BACHELOR OF TECHNOLOGY

COMPUTER SCIENCE AND ENGINEERING

COURSE STRUCTURE & SYLLABUS

(Batches admitted from the Academic Year 2026-2027)



MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution-UGC, Govt. of India)

Accredited by NAAC with 'A+' Grade | Programmes Accredited by NBA

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

Maisammaguda, Dhulapally, Secunderabad 500100.

CSE-COURSE STRUCTURE (R26)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. in COMPUTER SCIENCE AND ENGINEERING
Course Structure & Syllabus (R-26 Regulations)

AY 2026 - 2027

I Year I Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	2600BS01	Matrices and Calculus	3	1	0	4
2.	2600BS02	Engineering Chemistry	3	0	0	3
3.	2600HS01	English for Skill Enhancement	3	0	0	3
4.	2605ES02	Python Programming	3	0	0	3
5.	2605ES01	Programming for Problem Solving	3	1	0	4
6.	2600BS61	Engineering Chemistry Lab	0	0	2	1
7.	2605ES61	Programming for Problem Solving Lab	0	0	2	1
8.	2600HS61	English Language and Communication Skills Lab	0	0	2	1
9.	2605ES62	Python Programming Lab	0	0	2	1
10.		Induction Program				
		Total Credits	**15**	**2**	**8**	**21**

I Year II Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	2600BS03	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2.	2600BS04	Advanced Engineering Physics	3	0	0	3
3.	2603ES01	Computer Aided Engineering Graphics	2	0	2	3
4.	2602ES01	Basic Electrical and Electronics Engineering	3	0	0	3
5.	2605ES03	Data Structures	3	0	0	3
6.	2600BS62	Advanced Engineering Physics Lab	0	0	2	1
7.	2605ES63	Data Structures Lab	0	0	2	1
8.	2602ES61	Basic Electrical and Electronics Engineering Lab	0	0	2	1
9.	2603ES61	Engineering Workshop	0	0	2	1
		Total Credits	**14**	**1**	**10**	**20**

II YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1.	2605PC01	Discrete Mathematics	2	1	0	3
2.	2605PC02	Computer Organization and Architecture	3	0	0	3
3.	2605PC03	Object Oriented Programming through java	3	0	0	3
4.	2605PC04	Operating Systems	3	0	0	3
5.	2605PC05	Database Management Systems	3	0	0	3
6.	2605PC61	Object Oriented Programming through java Lab	0	0	2	1
7.	2605PC62	Operating Systems Lab	0	0	2	1
8	2605PC63	Database Management Systems Lab	0	0	2	1
9.	2600HS04	Innovation & Entrepreneurship	2	0	0	2
10	2605SD01	NodeJS / ReactJS /Django	0	0	2	1
11	2600ES01	Environmental Science*	1	0	0	0
		Total Credits	**17**	**1**	**08**	**21**

II YEAR II SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1.	2600BS05	Computer Oriented Statistical Methods	2	1	0	3
2.	2605PC06	Software Engineering	3	0	0	3
3.	2600HS02	Fundamentals of Management	3	0	0	3
4.	2605PC07	Computer Networks	3	0	0	3
5.	2666PC01	Machine Learning	2	1	0	3
6.	2600BS64	Computational Mathematics Lab Using Python	0	0	2	1
7.	2605PC65	Computer Networks Lab	0	0	2	1
8.	2666PC61	Machine Learning Lab	0	0	2	1
9.	2667SD01	Data Visualization-R/Python/Power BI	0	0	2	1
10.	2600IP01	Innovative Product Development-1	0	0	2	1
		Total Credits	**13**	**2**	**10**	**20**

III YEAR I SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1.	2605PC08	Compiler Design	3	1	0	4
2.	2605PC09	Design Analysis and Algorithms	2	1	0	3
3.	2600HS03	Business Economics and Financial Analysis	2	1	0	3
4.	PE-I	Professional Elective-I	3	0	0	3
5.	OE-I	Open Elective-I	2	0	0	2
6.	2605PC66	Compiler Design Lab	0	0	2	1
7.	2605PC67	Design Analysis and Algorithms Lab	0	0	2	1
8.	2600HS62	Professional English	1	0	0	1
9.	2605PR01	Field-Based Research Project	0	0	4	2
10.	2605SD02	UI Design–Flutter/Android Studio	0	0	2	1
11.	2600MC01	Indian Knowledge System	1	0	0	0
		Total Credits	**14**	**3**	**10**	**21**

III YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1.	2605PC10	Cryptography and Networks Security	3	0	0	3
2.	2666PC02	Artificial Intelligence	2	1	0	3
3.	2605PC11	DevOps	3	1	0	4
4.	PE-II	Professional Elective-II	3	0	0	3
5.	OE-II	Open Elective–II	2	0	0	2
6.	2605PC68	Cryptography and Networks Security Lab	0	0	2	1
7.	2666PC62	Artificial Intelligence with Python Lab	0	0	2	1
8.	2605PC69	Devops Lab	0	0	2	1
9.	2600HS63	English with Employability Skills Lab	0	0	2	1
10.	2666SD01	Prompt Engineering	0	0	2	1
11.	2600MC02	Gender Sensitization */Human Values and Professional Ethics*	1	0	0	0
		Total Credits	**14**	**2**	**10**	**20**

***Note: For the courses Gender Sensitization and Human Values and Professional Ethics-**
One hour of instruction will be conducted on alternate weeks .For example, if a one-hour class for Gender Sensitization is conducted this week,then a one-hour class for Constitution of India will be conducted in the following week.

IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1.	2666PC07	Natural Language Processing	3	0	0	3
2.	2662PC03	Cyber Security Essentials	3	0	0	3
3.	2666PC03	Deep Learning	2	1	0	3
4.	PE-III	Professional Elective-III	3	0	0	3
5.	PE-IV	Professional Elective–IV	3	0	0	3
6.	OE-III	Open Elective–III	2	0	0	2
7.	2666PC67	Natural Language Processing Lab	0	0	2	1
8.	2662PC61	Cyber Security Lab	0	0	2	1
9.	2605PR02	Industry Oriented Mini Project / Internship	0	0	2	2
11	2600MC03	Research Methodology & IPR	1	0	0	0
		Total Credits	**17**	**1**	**06**	**21**

IV YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1.	PE-V	Professional Elective–V	3	0	0	3
2.	PE-VI	Professional Elective–VI	3	0	0	3
3.	2605PR03	Project work	0	0	36	12
4	2600IP02	Innovative Startup	0	0	6	2
		Total Credits	**6**	**0**	**42**	**20**

PROFESSIONAL ELECTIVES

Professional Elective-I	**Professional Elective-II**	**Professional Elective-III**	**Professional Elective-IV**	**Professional Elective-V**	**Professional Elective-VI**
Distributed Systems 2667PE02	Distributed computing 2667PE08	Distributed Database 2667PE01	Text Analytics 2667PE03	Social network analytics 2667PE09	Principles of Web and Social Media Analytics 2667PE10
Ethical Hacking 2662PE07	Security Incident and Response Management 2662PE03	Digital Evidence and Forensics 2662PE08	Cyber laws and IT security 2662PE04	Data Privacy & Security 2662PE14	Database Security 2662PE12
Object Oriented Analysis and Design 2612PE01	Agile software Development 2605PE01	Software Architecture and Design Patterns 2605PE02	Software Testing Methodologies 2605PE03	Software Quality Assurance & Testing 2605PE04	Software Process and Project Management 2605PE05
Cloud Computing 2605PE06	Edge Computing 2605PE07	Big Data Analytics 2605PE08	Cognitive Computing 2605PE14	Data Engineering 2667PE17	High-Performance Computing 2605PE11
Computer Vision 2612PE03	Full Stack Development 2612PE02	Large Language Models (LLMs) 2666PE01	Generative AI Essentials 2666PE03	Agentic AI Essentials 2666PE13	Reinforcement Learning: Concepts and Applications 2666PE04
Computer Graphics 2605PE09	Human Computer Interaction 2612PE06	Information Retrieval Systems 2605PE12	Internet of Things 2612PE04	Block Chain Technology 2612PE05	Secure Software Engineering 2605PE13

OPEN ELECTIVES

Open Elective-1:

1. 2605OE01- Principles of Programming Languages
2. 2605OE02 –Fundamentals of Database Management Systems
3. 2605OE03 -Cloud computing essentials
4. 2605OE04- Advanced Software Engineering

Open Elective-2:

1. 2605OE05 – Fundamentals of Devops
2. 2605OE06 - Programming in Java
3. 2605OE07 - R programming
4. 2605OE08 - Advanced Data structures

Open Elective-3:

1. 2605OE09- Algorithms Design and Analysis
2. 2605OE10- Fundamentals of Cyber Security
3. 2605OE11 -Full Stack Application Development
4. 22605OE12- Introduction to Quantum Computing

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2600BS01) MATRICES AND CALCULUS

B. TECH I YEAR I SEMESTER

L	T	P	C
3	1	0	4

Course Objectives:

- To learn the concepts of matrix rank, matrix inverse, and methods for solving homogeneous and non-homogeneous systems of linear equations.
- To study the concepts of eigenvalues, eigenvectors, diagonalization, the Cayley–Hamilton theorem, and quadratic forms.
- To understand the concepts of limits, continuity, Mean Value Theorems, and Taylor's series.
- To study the concepts of partial differentiation for determining the maxima and minima of functions of two variables.
- To apply multiple integration techniques and coordinate transformations for evaluating double and triple integrals.

Course Outcomes: After learning the contents of this course, the student will be able to:

- Solve systems of linear equations and determine the rank and inverse of matrices using appropriate matrix methods.
- Apply the concepts of eigenvalues, eigenvectors, diagonalization, the Cayley–Hamilton theorem, and quadratic forms to solve matrix-related problems.
- Analyze the properties of continuous functions using Mean Value Theorems to solve mathematical problems.
- Apply Taylor's series to approximate functions and solve mathematical problems.
- Determine the maxima and minima of functions of two variables using partial differentiation.
- Evaluate double and triple integrals using appropriate integration techniques and coordinate transformations.

UNIT-I: Matrices — 8 L

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 Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors — 10 L

Linear Transformation and Orthogonal Transformation: Eigen values - Eigen vectors and their properties (without proofs) - Diagonalization of a matrix - Cayley-Hamilton Theorem (without proof) - Finding inverse and power of a matrix by Cayley-Hamilton Theorem. Quadratic forms and Nature of the Quadratic Forms - Reduction of Quadratic form to canonical form by Orthogonal Transformation.

UNIT-III: Single Variable Calculus **10 L**

Limit and Continuous of functions and its properties. Mean value theorems: Rolle 's Theorem - Lagrange's Mean value theorem with their Geometrical Interpretation and applications - Cauchy's Mean value Theorem-Taylor's Series (All the theorems without proof).

