BACHELOR OF TECHNOLOGY
Computer Science and Engineering

COURSE STRUCTURE & SYLLABUS

(Batches admitted from the Academic Year 2018 -2019)

MALLA REDDY ENGINEERING COLLEGEFORWOMEN

(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 (R18)

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COURSE STRUCTURE

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

S. No	Subject Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	1800HS01	English	2	0	0	2	30	70
2	1800BS01	Mathematics – I	3	1	0	4	30	70
3	1800BS07	Engineering Chemistry	3	1	0	4	30	70
4	1802ES01	Basic Electrical Engineering	3	0	0	3	30	70
5	1803ES02	Engineering Workshop	1	0	3	2.5	30	70
6	1800HS02	English Language & Communication Skills Lab	0	0	2	1	30	70
7	1800BS08	Engineering Chemistry Lab	0	0	3	1.5	30	70
8	1802ES61	Basic Electrical Engineering Lab	0	0	2	1	30	70
		Induction Programme						
		TOTAL	**12**	**2**	**10**	**19**	**240**	**560**

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

S. No	Subject Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	1800BS05	Applied Physics	3	1	0	4	30	70
2	1800BS02	Mathematics – II	3	1	0	4	30	70
3	1805ES01	Programming for Problem Solving	3	1	0	4	30	70
4	1803ES02	Engineering Graphics	1	0	4	3	30	70
5	1800BS06	Applied Physics Lab	0	0	3	1.5	30	70
6	1805ES61	Programming for Problem Solving Lab	-	0	3	1.5	30	70
7	1800MC01	Environmental Science	3	0	0	0	100	0
		TOTAL	**13**	**3**	**10**	**18**	**280**	**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	Subject Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	1800BS04	Probability and Statistics	3	1	0	4	30	70
2	1804ES01	Analog Electronic Circuits	3	1	0	4	30	70
3	1805PC01	Data Structures & Algorithms	3	0	0	3	30	70
4	1805PC02	Operating Systems	3	0	0	3	30	70
5	1805PC03	Discrete Mathematics	3	0	0	3	30	70
6	1805PC61	Data Structures & Algorithms Lab	0	0	3	1.5	30	70
7	1805PC62	Operating Systems Lab	0	0	3	1.5	30	70
8	1800MC02	Human Values and Professional Ethics	2	0	0	0	100	0
		TOTAL	**17**	**2**	**6**	**20**	**310**	**490**

**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	Subject Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	1800HS04	Managerial Economics and Financial Analysis	3	0	0	3	30	70
2	1804ES02	Digital Electronics	3	1	0	4	30	70
3	1805PC04	Computer Organization	3	1	0	4	30	70
4	1805PC05	Object Oriented Programming	3	0	0	3	30	70
5	1805PC06	Database Management Systems	3	0	0	3	30	70
6	1805PC63	Object Oriented Programming Lab	0	0	3	1.5	30	70
7	1805PC64	Database Management Systems Lab	0	0	3	1.5	30	70
8	1800MC03	Foreign Language - French*	2	0	0	0	100	0
		TOTAL	**17**	**2**	**6**	**20**	**310**	**490**

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

S. No	Subject Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	1800HS05	Management Science	3	0	0	3	30	70
2	1805PC07	Formal Language & Automata Theory	3	0	0	3	30	70
3	1805PC08	Design and Analysis of Algorithms	3	0	0	3	30	70
4	1805PC09	Computer Networks	3	0	0	3	30	70
5		Professional Elective-1	3	0	0	3	30	70
6		Open Elective-I	3	0	0	3	30	70
7	1805PC65	Design and Analysis of Algorithms Lab	0	0	3	1.5	30	70
8	1805PC66	Computer Networks Lab	0	0	3	1.5	30	70
9	1800MC05	Technical and Soft Skills*	2	0	0	0	100	0
		TOTAL	**20**	**0**	**6**	**21**	**340**	**560**

**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	Subject Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	1800HS06	Professional English	3	0	0	3	30	70
2	1812PC01	Compiler Design	3	0	0	3	30	70
3	1812PC02	Web Technologies	3	0	0	3	30	70
4		Professional Elective - 2	3	0	0	3	30	70
5		Professional Elective-3	3	0	0	3	30	70
6		Open Elective - 2	3	0	0	3	30	70
7	1812PC61	Compiler Design Lab	0	0	3	1.5	30	70
8	1812PC62	Web Technologies Lab	0	0	3	1.5	30	70
9	1800MC04	Indian Constitution *	2	0	0	0	100	0
		TOTAL	**20**	**0**	**6**	**21**	**340**	**560**

**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-I

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

S. No	Subject Code	Subject	L	T	P	C	Max. Marks	
							INT	EXT
1	1812PC03	Linux Programming	3	1	0	4	30	70
2	1805PC10	Data Warehousing and Data Mining	3	0	0	3	30	70
3		Professional Elective -4	3	0	0	3	30	70
4		Open Electives-3	3	0	0	3	30	70
5	1812PC63	Linux Programming Lab	0	0	3	1.5	30	70
6	1805PC67	Data Warehousing and Data Mining Lab	0	0	3	1.5	30	70
7	1805PR01	Industry Oriented Project / Internship	0	0	0	2	30	70
8	1805PR02	Project-I	0	0	8	4	30	70
9	1800MC06	Indian Traditional Knowledge	2	0	0	0	100	0
		TOTAL	**14**	**1**	**14**	**22**	**340**	**560**

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

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

S. No	*Subject Code*	*Subject*	*L*	*T*	*P*	*C*	*Max. Marks*	
							INT	*EXT*
1		Professional Elective-V	3	0	0	3	30	70
2		Professional Elective-VI	3	0	0	3	30	70
3		Open Elective -4	3	0	0	3	30	70
4	1805PR03	Technical Seminar	0	0	0	2	100	0
5	1805PR04	Project-II	0	0	18	8	30	70
		TOTAL	**9**	**0**	**18**	**19**	**220**	**280**

Semester	**I-I**	**I-II**	**II-I**	**II-II**	**III-I**	**III-II**	**IV-I**	**IV-II**	**TOTAL**
Credits	19	18	20	20	21	21	22	19	160

TOTAL: 160 Credits

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PROFESSIONAL ELECTIVES					
Professional Elective -I		**Professional Elective -II**		**Professional Elective -III**	
1805PE01	Neural Networks	1805PE03	Artificial Intelligence	1805PE05	Machine Learning
1812PE01	Software Engineering	1812PE02	Object Oriented Analysis and Design	1804PE12	Embedded Systems
1805PE02	Computer Graphics	1805PE04	Image Processing	1805PE06	Cloud Computing
Professional Elective -IV		**Professional Elective -V**		**Professional Elective –VI**	
1805PE07	Deep Learning	1805PE09	Big Data Analytics	1805PE11	Distributed Trust and Block Chain Technology
1812PE03	Distributed Systems	1812PE04	Adhoc and Sensor Networks	1812PE06	Programming Essentials in Python Programming
1805PE08	Mobile Computing	1805PE10	Soft Computing	1805PE12	Internet of Things

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OPEN ELECTIVES

Dept.	Open Elective-I	Open Elective-II	Open Elective-III	Open Elective-IV
CSE	1.Fundamentals of DBMS (1805OE01) 2. Computer Organization &Operating Systems (1805OE02)	1. Data Structures Using Python (1805OE03) 2.Advanced Compiler Design (1805OE04)	1. Java Programming (1805OE05) 2. Case Tools & Software Testing (1805OE06)	1. Data and Knowledge Mining(1805OE07) 2. Full Stack Web Application Development(1805OE08)
IT	1. Advanced Computer Architecture (1812OE01) 2. Advanced Operating Systems (1812OE02)	1. Embedded Systems (1812OE04) 2. Scripting Languages (1812OE03)	1. Advanced Computer Networks (1812OE05) 2. Advanced Algorithms (1812OE06)	1.Computational Complexity (1812OE07) 2.Robotic Process Automation(1812OE08)
AIML	1. Knowledge representation and Reasoning (1866OE01) 2. Neural Networks (1866OE02)	1. Advanced Artificial Intelligence (1866OE03) 2. Reinforcement Learning (1866OE04)	1. Deep Learning Using Python (1866OE05) 2. Edge Analytics (1866OE06)	1. Cognitive computing & Applications (1866OE07) 2. Quantum Computing (1866OE08)
DS	1. Computer Oriented Statistical Methods (1867OE01) 2.Data Visualization Techniques (1867OE02)	1. Data Wrangling using Python (1867OE03) 2.Data Science Tools (1867OE04)	1.Big Data Architecture(1867OE05) 2. Data Science Applications (1867OE06)	1. Business Analytics (1867OE07) 2. Big Data Management(1867OE08)
CS	1.Ethical hacking(1862OE01) 2. Cyber security essentials(1862OE02)	1. Cloud Security Essentials (1862OE03) 2. Vulnerability assessment and penetration testing (1862OE04)	1. Social media security (1862OE05) 2. Authorization and Authentication (1862OE06)	1. Cyber Security and laws(1862OE08) 2. Security incident and response management (1862OE07)
ECE	1. Computer Organization (1804OE01) 2.Sensors & Actuators(1804OE02)	1.Principles of Electronic Communication(1804OE03) 2.Image Processing (1804OE04)	1.Principles of Computer Communication and Network(1804OE05) 2. Pattern Recognition (1804OE06)	1.5G Technology (1804OE07) 2. RTOS and System Programming (1804OE08)

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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
(1800HS01) ENGLISH

B.Tech. I Year I 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 also 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.
- 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 formal and informal situations.

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: Synonyms and Antonyms – Idioms and phrases.

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 text book 'English for Engineers' published by Cambridge University Press.

Vocabulary: 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 Misplaced Modifiers and Tenses.

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: Standard Abbreviations in English

Grammar: 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: One-word substitution 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.

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.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1800BS01) MATHEMATICS–I

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

Course Objectives:

- 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 canonicalform.
- Geometrical approach to the mean value theorems, their application to the mathematical problems and Evaluation of improper integrals using Beta and Gamma functions
- Partial differentiation, concept of total derivative, finding maxima and minima of function of two and three variables.
- Evaluation of multiple integrals and their applications.

Course Outcomes:

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

- Write the matrix representation of a set of linear equations and to analyses the solution of the system of equations
- Find the Eigen values and Eigen vectors and reduce the quadratic form to canonical form using orthogonal transformations.
- Solve the applications on mean value theorems and evaluate the improper integrals using Beta and Gamma functions
- Find the extreme values of functions of two variables with/without constraints.
- Evaluate the multiple integrals and apply the concept to find areas, volumes.
- Students will be able to strengthen their individual and collaborative work strategies

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 power 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:

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). Taylor's series, Maclaurin's series. Definition of Improper Integral; Definition of Beta and Gamma functions, properties, relation between them and evaluation of integrals using Beta and Gamma functions.

UNIT-IV:

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 multipliers.

UNIT-V:

Multiple Integrals: Evaluation of Double Integrals (Cartesian and Polar coordinates); Change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Areas (by double integrals) and Volumes (by double integrals and triple integrals).

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36thEdition, 2010.
2. R.K. Jainand, S.R.K. Iyengar, AdvancedEngineeringMathematics, NarosaPublishers, 4th Edition, 2014.

REFERENCES:

1.MichaelGreenberg, Advanced Engineering Mathematics, PearsonEducation,2nd Edition, 1998.
2.ErwinKreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th Edition, 2006.
3. Ramana B.V. Higher Engineering Mathematics.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1800BS07) ENGINEERING CHEMISTRY

B.Tech. I Year ISem **L T P C**
3 1 0 4

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.
- To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.
- To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways

Course Outcomes:

The basic concepts included in this course will help the student to gain:

- 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 complex ometric 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 ozonization. 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: H_2-O_2 Fuel cell, CH_3OH-O_2 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: Galavanising , 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 alanalysis of n- butane.

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

Electrophilic and nucleophilic addition reactions: Addition of HBr to propene.

Markownikoff and anti Mark ownik 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, NH_2, OH, - COOH, C=O, C≡ N, C=C, C≡ C), applications of IR Spectroscopy, ^{1}H-NMR(NMR Spectroscopy), Principles of NMR spectroscopy, chemical shift, Chemical shifts of some organic protons , Introduction to Magnetic resonance ima

TEXT BOOKS:

1. Physical Chemistry, by P.W.Atkins
2.Engineering Chemistry by P.C.Jain&M.Jain; Dhanpat Rai Publishing Company Ltd., NewDelhi.
3.Fundamentals of Molecular Spectroscopy, by C.N.Banwell Organic Chemistry:

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1802ES01) BASIC ELECTRICAL ENGINEERING

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

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.

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”, McGraw Hill,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,

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1803ES02) 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, equipments 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 joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

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 /Cengage
Workshop Manual / K. Venugopal /Anuradha.

REFERENCE BOOKS:

Work shop Manual - P. Kannaiah/ K. L. Narayana/SciTech
Worksho Manual VenkatReddy / BSP

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1800HS02) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

B.Tech. I Year I 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 OUTCOMES:

- 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 speakingand interviews
- Better understanding of nuances of English language through audio-visual
- experience and group activities
- Neutralization of accent for intelligibility
- Speaking skills with clarity and confidence which in turn enhances their employability skills

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

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 Etiquete

Exercise - III CALL Lab:

Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI). Practice*:* Exercises on practicing intonation reading a paragraph/ dialogue for right pauses, tone etc. Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab:

Understand: How to make Formal Presentations.
Practice: Formal Presentations.

