User Interface. Data Preparation: Importing Data-Database, tabular files, web services. Transforming the Shape- Filtering rows, Appending tables ,Less columns,

More columns, Group By, Pivoting and Unpivoting, One2Many and Many2One, Cosmetic transformations. Transforming values: Generic transformations , Conversion between types, Binning, Normalization, Multiple columns, XML transformation, Time transformation, Smoothing, Data generation, Constraints ,Loops, Workflow customization.

UNIT-V (Data Exploration)

Computing statistics, Overview of visualizations, Visual guide for the views ,Distance matrix, Color , Size ,Shape ,KNIME views, HiLite , Use cases for HiLite, Row IDs, Extreme values. Basic KNIME views, The Box plots ,Hierarchical clustering, Histograms, Interactive Table, The Lift chart, Lines, Pie charts ,The Scatter plots, JFree Chart ,The Bar charts, The Bubble chart, Heatmap , The Histogram chart, The Interval chart, The Line chart, The Pie chart, The Scatter plot

Text Books:

1. Data Analysis with Excel by Manish Nigam. bpb Publications
2. R for Data Science, O'Reilly by Hadley Wickham 2016.
3. KNIME Essentials, by Gábor Bakos, 2013
4. Data Science Tools by Christopher Greco, 2020
5. Learn TensorFlow 2.0, by Pramod Singh, Apress Publication (1st Edition)

Reference Books:

1. Introduction to Data Science a Python approach to concepts, Techniques and Applications, Igual, L; Seghi', S. Springer, ISBN:978-3-319-50016-4.
2. ALL-IN-ONE-EXCEL 2022 BIBLE FOR DUMMIES BY Bryant Shelton
3. Excel® 2019 BIBLE BY Michael Alexander , Dick Kusleika

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
BIG DATA ARCHITECTURE(2267OE05)
(OPEN ELECTIVE - III)

Course Objectives :

1. Understand Big Data Terminology, Technology, and Applications across various domains.
2. Explore Data Analytics and Visualization Techniques for extracting insights from large datasets.
3. Analyze Big Data Architecture and Its Components to understand scalable data processing.
4. Learn the Fundamentals of Apache Spark for efficient big data computing and analytics.
5. Understand Various Database Systems and their role in handling structured and unstructured data.
6. Gain Knowledge of Hadoop Ecosystem and its integration with big data tools for storage and processing.

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

1. **Understand the Concept of Big Data** and its business implications. (*Understanding*)
2. **Analyze and Summarize the Importance of Big Data** in various domains. (*Analyzing, Summarizing*)
3. **Apply Fundamental Big Data Techniques** such as Hadoop and MapReduce for scalable analytics. (*Applying*)
4. **Evaluate and Select Appropriate File Systems** for storing and managing diverse data types. (*Evaluating*)
5. **Integrate Web Data Sources with Hadoop Components** to process real-time and streaming data. (*Applying, Integrating*)
6. **Develop Big Data Solutions Using Scalable Technologies** for efficient data processing and decision-making. (*Creating, Applying*)

UNIT I Big Data Introduction: Classification of Digital Data, Structured and Unstructured Data, Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data , Why Big Data - Traditional Business Intelligence versus Big Data, Importance of Big Data.

UNIT II: Big Data Architecture Introduction: Big Data Architecture- Definition, Why Big Data Architecture. Evolution of Big Data Architecture. Market Trends. Big Data Architecture and Its Sources. Big Data Architecture Use Cases.

UNIT-III Big Data architecture components: Data ingestion, Data storage, Data Computing, Data Analysis, Data Visualization. Understanding the Lambda architecture, HBase, Spark Libraries, Spark Streaming.

UNIT IV Introducing Apache Spark : Introduction to Spark, Spark Architecture and its components, Features of Spark, Spark vs Hadoop, Challenges of Spark.