UNIT-IV: Multivariable Calculus (Partial Differentiation and Applications) **10 L**

Definitions of Limit and continuity - Partial Differentiation: Euler's Theorem – Total derivative - Jacobian - Functional dependence & independence. Applications: Maxima and minima of functions of two variables.

UNIT-V: Multivariable Calculus (Integration) **10 L**

Evaluation of Double Integrals (Cartesian and polar coordinates) - change of order of integration (only Cartesian form) - Change of variables for double integrals (Cartesian to polar). Evaluation of Triple Integrals- Change of variables for triple integrals (Cartesian to Spherical and Cylindrical polar coordinates).

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44thEdition, 2017.
2. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9thEdition,2013.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi,38th Reprint, 2022.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, Pearson, 9thEdition, Reprint, 2002.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
5. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2600BS02: ENGINEERING CHEMISTRY

B. TECH I YEAR I SEMESTER **L T P C**

3 0 0 3

Course Objectives:

1. To acquire the knowledge of water treatment which are essential for the Engineers and in industry.
2. To include the importance of fundamental aspects of electrochemistry, significance of corrosion and it's control to protect the structures.
3. To impart foundational knowledge of various energy sources and their practical applications in engineering.
4. To account the applications of different kinds of polymers in various fields.
5. To equip students with an understanding of smart materials, biosensors, and analytical techniques applicable in engineering, industrial, environmental, and biomedical fields.

Course Outcomes:

1. Students will be able to understand the fundamental properties of water and its applications in both domestic and industrial purposes.
2. Students will gain basic knowledge of electrochemical processes to understand the functioning of electrodes.
3. Students will be able to assess the underlying causes and consequences of corrosion, distinguishing between various corrosion types and evaluate advanced corrosion control strategies.
4. Students will comprehend the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs.
5. Students will learn the basic concepts and properties of polymers and other engineering materials.
6. Students will be able to apply the principles of UV-Visible, IR spectroscopy and Raman spectroscopy in analyzing pollutants in dye industries and biomedical applications.

UNIT-I: Water and its treatment: [8]

Introduction- Hardness, types, degree of hardness and units. Estimation of hardness of water by complexometric method - Numerical problems. Potable water and its specifications (WHO) - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and breakpoint chlorination. Defluoridation - Nalgonda technique.

Boiler troubles: Scales, Sludges and Caustic embrittlement. Internal treatment of boiler feed water - Calgon conditioning, Phosphate conditioning, Colloidal conditioning. External treatment methods - Softening of water by ion- exchange processes. Desalination of brackish water – Reverse Osmosis.

UNIT-II: Electrochemistry and Corrosion: [8]

Introduction- Electrode potential, standard electrode potential, Nernst equation (no derivation), electrochemical cell - Galvanic cell, cell representation, Types of electrodes, reference electrodes

- Primary reference electrode - Standard Hydrogen Electrode (SHE), Secondary reference electrode - Calomel electrode. Construction, working and determination of pH of unknown solution using SHE and Calomel electrode, **Glass electrode-Construction, working and determination of pH of unknown solution using glass electrode.**

Corrosion: Introduction- Definition, causes and effects of corrosion – Theories of corrosion, chemical and electrochemical theories of corrosion, Types of corrosion: galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion - Nature of the metal, Nature of the corroding environment. Corrosion control methods - Cathodic protection Methods - Sacrificial anode and impressed current methods.

UNIT–III: Energy sources: [8]

Batteries: Introduction – Classification of batteries - Primary, secondary and reserve batteries with examples. Construction, working and applications of Zn-air and Lithium ion battery. Fuel Cells – Differences between a battery and a fuel cell, Construction and applications of Direct Methanol Fuel Cell (DMFC).

Fuels: Introduction and characteristics of a good fuel, **Solid fuels-classification, analysis of coal–proximate and ultimate analysis and their significance.** Fossil fuels: Introduction, Classification, Petroleum - Refining of Crude oil, Cracking - Types of cracking - Moving bed catalytic cracking. LPG and CNG composition and uses.

Synthetic Fuels: Fischer-Tropsch process, Introduction and applications of Hythane and Green Hydrogen.

UNIT - IV: Polymers: [8]

Definition - Classification of polymers: Based on origin and tacticity with examples – Types of polymerization - Addition (free radical addition mechanism) and condensation polymerization.

Plastics, Elastomers and Fibers: Definition and applications (PVC, Buna-S, Nylon-6,6). Differences between themoplastics and thermo setting plastics, Fiber reinforced plastics (FRP).

Conducting polymers: Definition and Classification with examples - Mechanism of conduction in transpoly-acetylene and applications of conducting polymers. Biodegradable polymers: Polylactic acid and its applications.

UNIT-V- Advanced Functional Materials: [8]

UNIT-V- Engineering Applications of Chemistry: [8]

Smart materials: Introduction, Classification with examples - Shape Memory Alloys – Nitinol,

Piezoelectric materials – quartz and their engineering applications.

Biosensor - Definition, Amperometric Glucose monitor sensor.

Interpretative spectroscopic applications of UV-Visible spectroscopy for Analysis of pollutants in dye industry, IR spectroscopy in night vision-security, Pollution Under Control-CO sensor (Passive Infrared detection), Raman spectroscopy (application) - Tumour detection in medical applications.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010.
2. Engineering Chemistry by Rama Devi, Dr. P. Aparna and Rath, Cengage learning, 2025.

REFERENCE BOOKS:

1. Engineering Chemistry: by Thirumala Chary Laxminarayana & Shashikala, Pearson Publications (2020)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi 2011.
3. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi 2015.
4. Engineering Analysis of Smart Material Systems by Donald J. Leo, Wiley, 2007.
5. Challenges and Opportunities in Green Hydrogen by Editors: Paramvir Singh, Avinash Kumar Agarwal, Anupma Thakur, R.K Sinha.
6. Raman Spectroscopy in Human Health and Biomedicine, https://www.worldscientific.com/ doi/epdf/10.1142/13094
7. E-Content- https://doi.org/10.1142/13094 | October 2023

E-books: https://archive.org/details/EngineeringChemistryByShashiChawla/page/n11/mode/2u

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2600HS01): ENGLISH FOR SKILL ENHANCEMENT

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

INTRODUCTION

National Education Policy-2020 aims at preparing students with knowledge, skills, values, leadership qualities and initiates them for lifelong learning. It also emphasizes language study and promotion of languages through understanding and proper interpretation. English language is central to the educational eco system. The importance of language as medium of communication for personal, social, official and professional needs to be emphasized for clear and concise expression. Teaching and learning of receptive and productive skills viz., Listening, Speaking, Reading and Writing (LSRW) are to be taught and learnt effectively in the undergraduate Engineering programs. Learners should be encouraged to engage in a rigorous process of learning to become proficient users of English language by adopting a deeply focused and yet flexible approach as opposed to rote learning.

In this connection, suitable syllabus, effective pedagogy, continuous assessments and students' involvement result in productive learning. This course supports the latest knowledge and skill requirements and shall meet specified learning outcomes. The main objectives of English language teaching and learning as medium of communication and for promotion of cultural values are embedded in this syllabus. Efforts are being made in providing a holistic approach towards value-based language learning which equips the learner with receptive as well as productive skills.

The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed textbook for detailed study. The students should be encouraged to read the texts leading to reading comprehension. 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.

LEARNING OBJECTIVES: This course will enable the students to:

a. Improve their vocabulary.
b. Use appropriate sentence structures in their oral and written communication.
c. Develop their reading and study skills.
d. Equip students to write paragraphs, essays, précis and draft letters.
e. Acquire skills for Technical report writing.

COURSE OUTCOMES: Students will be able to:

a. Choose appropriate vocabulary in their oral and written communication.
b. Demonstrate their understanding of the rules of functional grammar and sentence structures.
c. Develop comprehension skills from known and unknown passages.
d. Write paragraphs, essays, précis and draft letters.
e. Write abstracts and reports in various contexts.

UNIT –I

Theme: **Perspectives**

Lesson on 'The Generation Gap' by Benjamin M. Spock from the prescribed textbook titled *English for the Young in the Digital World* published by Orient Black Swan Pvt. Ltd.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Words Often Misspelt - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Parts of Speech particularly Articles and Prepositions – Degrees of Comparison

Reading: Reading and Its Importance- Sub Skills of Reading – Skimming and Scanning.

Writing: Sentence Structures and Types -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for Writing Precisely – Nature and Style of Formal Writing.

UNIT –II

Theme: **Digital Transformation**

Lesson on '*Emerging Technologies*' from the prescribed textbook titled *English for the Young in the Digital World* published by Orient BlackSwan Pvt. Ltd.

Vocabulary: Homophones, Homonyms and Homographs

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

Reading: Reading Strategies-Guessing Meaning from Context – Identifying Main Ideas – Exercises for Practice

Writing: Paragraph Writing – Types, Structures and Features of a Paragraph - Creating Coherence – Linkers and Connectives - Organizing Principles in a Paragraph – Defining- Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence - Essay Writing - Writing Introduction and Conclusion.

UNIT –III

Theme: **Attitude and Gratitude**

Poems on '*Leisure*' by William Henry Davies and '*Be Thankful*' - Unknown Author from the prescribed textbook titled *English for the Young in the Digital World* published by Orient BlackSwan Pvt. Ltd.

Vocabulary: Words Often Confused - 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 – Identifying Topic Sentence and Providing Supporting Ideas - Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Job Application with CV/Resume – Difference between Writing a Letter and an Email - Email Etiquette.

UNIT –IV

Theme: **Entrepreneurship**

Lesson on '*Why a Start-Up Needs to Find its Customers First*' by Pranav Jain from the prescribed textbook titled *English for the Young in the Digital World* published by Orient BlackSwan Pvt. Ltd.

Vocabulary: Standard Abbreviations in English – Inferring Meanings of Words through Context – Phrasal Verbs – Idioms.

Grammar: Redundancies and Clichés in Written Communication – Converting Passive to Active Voice and Vice-Versa.

Reading: Prompt Engineering Techniques– Comprehending and Generating Appropriate Prompts
- Exercises for Practice

Writing: Writing Practices- Note Making-Précis Writing.

UNIT –V

Theme: **Integrity and Professionalism**

Lesson on '*Professional Ethics*' from the prescribed textbook titled *English for the Young in the Digital World* published by Orient BlackSwan Pvt. Ltd.

Vocabulary: Technical Vocabulary and their Usage– One Word Substitutes – Collocations.

Grammar: Direct and Indirect Speech - Common Errors in English (Covering all the other aspects of grammar which were not covered in the previous units)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
2605ES02: PYTHON PROGRAMMING

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

Prerequisites: Basic knowledge of computer fundamentals, C programming.

Course Objectives:

Introduce the fundamentals of Python programming for problem-solving.

- Develop skills to write structured, modular, and efficient Python code.
- Enable students to use Python's built-in data structures and libraries effectively.
- Provide knowledge on file handling, exception handling, and object-oriented programming in Python.
- Equip students with the ability to apply Python for real-world applications including data processing and automation.