Exercise – IV CALL Lab:

Understand: Consonant Clusters, Plural and Past tense Markers Practice*:* Words often Miss pelt – 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 studies on Group Discussions and Mock Interviews.

(1800BS08) 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 an function of time.
- The measurement of physical properties like adsorption and viscosity.
- To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

Course Outcomes:

The experiments will make the student gain skills on:

- 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.

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 coconutoil
11. Verification of freundlich adsorption isotherm-adsorption of acetic acid oncharcoal
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 give liquid using stalagmometer.

Experiments beyond syllabus:

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

REFERENCES:

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

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1802ES61) 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
- To calculate, measure and know the relation between basic electrical parameters.
- To analyze the performance characteristics of DC and AC electrical machines

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 Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
10. Measurement of Active and Reactive Power in a balanced Three-phase circuit
11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
13. Performance Characteristics of a Three-phase Induction Motor
14. Torque-Speed Characteristics of a Three-phase Induction Motor
15. No-Load Characteristics of a Three-phase Alternator

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(1800BS05) 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 and Electromagnetic theory and a broad base of knowledge in 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, Planck's law, Photoelectric effect, Compton effect, 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 their V-I Characteristics.

UNIT-III: Optoelectronics

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

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, 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, 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.

TEXT BOOKS:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi – Cengage Learing.
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 Deepak Guptha on NPTEL

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1800BS02): MATHEMATICS – II

B.Tech I Year II Sem **L T P C**
3 1 0 4

Course objectives:

- To learn Methods of solving the differential equations of first and higher order
- Evaluation of multiple integrals and their applications
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course Outcomes:

- 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.
- Calculate the Laplace transform of standard functions both from the definition and by using formulae.
- Use the Laplace transforms techniques for solving ODE's.
- Find the directional derivatives, Irrotational and Solenoidal function and angle between the surfaces.
- Evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I:

First Order ODE Exact, linear and Bernoulli's equations; Applications: Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT II:

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

Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III:

Multivariable Calculus (Integration): Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation

of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallel piped).

UNIT-IV:

Vector Differentiation: Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V:

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

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition,2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley& Sons,2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry,9thEdition, Pearson,Reprint,2002.

REFERENCES:

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes

S. L. Ross, Differential Equations, 3rd Ed

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805ES01) PROGRAMMING FOR PROBLEM SOLVING

B.Tech I Year II 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 techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B. A. ForouzanandR. 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.
4. Basic computation and Programming with C, Subrata Saha and S. Mukherjee, Cambridge University

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1803ES02) ENGINEERIG GRAPHICS

B.Tech. I Year II Sem **L T P C**
1 0 4 3

Course objectives:

- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
  - To draw sectional views and pictorial views of solids.

Course Outcomes:

- Explain the principles of engineering graphics and construct conic sections and cycloidal curves.
- Apply orthographic projection techniques for points, lines, and plane figures.
- Illustrate projections and sectional views of regular solids, including auxiliary views.
- Develop surface models of solids and analyze intersections between geometric shapes.
- Construct isometric projections and convert between isometric and orthographic views.
- Utilize CAD software for creating 2D engineering drawings and freehand sketches.

UNIT – I:

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

UNIT- II:

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. - Auxiliary Planes.

UNIT – III:

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere.

UNIT – IV:

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder.

UNIT – V:

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines.

Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions

Introduction to CAD: (For Internal Evaluation Weightage only):

Introduction to CAD Software Package Commands.- Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package.

TEXTBOOKS:

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing / N. S. Parthasarathy and Vela Murali/Oxford

REFERENCE BOOKS:

1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGraw Hill
2. Engineering Drawing/ M. B. Shah, B.C. Rane /Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1800BS06) APPLIED PHYSICS LAB

B.Tech. I Year II Sem **L T 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:

(Any 8 experiments are mandatory)

1. Energy gap of P-N junction diode-To determine the energy gap of a semiconductor diode.
2. Solar Cell-To study the V-I Characteristics of solar cell.
3. Light emitting diode-Plot V-I and P-I characteristics of light emitting diode.
4. Stewart – Gee's experiment-Determination of magnetic field along the axis of a current carrying coil.
5. Hall effect-To determine Hall co-efficient of a given semiconductor.
6. Optical fibre-To determine the Numerical Aperture of given Optic fibre.
7. LASER-To study the characteristics of LASER sources.
8. Optical fibre-To determine the bending losses of Optical fibre.
9. LCR Circuit-To determine the Quality factor of LCR Circuit.
10. R-C Circuit-To determine the time constant of R-C circuit.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805ES61) PROGRAMMING FOR PROBLEM SOLVING LAB

B.Tech. I Year II 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:

The candidate is expected to be able to:

- formulate the algorithms for simple problems
- translate given algorithms to a working and correct program
- correct syntax errors as reported by the compilers
- identify and correct logical 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 form standard input.

Simple numeric problems:

a) Write a program for fiend 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 of 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 formula s = 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+…….+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 functions 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 besame.

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.

Strings:

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 in to a given main string from a given position.

 To delete n Characters from a given position in a given 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 contain ch.
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 uppercase 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 firs t 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-Hil

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,PrenticeHall of India iv. R.G. Dromey, How to solve it by Computer, Pearson (16thImpression)

iv .Programming in C, Stephen G. Kochan, Fourth Edition,Pearson Education.

v . Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4thEdition

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1800MC01) ENVIRONMENTAL SCIENCE

B.Tech I Year II Sem **L T P C**
3 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-I:

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnifications, 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-GoI initiatives.

UNIT-V:

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

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 life style.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. NewDelhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning 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. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1800BS04) 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.Srinivа, 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
(1804ES01) ANALOG ELECTRONICS CIRCUITS

B.Tech. II Year I Sem **L T P C**
3 1 0 4

Course Objectives:

- To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT and FET amplifier circuits, transistors and field effect transistors.
- To understand diodes rectifier.
- To apply principles of Boolean algebra to minimize logic expressions using minimization techniques.
- To outline the formal procedures to design the combinational and sequential circuits of desired functionality.

Course Outcomes:

- Upon successful completion of this course, the student will be able to:
- Understand and analyze the different types of diodes, operation and it' characteristics.
- Design and analyze the DC bias circuitry of BJT and FET.
- Perform arithmetic operations on different number systems and to apply the principles of Boolean algebra to minimize logic expressions.
- Analyze some basic components used in digital systems such as adder and subtractor, decoder, encoder, multiplexer, flip-flops, registers and counters.
- Design various combinational PLDs such as ROMs, PALs ,PALs.

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 VBE 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, andSatyabrata 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
(1805PC01) DATA STRUCTURES AND ALGORITHMS

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

Course Objectives:

- 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.
- To enable them to write algorithms for solving problems with the help of fundamental data Structures. Introduce foundational data structures and equip students to assess their efficiency using asymptotic notations.
- Develop skills in implementing and analyzing Linear and Binary Search, focusing on computational complexity.
- Train students to apply stack and queue structures in expression handling while optimizing complexity.

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 write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
- Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.
- **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.

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 Se arch 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
(1805PC02) 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, Dinning 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
(1805PC03) 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 Lips chutz, Marc Lipson,
3. Discrete Mathematics, Tata McGraw–Hill

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805PC61) DATA STRUCTURES & ALGORITHMS LAB

B.Tech. II Year I Sem **L T P C**
0 0 3 1.5

Course Objectives:

- To make the student to implement data structures using python and C programming languages.
- To make the student write ADTS for all data structures.
- Introduce foundational data structures and equip students to assess their efficiency using asymptotic notations.
- Develop skills in implementing and analyzing Linear and Binary Search, focusing on computational complexity.
- Train students to apply stack and queue structures in expression handling while optimizing complexity.
- Enhance proficiency in linked list operations, creating complex structures and analyzing their efficiency.

Course Outcomes:

- Implement and analyze search algorithms (Linear and Binary Search), comparing recursive and non-recursive approaches in terms of time complexity.
- Develop and apply fundamental sorting algorithms (Bubble, Selection, Quick, Insertion, Merge, and Heap Sort) to arrange data in order and evaluate their efficiency based on time and space complexity.
- Construct and manipulate stack and queue ADTs using arrays and linked lists, performing core operations (e.g., insertion, deletion) and analyze their applications.
- Construct and operate on various list ADTs (singly and doubly linked lists), including stacks, queues, and deques, and perform operations such as insertion, deletion, and searching.
- Implement tree-based data structures, including Binary Search Trees, B-trees, and AVL trees, and apply traversal methods (preorder, inorder, postorder) for efficient data handling.
- Design and implement dictionary ADTs using hashing techniques to perform key-value storage and retrieval efficiently, assessing hashing performance for data management.

Week1:

Write a C program and Python program to implement the following searching techniques in both recursive and non-recursive manner.

i) Linear search ii) Binary Search.

Week 2:

Write a C & Python program to implement the following using List and Dictionary.

i)Stack ii) Queue

Week 3:

Write a C & Python program to implement Linked list data structure and perform the following operations.

i)Insert an element into a list.

ii) Delete an element from list

iii) Search for a key element in list
iv) count number of nodes in list.

Week 4:
Write a C & Python program to implement the following using a singly linked list.
i)Stack ii) Queue

Week 5:
Write a C & Python program to implement the Deque (double ended queue) ADT using a List.

Week 6:
Write a C& python program to perform the following operations:
a) Insert an element into a binary search tree.
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.
j)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
(1805PC62) 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 alogorithms
- 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.

Week11: 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
(1800MC02) 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 Whit beck, 2e, Cambridge University Press2015.

REFERENCE BOOKS:

1. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications,3rd Edition.
2. IvanIIIich, 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

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1800HS04) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

B.Tech. II Year II 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, Hyderabad2013.
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
(1804ES02) DIGITAL ELECTRONICS

B.Tech. II Year II Sem **L T P C**
3 1 0 4

Course Objectives:
- To apply principles of Boolean algebra to minimize logic expressions using minimization techniques.
- To outline the formal procedures to design the combinational and sequential circuits of desired functionality.
- To understand the design of memory and how register transfer takes place using micro operations.

Course Outcomes:
- Upon successful completion of this course, the student will be able to:
- Perform arithmetic operations on different number systems and to apply the principles of Boolean algebra to minimize logic expressions.
- Use K-map method to minimize and optimize two-level logic functions up to five variables.
- Analyze some basic components used in digital systems such as adder and subtractor, decoder, encoder, multiplexer, flip-flops, registers and counters.
- Design various combinational PLDs such as ROMs, PALs, PALs and PROMs.
- Understanding about the micro operations such as arithmetic, logical and shift instructions.

UNIT – I:
Digital Systems, Binary Numbers, Number base conversions, Octal, Hexadecimal and other base numbers, complements, signed binary numbers, Floating point number representation, binary codes, Error detection and correction, binary logic, Boolean algebra and digital logic gates, Basic theorems and properties of Boolean Algebra, Boolean functions, canonical and standard forms.

UNIT – II:
Gate–Level Minimization, The K-Map Method, Three-Variable Map, Four-Variable Map, Five-Variable Map, sum of products, product of sums simplification, Don't care conditions, NAND and NOR implementation and other two-level implementations, Exclusive-OR function.

UNIT – III:
Combinational Circuits (CC), Analysis procedure, Design Procedure, Combinational circuit for different code converters, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Decoders, Encoders, Multiplexers, De-multiplexers.

UNIT – IV:
Synchronous Sequential Circuits, Latches, Flip-flops, analysis of clocked sequential circuits, Registers, Shift registers, Ripple counters, Synchronous counters. Asynchronous Sequential Circuits - Introduction, Analysis procedure, Circuits with latches.

UNIT – V:
Memory: Introduction, Random-Access memory, Memory decoding, ROM, Programmable

Logic Array, Programmable Array Logic, Sequential programmable devices. Register Transfer 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.

TEXT BOOKS:

1. M. Morris Mano, Michael D. Ciletti (2008), Digital Design, 4th edition, Pearson Education/PHI, India.
2. Thomas L. Floyd (2006), Digital fundamentals, 9th edition, Pearson Education International.

REFERENCE BOOKS:

1. Zvi. Kohavi (2004), Switching and Finite Automata Theory, Tata McGraw Hill, India.
2. C.V.S. Rao (2009), Switching and Logic Design, 3rd edition, Pearson Education, India.
3. Donald D.Givone (2002), Digital Principles and Design, Tata McGraw Hill, India.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805PC04) COMPUTER ORGANIZATION

B.Tech. II Year II Sem **L T P C**
3 1 0 4

Course Objectives:

To expose the students to the following:

1. How Computer Systems work & the basic principles
2. Instruction Level Architecture and Instruction Execution 3. The current state of art in memory system design
4. How I/O devices are accessed and its principles.
5. To provide the knowledge on Instruction Level Parallelism
6. To impart the knowledge on microprogramming
7. Concepts of advanced pipelining techniques.

Course Outcomes:

- Students will be able to understand computer organization and summaries data representations, Identify various algorithms for mathematical calculation.
- Students will be able to articulate register transfer logic, identify various micro operations.
- Students will be able to examine the memory reference instructions and determine the interrupts related to input and output.
- Students will be able to illustrate Design of central processing unit and apprise the CISC and RISC processes.
- Students will be able to correlate the various memories used in computer and distinguish the various mappings involved.
- Students will be able to review the input and output organization and structure the vector processing and pipeline.