UNIT V Introduction To Technology Landscape NoSQL, Comparison of SQL and NoSQL, Hadoop -RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem

TEXT BOOKS:

- 1) Tom White — Hadoop: The Definitive Guide|| Third Edit on, O_reily Media, 2012.
- 2) Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

REFERENCE BOOKS:

- 1) Michael Berthold, David J. Hand, "Intelligent Data Analysis||, Springer, 2007.
- 2) Jay Liebowitz, —Big Data and Business Analytics|| Auerbach Publications, CRC press (2013)
- 3) Tom Plunkett, Mark Hornick, —Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop||, McGraw-Hill/Osborne Media (2013), Oracle press.
- 4) Glen J. Myat, —Making Sense of Data||, John Wiley & Sons, 2007
- 5) Pete Warden, —Big Data Glossary||, O_Reily, 2011.
- 6) Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
- 7) ArvindSathi, —BigDataAnalytics: Disruptive Technologies for Changing the Gamell, MC Press, 2012
- 8) Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
DATA SCIENCE APPLICATIONS(2267OE06)
(OPEN ELECTIVE - III)

Course Objectives:

1. **Understand Data Science Applications and Challenges** across various domains, including tools and recommender systems.
2. **Analyze Time Series and Supply Chain Data** for financial forecasting and logistics optimization.
3. **Explore Data Science in Education and Social Media**, focusing on analytics, sentiment analysis, and recommendations.
4. **Examine Applications in Healthcare and Bioinformatics**, including predictive analytics and genomic data analysis.
5. **Develop Data Optimization Skills Using Python** for real-world business and technology applications.
6. **Apply Python for Data Science Solutions**, leveraging libraries for modeling, processing, and case studies.

Course Outcomes:

1. **Outline** the applications of data science across multiple domains, recognize challenges, and identify tools for data analysis. (*Remembering*)
2. **Analyze** time series data for financial forecasting and **apply** data science techniques to optimize supply chain logistics. (*Analyzing, Applying*)
3. **Examine** data science applications in education and social media, including personalized learning and sentiment analysis. (*Understanding, Evaluating*)
4. **Explain** the use of data science in healthcare and bioinformatics, emphasizing predictive analytics and AI-driven solutions. (*Understanding, Explaining*)
5. **Implement** data optimization techniques using Python to solve practical business and technological challenges. (*Applying, Creating*)
6. **Design and Develop** Python-based models for data-driven decision-making across diverse real-world case studies. (*Creating, Evaluating*)

UNIT - I Data Science Applications in various domains, Challenges and opportunities, tools for data scientists Recommender systems – Introduction, methods, application, challenges.

UNIT - II Time series data – stock market index movement forecasting. Supply Chain Management – Real world case study in logistics

UNIT - III Data Science in Education, social media

UNIT - IV Data Science in Healthcare, Bioinformatics

UNIT - V Case studies in data optimization using Python.

TEXT BOOKS:

1. Aakanksha Sharaff, G.K. Sinha, “Data Science and its applications “, CRC Press, 2021.
2. Q.A. Menon, S.A. Khoja, “Data Science: Theory, Analysis and Applications”, CRC Press, 2020

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
BUSINESS ANALYTICS(2267OE07)
(OPEN ELECTIVE - IV)

Course Objectives:

- To introduce the fundamental concepts of business analytics and its role in managerial decision-making.
- To equip students with data analysis techniques for identifying business trends and patterns.
- To familiarize students with various business intelligence tools used for data visualization and reporting.
- To enable students to apply statistical and machine learning models for business problem-solving.
- To develop students' ability to interpret analytical results and communicate insights effectively to stakeholders.
- To enhance students' critical thinking and problem-solving skills in real-world business scenarios using analytics.

Course Outcomes:

- Demonstrate an understanding of the key concepts and applications of business analytics in decision-making.
- Apply data analytics techniques to extract meaningful insights from business data.
- Use business intelligence and visualization tools to create comprehensive analytical reports.
- Implement statistical and machine learning models to solve business-related problems.
- Interpret and communicate analytical findings effectively to aid in strategic planning.
- Develop data-driven solutions for improving business performance and driving organizational growth.

Unit-I: Understanding Business Analytics Introduction: Meaning of Analytics - Evolution of Analytics - Need of Analytics - Business Analysis vs. Business Analytics - Categorization of Analytical Models - Data Scientist vs. Data Engineer vs. Business Analyst - Business Analytics in Practice - Types of Data - Role of Business Analyst.

Unit-II: Dealing with Data and Data Science Data: Data Collection - Data Management - Big Data Management - Organization/Sources of Data - Importance of Data Quality - Dealing with Missing or Incomplete Data - Data Visualization - Data Classification. Data Science Project Life Cycle: Business Requirement - Data Acquisition - Data Preparation - Hypothesis and Modeling - Evaluation and Interpretation - Deployment - Operations - Optimization - Applications for Data Science

Unit-III: Data Mining and Machine Learning Data Mining: The Origins of Data Mining - Data Mining Tasks - OLAP and Multidimensional Data Analysis - Basic Concept of Association Analysis and Cluster Analysis. Machine Learning: History and Evolution - AI Evolution - Statistics vs. Data Mining vs. Data Analytics vs. Data Science - Supervised Learning - Unsupervised Learning - Reinforcement Learning - Frameworks for Building Machine Learning Systems.