Course Outcomes:

- Demonstrate the use of Python variables, operators, expressions, input/output statements, and control structures to solve computational problems.
- Implement Python programs using built-in data structures such as lists, tuples, sets, and dictionaries for efficient data organization and processing.
- Develop modular Python programs using functions, modules, packages, and object-oriented programming concepts including classes and objects.
- Apply file handling, exception handling, and standard Python libraries to build reliable and efficient software solutions.
- Design and implement Python programs for automation, data manipulation, and problem-solving using appropriate programming techniques.
- Analyze and develop real-world Python applications by integrating programming constructs, libraries, and object-oriented principles to address practical computing problems.

UNIT-1 – Introduction to Python and Basics of Programming

Introduction to Python: Features, Applications, Installation, IDEs, Python Syntax, Indentation, Comments, Variables, Data Types, Type Casting, Operators: Arithmetic, Relational, Logical, Assignment, Membership, Identity, Bitwise, Input/Output functions (input(), print()), Control Structures: if, if-else, if-elif-else, Nested Conditions, Looping: for, while, Nested Loops, break, continue, pass.

UNIT-2 – Data Structures in Python

Strings: Creation, Indexing, Slicing, Methods, String Formatting, Lists: Creation, Indexing, Slicing, List Comprehension, Methods, Tuples: Properties, Indexing, Methods, Sets: Creation, Operations, Methods, Dictionaries: Creation, Access, Methods, Dictionary Comprehension, Iterating over data structures.

UNIT-3 – Functions and Modules

Functions: Defining, Calling, Parameters, Return Values, Types of Arguments: Positional, Keyword, Default, Variable Length, Scope of Variables: Local and Global, Lambda Functions, Map, Filter, Reduce, Recursion in Python, Modules: Importing, Creating User-defined Modules, Standard Modules (math, random, datetime), Packages in Python.

UNIT-4 – File Handling and Exception Handling

File Handling: Opening, Reading, Writing, Appending, File Modes, File Methods, Working with CSV and JSON Files, Exception Handling: try, except, else, finally, Built-in Exceptions, Raising Exceptions.

UNIT-5 – Object-Oriented Programming and Applications

OOP Basics: Classes, Objects, Attributes, Methods, Constructor (_init_), self keyword, Inheritance: Single, Multiple, Multilevel, Hierarchical, Method Overriding, Method Overloading (conceptual), Encapsulation and Polymorphism, Application Development: Data Processing Script, Basic Calculator.

TEXT BOOKS:

1. Python Programming: Using Problem Solving Approach by Reema Thareja.
2. Python Crash Course by Eric Matthes, Learning Python by Mark Lutz.

REFERENCE BOOKS:

1. Introduction to Python Programming by Gowrishankar S., Veena A.
2. Python Cookbook by David Beazley and Brian K. Jones.
3. Fluent Python by Luciano Ramalho, Automate the Boring Stuff with Python by Al Sweigart.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2605ES01: PROGRAMMING FOR PROBLEM SOLVING

B.Tech. I Year I Sem.

L	T	P	C
3	1	0	4

Course Objectives:

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

Course Outcomes: The student will learn

- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in the C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.
- Searching and sorting problems.

UNIT - I: Overview of C:C Language Elements, Variable Declarations and Data Types, Executable Statements, General Form of a C Program, Arithmetic Expressions.
Selection Structures: Control Structures, Conditions, if Statement, if Statements with Compound Statements, Decision Steps in Algorithms.
Repetition and Loop Statements: Repetition in Programs, Counting Loops and the while Statement, Computing a Sum or Product in a Loop, for Statement, Conditional Loops, Loop Design, Nested Loops, do-while Statement.

UNIT - II: Top-Down Design with Functions: Building Programs from Existing Information, Library Functions, Top-Down Design and Structure Charts, Functions without Arguments, Functions with Input Arguments.
Pointers and Modular Programming: Pointers and the Indirection Operator, Functions with Output Parameters, Formal Output Parameters as Actual Arguments.

UNIT - III: Arrays: Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Using Array Elements as Function Arguments, Array Arguments, Searching and Sorting an Array, Enumerated Types, Multidimensional Arrays.
Strings: String Basics, String Library Functions: Assignment and Substrings, String Comparison.

UNIT - IV: Recursion: The Nature of Recursion, Tracing a Recursive Function,
Structure and Union Types: User-Defined Structure Types, Structure Type Data as Input and Output Parameters, Union Types.

UNIT - V: Text and Binary File Pointers: Input/ Output Files - Review and Further Study, Binary Files.Searching and Sorting: 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).

TEXT BOOKS:

1. Jeri R. Hanly and Elliot B. Koffman, Problem solving and Program Design in C 7th Edition, Pearson.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill.
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB.
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.
7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2600BS61: ENGINEERING CHEMISTRY LAB

B. TECH I YEAR I SEMESTER **L T P C**
0 0 2 1

Course Objectives:

1. Students will understand and perform experiments based on core chemical principles relevant to engineering applications.
2. Students will learn to estimate the hardness of water to assess its suitability for drinking purposes.
3. Students will acquire the ability to perform acid-base titrations using instrumental methods such as conductometry, potentiometry, and pH metry.
4. Students will gain hands-on experience in synthesizing polymers like Bakelite and Nylon – 6, 6 in the laboratory.
5. Students will learn to determine the unknown concentration of potassium permanganate (KMnO4) using a calibration curve.

Course Outcomes:

1. Students will develop practical skills through hands-on chemistry experiments relevant to engineering.
2. Students will learn to determine important parameters such as water hardness and the corrosion rate of mild steel under various conditions.
3. Students will be able to apply techniques like conductometry, potentiometry, and pH metry to determine concentrations or equivalence points in acid-base reactions.
4. Students will gain experience in synthesizing polymers such as Bakelite and Nylon-6,6.
5. Students will understand the working principle of colorimetry and the relationship between absorbance and concentration (Beer-Lambert Law).
6. Students will gain the skills in resolving the societal issues and are able to understand the real-world scenario.

List of Experiments:

I. Volumetric Analysis: Estimation of Hardness of water by EDTA Complexometry method.

II. Conductometry: Estimation of the concentration of strong and weak acid in an acid mixture by Conductometry.

III. Potentiometry: Estimation of concentration of Fe^{+2}ion by Potentiometry using $K_2Cr_2O_7$.

IV. pH Metry: Determination of an acid concentration using pH meter.

V. Colorimetry: Verification of Lambert-Beer's law using KMnO4.

VI. Preparations:

1. Preparation of Bakelite.
2. Preparation Nylon – 6, 6.

VII. Corrosion: Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

VIII. Lubricants:

1. Determination of surface tension of a given liquid using stalagmometer.

2. Determination of viscosity of lubricant oil by using Ostwald's viscometer.

IX. Virtual lab experiments:

1. Construction of Fuel cell and it's working.
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications.

REFERENCE BOOKS:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022).
2. Vogel's text book of practical organic chemistry 5th edition.
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2605ES61: PROGRAMMING FOR PROBLEM SOLVING LAB

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

0 0 2 1

[Note:The programs may be executed using any available Open Source/ Freely available IDE Some of the Tools available are:
CodeLite: https://codelite.org/ Code::Blocks:
http://www.codeblocks.org/
DevCpp : http://www.bloodshed.net/devcpp.html Eclipse: http://www.eclipse.org
This list is not exhaustive and is NOT in any order of preference]

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:

Expression Evaluation:

a) 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).
b) Write a program that finds if a given number is a prime number.
c) Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
d) 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.

Simple numeric problems:

a) Write a program for finding the max and min from the three numbers.
b) Write the program for the simple, compound interest.
c) 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
d) Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Arrays, Pointers and Functions:

a) Write a C program to find the minimum, maximum and average in an array of integers.
b) Write a C program that uses functions to perform the following:
   I. Addition of Two Matrices
   II. Multiplication of Two Matrices
c) Write a program for reading elements using a pointer into an array and display the values using the array.
d) Write a program for display values reverse order from an array using a pointer.

Files:

a) Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

Strings:

a) Write a C program that uses functions to perform the following operations:
   I. To insert a sub-string into a given main string from a given position.
   II. To delete n Characters from a given position in a given string
b) 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.)
c) Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't contain ch.
d) Write a C program to count the lines, words and characters in a given text.

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.

TEXT BOOKS:

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2605ES62: PYTHON PROGRAMMING LAB

B.Tech. I Year I Sem. **L T P C**
0 0 2 1

Course Objectives:

- To install and run the Python interpreter
- To learn control structures.
- To Understand Lists, Dictionaries in python
- To Handle Strings and Files in Python

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

- Develop Python programs using variables, operators, input/output statements, expressions, and control structures to solve basic computational problems.
- Implement Python programs using built-in data structures such as lists, tuples, sets, and dictionaries for efficient data processing.
- Design modular Python programs using functions, modules, and packages to improve code reusability and maintainability.
- Develop object-oriented Python applications using classes, objects, inheritance, polymorphism, and encapsulation.
- Implement file handling, exception handling, and Python libraries to build robust and reliable software applications.
- Design and develop small-scale real-world Python applications for automation, data analysis, and problem-solving by integrating programming concepts and standard Python libraries.

Note: The lab experiments will be like the following experiment examples.

List of Experiments:

1.
   a. Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.
   b. Start the Python interpreter and type help() to start the online help utility.
2. Start a Python interpreter and use it as a Calculator.
3. Write a program to calculate compound interest when principal, rate and number of periods are given.
4. Read the name, address, email and phone number of a person through the keyboard and print the details.
5. Print the below triangle using for loop. 5
   i. 4 4
   ii. 3 3 3
   iii. 2 2 2 2
   iv. 1 1 1 1 1
6. Write a program to check whether the given input is digit or lowercase character or uppercase character or a special character(use 'if-else-if' ladder)
7. Python program to print all prime numbers in a given interval (use break)
8. Write a program to convert a list and tuple into arrays.
9. Write a program to find common values between two arrays.