UNIT I:

Basic Functional units of Computers: functional units, basic Operational concepts, Bus structures. Software, Performance, Multiprocessors and Multicomputer.

Data Representation: Signed number representation, fixed and floating point Representations.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms.

Error detection and correction codes.

UNIT II:

Register Transfer Language and Micro Operations: RTL- Registers, Register transfers, Bus and memory transfers. **Micro operations:** Arithmetic, Logic, and Shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Computer Registers, Computer instructions, Instruction cycle. Instruction codes, Timing and Control, Types of Instructions: Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.

UNIT III:

Central Processing Unit organization: General Register Organization, Stack organization**,** Instruction formats, Addressing modes, Data Transfer and Manipulation, Program Control, **CISC** and **RISC** Processors

Control unit design: Design approaches, Control memory, Address sequencing, micro program example, design of CU. Micro Programmed Control.

UNIT IV:

Memory Organization: Semiconductor memory technologies, hierarchy, Interleaving,

Main Memory-RAM and ROM chips, Address map, Associative Memory-Hardware organization. Match logic. Cache memory-size vs. block size, Mapping Functions-Associate, Direct, Set Associative mapping. Replacement algorithms, write policies.

Auxiliary memory-Magnetic tapes etc

UNIT V:

Input –Output Organization: Peripheral devices, Input-output subsystems, I/O device interface, I/O Processor, I/O transfers–Program controlled, Interrupt driven, and DMA, interrupts and exceptions. I/O device interfaces – SCII, USB

Pipelining and Vector Processing: Basic concepts, Instruction level Parallelism Throughput and Speedup, Pipeline hazards. **Case Study-** Introduction to x86 architecture.

TEXT BOOKS:

1. "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by carlHamacher, McGrawHill Higher Education.

REFERENCE BOOKS:

1. "Computer Architecture and Organization", 3rd Edition by John P.Hayes, WCB/McGraw-Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(1805PC05) OBJECT ORIENTED PROGRAMMING

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- block scope, 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.

Packages-Defining, creating and accessing a package, CLASSPATH, Access modifiers, importing packages.

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 problem.

UNIT-IV:

Collection Framework in Java – Introduction to java collections, Overview of java collection framework, Commonly used collection classes-ArrayList, LinkedList, HashSet, TreeSet, Map-HashMap, TreeMap, Legacy Classes-Vector, Stack, Hashtable.

Other Utilities-Scanner, String Tokenizer, Random, Date.

Files-Streams**-**Byte Streams, Character Streams, Text input/output, Binary input /output , File Management using File class.

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

(1805PC06) DATABASE MANAGEMENT SYSTEMS

B.Tech. II Year II 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:

- 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.
- Design entity-relationship (ER) models and develop conceptual schemas for database systems, effectively representing entities, relationships, and attributes in complex, large-scale enterprise databases.
- 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.
- 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.
- 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.
- 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.
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 nonvolatile storage, Remote Backup systems.

UNIT – V: 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.

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGraw Hill Education (India) Private Limited, 3rd Edition. (Part of UNIT-I, UNIT-II, UNIT-III, UNIT- V)
2. Data base System Concepts, A. Silberschatz, Henry. F. Korth, S. Sudarshan, McGraw Hill 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. 4.Database Development and Management, Lee Chao, Auerbach publications, Taylor& Francis Group. Introduction to Database Systems, C. J. Date, Pearson Education.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(1805PC63) OBJECT ORIENTED PROGRAMMING 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 of J2SE
- 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 also to learn Advanced Java topics like J2ME, J2EE, JSP and JavaScript
- To train Students with good OOP programming breadth so as to comprehend, analyze, design and 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 ArrayList 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.

TEXT BOOK/ 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

(1805PC64) 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 purse 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:

Students will be able to demonstrate their skills

- 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.
- 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.
- 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.
- Develop PL/SQL procedures and triggers to automate tasks, enforce data integrity, and apply business rules, ensuring robust and dynamic database applications.
- Apply normalization principles (1NF, 2NF, 3NF) to decompose tables, minimize redundancy, and enhance database structure, ensuring consistency and reducing data anomalies.
- 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.

Practice on SQL Queries to acquire knowledge on RDBMS.

A. Case Study:

Objective: This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, developing and

querying a database in the context of example database -Roadway travels". Students are expected to use "Mysql" database.

Roadway Travels: "Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

- Reservations and Ticketing
- Cancellations
- Reservations &Cancellation:

Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger .One Passenger /person can book many tickets (to his/her family).

Cancellations are also directly handed at the booking office.

In the process of computerization of Roadway Travels you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above Process involves many steps like

1. Analyzing the problem and identifying the Entities and Relationships, 2. E-R Model, 3. Relational Model 4. Normalization 5. Creating the database 6. Querying. Students are supposed to work on these steps week wise and finally create a complete "Database System" to Roadway Travels. Examples are given at every experiment for guidance to students.

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. Example:

Entities:

1. BUS
2. Ticket
3. Passenger

Relationships:

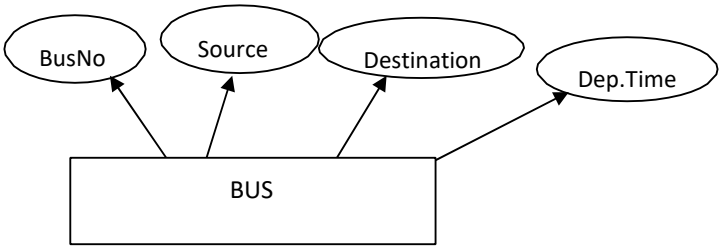
1. Reservation
2. Cancellation

PRIMARY KEY ATTRIBUTES:

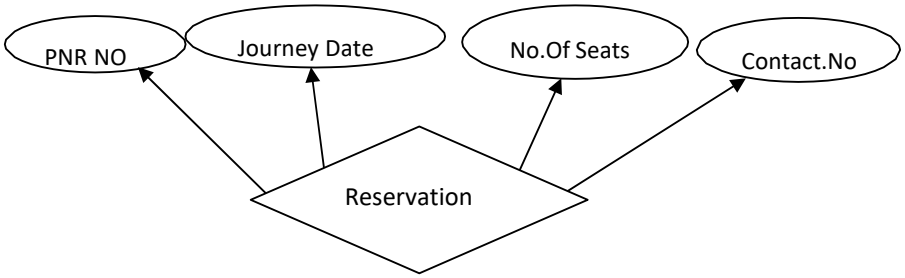
1. Ticket ID (Ticket Entity)
2. Passport ID (PassengerEntity)
3. Bus_NO(BusEntity)

Apart from the above mentioned entities you can identify more. The above mentioned are few.

Ex: Bus Entity



Ex: Reservation relationship



Note: ***The student is required to submit a document by writing the Entities and Keys to the lab teacher***

Experiment 2: Installation of Mysql and practicing DDL, commands

Installationof 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) Not NULL,
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,’hyderabd’ ‘Banglore’);
Insert into Bus values (23,'hyderabd','Kolkata');
Insert into Bus values (45,'Tirupathi,'Banglore');
Insert into Bus values (34,'hyderabd','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 DMLcommands:

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 HAVING CLAUSES.
Find the total number of cancelled seats.

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.Tickent N0 > 60 THEN SET
New.Tickent no = Ticket no; ELSE SET
New.Ticket no = 0; END IF;
END;

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 reserved boat103
- Find the name and the age of the youngest sailor
- Find the names and ratings of sailor whose rating is better than some sailor called Horatio
- Find the names of sailors who have reserved all boats

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,nameFROMPassengerWHERE
ppno=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:Varchar **Passenger** PPNO:
Varchar(15)) :
PK Name:
Varchar(15) Age : int (4) Sex:Char(I 0) : Male/Female Address: VarChar(20)
Passenger_Tickets
PPNO: Varchar(15)) : FK Ticket No: Numeric (9)

Reservation

PNR_No: Numeric(9) :
PK 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

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 :datetime(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_id Ticket_id

You can do these cond and third normal forms if required. And how Normalized tables 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_salary Emp_no Basic HRA DA Total_deduction

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, roll back 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 employees table into departments table

2.Develop a query to grants one privileges of employees table into departments table
3. Developaquerytorevokeallprivilegesofemployeestablefromdepartments table
4.Develop a query to revoke some privileges of employees table from departments 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, RickF. 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. McLaughlin, TMH
6. SQL Fundamentals, J.J.Patrick, Pearson Education

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1800MC03) FRENCH LANGUAGE

B.Tech. II Year II Sem **LTPC**
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.

Course Outcomes:
- The students will be able to communicate in French atA1level.
- 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 theyear-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 or 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 Saraswati House,2015
2. A propos, A1, Langers International,2010
3. Easy French Step-by-step by Myrna BellRochester
4. Ultimate French Beginner-Intermediate (Coursebook) By LividLanguage
5. Ã L'Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier-Berman, Anne C. Cummings.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1800HS05) MANAGEMENT SCIENCE

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

COURSE OUTCOMES:

- **Explain** the principles of management and organizational structures for effective decision-making.
- **Analyze** production and operations management techniques for improving efficiency.
- **Evaluate** financial management strategies, including capital budgeting and ratio analysis.
- **Apply** marketing management concepts for product positioning and customer satisfaction.
- **Assess** human resource management practices for workforce motivation and performance.
- **Demonstrate** project management techniques, including PERT/CPM, for effective planning and execution.

UNIT - I:

Introduction to Management and Organization:

Concepts of Management and organization- nature, importance and Functions of Management, Taylor's Scientific Management Theory- Fayal's Principles of Management- Maslow's theory of Hierarchy of Human Needs- Douglas McGregor's Theory X and Theory Y - Hertzberg Two Factor Theory of Motivation - Leadership Styles, Designing Organizational Structures: Basic concepts related to Organization - Departmentation and Decentralization.

UNIT - II:

Operations and Marketing Management:

Principles and Types of Plant Layout-Methods of Production(Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Store Records - JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Prodcut Life Cycle, Channels of distribution.

UNIT - III:

Human Resources Management(HRM):

Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Performance Appraisal, Job Evaluation and Merit Rating - Performance Management System.

UNIT - IV:

Project Management (PERT/ CPM):

Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, (simple problems).

UNIT - V:

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Environmental Scanning, Value Chain Analysis, SWOT Analysis, steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

TEXT BOOKS:

1. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
2. P. Vijay Kumar, N. Appa Rao and Ashnab, Chnalill, Cengage Learning India, 2012.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich Management - Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford Uiversity Press, 2012.
5. Samuel C. Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: Business Policy and Strategic Management Science, McGraw Hill, 2012.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805PC07)FORMAL LANGUAGES AND AUTOMATA THEORY

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

CourseObjectives:

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.

Course Outcomes:

- **Explain** the fundamental concepts of formal languages, grammars, and automata theory.
- **Construct** finite automata and regular expressions for pattern recognition and lexical analysis.
- **Analyze** context-free grammars and pushdown automata for syntactic processing.
- **Design** Turing machines for algorithmic problem-solving and computational modeling.
- **Evaluate** decidability and complexity issues in computational theory.
- **Apply** automata theory principles to compiler design, artificial intelligence, and software verification.

UNIT - I

Introduction to Finite Automata: Structural Representations, Central Concepts of Automata Theory and it's 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, Left most and Rightmost Derivations, the Language of a Grammar, Sentential Forms, Parse Trees, Minimization of Context-Free Grammar, Ambiguity in Grammars and Languages.

Push Down Automata: Construction of Pushdown Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata

.

UNIT - IV

Normal Forms for Context- Free Grammars, Closure Properties of Context-Free Languages. Types of Normal Forms and it's conversations.

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

UNIT - V

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.

TEXT BOOKS:

1. Introduction to Automata Theory, Languages, and Computation, 3nd Edition, John E. Hopcroft,
2. Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
3. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage Learning.
4. Kamala Krithivasan and Rama R, Introduction to Formal Languages, Automata Theory and
5. 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, JohnWiley.
3. A Text book on Automata Theory, P. K. Srimani, Nasir S. F. B, Cambridge University.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805PC08) DESIGN AND ANALYSIS OF ALGORITHMS

B.Tech. III Year I 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:

1. **Explain** the fundamental concepts of algorithm design and computational complexity.
2. **Apply** divide-and-conquer, greedy, and dynamic programming techniques to solve problems.
3. **Analyze** the efficiency of algorithms using asymptotic notations and amortized analysis.
4. **Design** efficient graph algorithms for shortest paths, spanning trees, and network flows.
5. **Evaluate** NP-completeness and approximation algorithms for intractable problems.
6. **Implement** advanced algorithmic techniques for real-world applications.

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 tree graphs 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 deadlines, 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 Sahniand 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 andsons.
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
(1805PC09) 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.
- To introduce Encryption Security Mechanism

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 IEEE 802.3, IEEE 802.5 – IEEE 802.11, Random access, Controlled access

UNIT – III

Network layer: Logical Addressing, Internetworking, 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

TEXT BOOKS:

1. Data Communications and Networking, Behrouz A. Forouzan , Fourth Edition TMH, 2006. 2. Computer Networks, Andrew S Tanenbaum, 4th Edition. Pearson Education, PHI.