Unit-IV: Applications of Business Analytics Overview of Business Analytics Applications: Financial Analytics - Marketing Analytics - HR Analytics - Supply Chain Analytics - Retail Industry - Sales Analytics - Web & Social Media Analytics - Healthcare Analytics - Energy Analytics - Transportation Analytics - Lending Analytics

Unit-V: Ethical, Legal and Organizational Issues Sports Analytics - Future of Business Analytics. Issues & Challenges: Business Analytics Implementation Challenges - Privacy and Anonymization - Hacking and Insider Threats - Making Customer Comfortable.

REFERENCES:

- James R Evans, Business Analytics, Global Edition, Pearson Education U Dinesh Kumar, Business Analytics, Wiley India Pvt. Ltd., New Delhi Ger Koole,
- An Introduction to Business Analytics, Lulu.com, 2019 J.D. Camm, J.J. Cochran, M. J. Fry, J.W. Ohlmann, D.R. Anderson, D.J. Sweeney, T. A. Williams - Essentials of Business Analytics

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
BIG DATA MANAGEMENT(2267OE08)
(OPEN ELECTIVE - IV)

Course Objectives:

1. To introduce students to the various sources of Big Data and their characteristics.
2. To develop skills in designing efficient algorithms for collecting Big Data from diverse sources.
3. To explore innovative approaches for preprocessing Big Data beyond traditional methods.
4. To equip students with techniques for extracting meaningful information from structured and unstructured data.
5. To familiarize students with advanced analytics frameworks and tools for handling Big Data.
6. To enable students to apply Big Data methodologies for solving real-world business and technological problems.

Course Outcomes:

1. Identify and classify different sources of Big Data, including structured and unstructured formats.
2. Develop and implement algorithms for efficient data collection from multiple sources.
3. Design and evaluate novel preprocessing techniques to enhance data quality and usability.
4. Apply methodologies to extract valuable insights from structured and unstructured data for analytics.
5. Utilize modern Big Data tools and frameworks for storage, processing, and analysis.
6. Solve practical problems using Big Data analytics techniques to support decision-making and innovation.

UNIT I INTRODUCTION TO BIG DATA MANAGEMENT: Big data framework - Fundamental concepts of Big Data management and analytics - Current challenges and trends in Big Data Acquisition.

UNIT II DATA COLLECTION AND TRANSMISSION :Big data collection- Strategies- Types of Data Sources- Structured Vs Unstructured data- ELT vs ETL - storage infrastructure requirements -Collection methods-Log files- Sensors- Methods for acquiring network data (Libcap-based and zero-copy packet capture technology) -Specialized network monitoring softwares (Wireshark, Smartsniff and Winnetcap)- Mobile equipments- Transmission methods- Issues.

UNIT III DATA PRE-PROCESSING :Data pre-processing overview-Sampling- Missing Values -Outlier Detection and Treatment - Standardizing Data- Categorization - Weights of Evidence Coding -Variable Selection and Segmentation.

UNIT IV DATA ANALYTICS :Predictive Analytics (Regression, Decision Tree, Neural Networks) - Descriptive Analytics (Association Rules, Sequence Rules), Survival Analysis

(Survival Analysis Measurements, Kaplan Meir Analysis, Parametric Survival Analysis) - Social Network Analytics (Social Network Learning- Relational Neighbor Classification).

UNIT V BIG DATA PRIVACY AND APPLICATIONS :Data Masking – Privately Identified Information (PII) -Privacy preservation in Big Data- Popular Big Data Techniques and tools- Map Reduce paradigm and the Hadoop system- Applications- Social Media Analytics- Recommender Systems- Fraud Detection.