10. Write a function called palindrome that takes a string argument and returnsTrue if it is a palindrome and False otherwise. Remember that you can use the built-in function len to check the length of a string.
11. Write a function called is_sorted that takes a list as a parameter and returns True if the list is sorted in ascending order and False otherwise.
12. Write a function called has_duplicates that takes a list and returns True if there is any element that appears more than once. It should not modify the original list.
13. Write a function called remove_duplicates that takes a list and returns a new list with only the unique elements from the original. Hint: they don't have to be in the same order.
14. The wordlist I provided, words.txt, doesn't contain single letter words. So you might
    a. want to add "I", "a", and the empty string.
15. Write a python code to read dictionary values from the user. Construct a function to invert its content. i.e., keys should be values and values should be keys.
16. Add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'
17. Remove the given word in all the places in a string?
18. Write a function that takes a sentence as an input parameter and replaces the first letter of every word with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function?
19. Writes a recursive function that generates all binary strings of n-bit length
20. Write a python program that defines a matrix and prints
21. Write a python program to perform multiplication of two square matrices
22. How do you make a module? Give an example of construction of a module using different geometrical shapes and operations on them as its functions.
23. Use the structure of exception handling all general-purpose exceptions.
24. Write a function called draw_rectangle that takes a Canvas and a Rectangle as arguments and draws a representation of the Rectangle on the Canvas.
25. Add an attribute named color to your Rectangle objects and modify draw_rectangle so that it uses the color attribute as the fill color.
26. Write a function called draw_point that takes a Canvas and a Point as arguments and draws a representation of the Point on the Canvas.
27. Define a new class called Circle with appropriate attributes and instantiate a few Circle objects. Write a function called draw_circle that draws circles on the canvas.
28. Write a python code to read a phone number and email-id from the user and validate it for correctness.
29. Write a Python code to merge two given file contents into a third file.
30. Write a Python code to open a given file and construct a function to check for given words present in it and display on found.
31. Write a Python code to Read text from a text file, find the word with most number of occurrences
32. Write a function that reads a file *file1*and displays the number of words, number of vowels, blank spaces, lower case letters and uppercase letters.
33. Import numpy, Plotpy and Scipy and explore their functionalities.
34. Install NumPypackage with pip and explore it.
35. Write a program to implement Digital Logic Gates – AND, OR, NOT, EX-OR
36. Write a GUI program to create a window wizard having two text labels, two text fields and two buttons as Submit and Reset.

TEXT BOOKS:

1. Supercharged Python: Take your code to the next level, Overland
2. Learning Python, Mark Lutz, O'reilly

REFERENCE BOOKS:

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
2. Python Programming A Modular Approach with Graphics, Database, Mobile, and Web Applications, Sheetal Taneja, Naveen Kumar, Pearson
3. Introduction to Python Programming, Gowrishakar S, Veena A, CRC Press
4. Programming with Python, A User's Book, Michael Dawson, Cengage Learning, India Edition
5. Python for Data Science, Dr. Mohd Abdul Hameed, Wiley publications
6. Core Python Programming, Dr. R. Nageswara Rao, Dreamtech press
7. Introduction to Python, Gowrishankar S, Veena A., CRC Press

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2600BS02) ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

B.TECH I YEAR II SEMESTER **L T P C**

3 1 0 4

Course Objectives:

- To learn the methods of solving first-order and higher-order differential equations.
- To learn the concepts and properties of Laplace transforms.
- To learn the techniques of solving ordinary differential equations using Laplace transforms.
- To understand the concepts of vector-valued functions and vector differential operators used in engineering applications.
- To understand the properties of vector integration and apply Green's, Gauss's, and Stokes' theorems to line, surface, and volume integrals.

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

- Identify whether a given first-order differential equation is exact or reducible to an exact equation and solve it using appropriate methods.
- Solve higher-order linear differential equations with constant coefficients using appropriate analytical techniques.
- Compute Laplace transforms of standard functions using the properties and theorems of Laplace transforms.
- Apply Laplace transform techniques, including the convolution theorem, to solve initial value problems involving linear ordinary differential equations.
- Apply the concepts of gradient, directional derivative, divergence, curl, and scalar potential to analyze vector fields.
- Evaluate line, surface, and volume integrals and apply Green's, Gauss's, and Stokes' theorems to solve vector calculus problems.

UNIT-I: First Order ODE **8 L**

Exact differential equations - Equations reducible to exact differential equations - linear and Bernoulli's equations - Orthogonal Trajectories (only in Cartesian Coordinates). Newton's law of cooling.

UNIT-II: Ordinary Differential Equations of Higher Order **10 L**

Higher order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, sin ax , cos ax polynomials in x, $e^{ax}V(x)$ & $xV(x)$ - Method of variation of parameters.

UNIT-III: Laplace Transforms **10L**

Laplace Transform of standard functions - First shifting theorem - Laplace transforms of functions multiplied by 't' and divided by 't' - Laplace transforms of derivatives and integrals of function - Evaluation of integrals by Laplace transforms - Inverse Laplace transform, convolution theorem (All theorems without proof). Applications: solving Initial value problems (Linear ODEs with constant coefficients) by Laplace Transform.

UNIT-IV: Vector Differentiation **10 L**

Vector Differentiation: Vector point functions and scalar point functions – Gradient – Directional derivatives -Divergence and Curl - Solenoidal and Irrotational vectors - Scalar potential functions

UNIT-V: Vector Integration **10 L**

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

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44thEdition, 2017.
2. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9thEdition,2013.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi,38th Reprint, 2022.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, Pearson, 9thEdition, Reprint, 2002.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
5. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2600BS04) ADVANCED ENGINEERING PHYSICS

I B.Tech. II- SEMESTER

L	T	P	C
3	0	0	3

Pre-requisites: 10+2 Physics

Course Objectives:

- To study crystal structures, defects, and material characterization techniques like XRD.
- To familiarize students with demonstrating skills in scientific enquiry, problem solving techniques and to develop competency and understanding the concepts found in quantum mechanics.
- To introduce quantum computing principles, quantum gates, and basic quantum algorithms.
- To solve non-traditional problems that potential drawn on knowledge in multiple areas of physics.

Course Outcomes:

- To understand the crystal structures, identify defects, and apply XRD techniques for material characterization.
- To apply quantum mechanical principles to explain particle behaviour and energy band formation in solids.
- To analyse the advance concepts linear algebra for quantum computation along operators', Dirac's Bra and Ket notations and their properties.
- To understand quantum computing concepts, use quantum gates and explain basic quantum algorithms.
- To classify magnetic and dielectric materials and explain their properties, synthesis, and applications.
- To explain the principles of lasers and fibre optics and their applications in communication and sensing.

UNIT - I: Crystallography & Materials Characterization

Introduction: Unit cell, space lattice, basis, lattice parameters; crystal structures, Bravais lattices, packing factor: SC, BCC, FCC; Miller indices, inter-planar distance; defects in crystals (Qualitative): point defects, line defects, surface defects and volume defects. concept of nanomaterials: surface to volume ratio, X -ray diffraction: Bragg's law, powder method, calculation of average crystallite size using Debye Scherrer's formula.

UNIT - II: Quantum Mechanics

Introduction, de-Broglie hypothesis, Heisenberg uncertainty principle, physical significance of wave function, postulates of quantum mechanics: operators in quantum mechanics, eigen values and eigen functions, expectation value; Schrödinger's time independent wave equation, particle in a 1D box, Bloch's theorem (qualitative), Kronig-Penney model (qualitative): E-k diagram, formation of energy bands, origin of

bandgap, classification of solids, concept of discrete energy levels and quantum confinement in nanomaterials.

UNIT - III: Quantum Computing

Introduction, linear algebra for quantum computation, Dirac's Bra and Ket notation and their properties, Hilbert space, Bloch's sphere, concept of quantum computer, classical bits, Qubits, multiple Qubit system, quantum computing system for information processing, evolution of quantum systems, quantum measurements, entanglement, quantum gates, challenges and advantages of quantum computing over classical computation, quantum algorithms: Deutsch-Jozsa, Shor, Grover (qualitative).

UNIT - IV: Magnetic and Dielectric Materials

Introduction to magnetic materials, origin of magnetic moment-classification of magnetic materials, hysteresis, Weiss domain theory of ferromagnetism, soft and hard magnetic materials, synthesis of ferrimagnetic materials using sol-gel method, applications: magnetic hyperthermia for cancer treatment, magnets for EV, Giant Magneto Resistance (GMR) device.

Introduction to dielectric materials, types of polarization (qualitative): electronics, ionic & orientation; ferroelectric, piezoelectric, pyroelectric materials and their applications: Ferroelectric Random-Access Memory (Fe-RAM), load cell and fire sensor.

UNIT - V: Laser and Fibre Optics

Introduction to laser, characteristics of laser, Einstein coefficients and their relations, metastable state, population inversion, pumping, lasing action, Ruby laser, He-Ne laser, CO_2 laser, semiconductor diode laser, applications: Bar code scanner, LIDAR for autonomous vehicle.

Introduction to fibre optics, total internal reflection, construction of optical fibre, acceptance angle, numerical aperture, classification of optical fibres, losses in optical fibre, applications: optical fibre for communication system, sensor for structural health monitoring.

TEXT BOOKS:

1. Walter Borchardt-Ott, *Crystallography: An Introduction*, Springer.
2. Charles Kittel, *Introduction to Solid State Physics*, John Wiley & Sons, Inc.
3. Thomas G. Wong, *Introduction to Classical and Quantum Computing*, Rooted Grove
4. *A Textbook of Advanced Engineering Physics*, Dr. T.V.S Arun Murthy, Dr. M. N. Avadhanulu, S. Chand, First edition, 2026.
5. *Engineering Physics* by P.K. Palanisamy, SciTech Publications.

REFERENCE BOOKS:

1. Jozef Gruska, *Quantum Computing*, McGraw Hill
2. Michael A. Nielsen & Isaac L. Chuang, *Quantum Computation and Quantum Information*, Cambridge University Press.
3. John M. Senior, *Optical Fiber Communications Principles and Practice*, Pearson Education Limited.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

COMPUTER AIDED ENGINEERING GRAPHICS (2603ES01)

B.Tech. I Year. II Sem **L / T/ P/ C**
2/ 0 / 2/ 3

Course Objectives:

- To impart conceptual knowledge about AutoCAD software in creating, editing and manipulating 2D engineering drawings.
- To inculcate the required skills to apply engineering drawing principles effectively for accurately sketching conics, scales and cycloids.
- To enhance visualization skills for better interpreting the position of points and lines, enabling accurate representation of their orthographic projections.
- To familiarize drafting skills for constructing orthographic views of planes, solids and development of surfaces in diverse orientation.
- To develop the competency in creating isometric views from orthographic views and vice-versa.

Course Outcomes:

Upon the completion of the course students should be able to

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

UNIT-I

Introduction to AutoCAD Software: Menu Bar, Ribbon – Draw and Modify Toolbar, Dimension, Status Bar, Command Bar, etc., Basic geometrical constructions using AutoCAD commands.

Introduction to Engineering Drawing: Principles of Engineering drawing and their significance, Conventions.

Conic Sections: Construction of Ellipse, Parabola, Hyperbola - General method only. Scales, Plain and Diagonal.

Cycloidal Curves: Cycloid, Epicycloid and Hypocycloid.

UNIT-II

Principles of Orthographic Projections: Conventions; Projections of Points; Projections of lines - Parallel to one Plane and Perpendicular to other Plane, Inclined to one Plane and Parallel to other Plane, inclined to both the planes.

UNIT-III

Projections of Planes: Surface Parallel to one Plane and Perpendicular to other Plane, Surface Inclined to one Plane and Perpendicular to other Plane, Surface Inclined to both the Planes.