REFERENCES:

1. Data communications and Computer Networks, P.C .Gupta, PHI.
2. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.
3. Understanding communications and Networks, 3rd Edition, W.A. Shay, Cengage Learning.
4. Computer Networking: A Top-Down Approach Featuring the Internet. James F. Kurose & Keith W. Ross, 3 rd Edition, Pearson Education.
5. Data and Computer Communication, William Stallings, Sixth Edition, Pearson Education, 2000

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
PROFESSIONAL ELECTIVE- 1
(1805PE01) NEURAL NETWORKS

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

Course Objective:
This course introduces the basics of Neural Networks and essentials of Artificial Neural Networks with Single Layer and Multi-layer Feed Forward Networks. Also deals with Associate Memories and introduces Fuzzy sets and Fuzzy Logic system components. The Neural Network and Fuzzy Network system application to Electrical Engineering is also presented. This subject is very important and useful for doing Project Work.

Course Outcome:
- 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 – II
Introduction: Neural network, Human brain, biological and artificial Neurons, model of Neuron Knowledge representation, Artificial intelligence and Neural network, Network architecture, Basic Approach of the working of ANN – training, Learning and generalization.

UNIT – II
Supervised learning: Single- layer networks, perception-linear separability, limitations of multi layer network architecture, back propagation algorithm (BPA) and other training algorithms, applications of adaptive multi-layer network architecture, recurrent network, feed forword networks, radial- basis-function (RBF) networks.

UNIT – III
Unsupervised learning: Winner-takes-all networks, Hamming networks, maxnet, simple competitive learning vector-quantization, counter-propagation network, adaptive resonance theory, Kohonen's self-organizing maps, principal component analysis.

UNIT – IV
Associated models: Hopfield networks, brain-in-a-box network, Boltzman machine.

UNIT - V
Optimization methods: Hopfield networks for-TSP, solution of simultaneous linear equations, Iteratedradiant descent, simulated annealing, fenetic algorithm.

TEXT BOOKS:

1. Simon Haykin, "Neural Networks – A Comprehensive Foundation", Macmillan Publishing Co., NewYork, 1994.
2. K. Mahrotra, C.K. Mohan and Sanjay Ranka, "Elements of Artificial Neural Networks", MIT Press,1997 – Indian Reprint Penram International Publishing (India), 1997

REFERENCE BOOKS:

1. A Cichocki and R. Unbehauen, "Neural Networks for optimization and Signal processing", John Wiley and Sons, 1993.
2. J.M. Zurada, "Introduction to Artificial Neural networks", (Indian edition) Jaico Publishers, Mumbai, 1997.
3. Limin Fu. "Neural Networks in Computer Intelligence", TMH.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1812PE01) SOFTWARE ENGINEERING
PROFESSIONAL ELECTIVE- 1

B.Tech. III Year I Sem **L T P C**

3 0 0 3

Course Objectives:

- 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:

At the end of the course the students are able to:

- 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: A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process, Agility and Agile 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 (IEEE FORMAT) and its contents.

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.

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, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:

1. Software Engineering A Practitioner's Approach, Roger S Pressman, 6th edition. McGrawHill Internationa lEdition. 2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, WileyIndia,2010.
2. Software Engineering: A Primer, Waman S Jawadekar, TataMcGraw-Hill,2008
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
4. SoftwareEngineering1:Abstraction and modeling, DinerBjorner, Springer Internationaledition,2006.
5. SoftwareEngineering2: Specification of systems and languages, Diner Bjorner, Springer Internationaledition2006.
6. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley & SonsLtd.
7. Software Engineering3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
8. Introduction to Software Engineering, R. J. Leach,CRCPress.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805PE02) 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:
At the end of the course, the student should be able to:
- Design two dimensional graphics.
- Apply two dimensional transformations.
- Design three dimensional graphics.
- Apply Illumination and color models.
- Apply three dimensional transformations.
- Apply clipping techniques to graphics.
- Design animation sequences.

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 work stations 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.

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, 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

TEXT BOOKS:

1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.
2. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

REFERENCE BOOKS:

1. "Computer Graphics Second edition", 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
(1805PC65) DESIGN AND ANALYSIS OF ALGORITHMS LAB

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

Course Objectives:

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

Course Outcomes:

Divide and Conquer, Greedy, Dynamic programming, and Backtracking.

- implementing and analyzing Quick Sort and Merge Sort in Java.
- Students will apply graph traversal techniques by implementing DFS and BFS algorithms to explore graph structures.
- Students will apply backtracking techniques to solve complex problems (N-Queens, Sum of Subsets, and Hamiltonian Circuits) and analyze the efficiency of these solutions.
- Students will apply the greedy approach to implement job sequencing algorithms and analyze their performance and optimality.
- Students will apply and analyze the implementation of Dijkstra's, Kruskal's and Prim's algorithms and Floyd's algorithms to determine shortest paths in graphs.

List of Experiment

1. Write a java program to implement Quick sort algorithm for sorting a list of integers in ascending order
2. Write a java program to implement Merge sort algorithm for sorting a list of integers in ascending order.
3. Write a java program to implement the dfs algorithm for a graph.
4. Write a. java program to implement the bfs algorithm for a graph.
5. Write a java programs to implement backtracking algorithm for the N-queens problem.
6. Write a java program to implement the backtracking algorithm for the sum of subsets problem.
7. Write a java program to implement the backtracking algorithm for the Hamiltonian Circuits problem.
8. Write a java program to implement greedy algorithm for job sequencing with deadlines.
9. Write a java program to implement Dijkstra's algorithm for the Single source shortest path problem.

10. Write a java program that implements Prim's algorithm to generate minimum cost spanning tree.
11. Write a java program that implements Kruskal's algorithm to generate minimum cost spanning tree
12. Write a java program to implement Floyd's algorithm for the all pairs shortest path problem.
13. Write a java program to implement Dynamic Programming algorithm for the 0/1 Knapsack problem.

TEXT BOOKS:

1.Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, Universities Press.

2.Design and Analysis of Algorithms, P. H. Dave, H. B. Dave, 2nd edition, Pearson Education.

3.Java: The Complete Reference, Eleventh Edition, 11th Edition by Herbert Schildt Publisher(s):
McGraw-Hill

REFERENCE BOOKS:

1. Levitin A, "Introduction to the Design And Analysis of Algorithms", Pearson Education, 2008.
2. Goodrich M.T.,R Tomassia, "Algorithm Design foundations Analysis and Internet Examples", John Wileyn and Sons, 2006.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805PC66) 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 166 MHZ or faster processor with at least 64 MB RAM and 100 MB 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 subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm
6. To implement Open Shortest Path First (OSPF) Routing Protocol
7. Take a 64 bit 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 – Behrouz A. Forouzan, 4th Edition McGraw Hill Education, 2006.
2. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.
3. Data communication and Networks – Bhusan Trivedi, Oxford University Press 2016. 4. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1800MC05)TECHNICAL AND SOFT SKILLS

B.Tech. III Year I Sem

L T P C
2 **0 0 0**

Introduction:
Technical Communication and Soft skills focuses on enhancing students' communication. A thorough drill in 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 hone 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.

Course Objectives:
- To make the students recognize the role of Technical English in their 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 Outcomes:

- **Demonstrate** effective communication skills for professional and interpersonal interactions.
- **Apply** problem-solving and critical-thinking techniques in technical and real-world scenarios.
- **Develop** teamwork, leadership, and adaptability skills for a collaborative work environment.
- **Utilize** technical writing and presentation skills for clear and impactful communication.
- **Implement** time management and organizational strategies for increased productivity.
- **Exhibit** professionalism, ethics, and a positive attitude in workplace and academic settings.

UNIT I – 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

TEXT BOOKS:

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. (ISBN 0312406843) 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 Delhi2012.
3. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
4. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi2002.
5. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN0402213)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1800HS06) 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.
- Toacquaintstudentswithdifferentcomponentsofprofessionalpresentationskills.
- 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 – gerundre 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 – learningprofessional/conversationaletiquette–Oralpresentationskills.

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 Heasly. Cambridge University Press.2006.
2. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford UniversityPress.2011.
3. Exercises in Spoken English. Parts. I – III. CIEFL, Hyderabad. Oxford University Press.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1812PC01) COMPILER DESIGN

B.Tech. III Year II 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 also 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 the knowledge of patterns, tokens & regular expressions for lexical analysis.
- Acquire skills in using lex tool & yacc tool for devleoping 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, bootstrapping, 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: 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, 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 formats to represent 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. Runtime 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.

TEXT BOOKS:

1. Compilers, Principle, Techniques, and Tools. – Alfred.VAho, Monica S.Lam, Ravi Sethi, Jeffrey . 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, Cariel TH Jacobs, Wiley Dreatech

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1812PC02) WEB TECHNOLOGIES

B.Tech. III Year II Sem

L T P C
3 0 0 3

Course Objectives:

- To introduce PHP language for server side scripting
- To introduce XML and processing of XML Data with Java To introduce Server side programming with Java Servlets and JSP To introduce Client side scripting with Javascript and AJAX.

Course Outcomes:

- Develop dynamic and interactive web applications using HTML, CSS, and JavaScript.
- Implement client-side and server-side scripting using frameworks like AngularJS and Node.js.
- Design responsive and user-friendly web interfaces using modern UI/UX principles.
- Utilize databases and backend technologies like MongoDB and Express for web development.
- Integrate authentication, authorization, and security mechanisms in web applications.
- Deploy and maintain web applications on cloud platforms and hosting services.

UNIT- I

- Introduction to the Web - Concept of Internet- History of Internet, Protocols of Internet, World Wide Web, URL, Web Server, Web Browser. Hyper Text Markup Language
- (HTML), HTML Elements, Attributes and Tags, Basic Tags, Advanced Tags – Tables, Forms, Frames, Images, Cascading Style Sheet (CCS)

UNIT – II

Client side Scripting: Introduction to Java script: Java script language - declaring variables, scope of variables, functions, event handlers (on click, on submit etc.), Form validation, Simple AJAX Application. XML: Introduction to XML, XML DTD, W3C XML Schema, Parsing XML, XPath, XML Transformation, Document Object Model, XHTML

UNIT - III

Introduction to Servlets: Common Gateway Interface (CGI), Lifecycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

UNIT – IV

Introduction to JSP: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

UNIT- V

Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control tructures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc.Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies..

FILE HANDLING IN PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

TEXT BOOKS

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP — Steven Holzner, Tata McGraw-Hill

REFERENCE BOOKS

1. Web Programming, building internet applications, Chris Bates 2″ edition, Wiley Dream tech
2. Java Server Pages —Hans Bergsten, SPD O'Reilly,
3. Java Script, D.Flanagan, O'Reilly,SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web — How to program. Dietel and Nieto, Pearson.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805PE03)ARTIFICIAL INTELLIGENCE
PROFESSIONAL ELECTIVE-2

B.Tech. III Year II Sem **L T P C**

3 0 0 3

Course Objectives:

- To learn the significance of intelligence systems.
- To understand the concepts of heuristic search techniques &logic programming.
- To know the various knowledge representation techniques.
- To understand the applications of artificial intelligence i.e Expert systems, game playing , Machine learning and natural language processing.

Course Outcomes:

- Analyze fundamental concepts and principles of Artificial Intelligence and its real-world applications.
- Apply heuristic search techniques and knowledge representation methods for problem-solving.
- Develop intelligent agents using machine learning and reasoning techniques.
- Implement Artificial Neural Networks and fuzzy logic for pattern recognition and decision-making.
- Evaluate AI models using optimization, regularization, and performance metrics.
- Design AI-driven solutions for complex problems in various domains such as robotics, NLP, and computer vision.

UNIT-I

Introduction, History, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications. Problem Solving – State-Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A*, Constraint Satisfaction. Game Playing, Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning

UNIT-II

Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming. Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

UNIT-III

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems Vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools. Uncertainty Measure – Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory

UNIT-IV

Machine-Learning Paradigms: Introduction. Machine Learning Systems .Supervised and Unsupervised Learning. Inductive Learning. Learning Decision Trees (Text Book 2), Deductive Learning. Clustering, Support Vector Machines. Artificial Neural Networks: Introduction, Artificial Neural Networks, Single- Layer Feed-Forward Networks, Multi- Layer Feed-Forward Networks, Design Issues of Artificial Neural Networks.

UNIT-V

Natural Language Processing: Introduction, Sentence Analysis Phases, Grammars and Parsers, Types of Parsers, Semantic Analysis, Universal Networking Knowledge, Semantic web.

TEXT BOOKS:

1. Saroj Kaushik. Artificial Intelligence. Cengage Learning.2011
2. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, Second Edition.2004

REFERENCE BOOK:

1.Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition2009.
2.Introduction to Artificial Intelligence by Eugene Charniak, Pearson.
3.Introduction to Artificial Intelligence and expert systems Dan W.Patterson. PHI.
4.Artificial Intelligence by George Flugerrears on Fifth Edition.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1812PE02) OBJECT ORIENTED ANALYSIS AND DESIGN
PROFESSIONAL ELECTIVE-2

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

Course Objectives:

- Concisely define the following key terms: class, object, state, behavior, object class, class diagram, object diagram, operation, encapsulation, constructor operation, query operation, update operation, scope operation, association, association role, multiplicity, association class, abstract class, concrete class, class-scope attribute, abstract operation, method, polymorphic, overriding, multiple classification, aggregation, and composition.
- Describe the activities in the different phases of the object-oriented development life cycle. State the advantages of object-oriented modeling vis-a-vis structured approaches. Compare and contrast the object-oriented model with the E-R and EER models.
- Model a real-world application by using a UML class diagram.
- Provide a snapshot of the detailed state of a system at a point in time using a UML (Unified Modeling Language) object diagram.
- Recognize when to use generalization, aggregation and composition relationships. Specify different types of business rules in a class diagram.