REFERENCES: 1. Bart Baesens," Analytics in a Big Data World: The Essential Guide to Data Science and its Applications", John Wiley & Sons, 2014
2. Min Chen, Shiwen Mao, Yin Zhang, Victor CM Leung ,Big Data: Related Technologies, Challenges and Future Prospects, Springer, 2014.
3. Michael Minelli, Michele Chambers, Ambiga Dhiraj , “Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends”, John Wiley & Sons, 2013
4. Raj, Pethuru, “Handbook of Research on Cloud Infrastructures for Big Data Analytics”, IGI Global.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2204OE01) COMPUTER ORGANIZATION
(OPEN ELECTIVE - I)

L T P C
3 0 0 3

Course Objectives:

- To understand Basic Structure of Computers
- To understand register language and micro operations
- To analyze Micro programming control and to understand computer arithmetic operations
- To understand memory system & I/O Organization

Course Outcomes:

1. Students will be able to understand computer organization and summaries data representations, Identify various algorithms for mathematical calculation.
2. Students will be able to articulate register transfer logic, identify various micro operations.
3. Students will be able to examine the memory reference instructions and determine the interrupts related to input and output.
4. Students will be able to illustrate Design of central processing unit and apprise the CISC and RISC processes.
5. Students will be able to correlate the various memories used in computer and distinguish the various mappings involved.
6. Students will be able to review the input and output organization and structure the vector processing and pipeline.

UNIT I: BASIC STRUCTURE OF COMPUTERS:

Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers. Data Representation. Fixed Point Representation. Floating – Point Representation. Error Detection codes.

UNIT II: REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS:

Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit. Instruction codes. Computer Registers Computer instructions – Instruction cycle. Memory – Reference Instructions. Input – Output and Interrupt. STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer.

UNIT III: MICRO PROGRAMMED CONTROL:

Control memory, Address sequencing, microprogram example, design of control unit Hard wired control. Microprogrammed control

UNIT IV: COMPUTER ARITHMETIC: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit Decimal Arithmetic operations.

UNIT V: THE MEMORY SYSTEM & INPUT-OUTPUT ORGANIZATION:

Basic concepts semiconductor RAM memories. Read-only memories Cache memories performance considerations, Virtual memories secondary storage. Introduction to RAID.

Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer Priority Interrupt Direct memory Access, Input –Output Processor (IOP) Serial communication; Introduction to peripheral component, Interconnect (PCI) bus. Introduction to standard serial communication protocols like RS232, USB, IEEE1394.

TEXT BOOKS:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI

REFERENCE BOOKS:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN**(2204OE02) SENSORS & ACTUATORS****(Open Elective – I)****L T P C****3 0 0 3**

Aim & objectives: To study the various instruments displays and panels in the aircraft and to discuss the cock pit layout. The objective of the study of aircraft instrumentation is to know the functions of all the flight, gyroscopic and power plant instruments in the aircraft and enable the learners to rectify the problems occurring in the aircraft.

Course Outcomes:

1. Distinguish between sensors, transducers, and transmitters, and evaluate their selection criteria and performance characteristics based on range, sensitivity, accuracy, and other parameters.
2. Analyze the working principles, construction, and applications of inductive and capacitive transducers, and design appropriate signal conditioning methods for their use in real-world scenarios.
3. Evaluate the types, principles, and selection criteria of pneumatic, hydraulic, and electrical actuators, and propose suitable actuating systems for specific applications.
4. Examine the principles, characteristics, and applications of micro sensors and micro actuators, and apply them to measure physical, chemical, and biological parameters.
5. Critique sensor materials such as silicon, ceramics, and nano-materials based on their properties, and recommend suitable materials for specific sensing applications.
6. Demonstrate understanding of processing techniques like vacuum deposition, chemical vapor deposition, and silicon micromachining, and develop strategies for fabricating advanced sensor systems.

UNIT – I SENSORS

Difference between sensor, transmitter and transducer - Primary measuring elements - selection and characteristics: Range; resolution, Sensitivity, error, repeatability, linearity and accuracy, impedance, backlash, Response time, Dead band. Signal transmission - Types of signal: Pneumatic signal; Hydraulic signal; Electronic Signal. Principle of operation, construction details, characteristics and applications of potentiometer, Proving Rings, Strain Gauges, Resistance thermometer, Thermistor, Hot-wire anemometer, Resistance Hygrometer, Photo-resistive sensor.

UNIT- II INDUCTIVE & CAPACITIVE TRANSDUCER

Inductive transducers: - Principle of operation, construction details, characteristics and applications of LVDT, Induction potentiometer, variable reluctance transducer, synchros, microsyn. Capacitive transducers: - Principle of operation, construction details, characteristics of Capacitive transducers – different types & signal conditioning- Applications:- capacitor microphone, capacitive pressure sensor, proximity sensor.