UNIT-IV

Projection of Regular Solids: Prisms, Pyramids, Cylinder and Cone – Axis parallel to one plane and perpendicular to other plane, Axis Inclined to one plane and parallel to other plane.

Development of Surfaces: Prism, Cylinder, Pyramid and Cone.

UNIT-V

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

TEXT BOOKS

1. Engineering Drawing, N.D. Bhatt – N.D. Bhatt & V.M Panchal, 48th Edition, 2005 Charotar Publishing House, Gujarat.
2. Engineering Drawing / Basant Agarwal and MC Agarwal / McGraw Hill

REFERENCES

1. Engineering drawing – P.J. Shah .S.Chand Publishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill Book Publisher.
3. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.
4. "Computer Aided Engineering Drawing"by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Premkumar Fifth edition, New Age International Publishers.
5. Engineering Drawing by K.Venu Gopal& V.Prabu Raja New Age Publications.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2602ES01: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

B.Tech. I Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives :

After completing this course, students will be able to:

- **Understand** the fundamental concepts of semiconductor devices, diode characteristics, and voltage regulation using Zener diodes.
- **Explain** the construction, operation, characteristics, and applications of Bipolar Junction Transistors (BJTs).
- **Apply** number systems, Boolean algebra, and Karnaugh Maps for solving digital logic problems.
- **Analyze** DC and AC electrical circuits using network theorems and electrical laws.
- **Describe** the construction, working principles, and applications of basic electrical machines such as DC machines, transformers, induction motors, and alternators.

Course Outcomes

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

- Explain the characteristics and operation of semiconductor devices including PN junction diodes, Zener diodes, and their applications in voltage regulation.
- Analyze the working principles, configurations, characteristics, and applications of Bipolar Junction Transistors (BJTs).
- Apply number systems, complements, binary arithmetic, Boolean algebra, and Karnaugh Maps to simplify and solve digital logic problems.
- Analyze DC electrical circuits using Ohm's law, Kirchhoff's laws, and network theorems such as Thevenin's, Norton's, Superposition theorem to solve electrical circuit problems.
- Explain AC fundamentals including waveform parameters, RMS value, average value, form factor, peak factor, and solve simple AC circuit problems.
- Describe the construction, operating principles, and applications of DC motors, DC generators, transformers, three-phase induction motors, and alternators.

UNIT I:

Diode Characteristics:

Semiconductors –classification -PN Junction Diode, Avalanche breakdown, zener break down, forward bias and reverse bias characteristics, diode resistance an capacitance, diode models (Ideal, simplified, piecewise linear) Zener diode-I-V characteristics and zener diode as voltage regulator.

UNIT II:

Bipolar Junction Transistor (BJT)

Structure and working principle of BJT, Transistor as switch, configuration: Common base (CB), Common emitter (CE), Common collector(CC), Common Base(CB), input and output characteristics. Applications of transistor.

UNIT III :

Number Systems and Boolean algebra

Overview of Number Systems, 1's complement and 2's Complement, addition, subtraction using 1's complement and 2's Complement, BCD codes, Excess-3 codes, HEX codes, parity bit generator. Boolean Algebra-Basic Theorems and properties, Minimization of Boolean function using K-Maps up to four variables.

UNIT IV:

DC and AC Circuits

Electrical circuit elements (R, L, and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Thevenin's, Norton's, and Super Position theorem, and Simple numerical problems.

A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, and peak factor, (Simple Numerical problems).

UNIT V Electrical Machines

Construction and working principle of DC Motor, DC Generator, Single Phase Transformer, Three Phase Induction Motors and Alternator.

TEXT BOOKS:

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, Tata McGraw Hill.
2. A text book of Electrical Technology Vol- 1, 2 by B.L.Theraja and A K Theraja- S Chand Publications.
3. Electronic Devices and Circuits, S. Salivahanan, N. Suresh Kumar, A. Vallavaraj, Tata McGraw-Hill companies.
4. Switching Theory and Logic Design by A. Anand Kumar, PHI Publications.

REFERENCE BOOKS:

1 Basic Electrical Engineering, T.K. Naga sarkar and M.S. Sukhija, Oxford University Press
2.M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2605ES03: DATA STRUCTURES

B.Tech. I Year II Sem.

L T P C
3 0 0 3

Prerequisites: A course on "Programming for Problem Solving

Course Objectives

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithms.

Course Outcomes

- Explain the concepts of linear and non-linear data structures and analyze their characteristics and applications.
- Select appropriate data structures to efficiently represent and solve computational problems.
- Analyze the time and space complexity of various data structures and algorithms to evaluate their performance.
- Implement searching, sorting, and pattern matching algorithms using suitable data structures.
- Design and implement programs using advanced data structures such as hash tables, trees, binary search trees, AVL trees, heaps, tries, and graphs.
- Apply appropriate data structures and algorithms to develop efficient solutions for real-world computing problems by considering performance and memory trade-offs.

UNIT – I

Introduction to Data Structures: Basic Terminology, Classification of Data Structures, Operation on Data Structures, abstract data types, selecting a Data Structure, Linear list – Introduction, singly linked list, Circular Linked Lists, Doubly Linked List, Stacks- Operations, Stack algorithm, Stack ADT, Stack applications, Queues- operations, Queue Algorithm, Queue ADT, Queue Applications.

UNIT - II

Trees: Introduction, Types of Trees, creating a Binary Tree from a General Tree, traversing a Binary Tree, Binary Search Trees (BST), BST Operations- Searching, Insertion and Deletion, BST ADT, BST Applications, Threaded Binary Trees, AVL Trees.

UNIT – III

Multi way Search Trees: Introduction, B Trees, B Trees ADT, B+ Trees. Heaps: Binary Heaps, Binomial heaps, Fibonacci heaps, Comparison of Various Heaps. Applications Searching: Introduction, Interpolation Search, Jump search.

UNIT - IV

Graphs: Introduction, Directed Graphs, Bi connected Components, Representation of Graphs, Graph Traversal Algorithms, Graph ADT, Applications of Graphs

Sorting: Heap sort, merge sort, quick sort.

UNIT – V

Hashing and Collision: Introduction, Hash Tables, Hash Functions, Different Hash Functions: Division Method, Multiplication Method, Mid-square Method, Folding Method; collisions: Collision Resolution by Open Addressing, Collision Resolution by Chaining

Files and their Organization: Introduction, Data hierarchy, File Attributes, Text and Binary Files, Basic File Operations, File Organization, Indexing.

TEXTBOOKS:

1. Data Structures: A Pseudocode Approach with C, 2 nd Edition, R. F. Gilberg and B.A.Forouzan, Cengage Learning
2. Data Structure using C– Reema Thareja, 3rd Edition, Oxford University Press.

REFERENCE:

1. Data Structures using C – A. S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2600BS62) ADVANCED ENGINEERING PHYSICS LAB

I B.Tech. II- SEMESTER **L T P C**

0 0 2 1

Course Objectives:

- To provide practical exposure to advanced concepts in solid-state and modern physics.
- To synthesize and study the physical properties of materials like semiconductors, ferromagnetic, and ferroelectric substances.
- To perform semiconductor characterization using Hall effect and band gap experiments.
- To explore the working principles of lasers and optical fibers through hands-on experiments.
- To develop skills in data analysis, interpretation, and scientific reporting.

Course Outcomes:

- To synthesize and analyze nanomaterials such as magnetite (Fe_3O_4) using chemical methods.
- To determine key electrical, magnetic, and optical properties of semiconductors and other functional materials.
- To characterize semiconductors using Hall effect and energy gap measurement techniques.
- To demonstrate working knowledge of laser systems and optical fiber parameters through experimental study.
- To apply scientific methods for accurate data collection, analysis, and technical report writing.
- To calculate the dielectric constant of a given material and its applications.

List of Experiments:

1. Synthesis of magnetite (Fe3O4) powder using sol-gel method.
2. Determination of energy gap of a semiconductor.
3. Determination of Hall coefficient and carrier concertation of a given semiconductor.
4. To determine the magnetic induction at the centre and at several points on the axis of a circular coil
5. Study of B-H curve of a ferro magnetic material.
6. Study of P-E loop of a given ferroelectric crystal.
7. Determination of dielectric constant of a given material.
8. Determination of Curie's temperature of a given ferroelectric material.
9. Study of V-I & L-I characteristics of a given laser diode.
10. a. Determination of numerical aperture of a given optical fibre.
    b. Determination of bending losses of a given optical fibre.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2605ES63: DATA STRUCTURES LAB

B.Tech. I Year II Sem.

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

Prerequisites: 1. A Course on "Programming for problem solving".

Course Objectives:

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes:

- Develop C programs using variables, data types, operators, input/output statements, and control structures to solve computational problems.
- Implement C programs using arrays, strings, functions, and recursion for problem-solving and data processing.
- Develop programs using pointers and dynamic memory allocation to efficiently manage data.
- Design and implement linear data structures such as stacks, queues, and linked lists using C.
- Implement searching and sorting algorithms to analyze and improve program efficiency.
- Develop real-world applications by integrating C programming concepts, data structures, and algorithms to solve practical computing problems.

List of Experiments

1. Write a program that uses functions to perform the following operations on singly linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
3. Write a program that uses functions to perform the following operations on circular linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
4. Write a program that implement stack (its operations) using
   i) Arrays ii) ADT
5. Write a program that implement Queue (its operations) using
   i) Arrays ii) ADT
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
   i) Heap sort, ii) Merge Sort, iii) Quick Sort
7. Write a program to implement the tree traversal methods (Recursive and Non-Recursive).
8. Write a program to implement
   i) Binary Search tree ii) B Trees iii) B+ Trees iv) AVL trees
9. Write a program to implement the graph traversal methods.
10. Write a program to implement the following Hash Functions: i) Division Method, ii) Multiplication Method, iii) Mid-square Method, iv) Folding Method

TEXT BOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein, PHI/Pearson Education.

REFERENCE BOOK:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. . Forouzan, Cengage Learning.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

2602ES61: BASIC ELECTRICAL& ELECTRONICS ENGINEERING LAB

B.Tech. I Year II Sem

L/T/P/C
0/0/2/1

LIST OF EXPERIMENTS

The following experiments are required to be conducted compulsory experiments:

1. PN Junction diode characteristics.
2.
3. Zener diode characteristics.
4. Transistor as a switch
5. Input – Output Characteristics of Transistor of BJT
6. Realization of Basic logic gates.
7. Implementation of Universal gates using Basic gates
8. Verification of Ohm's Law
9. Verification of KVL and KCL.

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted

1. Verification of Thevenin's &Norton's theorem.
2. Verification of Superposition theorem.
3. Calculations and Verification of Impedance and current of RL, RC, and RLC Series Circuits
4. Load test on DC shunt Motor.
5. Measurement of voltage, and current of a single-phase transformer.