Course Outcomes:

- Explain the importance of modeling and the principles of object-oriented modeling in software development.
- Apply UML concepts to represent system architectures using structural and behavioral diagrams.
- Construct class, object, and package diagrams to model real-world software applications.
- Develop interaction, use case, and activity diagrams for capturing system behavior.
- Analyze system state changes using state chart diagrams and model software deployment using component and deployment diagrams.
- Implement design patterns and frameworks in software modeling through case studies like the Unified Library application.

UNIT I:

Introduction to UML: Importance of modeling, Principles of modeling, Object oriented modeling, Conceptual model of the UML, Architecture, Software Development Life cycle.

UNIT II:

Basic Structural Modeling: Classes, Relationships, Common Mechanisms and diagrams. **Advanced Structural Modeling**: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

Class and Object Diagrams: Terms Concepts, Modeling techniques for Class and Object Diagrams

UNIT III:

Basic Behavioral Modeling-I: Interactions, Interaction diagrams,

Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams

UNIT IV:

Advanced Behavioral Modeling: Events and Signals, State Machines, Processes and Threads, Time and Space, State Chart Diagrams.

Architectural Modeling: Component, Deployment, Component Diagrams and Deployment Diagrams.

UNIT V:

Patterns and frameworks, Artifact Diagrams, Case Study: The Unified Library application.

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education 2nd Edition

2.-Erik Eriksson, Magnus Penker, Brain Lyons. David Fado: UML 2 Toolkit, WILEY-Dream tech India Pvt. Ltd

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805PE04) IMAGE PROCESSING
PROFESSIONAL ELECTIVE-2

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

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:

- 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: Fundamental Steps in Digital Image Processing, Components of an Image Processing System, A Simple Image Formation Model, Image Sampling and Quantization, Relationships Between Pixels, Imaging Geometry.

UNIT - II

IMAGE TRANSFORMS: 2-D Fourier Transform, Properties, FFT, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar transform, Slant transform, Hotelling transform.

UNIT - III

IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN: Introduction, Gray Level Transformations, Histogram Processing, Arithmetic and Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.

IMAGE ENHANCEMENT IN FREQUENCY-DOMAIN: Smoothing Frequency-Domain Filters, Sharpening Frequency-Domain Filters, Homomorphic Filtering.

UNIT - IV

IMAGE RESTORATION: Image Degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering,Constrained Least Squares Filters.

IMAGE COMPRESSION: Fundamentals, Image Compression Models, Elements of information Theory, Error Free Compression, Lossy Compression.

IMAGE SEGMENTATION: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation, Segmentation by Morphological Watersheds

TEXT BOOKS:

1. R. C. Gonzalez, R. E. Woods (2002), Digital Image processing, 3rd edition, Addison Wesley/ Pearson education, New Delhi, India.

REFERENCE BOOKS:

1. K. Jain (1997), Fundamentals of Digital Image processing, Prentice Hall of India, New Delhi.
2. Rafael C. Gonzalez (2004), Digital Image processing using MATLAB, Richard E. Woods and Steven Low price Edition, Pearson Education Asia, India.
3. William K. Pratt, (2004), Digital Image Processing, 3rd edition, John Wiley & Sons, New Delhi, India.
4. Arthur R.Weeks, Jr. (1996), Fundamentals of Electronic Image Processing, SPIE Optical Engineering

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(1805PE05)MACHINE LEARNING
PROFESSIONAL ELECTIVE-3

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 networks structures – support vector machines – soft margin SVM – going beyond linearity – generalization and overfitting – regularization – validation.

UNIT III
DISTANCE-BASED MODELS

Nearest neighbor models – K-means – clustering around medoids – silhouttes – 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 trees – clustering trees – learning ordered rule lists – learning unordered rule lists– descriptive rule learning – association rule mining – first-order rulelearning

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.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

PROFESSIONAL ELECTIVE-3

(1804PE12)EMBEDDED SYSTEMS

B.Tech. III Year II Sem **LTPC**

3 0 0 3

Course Objectives:

For embedded systems, the course will enable the students to:

- To understand the basics of microprocessors and microcontrollers architecture and its functionalities
- Understand the core of an embedded system
- To learn the design process of embedded system applications. To understands the RTOS and inter-process communication

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 MICROPROCESSORS AND MICROCONTROLLERS: 8086

Microprocessor: Architecture of 8086, Register Organization, Programming Model, Memory Segmentation, Signal descriptions of 8086, Addressing modes, Instruction Set.8051 Microcontroller: 8051 Architecture, I/O Ports, Memory Organization, Instruction set of 8051.

UNIT-II:

INTRODUCTION TO EMBEDDED SYSTEMS:

History of embedded systems, Classification of embedded systems based on generation and complexity, Purpose of embedded systems, Applications of embedded systems, and characteristics of embedded systems, Operational and Non-operational attributes of embedded systems.

UNIT-III:

TYPICAL EMBEDDED SYSTEM

Core of the embedded system, Sensors and actuators, Onboard communication interfacesI2C, SPI, parallel interface; External communication interfaces-RS232, USB, infrared, Bluetooth, Wi-Fi, ZigBee, GPRS.

UNIT-IV:

EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT: Embedded firmware design approaches-super loop based approach, operating system based approach; embedded firmware development languages-assembly language based development, high level language based development.

UNIT-V :

EMBEDDED PROGRAMMING CONCEPTS
Data types, Structures, Modifiers, Loops and Pointers, Macros and Functions, object oriented Programming, Embedded Programming in C++ &JAVA

TEXT BOOKS:

1. Embedded Systems, Raj Kamal, Second Edition TMH.
2. Kenneth. J. Ayala, The 8051 Microcontroller , 3rd Ed., Cengage Learning
3. Introduction to Embedded Systems - shibu k v, Mc Graw Hill Education.

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandi, TMH, 2nd Edition2006
2. Embedded Systems- An integrated approach - Lyla B Das, Pearson education2012.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

PROFESSIONAL ELECTIVE3

(1805PE06) CLOUD COMPUTING

B.Tech. III Year II Sem **LTPC**

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.

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, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjra soft, Aneka Platform

TEXT BOOKS:

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(1812PC61) COMPILER DESIGN LAB

B.Tech. III Year II 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 an abstract mini language whose syntax by BNF notation in following lines.

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.

SOURCE (MINI) LANGUAGE (A Case Study)

Consider the following mini language, a simple procedural High Level Language, operating on integer data with a syntax looking vaguely like a simple C crossed with Pascal. The syntax of the language is defined by the following BNF grammar:

<program> ::=<block>
<block> ::= { <variable definition><slist> }
| { <slist> }
<variable definition> ::= int <vardeflist> ;
<vardeflist> ::=<vardec> | <vardec>, <vardeflist>
<vardec> ::=<identifier> | <identifier> [<constant>]
<slist> ::=<statement> |<statement> ; <slist>
<statement> ::=<assignment> | <ifstatement> | <whilestatement> | <block>
| <printstatement> |<empty>
<assignment> ::=< identifier> =<expression>
| <identifier> [<expression>] = [<expression>
<ifstatement> ::= if <bexpression> then <slist> else <slist> endif
| if <bexpression> then <slist> endif
<whilestatement> ::= while <bexpression> do <slist>enddo
<printstatement> ::= print{ <expression> }
<expression> ::=<expression><addingop><term> | <term> | <addingop><term>
<bexpression> ::=<expression><relop><expression>
<relop> ::=< | <= | = = | >= | > |!=
<addingop> ::= + | -
<term> ::=<term><multop><factor> | <factor>
<multop> ::= * | /
<factor> ::=<constant> | <identifier> |<identifier> [<expression>

| (<expression>)
<constant> ::=<digit> | <digit><constant>
<identifier> ::=<identifier><letterordigit> | <letter>
<letterordigit> ::=a|b|c|….|y|z
<digit> ::= 0|1|2|3|…|8|9
<empty> ::= has the obvious meaning
Comments : zero or more characters enclosed between the standard C/Java style comment brockets /*…*/. The language has the rudimentary support for 1-Dimensional arrays. Ex: int a[3] declares a as an array of 3 elements, referenced as a[0],a[1],a[2]. Sample Program written in this language is :

```
{ int a[3],t1,t2; t1=2; a[0]=1;
    a[1]=2; a[t1]=3; t2= -
    (a[2]+t1*6) / a[2]-t1); if
    t2>5 then print(t2); else
{
int t3; t3=99; t2=25;
print(-11+t2*t3); /* this is not a comment on two lines */
    } endif
    }
```

1. Write a C Program to scan and count the number of characters, words, and line of a file.
2. Write a program for implementation of NFAs that recognize identifiers, constants, and operators of the mini language.
3. Write a program for the implementation of DFAs that recognize identifiers, constants, and operators of the mini language.
4. Design a Lexical analyzer for the above language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value.
5. Implement the lexical analyzer using JLex, flex, flex or lex or other lexical analyzer generating tools.
6. Design Predictive parser for the given language.
7. Design LALR bottom up parser for the above language.
8. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree or Three Address code.
9. Write program to generate machine code from the abstract syntax tree generated by the parser. The following instruction set may be considered as target code.

The following is a simple register-based machine, supporting a total of 17 instructions. It has three distinct internal storage areas. The first is the set of 8 registers, used by the individual instructions as detailed below, the second is an area used for the storage of variables and the third is an area used for the storage of program. The instructions can be preceded by a label. This consists of an integer in the range 1 to 9999 and the label is followed by a colon to separate it from the rest of the instruction. The numerical label can be used as the argument to a jump instruction, as detailed below.

In the description of the individual instructions below, instruction argument types are specified as follows:

R specifies a register in the form R0, R1, R2, R3, R4, R5, R6 or R7 (or r0, r1, etc). L specifies a numerical label (in the range 1 to 9999).

III specifies a "variable location" (a variable number, or a variable location pointed to by a register - see below).

A specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value, optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register.

So, for example an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed).

The instruction set is defined as follows:

LOAD A, R : Loads the integer value specified by A into register R. STORE R, V: Stores the value in register R to variableV.

OUT R : Outputs the value in register R. NEG R : Negates the value in register R.

ADD A, R : Adds the value specified by A to register R, leaving the result in register R. SUB A, R : Subtracts the value specified by A from register R, leaving the result in register R.

MUL A, R : Multiplies the value specified by A by register R, leaving the result in register R. DIV A, R : Divides register R by the value specified by A, leaving the result in register R. JMP L: Causes an unconditional jump to the instruction with the labelL.

JEQ R, L : Jumps to the instruction with the label L if the value in register R is zero. JNER, L : Jumps to the instruction with the label L if the value in register R is notzero. JGE R, L : Jumps to the instruction with the label L if the value in register R is greater than or equal tozero.

JGT R, L : Jumps to the instruction with the label L if the value in register R is greater than zero.

JLE R, L : Jumps to the instruction with the label L if the value in register R is less than or equal to zero.

JLT R, L : Jumps to the instruction with the label L if the value in register R is less than zero. NOP: Is an instruction with no effect. It can be tagged by alabel.

STOP: Stops execution of the machine. All programs should terminate by executing a STOP instruction.

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 diskspace.
2. C ++ Compiler and JDK kit, Lex or Flex and YACC tools (Unix/Linux utilities)

USEFUL TEXT BOOKS / REFERENCES / WEBSITES :

1.Modern compiler implementation in C, Andrew w.Appel, Revised Edn, Cambridge UniversityPress

2.Principles of Compiler Design. – A.V Aho, J.D Ullman ;PearsonEducation.

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,HenryE.Bal, Cariel TH Jacobs, WileyDreamtech

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(1812PC62)WEB TECHNOLOGIES LAB

B.Tech. III Year II Sem **LT P C**

0 3 1.5

Course Objectives:

- To enable the student to program web applications using the following technologies HTML, Javascript , AJAX, Servlets, JSP and PHP

Course Outcomes:

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

Note:

i. Use XAMPP Stack (Cross Platform, Apache, MariaDB, PHP and Perl) for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform wherever applicable

ii. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.

1. Install the following on the local machine
   - Apache Web Server (if not installed)
   - Tomcat Application Server locally
   - Install MariaDB (formerly called as MySQL if not installed)
   - Install PHP and configure it to work with Apache web server and MySQL (if not already configured)
2. Design a simple online shopping website with different web pages. (Note: Use frames, hyperlinks, Images, tables etc...)
3. Re-design the above the website applying CSS.
4. Design login page, registration page and apply the client side validations using JavaScript.
5. Create an XML document that contains 10 users information. Write a Java program, which takes User Id as input and returns the user details by taking the user information from the XML document using (a) DOM Parser and (b) SAX parserImplement the following web applications using (a) PHP, (b) Servlets and (c) JSP:

6. A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is shown to the user.
7. A simple calculator web application that takes two numbers and an operator (+, -, /, * and %) from an HTML page and returns the result page with the operation performed on the operands.
8. A web application takes a name as input and on submit it shows a hello <name> page where <name> is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).
9. A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with "Hello <name>, you are not authorized to visit this site" message, where <name> should be replaced with the entered name. Otherwise it should send

"Welcome <name> to this site" message.