UNIT III ACTUATORS

Definition, types and selection of Actuators; linear; rotary; Logical and Continuous Actuators, Pneumatic actuator- Electro-Pneumatic actuator; cylinder, rotary actuators, Mechanical actuating system: Hydraulic actuator - Control valves; Construction, Characteristics and Types, Selection criteria. Electrical actuating systems: Solid-state switches, Solenoids, Electric Motors- Principle of operation and its application: D.C motors - AC motors - Single phase & 3 Phase Induction Motor; Synchronous Motor; Stepper motors - Piezoelectric Actuator.

UNIT IV MICRO SENSORS AND MICRO ACTUATORS

Micro Sensors: Principles and examples, Force and pressure micro sensors, position and speed micro sensors, acceleration micro sensors, chemical sensors, biosensors, temperature micro sensors and flow micro sensors. Micro Actuators: Actuation principle, shape memory effects- one way, two way and pseudo elasticity. Types of micro actuators- Electrostatic, Magnetic, Fluidic, Inverse piezo effect, other principles.

UNIT V SENSOR MATERIALS AND PROCESSING TECHNIQUES

Materials for sensors: Silicon, Plastics, metals, ceramics, glasses, nano materials Processing techniques: Vacuum deposition, sputtering, chemical vapour deposition, electro plating, photolithography, silicon micro machining, Bulk silicon micro machining, Surface silicon micro machining, LIGA process.

TEXT BOOKS

- 1.Patranabis.D, “Sensors and Transducers”, Wheeler publisher, 1994.
- 2.Sergej Fatikow and Ulrich Rembold, “ Microsystem Technology and Microbotics”, First edition, Springer –Verlag NEWyork, Inc, 1997.
- 3.Jacob Fraden, “Hand Book of Modern Sensors: Physics, Designs and Application” Fourth edition, Springer, 2010.

REFERENCE BOOKS

- 1.Robert H Bishop, “The Mechatronics Hand Book”, CRC Press, 2002.
- 2.Thomas. G. Bekwith and Lewis Buck.N, Mechanical Measurements, Oxford and IBH publishing Co. Pvt. Ltd.,
- 3.Massood Tabib and Azar, “Microactuators Electrical, Magnetic, thermal, optical, mechanical, chemical and smart structures”, First edition, Kluwer academic publishers, Springer, 1997.
- 4.Manfred Kohl, “Shape Memory Actuators”, first edition, Springer

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2204OE03) PRINCIPLES OF ELECTRONIC COMMUNICATION

(Open Elective – II)

L T P C

3 0 0 3

Course Objectives:

The main objectives of the course are:

- 1.To develop ability to analyze system requirements of analog communication systems.
- 2.To understand the need for modulation
- 3.To understand the generation, detection of various analog modulation techniques and also perform the mathematical analysis associated with these techniques.
- 4.To understand the pulse modulation techniques.
- 5.To understand the functional block diagram of Digital communication system.
- 6.To learn about the networking concept, layered protocols.
- 7.To understand various communications concepts.
- 8.To get the knowledge of various networking equipment.
- 9.To understand the basic concepts of satellite, optical, cellular, mobile and wireless communication systems.

Course Outcomes:

- 1.Students will be able to understand various needs of modulation and categories various electro magnetic spectrum , exemplify the need of attenuation.
- 2.Students will be able to articulate mathematical representation of amplitude modulation, identify the various discrete modulations and summarize the use of PCM
- 3.Students will be able to compare the techniques with digital modulation, examine the ASK,FSK and PSK.
- 4.Students will be able to understand various telephone communications, grasp the working of network using IEEE standards.
- 5.Students will be able to correlate satellite communication, distinguish various optical communications and there indexes
- 6.Students will be able to review the various mobile and cellular communications, structure the wireless communications and negotiate with bandwidth usage

UNIT - I

Introduction: Need for Modulation, Frequency translation, Electromagnetic spectrum, Gain, Attenuation and decibels.

UNIT - II

Simple description on Modulation: Analog Modulation-AM, FM, Pulse Modulation- PAM, PWM, PCM, Digital Modulation Techniques-ASK, FSK, PSK, QPSK modulation and demodulation schemes.

UNIT - III

Telecommunication Systems: Telephones Telephone system, Paging systems, Internet Telephony.