TEXT BOOKS:

1. Jacob Millman - Electronic Devices and Circuits, McGraw Hill Education.
2. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.

REFERENCE BOOKS:

1. Horowitz -Electronic Devices and Circuits, David A. Bell – 5th Edition, Oxford.
2. ChinmoySaha, ArindamHalder, DebaatiGanguly - Basic Electronics-Principle and Applications, Cambridge, 2018.
3. Robert L. Boylestead, Louis Nashelsky- Electronic Devices and Circuits theory, 11th Edition, 2009, Pearson.
4. P. Ramana, M. Suryakalavathi, G.T.Chandrasheker,"Basic Electrical Engineering", S. Chand, 2nd Edition, 2019.
5. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
6. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2603ES61)ENGINEERING WORKSHOP

B.Tech. I Year II Sem **L / T/ P/ C**
0/ 0 / 2/ 1

Course Objectives:

- To Study different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipment's and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- To study commonly used carpentry joints and to have practical exposure to various welding and joining processes.

Course Outcomes: At the end of the course, the student would able to:

- 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.

TRADES FOR EXERCISES:

I. *Carpentry*

1. T- Lap Joint
2. Dovetail Lap Joint

II. *Fitting*

1. Semi-circular Fitting
2. V- Fitting

III. *Tin Smithy*

1. Rectangular Tray
2. Square Tin

IV. *House Wiring*

1. Two bulbs controlled by two independent switches (Series and parallel connection)
2. One bulb controlled by two-two way switches (Stair case connection).

V. *Foundry*

1. Single piece pattern
2. Split piece pattern

VI. *Black Smithy*

1. Round to Square

Trades for Demonstration:

1. Plumbing
2. Welding
3. Machine Shop
4. Power tools

TEXT BOOKS:

1. Workshop Manual, P. Kannaiah and K. L. Narayana, 3rd Edition, Scitech, 2015
2. Elements of Workshop Technology Vol.1 & 2, S. K. Hajra Choudhury, A. K. Hajra Choudhury and Nirjhar Roy, 13th Edition, Media Promoters & Publishers Pvt. Ltd., 2010.

REFERENCE BOOKS:

1. Workshop Manual / Venkat Reddy/ BSP
2. Workshop Manual / K Venu Gopal / Anuradha

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2605PC01) DISCRETE MATHEMATICS

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

2 1 0 3

Course Objectives:

1. To use correct mathematical terminology and notation.
2. To construct valid direct and indirect proofs.
3. To apply division into cases (proof by cases) to construct proofs.
4. To use counterexamples to disprove false mathematical statements.
5. To upply logical reasoning to solve a variety of mathematical and real-world problems.

Course Outcomes:

CO1: Express logical statements using predicates, quantifiers, and logical connectives, and construct valid proofs using logical equivalences and rules of inference.
CO2: Classify sets, relations, and functions based on their properties, represent partial orders using Hasse diagrams, and apply mathematical induction to construct proofs.
CO3: Classify a given algebraic structure semigroup, monoid, group, or ring based on its defining properties.
CO4: Evaluate Boolean functions and simplify Boolean expressions using the laws and duality principle of Boolean algebra.
CO5: Apply the principles of counting, the pigeonhole principle, inclusion-exclusion, and permutations and combinations (with and without repetition) to solve combinatorial problems.
CO6: Apply graph theory concepts including connectivity, paths, cycles, isomorphism, Eulerian and Hamiltonian circuits, graph coloring, planar graphs, and trees to solve real-world problems such as finding shortest paths and articulation points.

SYLLABUS

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 Combinatorics: 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.
3. Seymour Lipschutz, Marc Lipson, Discrete Mathematics, Tata McGraw–Hill

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2605PC02) COMPUTER ORGANIZATION AND ARCHITECTURE

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

Course Objectives

- To introduce the fundamentals of computer organization, architecture, and design.
- To explain register transfer language, microoperations, and basic computer organization.
- To introduce microprogrammed control and CPU organization.
- To explain data representation and computer arithmetic operations.
- To introduce I/O organization and memory hierarchy.
- To explain RISC, CISC, pipelining, vector processing, and multiprocessor systems.

Course Outcomes

- At the end of the course, the students will be able to:
- Understand the fundamentals of computer organization and architecture.
- Apply register transfer and micro operation concepts in computer design.
- Analyze CPU organization, instruction formats, and addressing modes.
- Apply data representation and computer arithmetic techniques.
- Analyze I/O organization and memory hierarchy.
- Explain RISC, CISC, pipelining, vector processing, and multiprocessor concepts.

UNIT - I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift microoperations, Arithmetic logic shift unit.

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

UNIT - II

Micro programmed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT - III

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT - IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

UNIT - V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics. Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Inter processor arbitration, Inter processor communication and synchronization, Cache Coherence.

TEXTBOOK:

1. Computer System Architecture – M. Morris Mano, Third Edition, Pearson/PHI.

REFERENCE BOOKS:

1. Computer Organization Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Organization and Architecture William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2605PC03) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

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

Course Objectives

- To introduce OOPs and Java programming.
- To explain inheritance, polymorphism, interfaces, and packages.
- To develop programs using exception handling and multithreading.
- To introduce Java Collection Framework and utility classes.
- To explain file handling, streams, and I/O operations.
- To introduce GUI programming and event handling using AWT and Swing.

Course Outcomes:

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

- Understand OOPs concepts and Java programming.
- Apply inheritance, polymorphism, interfaces, and packages.
- Implement exception handling and multithreading.
- Use Java Collection Framework and utility classes.
- Perform file handling and stream-based I/O operations.
- Develop GUI applications using AWT, Swing, and event handling.

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 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-Array List, Linked List, Hash Set, Tree Set, Map- Hash Map, Tree Map, Legacy Classes-Vector, Stack, Hash table.

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:

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

REFERENCE BOOKS:

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
2. Object Oriented Programming through Java,P.Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.
5. Design Patterns Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2605PC06) SOFTWARE ENGINEERING

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

Course Objectives
- To introduce the fundamentals and principles of Software Engineering.
- To explain software process models and agile development methodologies.
- To introduce software requirements in engineering and UML modeling.
- To explain software design concepts, architecture, and user interface design.
- To introduce software testing strategies, debugging, and software metrics.
- To explain software risk management, quality assurance, and quality standards.

Course Outcomes
At the end of the course, the students will be able to:
- Understand the fundamentals and principles of Software Engineering.
- Apply appropriate software process models and agile methodologies.
- Analyze and document software requirements using UML models.
- Design software architecture, object-oriented systems, and user interfaces.
- Apply software testing techniques, debugging, and software metrics.
- Manage software risks and quality assurance using quality standards and models.

UNIT - I:
Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths. A Generic view of process: Software engineering- A layered technology, a process framework, Process patterns, process assessment. Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process, Agility and Agile Process model, Extreme Programming, Other process models of Agile Development and Tools

UNIT - II:
Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document. Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. System models: Context Models, Behavioral models, Data models, Object models, structured methods. UML Diagrams.

UNIT - III:
Design Engineering: Design process and Design quality, Design concepts, the design model. Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design. Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution. Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation**.**

UNIT - IV:
Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black- Box and White-Box testing, Validation testing, System testing, the art of Debugging. Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for

source code, Metrics for testing, Metrics for maintenance. Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT-V: Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan. Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, The Capability Maturity Model Integration (CMMI), Software reliability, The ISO 9000 quality standards.

TEXTBOOKS :

1. Software Engineering A practitioner's Approach, Roger S Pressman, 6thedition. McGrawHill International Edition.
2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
4. Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.
5. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
6. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley & Sons Ltd.
7. Software Engineering 3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
8. Introduction to Software Engineering, R. J. Leach, CRC Press. Course.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2605PC05) DATABASE MANAGEMENT SYSTEMS

B. Tech. II Year 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:
Students will be able to
- Demonstrate the basic elements of a relational database management system and Ability to identify the data models for relevant problems.
- Ability to design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data.
- 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.

UNIT – I:
Introduction: Database System Applications, Purpose of Database Systems, View of Data, Database Languages – DDL, DML, Relational Databases, Database Design, Database Architecture, Data Mining and Information Retrieval, Database Users and Administrators, History of Database Systems.
Introduction to Data base design: Database Design and ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises.
UNIT – II:
Relational Model: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design: ER to Relational, Introduction to Views, Destroying /Altering Tables and Views.
Relational Algebra and Calculus: Preliminaries, Relational Algebra, Relational calculus– Tuple relational Calculus, Domain relational calculus.

UNIT – III:

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

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

UNIT – IV:

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

UNIT V:

Concurrency Control: Lock – Based Protocols, Multiple Granularity, Timestamp - Based Protocols, Validation - Based Protocols.

Recovery System - Failure Classification, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with loss of nonvolatile storage, Remote Backup systems.

Storage and Indexing: Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing, Index Data Structures, Comparison of File Organizations. Tree-Structured Indexing: Intuition for tree Indexes, Indexed Sequential Access Method (ISAM),

B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

TEXTBOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGrawHill 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, Mc Graw 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. Database Development and Management, Lee Chao, Auerbach publications, Taylor& Francis Group.
5. Introduction to Database Systems, C.J.Date, Pearson Education

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2605PC61) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

B.Tech. II Year I Sem **L T P C**
0 0 2 1

Course Objectives:

- To prepare students to become familiar with the Standard Java technologies ofJ2SE
- To prepare students to excel in Object Oriented programming and to succeed as a Java Developer through global rigorous education.
- To provide Students with a solid foundation in OOP fundamentals required to solve programming problems and to learn Advanced Java topics like J2ME, J2EE, JSP and JavaScript
- To train Students with good OOP programming breadth so as to comprehend, analyze, 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:

Students will be able to

- Analyze the necessity for Object Oriented Programming paradigm and over structured programming and become familiar with the fundamental concepts in OOP.
- Demonstrate an ability to design and develop java programs, analyze, and interpret object-oriented data and report results.
- Demonstrate an ability to design an object-oriented system, Swing components or multithreaded process as per needs and specifications.
- Demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks like console and windows applications both for standalone and Applets program.
- Analyze commonly used Java libraries and APIs, including the Collections Framework, Java I/O, and other utility classes.
- Design and create GUIs using Java Swing, incorporating event handling for user interactions.

Week 1:

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

Week 2:

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

Week 3:

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

Week 4:

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

Week 5:

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

Week 6:

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

Week 7:

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

Week 8:

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

Week 9:

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

Week 10:

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

Week 11:

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

TEXTBOOK/ REFERENCE BOOKS:

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

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2605PC63) DATABASE MANAGEMENT SYSTEMS LAB

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

0 0 2 1

Course Objectives:

- 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.
- To 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

- In drawing the ER, EER, and UML Diagrams.
- In converting the entity-relationship diagrams into relational tables.
- To developing appropriate Databases to a given problem that integrates ethical, social, legal, and economic concerns.
- Developing PL/SQL procedures and triggers to automate tasks, enforce data integrity, and apply business rules, ensuring robust and dynamic database applications.
- Applying normalization principles (1NF, 2NF, 3NF) to decompose tables, minimize redundancy, and enhance database structure, ensuring consistency and reducing data anomalies.
- In using 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.