10. A web application for implementation:

The user is first served a login page which takes user's name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions.

If name and password matches, serves a welcome page with user's full name.

If name matches and password doesn't match, then serves "password mismatch" page

If name is not found in the database, serves a registration page, where user's full name is asked and on submitting the full name, it stores, the login name, password and full name in the database (hint: use session for storing the submitted login name and password)

11. A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary.

REFERENCE BOOKS:

1. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill
2. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech
3. Java Server Pages –Hans Bergsten, SPD O'Reilly
4. Java Script, D.Flanagan, O'Reilly, SPD.
5. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(1800MC04)INDIAN CONSTITUTION

B.Tech. III Year II Sem **LTPC**

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.

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, Indian Constitution Law, 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
(1812PC03) LINUX PROGRAMMING

B.Tech. IV Year I Sem **LT P C**

3 1 0 4

Course Objectives:

- To understand and make effective use of Linux utilities and Shell scripting language (bash) to solve Problems.
- To implement in C some standard Linux utilities such as ls, mv, cp etc. using system calls.
- To develop the skills necessary for systems programming including file system programming, process and signal management, and inter process communication.
- To develop the basic skills required to write network programs using Sockets.

Course Outcomes:

- Utilize Linux utilities and command-line tools for file handling, text processing, networking, and system administration.
- Develop shell scripts using Bash to automate tasks, handle control structures, and perform file operations.
- Implement system calls for file and directory management, including file I/O operations, metadata handling, and linking mechanisms.
- Analyze process management concepts, including process creation, termination, inter-process communication, and signal handling.
- Apply different IPC mechanisms such as pipes, message queues, semaphores, and shared memory for process synchronization and communication.
- Design client-server applications using Berkeley sockets for network-based IPC, handling multiple client connections efficiently.

UNIT I:

Linux Utilities: File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities, sed –scripts, operation, addresses, commands, applications, awk –execution, fields and records, scripts, operation, patterns, actions, system commands in awk, Applications.

Shell Programming with Bourne again shell(bash): Introduction, shell responsibilities, pipes and Redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shellscripts.

UNIT II:

Files and Directories: File Concept, File System Structure, File metadata- Inodes, kernel support for files, System calls, Kernel support for files, System calls for File I/O Operations- open, creat, read, write , close, lseek, dup2file, filestatus information- stat family, File and record locking-fcntl function, File permissions chmod, fchmod, file ownership-chown, lchown, fchown, links- softlinks and hard links- Symlink,
Link, Unlink

Directories: Creating, removing and changing directories- mkdir, rmdir, chdir, obtaining current working directory-getcwd, Directory contents, Scanning, Directories- Opendir, readdir, closedir, rewinddir functions

UNIT III:

Process and Signals: Process concept, Layout of a C program image in main memory, process attributes, Kernel support for process, process identification. process control - process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process, System call interface for Process management- fork, vfork, exit, wait, waitpid, exec family, Process groups, Sessions and controlling Terminal, diff b/n threads and process

Signals: Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions.

UNIT IV:

Inter process Communication: Introduction to IPC, Pipes, FIFOs, Introduction to three types of IPC-message queues, semaphores and shared memory. Message Queues-Kernel support for messages, Unix system V APIs for messages, client/server example. Semaphores-Kernel support for semaphores, Unix system V APIs for semaphores. Shared Memory- Kernel support for shared memory, Unix system V APIs for shared memory, semaphore and shared memory example.

UNIT V:

Sockets – Introduction to Berkeley Sockets, IPC over a network, Client-Server model, Socket address structures (Unix domain and internet domain), Socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs-Single Server-Client connection, Multiple simultaneous Clients, Socket options and fcntl system calls, Comparison of IPC mechanisms

TEXT BOOKS:

1. T.Chan, “UNIX System Programming using C++”,PHI.
2. Sumitabha Das, “UNIX Concepts and Applications”, 4e, TMH,2006.
3. N.Matthew, R.Stones, Wrox, “Beginning Linux Programming”, 4e, Wiley India Edition.

REFERENCES:

1. Robert Love, “Linux System Programming”, O’Reilly.
2. W.R.Stevens, “UNIX Network Programming”, PHI.
3. Graham Glass, King Ables, “UNIX for programmers and users”, 3e, Pearson Education,2003.
4. W.R.Stevens, “Advanced Programming in the Unix environment”, 2e, PHI, Pearson Education.
5. A.Hoover, “System Programming with C and UNIX”,Pearson.
6. Kumar Saurabh,”Unix Programming”, 1e, Wiley India pvtLtd.
7. B.A.Forouzan and R.F.Gilberg, “UNIX and Shell programming”, Cengage Learning.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(1805PC10) DATA WAREHOUSING AND DATA MINING

B.Tech. IV Year I Sem **LTPC**

3 0 0 3

Course Objectives:

- Study data warehouse principles and its working learn data mining concepts.
- To understand association rules mining.
- Discuss classification algorithms. Learn how data is grouped using clustering techniques.

Course Outcomes:

- Student should be able to understand why the data warehouse in addition to database systems.
- Ability to solve real world problems in business and scientific information using data mining
- Analyze the differences between operational databases and data warehouses and design data warehouse architectures with appropriate schema models, such as Star and Snowflake, to support multi-dimensional data analysis.
- Construct ETL processes for data extraction, transformation, and loading (ETL) by applying logical data modeling and OLAP operations (such as ROLAP, MOLAP, and HOLAP) to ensure efficient data storage and retrieval.
- Evaluate data preprocessing techniques, including data cleaning, integration, and reduction, to prepare data for mining processes, and justify their importance in improving data quality and accuracy in analytics.
- Implement association rule mining techniques, including Apriority and FP-Growth algorithms, to identify frequent item sets and generate meaningful association rules for pattern discovery in large datasets.

UNIT-I

Data Warehouse: Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction- Transformation-Loading, Logical(Multi- Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Constellation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact- Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture- ROLAP, MOLAP and HOLAP.

UNIT-II

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major issues in DataMining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration &Transformation, Data Reduction, Discretization and Concept Hierarchy Generation**.**

UNIT-III

Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI

Principle, Support and Confidence Measures, Association Rule Generation;
APRIOIRI Algorithm, The Partition Algorithms, FP-Growth
Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

UNIT-IV

Classification: Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers , Classification techniques, Decision Trees Decision tree Construction, Methods for Expressing attribute test conditions,
Measures for Selecting the Best Split, Algorithm for Decision tree Induction ; NaiveBayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification Algorithm and Characteristics.
Prediction: Accuracy and Error measures. Evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods.

UNIT-V

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major
Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, and Model based Clustering Methods, Outlier Analysis.

TEXT BOOKS:

1) Data Mining- Concepts and -1.chniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2Edition,2006.

2) Introduction to Data Mining, Psng-Ning Tan, Vipin Kumar, Michael Stein banch, Pearson Educator.

REFERENCE BOOKS:

1) Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.

2) Data Warehousing Fundament's, Pualraj Ponnaiah, Wiley Student Edition.

3) The Data Warehouse Life Cycle Tool kit — Ralph Kimball, Wiley Student Edition.

4) Data Mining, Vikaram Pudi, P Rddha Krishna, Oxford University Press

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
PROFESSIONAL ELECTIVE IV
(1805PE07)DEEP LEARNING

B.Tech. IV Year I Sem **LTPC**
3 0 0 3

Course Objectives:

By the end of the course, students will be able to:

- understand complexity of Deep Learning algorithms and their limitations
- understand modern notions in data analysis oriented computing;
- be capable of confidently applying common Deep Learning algorithms in practice and implementing their own;
- be capable of performing distributed computations; ▪ be capable of performing experiments in Deep Learning using real-world data.

Course Outcomes:

By the end of this deep learning course with TensorFlow, the student will be able to:

- Understand the concepts of TensorFlow, its main functions, operations and the execution pipeline
- Implement deep learning algorithms, understand neural networks and traverse the layers of data abstraction which will empower the student to understand data more precisely.
- Learn topics such as convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces
- Build deep learning models in TensorFlow and interpret the results
- Understand the language and fundamental concepts of artificial neural networks, Troubleshoot and improve deep learning models
- Build own deep learning project, Differentiate between machine learning, deep learning and artificial intelligence

UNIT 1:

Introduction to TensorFlow : Computational Graph, Key highlights, Creating a Graph, Regression example, Gradient Descent, TensorBoard, Modularity, Sharing Variables, Keras Perceptrons: What is a Perceptron, XOR Gate

UNIT 2:

Activation Functions :Sigmoid, ReLU, Hyperbolic Fns, Softmax Artificial Neural Networks : Introduction, Perceptron Training Rule, Gradient Descent Rule

UNIT 3:

Gradient Descent and Backpropagation: Gradient Descent, Stochastic Gradient Descent, Backpropagation, Some problems in ANN Optimization and Regularization :Overfitting and Capacity, Cross Validation, Feature Selection, Regularization, Hyperparameters

UNIT 4:

Introduction to Convolutional Neural Networks: Introduction to CNNs, Kernel filter ,Principles behind CNNs, Multiple Filters, CNN applications.

Introduction to Recurrent Neural Networks: Introduction to RNNs, Unfolded RNNs,Seq2Seq RNNs, LSTM, RNN applications

UNIT 5:

Deep Learning applications: Image Processing, Natural Language Processing, Speech Recognition, Video Analytics

TEXT BOOK

1. Goodfellow, I., 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

PROFESSIONAL ELECTIVE IV

(1812PE03) DISTRIBUTED SYSTEMS

B.Tech. IV Year I Sem **LTPC**

3 0 0 3

Course Objectives:

- To learn the principles, architectures, algorithms and programming models used in distribute systems.
- To examine state-of-the-art distributed systems, such as Google File System.
- To design and implement sample distributed systems.

Course Outcomes:

- Analyze the key characteristics and architectural models of distributed systems to evaluate the challenges and opportunities in resource sharing and networked environments.
- Apply knowledge of time synchronization methods and global state coordination to design solutions for distributed mutual exclusion, consensus, and multicast communication.
- Evaluate interprocess communication protocols, including Internet Protocol APIs and UNIX IPC, to develop robust and efficient client-server and group communication models.
- Design distributed objects and remote invocation mechanisms using frameworks such as Java RMI, demonstrating an understanding of event handling and data marshalling techniques.
- 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.
- 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: Introduction, Examples of Distributed systems, Resource sharing and web, challenges.

System models: Introduction, Architectural and Fundamental models, networking and Internetworking.

UNIT II

Time and Global States: Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global States.

Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT III

Inter process Communication: Introduction ,The API for the Internet Protocols, External Data Representation and Marshalling, Client –Server Communication, Group Communication, Case Study: IPC in UNIX.

Distributed Objects and Remote Invocation: Introduction, Communication between distributed objects, Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI

UNIT IV

Distributed File Systems: Introduction, File Service Architecture, Case Study: Sun Network File System

Name Services: Name Services: Introduction, Name Services and the Domain Name System, Case study of the Global Name Service

Distributed Shared Memory: Introduction, Design and Implementation issues, Sequential consistency, Release consistency,Other consistency models.

UNIT V

Transactions and Concurrency control: Introduction, Transactions, Nested Transactions, Locks, optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education. 2009.

REFERENCES:

1. Distributed Systems, Principles and paradigms, Andrew S.Tanenbaum, Maarten Van Steen, Second Edition,PHI.
2. Distributed Systems, An Algorithm Approach, Sikumar Ghosh, Chapman & Hall/CRC, Taylor &Fransis Group,2007.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

PROFESSIONAL ELECTIVE IV

(1805PE08) MOBILE COMPUTING

B.Tech. IV Year 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, Network 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:

- 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.
- 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.
- 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.
- 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.
- 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.
- 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 – SDMF-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- RoutingLocalization-Handover-Examples

UNIT III: Wireless LAN and Mobile Network Layer

Wireless LAN -Infrared vs radio transmission - Infrastructure and ad-hoc network 205- IEEE 802.11- 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- SyncML- 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, Oct 2004.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(1812PC63) LINUX PROGRAMMING LAB

B.Tech. IV Year I Sem **L T P C**

0031.5

Course Objectives:

- To write shell scripts to solve problems
- To implement some standard Linux utilities such as ls, cp etc using system calls.
- To develop network-based applications.

Course Outcomes:

- **Demonstrate** proficiency in using basic Linux utilities for file handling, process management, and system operations.
- **Develop** shell scripts to automate tasks, manage system configurations, and process text data efficiently.
- **Utilize** Linux system calls for file I/O operations, including creation, reading, writing, and modification of files.
- **Implement** process control techniques, including process creation, management, and signal handling in a Linux environment.
- **Apply** inter-process communication (IPC) methods such as pipes, message queues, semaphores, and shared memory in real-world applications.
- **Design** and **debug** network-based applications using socket programming for client-server communication over the internet or local networks.

WEEK 1:

Practice File handling utilities, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

WEEK 2:

a) Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or directory and reports accordingly. Whenever the argument is a file it reports no of lines present init.

b) Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

WEEK 3:

a)Write a shell script to list all of the directory files in a directory

b)Write a shell script that deletes all lines containing the specified word in one or more files supplied as arguments to it.

c)Write a shell script to find factorial of a given number.