Networking and Local Area Networks: Network fundamentals, LAN hardware, Ethernet LANs, Token Ring LAN.

UNIT - IV

Satellite Communication: Satellite Orbits, Satellite Communication systems, Satellite subsystems, Ground Stations Satellite Applications, Global Positioning systems.

Optical Communication: Optical Principles, Optical Communication Systems, Fiber –Optic Cables, Optical Transmitters & Receivers, Wavelength Division Multiplexing.

UNIT - V

Cellular and Mobile Communications: Cellular telephone systems, AMPS, GSM, CDMA, and WCDMA.

Wireless Technologies: Wireless LAN, PANs and Bluetooth, Zig-Bee and Mesh Wireless networks, Wi-MAX and MANs, Infrared wireless, RFID communication, UWB.

TEXT BOOKS

- 1.Louis E. Frenzel, “Principles of Electronic Communication Systems”, 3rdEd., McGraw Hill publications, 2008.
- 2.Kennady, Davis, “Electronic Communications systems”, 4Ed., TMH, 1999

REFERENCE BOOKS

- 1.Tarmo Anttalainen, “Introduction to Telecommunications Network Engineering”, Artech HouseTelecommunications Library.
- 2.Theodore Rappaport, “Wireless Communications-Principles and practice”, Prentice Hall, 2002.
- 3.Roger L. Freeman, “Fundamentals of Telecommunications”, 2 Ed. Wiley publications.
- 4.Wayne Tomasi, “Introduction to data communications and networking”, Pearson Education,2005.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(22040E04) IMAGE PROCESSING
(OPEN ELECTIVE –II)

Course Outcomes:

- Analyze digital image fundamentals and various image transforms.
- Apply spatial and frequency domain techniques for image enhancement.
- Implement image restoration techniques for degraded images.
- Utilize segmentation and morphological operations for image analysis.
- Compare different image compression techniques and standards.
- Evaluate image processing methods for real-world applications.

UNIT-I: Digital Image Fundamentals & Image Transforms: Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels. Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

UNIT-II: Image Enhancement (Spatial Domain): Introduction, Image Enhancement in Spatial Domain, Enhancement through Point Processing, Types of Point Processing, Histogram Manipulation, Linear and Non – Linear Gray Level Transformation, Local or Neighborhood criterion, Median Filter, Spatial Domain High-Pass Filtering. Image Enhancement (Frequency Domain): Filtering in Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

UNIT -III: Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT -IV: Image Segmentation: Detection of Discontinuities, Edge Linking And Boundary Detection, thresholding, Region Oriented Segmentation. Morphological Image Processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, Hit or Miss Transformation.

UNIT -V: Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

TEXT BOOKS:

1. Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008
2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- TMH, 2010.

REFERENCE BOOKS:

1. Digital Image Processing and Analysis-Human and Computer Vision Application with using CVIP Tools - Scotte Umbaugh, 2nd Ed, CRC Press, 2011
2. Digital Image Processing using MATLAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, TMH, 2010.
3. Digital Image Processing and Computer Vision – Somka, Hlavac, Boyle- Cengage Learning (Indian edition) 2008.
4. Introductory Computer Vision Imaging Techniques and Solutions- Adrian low, 2 nd Edition, BS Publication, 2008.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2204OE05) PRINCIPLES OF COMPUTER COMMUNICATION &
NETWORK

(Open Elective – III)

L T P C
3 0 0 3

Course Objectives:

1. To understand the concept of computer communication.
2. To learn about the networking concept, layered protocols.
3. To understand various communications concepts.
4. To get the knowledge of various networking equipment.

Course Outcomes:

1. Students will be able to understand various computer networks and summaries routing, Identify various network standards.
2. Students will be able to articulate application protocols, identify various Multiplexing and switching algorithms.
3. Students will be able to examine the analog and digital signal representation and determine the data rate and bandwidth reduction.
4. Students will be able to illustrate Physical and Electrical Characteristics and apprise the fiber optic media.
5. Students will be able to correlate the logical link control and distinguish the medium access control sub-layers.
6. Students will be able to review the media convertors and structure the bridges and switches

UNIT - I

Overview of Computer Communications and Networking: Introduction to Computer Communications and Networking, Introduction to Computer Network, Types of Computer Networks, Network Addressing, Routing, Reliability, Interoperability and Security, Network Standards, The Telephone System and Data Communications.