A. 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 must design and develop a Database

which consists of 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.

Entities:

1. BUS
2. Ticket
3. Passenger

Relationships:

1. Reservation
2. Cancellation

Primary Key Attributes:

1. Ticket ID (Ticket Entity)
2. Passport ID(Passenger Entity)
3. Bus_NO(Bus Entity)

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.

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

Example for creation of a normalized "Passenger" table.

CREATE TABLE Passenger (Passport_id INTEGER PRIMARY KEY, Name VARCHAR (50) Not NULL,Age Integer 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 a data base
- 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, 24,'seetha',

32,'F','abc55');

Few more Examples of DML commands:

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

Experiment 4: Querying

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

Practice the following Queries:

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

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

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

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

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

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

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

Find the distinct PNR numbers that are present.

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

Find the total number of cancelled seats.

Nested Query and Co-related Queries

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

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

- Find the names of sailors who have reservedboat103.
- Find the name and the age of the youngest tailor
- 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 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;

Experiment 8: Procedures

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

Eg: CREATE PROCEDURE myProc()BEGIN.

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

Experiment 9: Cursors

In this week you need to do the following: Declare a cursor that defines a result set.
Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done.
CREATE PROCEDURE myProc (in_customer_id INT) BEGIN DECLARE v_id INT; DECLARE v_nameVARCHAR(30);
DECLAREclCURSORFORSELECTppno,nameFROMPassengerWHEREppno=in_customer_id;
OPENcl;
FETCH cl into v_id, v_name; Close cl; END Tables BUS Bus No: Varchar:
PK (Primary key) Source: Varchar Destination:
Varchar DeptTime:
VarcharPassenger PPNO:
Varchar(15)) :
PK Name:
Varchar (15) Age: int (4) Sex: Char(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 :date time(8) No_of_seats : int (8) Address: Varchar(50) Contact_No: Numeric (9)
—> Should not be less than 9 and Should not accept any other character other than Integer
Status: Char (2) : Yes / No

Cancellation

PNR_No: Numeric(9):
FK Journey_date:datetime (8) No_of_seats : int (8) Address : Varchar (50)
Contact_No: Numeric (9) —> Should not be less than 9 and should not accept any other character other than Integer
Status: Char (2) : Yes / No

Ticket

Ticket No: Numeric(9):
PK Journey date: date time(8) Age : int (4)
Sex:Char(10) :Male/Female
Source :Varchar Destination :Varchar Dep_time :Varchar

Experiment 10: Normalization

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

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

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

Passenger

Name Age Sex Address PassportID

Passport_idTicket_id

You can do these cond and third normal forms if required. And how 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 Net_salary Gross_salary

Experiment 12: Revoke/Grant/Commit/Rollback

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

1. Develop a query to grant all privileges of employees table into departments table
2. Develop a query to grant some privileges of employees table into departments table
3. Develop a query to revoke all privileges of employees table from departments 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 troll back

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.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2600IN01) INNOVATION AND ENTREPRENEURSHIP

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

Course Objectives:

- To familiarize on the basic concepts of innovation, entrepreneurship and its importance.
- To Identify and analyze the process of problem-opportunity identification, market segmentation, and idea generation techniques.
- To initiate prototype development and understand minimum viable product.
- To develop initial Business and financial planning and Go-to-Market strategies
- To impart knowledge on establishing startups, venture pitching and IPR.

Course Outcomes:

Students will be able to:

- Understand the entrepreneurship and the entrepreneurial process and its significance in economic development.
- Assess the problem from an industry perspective and generate solutions using the design thinking principles.
- Assess market competition, estimate market size, and develop a prototype.
- Analyze Business and financial planning models and Go-to-Market strategies.
- Able to build a start-up, register IP and identify funding opportunities.

Unit I: Fundamentals of Innovation and Entrepreneurship

Innovation: Introduction, need for innovation, Features, Types of innovations, innovations in manufacturing and service sectors, fostering a culture of innovation, planning for innovation. Entrepreneurship: Introduction, types of entrepreneurship attributes, mindset of entrepreneurial and intrapreneurial leadership, Role of entrepreneurs in economic development. Woman Entrepreneurship, Importance of on-campus startups. Understanding to build entrepreneurial mindset, attributes and networks individuals while on campus.

Core Teaching Tool: Simulation, Game, Industry Case Studies (Personalized for students – 16 industries to choose from), Venture Activity.

Unit II: Problem and Customer Identification

Identification of gap, problem, analyzing the problem from a industry perspective, real-world problems,market and customer segmentation, validation of customer problem fit, Iterating problem-customer fit,Competition and Industry trends mapping and assessing initial opportunity, Porter's Five Force Model. Idea generation, Ideation techniques: Brainstorming, Brain writing, Round robin, and SCAMPER,Design thinking principles, Mapping of solution to problem.

Core Teaching Tool: Several types of activities including: Class, game, Gen AI, 'Get out of the Building'and Venture Activity.

Unit III: Opportunity assessment and Prototype development

Identify and map global competitors, review industry trends, and understand market sizing: TAM, SAM,and SOM. Assessing scope and potential scale for the opportunity. Understanding prototyping and Minimum Viable Product (MVP). Developing a prototype: Testing, and validation.

Core Teaching Tool: Venture Activity, no-code Innovation tools, Class activity

Unit IV: Business & Financial Models

Introduction to Business Model and types, Lean Canvas Approach: 9-block lean canvas model, building lean canvas for your startup. Business planning: components of Business plan- Sales plan, People plan and financial plan, Financial Planning: Types of costs, preparing a financial plan for profitability using a financial template, understanding the basics of Unit economics, Economies of Scale and analyzing financial performance. Go-To-Market (GTM) approach – Selecting the Right Channel, creating digital presence, and building customer acquisition strategy.

Core Teaching Tool: Founder Case Studies – Sama and Securely Share; Class activity and discussions; Venture Activities.

Unit V: Startups and IPR

Startup requirements, building founding team members and mentors, pitch preparation, start-up registration process, funding opportunities and schemes, institutional support to entrepreneurs, startup lifecycle, documentation, legal aspects in startup, venture pitching readiness, National Innovation Startup Policy (NISP) and its features. Patents, Designs, Patentability, Procedure for grants of patents. Indian Scenario of Patenting, International Scenario: International cooperation on Intellectual Property. Patent Rights: Scope of Patent Rights. Copyright, trademark, and GI. Licensing and transfer of technology.

Core Teaching Tool: Expert talks; Cases; Class activity and discussions; Venture Activities.

TEXTBOOKS:

1. John R Bessant, Joe Tidd, Innovation and Entrepreneurship, 4E, Wiley, Latest Edition.
2. Ajay Batra, The Stratup Launch Book- A Practical Guide for Launching Customer Centric
3. Ventures, Wiley, 2020. (For Core Teaching Tool).
4. Entrepreneurship Development and Small Business Enterprises, Poornima M Charantimath,3E, Pearson, 2018.
5. D.F. Kuratko and T.V. Rao, Entrepreneurship: A South-Asian Perspective, Cengage Learning,
6. 2013.
7. Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Sabyasachi Sinha (2020).
8. Entrepreneurship, McGrawHill, 11th Edition.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2612SD02) Node JS/ React JS/ Django, UI Design - Flutter

B.Tech. II Year I Sem. **L T P C**
0 0 2 1

Prerequisites: Object Oriented Programming through Java, HTML Basics.

Course Objectives:

- To implement responsive web pages using HTML, CSS3, Bootstrap, and JavaScript validation.
- To develop full-stack applications with Node.js, Express, React.js, and secure them using JWT.
- To build and integrate RESTful APIs using Node.js and Django with frontend CRUD operations.
- To create Flutter apps with responsive layouts, state management, and custom widgets.
- To enhance Flutter apps by integrating REST APIs and adding animations for better user experience.

Course Outcomes:

Students will be able to

- Design responsive web pages using HTML, CSS, Bootstrap, and JavaScript.
- Develop backend applications using Java and Node.js.
- Build single-page applications with React.js.
- Create Flutter apps with custom widgets, layouts, and forms.
- Integrate APIs, add animations, and perform UI testing in Flutter apps.

List of Experiments: Students need to implement the following experiments

1. Build a responsive website with registration, login, catalog, and cart pages using HTML, CSS3, Bootstrap, and JavaScript validation.
2. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages
3. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation using chart.js
4. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)
5. Implement JWT authentication in Node.js to create secure endpoints.
6. Create a TODO application in react with necessary components and deploy it into github.
7. Integrate a React frontend with Node.js backend to perform CRUD operations on a shared dataset (e.g., MongoDB, MySQL.)
8. Build a Django REST API for managing student data, tested using Postman.
9. Install Flutter and Dart SDK; Write Dart programs on data types, control flow, Functions, Class & Objects and collections to understand syntax and features.
10. Create a Flutter app showcasing common widgets (Text, Image, Container, Card, ListView).
11. Design a responsive UI using Row, Column, Stack, media queries, and breakpoints.
12. Implement screen navigation using Navigator and named routes.
13. Use stateful & stateless widgets; manage state using Provider or setState.

14. Design a form in Flutter with input fields, validation, and error handling (e.g., student registration form).
15. Fetch and display data from a REST API (e.g., weather or student info) in Flutter.
16. Add basic animations (fade or slide) to a Flutter app for enhancing UI interactions

TEXT BOOK:

Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development.

REFERENCE BOOKS:

1. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wrox Publications, 2010
2. Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets and JSP, O'Reilly Media, 2nd Edition, 2008.
3. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, A Press.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2600ES01) ENVIRONMENTAL SCIENCE

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

1 0 0 0

Course Objectives:

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

Course Outcomes:

Students will be able to:

- 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, Bio geochemical cycles, Bio accumulation, Bio magnifications, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

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

UNIT-III

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

UNIT-IV

Environmental Pollution and Control Technologies:

Environmental Pollution: Classification of pollution,

Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards.

Water pollution: Sources and types of pollution, drinking water quality standards.

Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil.

Noise Pollution: Sources and Health hazards, standards,

Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management.

Pollution control technologies: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation.

Global Environmental Issues and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC- Go initiatives.

UNIT-V

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

Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon lifestyle.

TEXTBOOKS:

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

REFERENCE BOOKS:

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

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2600BS05) COMPUTER ORIENTED STATISTICAL METHODS

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

3 0 0 3

Course Objectives:

- To understand the concepts of random variables, probability distributions, and their applications in engineering problems.
- To learn the Normal distribution and sampling distributions for statistical analysis.
- To understand the principles of statistical estimation and large-sample hypothesis testing.
- To learn the concepts of small-sample hypothesis testing.
- To apply statistical techniques such as curve fitting, correlation, and regression to analyze engineering data.