WEEK 4:

Write an awk script to count number of lines in a file that does not contain vowels Write an awk script to find the no of characters ,words and lines in a file

WEEK 5:

Implement in c language the following Unix commands using system calls a)cat b) ls c) Scanning Directories (Ex: opendir(),readdir(),etc.)

WEEK 6:

Write a C program that takes one or more file/directory names as command line input and reports following information A) File Type B) Number Of Links

C) Time of last Access D) Read, write and execute permissions

WEEK 7:

a) Write a C program to implement kill(), raise() and sleep()functions.

b) Write a C program to implement alarm(), pause() and abort()functions.

WEEK 8:

a) Write a C program to create child process and allow parent process to display "parent" and the child to display "child" on the screen

b) Write a C program to create zombie process

c) Write a C program to illustrate how an orphan process is created

WEEK 9:

a) Write a C program that illustrate communication between two process using unnamed pipes

b) Write a C program that illustrates communication between two process using named pipes or FIFO.

WEEK 10:

a) Write a C program for FileLocking.

b) Write a C program that receives a message from message queue and display them.

WEEK 11:

Write a C program that illustrates two processes communicating using Shared memory.

WEEK 12:

Write client server programs using c for interaction between server and client process using sockets

TEXT BOOKS:

1. Unix System Programming using C++, T.Chan, PHI.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH, 2006.
3. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition,rp-2008

REFERENCES:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. Unix Network Programming, W.R.Stevens,PHI.
4. UNIX for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805PC67)DATA WAREHOUSING AND DATA MINING LAB

B.Tech. IV Year I Sem **LT P C**

0 0 3 1.5

Course Objectives:

Learn how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics), Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA), Understand the data sets and data preprocessing, Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression, Exercise the data mining techniques with varied input values for different parameters.

Course Outcomes:

- Implement data pre-processing techniques such as cleaning, transformation, and reduction for quality data preparation.
- Construct data warehouses and perform OLAP operations to analyze multidimensional data effectively.
- Apply association rule mining techniques like Apriori and FP-Growth to discover frequent itemsets and correlations.
- Develop classification models using algorithms such as Decision Trees, Naïve Bayes, and k-Nearest Neighbors for predictive analytics.
- Execute clustering techniques such as K-Means and Hierarchical clustering to uncover hidden patterns in data.
- Evaluate data mining models using performance metrics to assess accuracy, efficiency, and real-world applicability.

UNIT-I. Build Data Warehouse and Explore WEKA:

A. Build a Data Warehouse/Data Mart (using open source tools like Pentaho Data Integration tool, Pentoaho Business Analytics; or other data warehouse tools like Microsoft-SSIS, Informatica, Business Objects,etc.).

Identify source tables and populate sample data

Design multi-dimensional data models namely Star, snowflake and Fact constellation schemas for any one enterprise (ex. Banking, Insurance, Finance, Healthcare, Manufacturing, Automobile, etc.).

Write ETL scripts and implement using data warehouse tools

Perform various CLAP operations such slice, dice, roll up, drill up and pivot Explore visualization features of the tool for analysis like identifying trends etc.

B. Explore WEKA Data Mining/Machine Learning Toolkit Downloading and/or installation of WEKA data mining toolkit,Understand the features of WEKA toolkit such as Explorer, Knowledge Flow interface, Experimenter, command- line interface.

Navigate the options available in the WEKA (ex. Select attributes panel, Preprocess panel, Classify panel, Cluster panel, Associate panel and Visualize panel) Study the arff file format

Explore the available data sets in WEKA.

Load a data set (ex. Weather dataset, Iris dataset, etc.) Load each dataset and observe the following

List the attribute names and they types Number of records in each dataset Identify the class attribute (if any)

Plot Histogram

Determine the number of records for each class.

Visualize the data in various dimensions

Unit 2 Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets

A.Explore various options available in Weka for preprocessing data and apply (like DiscretizatiOfl Filters, Resample filter, etc.) on each dataset

B.Load each dataset into Weka and run Apron algorithm with different support and confidence values. Study the rules generated.

C. Apply different discretization filters on numerical attributes and run the Apriori association rule algorithm. Study the rules generated. Derive interesting insights and observe the effect of discretization in the rule generation process.

Unit 3 Demonstrate performing classification on datasets

A. Load each dataset into Weka and run 1d3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappastatistic.

B. Extract if-then rules from the decision tree generated by the classifier, observe the confusion matrix and derive Accuracy, F-measure, TPrate, FPrate, Precision and Recall values. Apply cross-validation strategy with various fold levels and compare the accuracy results.

C. Load each dataset into Weka and perform Naïve-bayes classification and k- Nearest Neighbor classification. Interpret the results obtained.

D. Plot RoCCurves

E. Compare classification results of 1D3, J48, Naïve-Bayes and k-NN classifiers for each dataset, and deduce whlch classifier is performing best and poor for each dataset and justify.

Unit 4 Demonstrate performing clustering Ofl data sets

A. Load each dataset into Weka and run simple k-means clustering algorithm with different values of k (number of desired clusters). Study the clusters formed. Observe the sum of squared errors and centroids, and deriveinsights.
B. Explore other clustering techniques available in Weka.

Unit 5 Demonstrate performing Regression on data sets

A. Load each dataset into Weka and build Linear Regression model. Study the clusters formed. Use Training set option. Interpret the regression model and derive patterns and conclusions from the regression results.

B. Use options cross-validation and Percentage split and repeat running the Linear Regression Model. Observe the results and derive meaningful results.

Explore Simple linear regression technique that only looks at one variable.

RESOURCE SITES:

1. http://www.pentaho.com/http://www.cs.waikato.ac.nz/ml/weka/

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805MC06) INDIAN TRADITIONAL KNOWLEDGE

B.Tech. IV Year I Sem **LTPC**

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 frame work 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 (PPVFRAct);

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 Mohantaand Vipin Kumar Singh, Pratibha Prakashan 2012.

Reference Books:

1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
"Knowledge Traditions and Practices of Ind

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805PE09) BIG DATA ANALYTICS
PROFESSIONAL ELECTIVE – V

Course Outcomes:

- Analyze the characteristics, challenges, and evolution of Big Data, differentiating it from traditional business intelligence.
- Compare SQL and NoSQL databases, exploring Hadoop architecture and distributed computing challenges.
- Implement CRUD operations and data querying techniques in MongoDB and Cassandra for Big Data management.
- Develop Map Reduce programs and Hive queries for efficient data processing and analytics.
- Utilize Pig for data transformation and apply Jasper Reports for data visualization and reporting.
- Evaluate Big Data analytics tools and techniques for real-world applications in data science and business intelligence.

UNIT-I
INTRODUCTION TO BIG DATA AND ANALYTICS

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 - Data Warehouse and Hadoop Environment Big Data Analytics: Classification of Analytics – Challenges - Big Data Analytics important - Data Science - Data Scientist - Terminologies used in Big Data Environments - Basically Available Soft State Eventual Consistency - Top Analytics Tools

UNIT II
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

UNIT III
INTRODUCTION TO MONGODB AND CASSANDRA

MongoDB: Why Mongo DB - Terms used in RDBMS and Mongo DB - Data Types - MongoDB Query Language Cassandra: Features - CQL Data Types – CQLSH – Keyspaces - CRUD Operations – Collections - Using a Counter - Time to Live - Alter Commands - Import and Export - Querying System Tables

UNIT IV
INTRODUCTION TO MAPREDUCE PROGRAMMING AND HIVE

MapReduce: Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression Hive: Introduction – Architecture - Data Types - File Formats - Hive Query Language Statements – Partitions – Bucketing – Views - Sub- Query – Joins – Aggregations – Group by and Having - RCFile

Implementation - Hive User Defined Function - Serialization and Deserialization - Hive Analytic Functions

UNIT V

INTRODUCTION TO PIG & JASPER REPORTS

Pig: Introduction - Anatomy – Features – Philosophy - Use Case for Pig - Pig Latin Overview - Pig Primitive Data Types - Running Pig - Execution Modes of Pig – HDFS Commands - Relational Operators – Eval Function - Complex Data Types - Piggy Bank - User-Defined Functions – Parameter Substitution - Diagnostic Operator - Word Count Example using Pig - Pig at Yahoo! – Pig Versus Hive - JasperReport using Jaspersoft.

TEXT BOOK:

1. Seema Acharya, SubhashiniChellappan, “Big Data and Analytics”, Wiley Publications, First Edition,2015

REFERENCE BOOKS:

1. Judith Huruwitz, Alan Nugent, Fern Halper, Marcia Kaufman, “Big data for dummies”, John Wiley & Sons, Inc.(2013)
2. Tom White, “Hadoop The Definitive Guide”, O’Reilly Publications, Fourth Edition, 2015
3. Dirk Deroos, Paul C.Zikopoulos, Roman B.Melnky, Bruce Brown, Rafael Coss, “Hadoop For Dummies”, Wiley Publications,2014
4. Robert D.Schneider, “Hadoop For Dummies”, John Wiley & Sons, Inc.(2012)
5. Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGraw Hill, 2012 Chuck Lam, “Hadoop In Action”, Dreamtech Publications,2010

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(1812PE04) Adhoc and Sensor Networks

PROFESSIONAL ELECTIVE – V

Course Outcomes:

- **Analyze** the characteristics, challenges, and applications of Mobile Ad Hoc Networks (MANETs).
- **Evaluate** various topology-based and position-based routing protocols for efficient data transmission in MANETs.
- **Demonstrate** the concepts of wireless sensor networks (WSNs), including design issues, clustering, and energy consumption.
- **Assess** data retrieval techniques in WSNs and explore MAC, routing, and application layer protocols.
- **Examine** security mechanisms in ad hoc and sensor networks, including key management, secure routing, and intrusion detection.
- **Explore** sensor network platforms, tools, and operating systems such as TinyOS, Mate, and MagnetOS.

UNIT – I

Introduction to Ad Hoc Wireless Networks: Characteristics of MANETS, Applications of MANETS, Challenges Routing In MANETS: Topology based versus position based approaches, Topology based routing protocols, and position based routing, other routing protocols

UNIT – II

Data Transmission in MANETS: The broadcast storm, Multicasting, Geocasting.TCP Over Ad Hoc Networks: TCP protocol overview, TCP and MANETS, Solutions for TCP over Ad Hoc

UNIT – III

Basics of Wireless Sensors and Applications: The Mica Mote, Sensing and Communication Range, Design Issues, Energy Consumption, Clustering of Sensors, Applications. Data Retrieval in Sensor Networks: Classification of WSNs, MAC Layer, Routing Layer, High-Level Application Layer Support, Adapting to the Inherent Dynamic Nature of WSNs.

UNIT – IV Security: Security in Ad Hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems Sensor Network Platforms and Tools: Sensor network Hardware, Sensor Network Programming Challenges, and Node-Level Software Platforms.

UNIT – V

Operating Systems for Wireless Sensor Networks: Introduction, Examples of Operating Systems: TinyOS, Mate, MagnetOS.

TEXT BOOKS:

1. Ad Hoc and Sensor Networks: Theory and Applications, Carlos de Morais Cordeiro and Dharma PrakashAgrawal, World Scientific Publications / Cambridge University Press,2006.
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science Imprint, Morgan Kauffman Publishers, 2005.

REFERENCES:

1. Ad Hoc Wireless Networks: Architectures and Protocols, C. Siva Ram Murthy and B. S. Manoj, Pearson Education, 2004.
2. Guide to Wireless Ad Hoc Networks, Sudip Misra, Isaac Woungang, and Subhas Chandra Misra, Springer International Edition, 2011.
3. Guide to Wireless Sensor Networks, Sudip Misra, Isaac Woungang, and Subhas Chandra Misra, Springer International Edition, 2012.
4. Wireless Mesh Networking, Thomas Krag and SebastinBuettrich, O'Reilly Publishers,2007.
5. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010.
6. Wireless Ad hoc Mobile Wireless Networks-Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
7. Wireless Ad hoc Networking, Shih-Lin Wu, Yu-Chee Tseng, Auerbach Publications, Taylor & Francis Group, 2007
8. Wireless Ad hoc and Sensor Networks–Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp2010.
9. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al., World Scientific Publications /Cambridge University Press, 2010

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805PE10) SOFT COMPUTING
PROFESSIONAL ELECTIVE – V

Course Outcomes:

- Differentiate between conventional AI and computational intelligence, applying heuristic search techniques for problem-solving.
- Analyze artificial neural network models, including supervised learning algorithms like perceptron and backpropagation networks.
- Evaluate unsupervised learning networks such as Kohonen maps, adaptive resonance theory, and other specialized architectures.
- Apply fuzzy set theory, operations, and membership functions for uncertainty handling in computational systems.
- Implement fuzzy logic concepts, including fuzzy rule-based reasoning and decision-making systems.
- Utilize genetic algorithms for optimization problems such as the traveling salesman problem and internet search techniques.

UNIT I -Evolution of Computing:

Soft Computing Constituents - From Conventional AI to Computational Intelligence, Heuristic Search Techniques-Generate and Test, Hill Climbing ,Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation-Using Predicate Logic and Rules.

UNIT II- Artificial Neural Networks:

Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Back propagation Network, Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks.

UNIT III- Unsupervised Learning Network:

Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks Adaptive Resonance Theory Networks. Special Networks - Introduction to various networks.