UNIT - II

Essential Terms and Concepts: Computer Applications and application protocols, Computer Communications and Networking models, Communication Service Methods and data transmission modes, analog and Digital Communications , Speed and capacity of a Communication Channel, Multiplexing and switching, Network architecture and the OSI reference model.

UNIT - III

Analog and Digital Communication Concepts: Representing data as analog signals, representing data as digital signals, data rate and bandwidth reduction, Digital Carrier Systems.

UNIT - IV

Physical and data link layer Concepts: The Physical and Electrical Characteristics of wire, Copper media, fiber optic media, wireless Communications. Introduction to data link Layer, the logical link control and medium access control sub-layers.

UNIT - V

Network Hardware Components: Introduction to Connectors, Transreceivers and media convertors, repeaters, network interference cards and PC cards, bridges, switches, switches Vs Routers.

TEXT BOOKS:

1. Computer Communications and Networking Technologies, Michel A. Gallo and William H. Hancock, Thomson Brooks / Cole.
2. Data Communications and Networking – Behrouz A. Forouzan, Fourth Edition MC GRAW HILL EDUCATION, 2006.

REFERENCE BOOKS:

1. Principles of Computer Networks and Communications, M. Barry Dumas, Morris Schwartz, Pearson.
2. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(22040E06) PATTERN RECOGNITION
(Open Elective – III)

L T P C
3 0 0 3

Course Outcomes:

- Explain fundamental concepts and paradigms of pattern recognition.
- Apply nearest neighbor and Bayes classifiers for pattern classification.
- Implement Hidden Markov Models and decision trees for classification tasks.
- Utilize Support Vector Machines and ensemble methods for classification.
- Analyze hierarchical and partitional clustering techniques for pattern discovery.
- Evaluate pattern recognition models using real-world applications like handwriting recognition.

UNIT - I: Introduction: What is Pattern Recognition, Data Sets for Pattern Recognition, Different Paradigms for Pattern Recognition. Representation: Data Structures for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature Extraction, Feature Selection, Evaluation of Classifier, Evaluation of Clustering.

UNIT - II: Nearest Neighbor Based Classifier: Nearest Neighbor Algorithm, Variants of the NN Algorithm use of the Nearest Neighbor Algorithm for Transaction Databases, Efficient Algorithms, Data Reduction, Prototype Selection. Bayes Classifier: Bayes Theorem, Minimum Error Rate Classifier, Estimation of Probabilities, Comparison with the NNC, Naïve Bayes Classifier, Bayesian Belief Network.

UNIT - III: Hidden Markov Models: Markov Models for Classification, Hidden Markov Models, Classification using HMMs. Decision Trees: Introduction, Decision Tree for Pattern Classification, Construction of Decision Trees, Splitting at the Nodes, Overfitting and Pruning, Examples of Decision Tree Induction.

UNIT - IV: Support Vector Machines: Introduction, Learning the Linear Discriminant Functions, Neural Networks, SVM for Classification. Combination of Classifiers: Introduction, Methods for Constructing Ensembles of Classifiers, Methods for Combining Classifiers.

UNIT - V: Clustering: Why is Clustering Important, Hierarchical Algorithms, Partitional Clustering, Clustering Large Data Sets. An Application-Hand Written Digit Recognition: Description of the Digit Data, Preprocessing of Data, Classification Algorithms, Selection of Representative Patterns, Results.

TEXT BOOK:

1. Pattern Recognition: An Algorithmic Approach: Murty, M. Narasimha, Devi, V. Susheela, Springer Pub, 1st Ed.

REFERENCE BOOKS:

1. Machine Learning - Mc Graw Hill, Tom M. Mitchell.
2. Fundamentals Of Speech Recognition: Lawrence Rabiner and Biing- Hwang Juang. Prentice Hall Pub.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2204OE07) 5G TECHNOLOGY
(Open Elective – IV)

L T P C
3 0 0 3

Course Objectives

- 1.To provide the student with an understanding of the Cellular concept, Frequency reuse, Co-channel interference.
- 2.To give the student an understanding of handoff and dropped calls and multiple access techniques.
- 3.To learn 5G technology basic requirements and advances.
- 4.To learn about Device to Device Communication.