Course Outcomes:

Students will be able to:

- Analyze random variables and select appropriate discrete and continuous probability distributions for engineering applications.
- Apply continuous probability distributions and sampling distributions to solve statistical problems.
- Estimate population parameters using appropriate statistical estimation techniques.
- Evaluate statistical hypotheses using appropriate large-sample tests for decision making.
- Examine statistical data using suitable small-sample tests involving means and variances.
- Apply curve fitting, correlation, and regression techniques to analyze data and develop predictive models for engineering applications.

UNIT-I: Random Variables and Probability Distributions

Concept of a Random Variable - Discrete Probability Distributions – Continuous Probability Distributions - Mean of a Random Variable - Variance of a Random Variable Discrete Probability Distributions: Binomial Distribution - Poisson distribution (Without proofs).

UNIT-II: Continuous Distributions and sampling 10 L

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 - Central Limit Theorem.

UNIT-III: Estimation and Testing of Hypothesis (Large Samples)10 L

Estimation: Introduction - Statistical Inference - Classical Methods of Estimation - Single Sample: Estimating the mean - Standard error of a point estimate. Estimating a single proportion. Tests of Hypothesis: Statistical hypothesis: General concepts- Single mean -difference between two means - one proportion– difference between two proportions.

UNIT-IV: Testing of Hypotheses (Small Samples) 10L

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 it's properties. Test of equality of two population variances. Chi-square distribution, it's properties.

UNIT-V: Applied Statistics 10L

Curve fitting by the method of least squares - Fitting of straight lines - Second degree parabolas and

more general curves - Correlation and Regression - Rank correlation.

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
3. Sheldon M. Ross, Probability and Statistics for Engineers and Scientists, Academic Press,5th reprint,2018.

REFERENCE BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44thEdition, 2017.
2. Jay L. Devore, Probability and Statistics for Engineering and the Sciences, 6th reprint, 2017.
3. Miller and Freund's, Probability and Statistics for Engineers, Pearson Educations, 6th Edition, 2006.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(2605PC07) COMPUTER NETWORKS

B.Tech. II Year II 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:
Students will be able to
- 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-32on 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.

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

(2605PC04) Operating Systems

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

3 0 0 3

Course Objectives

- To introduce the fundamentals, functions, and structures of Operating Systems.
- To explain processes, threads, and CPU scheduling algorithms.
- To introduce inter-process communication and synchronization mechanisms.
- To explain deadlock prevention, avoidance, detection, and recovery techniques.
- To introduce memory management and virtual memory concepts.
- To explain I/O systems, file management, and disk scheduling techniques.

Course Outcomes

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

- Understand the fundamental concepts and structures of Operating Systems.
- Apply process, thread, and CPU scheduling concepts.
- Apply IPC and synchronization mechanisms for process coordination.
- Analyze and handle deadlock situations using appropriate techniques.
- Apply memory management and page replacement algorithms.
- Apply file, I/O, and disk management techniques 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 COLLEGEFORWOMEN

(2605PC65) COMPUTER NETWORKS LAB

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

0 0 2 1

Course Objectives:

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

Course Outcomes:

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

System/Software Requirement

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

Computer Networks Lab:

WEEK1: Implement the data link layer framing methods such as character, character stuffing, and bit stuffing.

WEEK 2: Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC.

WEEK 3: Implement Stop and wait protocol.

WEEK 4: Implement Dijkstra's algorithm to compute the shortest path through a graph.

WEEK 5: Take an example sub net graph with weight syndicating delay between nodes.

WEEK 6: Now obtain Routing table art each node using distance vector routing algorithm

WEEK 7: To implement Open Shortest Path First (OSPF) Routing Protocol.

WEEK 8: Take a 64bit playing text and en crypt the same using DES algorithm.

WEEK 9: Using RSA algorithm encrypts a text data and decrypt the same.

REFERENCES:

1. Data Communications and Networking–Behrouza. Forouzan, 4thEdition Mc Graw Hill Education, Computer Networking: Atop
2. 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, 2ndEdition, Pearson Education.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2666PC01) MACHINE LEARNING

B. Tech. II 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:

Students will be able to

- 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

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 over fitting, regularization, validation.

UNIT III

DISTANCE-BASED MODELS

Nearest neighbor models, K-means, clustering around methods, 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 tree Clustering trees, learning ordered rule lists, learning unordered rule lists, descriptive rule learning Association rule mining firstorder rule learning.

UNIT V

REINFORCEMENT LEARNING

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

TEXTBOOKS:

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

REFERENCE BOOKS:

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

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2605PC62) Operating Systems Lab

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

0 0 2 1

Course Objectives:

- To Understand the fundamental concepts of operating systems through practical implementation.
- To Develop programs for CPU scheduling, memory management, and file management.
- To Apply operating system algorithms to solve resource management problems.
- To Analyze the performance of scheduling, paging, and disk management algorithms.
- To Implement process synchronization and deadlock handling techniques.
- To Enhance programming, problem-solving, and debugging skills using C programming.

Course Outcomes:

Students will be able to

- At the end of the course the students are able to:
- Ability to implement inter process communication between two processes.
- Ability to design and solve synchronization problems.
- Ability to simulate and implement operating system concepts such as scheduling,
- Deadlock management, file management, and memory management.
- Implement file allocation and organization strategies to manage storage efficiently
- Develop programs to simulate contiguous memory allocation and page replacements

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 BOOK:

1. An Introduction to Operating Systems, P.C.P Bhatt, 2nd edition, PHI.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2605PC64) Computational Mathematics Lab Using Python

B.Tech. II Year II Sem **L T P C**
0 0 2 1

Pre-requisites

- Basic knowledge of Python Programming.
- Fundamentals of Matrices and Linear Algebra.
- Basic concepts of Numerical Methods and Differential Equations.

Course Objectives

- Upon successful completion of the course, the student will be able to:
- Develop Python programs using **NumPy, SciPy, and Matplotlib** for scientific and numerical computing.
- Apply Python programming to solve **Eigenvalue and Eigenvector** problems.
- Implement numerical techniques to solve **Algebraic and Transcendental Equations**.
- Develop Python programs to solve **Systems of Linear Equations** using iterative methods.
- Solve **First-Order and Higher-Order Differential Equations** using Python.
- Visualize and interpret numerical solutions through graphical representations for engineering applications.

Course Outcomes:

Students will be able to:

- Develop Python programs using scientific computing libraries for numerical analysis.
- Compute Eigenvalues and Eigenvectors of matrices using Python
- Implement numerical methods to solve Algebraic, Transcendental, and Linear System problems.
- Solve First-Order Differential Equations and engineering application problems using Python.
- Solve Higher-Order Differential Equations using Python programming techniques.
- Analyze and visualize numerical results using appropriate graphical representations and interpret the outcomes.

List of Experiments

Week-1: Matrix Operations and Eigenvalues *(4 Practical Hours)*

1. Write a Python program to perform basic matrix operations using NumPy.
2. Write a Python program to compute Eigenvalues and Eigenvectors of a matrix.

Week-2: Algebraic and Transcendental Equations *(4 Practical Hours)*

1. Write a Python program to find the root of an equation using the Bisection Method.
2. Write a Python program to find the root of an equation using the Newton–Raphson Method.

Week-3: System of Linear Equations *(4 Practical Hours)*

1. Write a Python program to solve a system of linear equations using the Jacobi Iteration Method.
2. Write a Python program to solve a system of linear equations using the Gauss–Seidel Method.

Week-4: **First-Order Differential Equations** *(6 Practical Hours)*

1. Write a Python program to solve first-order differential equations.
2. Write a Python program to solve engineering applications such as exponential growth/decay and Newton's law of cooling.

Week-5: Higher-Order Differential Equations *(4 Practical Hours)*

1. Write a Python program to solve homogeneous linear differential equations.
2. Write a Python program to solve non-homogeneous linear differential equations.

Additional Activity

Plot and visualize the numerical solutions of selected experiments using Matplotlib.

Text Books

1. Kenneth A. Lambert, *Fundamentals of Python: First Programs*, 3rd Edition, Cengage Learning.
2. Allen B. Downey, *Think Python: How to Think Like a Computer Scientist*, 2nd Edition, O'Reilly Media.
3. Charles R. Severance, *Python for Everybody: Exploring Data Using Python 3*, CreateSpace.
4. Steven C. Chapra, *Applied Numerical Methods with Python for Engineers and Scientists*, McGraw-Hill.
5. Jake VanderPlas, *Python Data Science Handbook*, O'Reilly Media.

Reference Books

1. Brian Heinold, *A Practical Introduction to Python Programming*, Franklin, Beedle & Associates.
2. John C. Lusth, *An Introduction to Python Programming*, Addison-Wesley.
3. Eric Matthes, *Python Crash Course*, 3rd Edition, No Starch Press.
4. E. Balagurusamy, *Numerical Methods*, McGraw-Hill Education.
5. Richard L. Burden and J. Douglas Faires, *Numerical Analysis*, Cengage Learning.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(2612SD01) DATA VISUALIZATION - R PROGRAMMING/ POWER BI TABLEAU/GOOGLE CHART

B.Tech. II Year II Sem. **L T P C**
0 0 2 1

Course Objectives:

- To Effective use of Business Intelligence (BI) technology (Tableau) to apply data visualization
- To discern patterns and relationships in the data.
- To build Dashboard applications.
- To communicate the results clearly and concisely.
- To be able to work with different formats of data sets.

Course Outcomes:

- Understand how to import data into Tableau.
- Understand concepts of Dimensions and Measures.
- Develop Programs and understand how to map Visual Layouts and Graphical Properties
- Create Dashboard, custom charts, and, publish to tableau online for any real time dataset

List of Programs

1. Understanding Data, what is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization.
2. Getting started with Tableau Software using Data file formats, connecting your Data to Tableau, creating basic charts (line, bar charts, Tree maps), Using the Show me panel.
3. Tableau Calculations, Overview of SUM, AVR, and Aggregate features, Creating custom calculations and fields.
4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, Formatting specific parts of the view.
5. Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data
6. Structuring your data, Sorting and filtering Tableau data, Pivoting Tableau data.
7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.
8. Creating Dashboards & Storytelling, creating your first dashboard and Story, Design for different displays, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.
9. Tableau file types, publishing to Tableau Online, sharing your visualizations, printing, and exporting.
10. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.
11. Visualize various data patterns taking any dataset from Kaggle.
12. Visualize data patterns using Google Charts by creating interactive Line, Bar, and Pie charts along with Dashboards using HTML and JavaScript.

REFERENCE BOOKS:

1. Brett Powell, Microsoft Power BI cookbook, 2nd edition.
2. Roger D. Peng, R Programming for Data Science
3. Norman Matloff Cengage Learning India, The Art of R Programming.