UNIT IV- Fuzzy Sets:

Introduction to Classical Sets (crisp Sets) and Fuzzy Sets, Operations and Fuzzy sets. Classical Relations and Fuzzy Relations - Cardinality, Operations, Properties and composition. Tolerance and equivalence relations. Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

UNIT V-Fuzzy Logic:

Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making.Fuzzy Logic Control Systems, Genetic Algorithm- Introduction and basic operators and terminology, Applications: Optimization of TSP, Internet Search Technique.

TEXT BOOKS:

1. Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India,2007.
2. Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva, Pearson Edition,2004

REFERENCE BOOKS:

1. Artificial Intelligence and Soft Computing- Behavioural and Cognitive Modeling of the Human Brain Amit Konar, CRC press, Taylor and Francis Group.
2. Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991, rp2008.
3. Artificial Intelligence–Patric Henry Winston – Third Edition, Pearson Education. 4. A first course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group.
5. Artificial Intelligence and Intelligent Systems, N.P.Padhy, Oxford Univ. Press

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(1805PE11) DISTRIBUTED TRUST AND BLOCK CHAIN TECHNOLOGY
PROFESSIONAL ELECTIVE – VI

Course Outcomes:

- Analyze distributed database challenges, fault tolerance mechanisms, and cryptographic techniques in blockchain systems.
- Compare blockchain with conventional distributed databases and evaluate its mining mechanisms, consensus models, and transaction structures.
- Examine distributed consensus algorithms, including Proof of Work, Proof of Stake, and their impact on security and energy utilization.
- Evaluate cryptocurrency architectures, protocols, and smart contract vulnerabilities in platforms like Bitcoin and Ethereum.
- Assess cryptocurrency regulations, legal implications, and their influence on global markets and black-market economies.
- Apply blockchain technology in real-world applications such as cloud computing, medical records, and domain name services.

UNIT I: BASICS:
Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. - Cryptography: Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof.

UNIT II: BLOCKCHAIN:
Introduction, Advantage over conventional distributed database, Blockchain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Private and Public blockchain**.**

UNIT III: DISTRIBUTED CONSENSUS:
Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy utilization and alternate.

UNIT IV: CRYPTOCURRENCY:
History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin

UNIT V: CRYPTOCURRENCY REGULATION:
Stakeholders, Roots of Bit coin, Legal Aspects-Crypto currency Exchange, Black Market and Global Economy.

Applications: Cloud Computing, Medical Record Management System, Domain Name Service and future of Blockchain.

TEXT BOOKS:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Crypto currency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).
2. The Block chain for Beginners –Guide to Block chain and Leveraging Block chain Programming by Josh Thompsons , create space Independent Publishing platform,2017.

REFERENCE BOOKS:

1. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies
2. Block Chain Technology, Crypto currency and Applications. By S.Shukla, M.Dhawan, S.Sharma, S.Venkatesan , Oxford University Press 2019.
3. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System
4. DR. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger," Yellow paper.2014.
5. Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum Smart contracts

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(1812PE06) Programming Essentials in Python Programming

PROFESSIONAL ELECTIVE – VI

Course Outcomes:

- Explain Python's history, features, applications, programming modes, and environment setup.
- Utilize Python data types, operators, slicing, indexing, and control flow statements for problem-solving.
- Implement advanced data structures such as lists, tuples, sets, dictionaries, and their operations.
- Develop modular programs using functions, file handling, exception handling, and string manipulations.
- Apply Python modules, libraries, regular expressions, and command-line arguments in real-world applications.
- Demonstrate object-oriented programming concepts, including classes, objects, inheritance, polymorphism, and encapsulation.

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 -ve 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, Frozenset, Dictionary, Range, Bytes & Bytearray, 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, Frozenset 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, Bytearray & 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 FileUsing 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

TEXT BOOK:

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. Louden 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
(1805PE12) INTERNET OF THINGS
PROFESSIONAL ELECTIVE –VI

B.Tech IV Year 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 enabaled 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

Io T 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 REST ful web API

TEXT BOOKS:

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
(1805OE01) FUNDAMENTALS OF DBMS
(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: INTRODUCTION:

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.

UNITV:

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
(1805OE02) (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. Analyze
- 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
(1805OE03S) (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 & Pythonand 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. Sahniand Susan.
Data structures A Programming Approach with C, D., S.Kushwahaand, 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. Tondoan dB. 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. Lipscutz, Schism's Outlines, TMH.
8. Data structures using C, A. K. Sharma, 2nd edition, Pearson..
9. 9.DataStructuresusingC&C++,R. Shukla, Wiley India.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
ADVANCED COMPILER DESIGN
(1805OE04) (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 lax 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, 3nd 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
(1805OE05) (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 Frame 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 Scheldt and Dale Skrien.

REFERENCE BOOKS:

Java for Programmers. J. Dixieland H. M. Deitel, PEA (or) Java: How-to Program, P. J. Deitel and H. M. Deitel, PHI

Object Oriented Programming through Java, P. Radha Krishna, Universities Press.3. Thinking in Java, Bruce Eckel, PE

Programming Java, S. Malhotra and S. Choudhary, Oxford Universities

Design Patterns Erich Gamma, Richard Helm, Ral ph Johnson and John Vlissides

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
CASE TOOLS AND SOFTWARE TESTING
(1805OE06) (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 Engineering 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:

TESTCASEDESIGN

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:

LEVELSOFTESTING

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:

TESTMANAGEMENT

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:

TESTAUTOMATION

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:

Ilene Burnstein,"Practical Software Testing" ,Springer International Edition, 2203.

Edward Kit, "Software Testing in the Real World–Improving the Process", Pearson Education,1995.

Boris Beizer,"Software Testing Techniques"–2ndEdition, Van Nostrand Reinhold, New York, 1990.

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

(1805OE07) DATA AND KNOWLEDGE MINING

(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.
- Ability to 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 using 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, APRIOIRI 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 TelecommunicationIndustries–DataMininginScienceandEngineering– DataMiningforIntrusionDetectionandPrevention – Data Mining and Recommender Systems.

TEXTBOOKS:

Data Mining- Concepts and Techniques-Jiawei Han, Michelin Kimber, Morgan Kaufmann Publishers, Elsevier, 2 Edition,2206.

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

REFERENCEBOOKS:

Data Mining Techniques, ArunK Pujari, 3rdEdition, Universities Press.

Data Mining Principles &Applications

T.VSveresh Kumar. Esware Reddy, Jag adish Skillman, Elsevier.

Data Mining, Vikaram Pudi ,P Radha Krishna, Oxford University Press

Data mining Techniques and Applications, Hong boDuCengage India Publishing

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

FULL STACK WEB APPLICATION DEVELOPMENT

(1805OE08) (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 – Back end 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 RESTAPIs – 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
(1812OE01) (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:

1.Analyze various parallel computer models, program partitioning techniques, and system interconnect architectures to assess their impact on computing performance.
2.Evaluate the principles of scalable performance and apply performance metrics and measures to determine the efficiency of parallel processing systems
3.Design effective memory hierarchy and pipeline systems, including superscalar and vector processors, to enhance computational throughput.
4.Examine the architectures of multiprocessors, multi-computers, and SIMD systems to propose optimized solutions for parallel and scalable processing.
5.Critique the mechanisms of cache coherence, synchronization, and message-passing in parallel architectures to ensure data consistency and efficient communication.
6.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

(1812OE02) ADVANCED OPERATING SYSTEMS

(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: Lamppost's Algorithm, The Ricart Agrawala Algorithm, Makala'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, Niranjan 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

(1812OE04) EMBEDDED SYSTEMS

(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 E bedded 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

(1812OE03) SCRIPTING LANGUAGES

(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.
- Implement and Solve anatomy of WSDL definition document and WSDL bindings.
- Analyze Various Discovering Web Services and role of service discovery in a SOA.

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, evil, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware 0applications, 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- evil, 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

(1812OE05) ADVANCED COMPUTER NETWORKS

(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 frame work, 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

(1812OE06) ADVANCED ALGORITHMS

(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 and evaluate the time and space complexity of advanced algorithms using appropriate computational models.
- Apply dynamic programming techniques to solve optimization problems such as matrix chain multiplication and longest common subsequence.
- Design and implement greedy algorithms for problems like Huffman coding, activity selection, and minimum spanning trees.
- Solve graph-based problems using advanced algorithms such as Dijkstra's, Bellman-Ford, and maximum flow algorithms.
- Develop and optimize algorithms for string matching, including Rabin-Karp and Knuth-Morris-Pratt algorithms.
- Demonstrated where

UNIT - I

Introducti0on: 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 ENGINEERINGE COLLEGE FOR WOMEN

(1812OE07) COMPUTATIONAL COMPLEXITY

(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

(1812OE08S) ROBOTIC PROCESS AUTOMATION

(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

(1866OE01) (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-HillInternational 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

(1866OE02) NEURAL NETWORKS

(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 –Defuzzificatiuon- Knowledge base- Decision making logic Membership functions – Rule base.

UNIT – II:

Adaptive Fuzzy Systems: Performance index- Modification of rule base0- 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 propagation algorithm and its Variants- Different types of learning, examples.

UNIT – IV:

Mapping and Recurrent Networks: Counter propagation –Self organization Map- Congnitron and Neocognitron- Hopfield Net- Kohonnen 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 anfd Yuan B.B Prentice Hall oif 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

(1866OE03) ADVANCED ARTIFICIAL INTELLIGENCE

(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

(1866OE04) REINFORCEMENT LEARNING

(OPEN ELECTIVE - II)

III Year B.Tech. II-Sem **L T P C**

3 0 0 3

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 ofregret, Achieving sublinear regret, UCB algorithm, KL-UCB, Thompson Sampling.

UNIT – II:

Markov Decision Problem, policy, and value function, Reward models (infinite discounted, total, finitehorizon, 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-freecontrol: 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

(1866OE05) DEEP LEARNING USING PYTHON

(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.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(1866OE06) EDGE ANALYTICS

(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 caseand deployment, Case study – Telemedicine palliative care, Requirements, Implementation, Use casev retrospective.

UNIT – III:

Raspberry Pi: Introduction to Raspberry cPi, About the Raspberry Pi Board: Hardware Layout and Pinouts,Operating Systems on Raspberryc Pi, Configuring RaspberryPi, Programming RaspberryPi, ConnectingRaspberry 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 RaspberrycPi and device Interfacing, Edge to Cloud Protocols-Protocols, MQTT, MQTT publish-subscribe, MQTT architecture details, MQTT state transitions, MQTTpacket 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 AND APPLICATIONS

(1866OE07) (OPEN ELECTIVE - IV)

IV Year B.Tech. II –Sem **L T P C**

3 0 0 3

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 theCorpus, 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

(1866OE08) QUANTUM COMPUTING

(OPEN ELECTIVE - IV)

B.Tech. IV Year II Sem. **L T P C**
3 0 0 3

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, EntanglementBasic 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 CurveThe 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

(1804OE01) 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 Mircro programming control and to understand computer arithmetic operations
- To understand memory system & I/O Organization

Course Outcomes:

- Students will be able to understand computer organization and summaries data representations, Identify various algorithms for mathematical calculation.
- Students will be able to articulate register transfer logic, identify various micro operations.
- Students will be able to examine the memory reference instructions and determine the interrupts related to input and output.
- Students will be able to illustrate Design of central processing unit and apprise the CISC and RISC processes.
- Students will be able to correlate the various memories used in computer and distinguish the various mappings involved.
- 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 Mircro operatiaons, 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

(1804OE02) 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:

- Distinguish between sensors, transducers, and transmitters, and evaluate their selection criteria and performance characteristics based on range, sensitivity, accuracy, and other parameters.
- 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.
- Evaluate the types, principles, and selection criteria of pneumatic, hydraulic, and electrical actuators, and propose suitable actuating systems for specific applications.
- Examine the principles, characteristics, and applications of micro sensors and micro actuators, and apply them to measure physical, chemical, and biological parameters.
- Critique sensor materials such as silicon, ceramics, and nano-materials based on their properties, and recommend suitable materials for specific sensing applications.
- 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

(1804OE03) PRINCIPLES OF ELECTRONIC COMMUNICATIONS

(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
(18040E04) 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

PRINCIPLES OF COMPUTER COMMUNICATION & NETWORK

(1804OE05) **(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

(18040E06) 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 Morkov 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, Spinger 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

(1804OE07) 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

- Remember the fundamentals of Co-channel and Non Co channel interference and Label their significance in the Communication.
- Understand types of handoff and dropped calls and Relate the impact of dropped calls and multiple access techniques required for 5G.
- Understand 5G Technology advances and Illustrate their benefits.
- Analyzing Device to device communication and Contrast their importance for the upcoming Generation.
- Create future directions and research opportunities in the field of 5G and proposing innovative ideas for Invent large 5G models and their applications.
- 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-rthogonal 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

(2004OE08) RTOS and System Programming

(Open Elective – IV)

L T P C
3 0 0 3

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

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

COMPUTER ORIENTED STATISTICAL METHODS(1867OE01)

(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(1867OE02)
(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, Margon 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

(1867OE03) DATA WRANGLING WITH PYTHON

(OPEN ELECTIVE - II)

L T P C
3 0 0 3

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 acquring and storing data from world web within python framework.

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(180670E4)

(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 TensorFlow2.0, 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(1867OE05)
(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 Game‖, 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(1867OE06)

(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(1867OE07)
(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 Anonymizaiton - 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(1867OE08)

(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.