Course Outcomes

- 1.Remember the fundamentals of Co-channel and Non Co channel interference and Label their significance in the Communication.
- 2.Understand types of handoff and dropped calls and Relate the impact of dropped calls and multiple access techniques required for 5G.
- 3.Understand 5G Technology advances and Illustrate their benefits.
- 4.Analyzing Device to device communication and Contrast their importance for the upcoming Generation.
- 5.Create future directions and research opportunities in the field of 5G and proposing innovative ideas for Invent large 5G models and their applications.
- 6.Apply large 5G models, their knowledge to Organize practical applications in diverse Areas such as Space and Industry.

UNIT I

Introduction to Cellular Mobile Radio Systems: Basic Cellular Mobile System, First, Second, Third and Fourth Generation Cellular Wireless Systems. Concept of Frequency Reuse, Co-Channel Interference, Sectoring, Microcell Zone Concept.

UNIT II

Handoffs and Dropped Calls: Handoff Initiation, Types of Handoff, Delaying Handoff, Advantages of Handoff, Power Difference Handoff, Forced Handoff, Mobile Assisted and Soft Handoff, Introduction to Dropped Call Rate.

UNIT III

Overview of 5G Broadband Wireless Communications: Requirements, Modulation Techniques – Orthogonal frequency division multiplexing (OFDM), generalized frequency division multiplexing (GFDM).

UNIT IV

Multiple Access Techniques: FDMA, TDMA, CDMA, orthogonal frequency division multiple accesses (OFDMA), generalized frequency division multiple accesses (GFDMA), Non-orthogonal Multiple accesses (NOMA).

UNIT V

Device-to-device (D2D) and machine-to-machine (M2M) type communications – Extension of 4G D2D standardization to 5G, Need for millimeter wave communications and MIMO systems.

Textbooks:

- 1.Mobile Cellular Telecommunications — W.C.Y. Lee, McGraw Hill, 2nd Edn., 1989.
- 2.Martin Sauter “From GSM From GSM to LTE–Advanced Pro and 5G: An Introduction to Mobile Networks and Mobile Broadband”, Wiley-Blackwell.
- 3.Afif Osseiran, Jose.F.Monserrat, Patrick Marsch, “Fundamentals of 5G Mobile Networks”, Cambridge University Press.

References

- 1.Jonathan Rodriguez, “Fundamentals of 5G Mobile Networks”, John Wiley & Sons.
- 2.Amitabha Ghosh and Rapeepat Ratasuk “Essentials of LTE and LTE-A”, Cambridge University Press.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2204OE08) RTOS and System Programming
(Open Elective – IV)

L T P C
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Course Outcomes:

- Be able to explain real-time concepts such as preemptive multitasking, task priorities, priority inversions, mutual exclusion, context switching, and synchronization, interrupt latency and response time, and semaphores.
- Able describe how a real-time operating system kernel is implemented. Able explain how tasks are managed.
- Explain how the real-time operating system implements time management.
- Discuss how tasks can communicate using semaphores, mailboxes, and queues.
- Be able to implement a real-time system on an embedded processor.
- Be able to work with real time operating systems like RT Linux, Vx Works, MicroC /OSII, Tiny Os

UNIT – I Introduction: Introduction to UNIX/LINUX, Overview of Commands, File I/O,(open, create, close, lseek, read, write), Process Control (fork, vfork, exit, wait, waitpid, exec).

UNIT - II Real Time Operating Systems: Brief History of OS, Defining RTOS, The Scheduler, Objects, Services, Characteristics of RTOS, Defining a Task, asks States and Scheduling, Task Operations, Structure, Synchronization, Communication and Concurrency. Defining Semaphores, Operations and Use, Defining Message Queue, States, Content, Storage, Operations and Use

UNIT - III Objects, Services and I/O: Pipes, Event Registers, Signals, Other Building Blocks, Component Configuration, Basic I/O Concepts, I/O Subsystem

UNIT - IV Exceptions, Interrupts and Timers: Exceptions, Interrupts, Applications, Processing of Exceptions and Spurious Interrupts, Real Time Clocks, Programmable Timers, Timer Interrupt Service Routines (ISR), Soft Timers, Operations.

UNIT - V Case Studies of RTOS: RT Linux, MicroC/OS-II, Vx Works, Embedded Linux, and Tiny OS.

TEXT BOOK:

1.Real Time Concepts for Embedded Systems – Qing Li, Elsevier, 2011

REFERENCE BOOKS:

1. Embedded Systems- Architecture, Programming and Design by Rajkamal, 2007, TMH.
2. Advanced UNIX Programming, Richard Stevens
3. Embedded Linux: Har