# MOTHER TERESA INSTITUTE OF SCIENCE AND TECHNOLOGY
## AUTONOMOUS

**B.Tech. in COMPUTER SCIENCE AND ENGINEERING COURSE STRUCTURE & SYLLABUS**
**(M24 Regulation)**

**I Year I Semester**

| S. No. | Course Code | Course | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1. | M241ACS101 | Matrices and Calculus | 3 | 1 | 0 | 4 |
| 2. | M241ACS102 | Engineering Chemistry | 3 | 1 | 0 | 4 |
| 3. | M241ACS103 | Programming for Problem Solving | 3 | 0 | 0 | 3 |
| 4. | M241ACS104 | Basic Electrical Engineering | 2 | 0 | 0 | 2 |
| 5. | M241ACS105 | Computer Aided Engineering Graphics | 1 | 0 | 4 | 3 |
| 6. | M241ACS106 | Elements of Computer Science & Engineering | 0 | 0 | 2 | 1 |
| 7. | M241ACS107 | Engineering Chemistry Laboratory | 0 | 0 | 2 | 1 |
| 8. | M241ACS108 | Programming for Problem Solving Laboratory | 0 | 0 | 2 | 1 |
| 9. | M241ACS109 | Basic Electrical Engineering Laboratory | 0 | 0 | 2 | 1 |
| | | Induction Program | | | | |
| | | **Total** | **12** | **2** | **12** | **20** |

**I Year II Semester**

| S. No. | Course Code | Course | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1. | M241ACS201 | Ordinary Differential Equations and Vector Calculus | 3 | 1 | 0 | 4 |
| 2. | M241ACS202 | Applied Physics | 3 | 1 | 0 | 4 |
| 3. | M241ACS203 | Engineering Workshop | 0 | 1 | 3 | 2.5 |
| 4. | M241ACS204 | English for Skill Enhancement | 2 | 0 | 0 | 2 |
| 5. | M241ACS205 | Electronic Devices and Circuits | 2 | 0 | 0 | 2 |
| 6. | M241ACS206 | Python Programming Laboratory | 0 | 1 | 2 | 2 |
| 7. | M241ACS207 | Applied Physics Laboratory | 0 | 0 | 3 | 1.5 |
| 8. | M241ACS208 | English Language and Communication Skills Laboratory | 0 | 0 | 2 | 1 |
| 9. | M241ACS209 | IT Workshop | 0 | 0 | 2 | 1 |
| 10. | * M241ACS210 | Environmental Science | 3 | 0 | 0 | 0 |
| | | **Total** | **13** | **4** | **12** | **20** |

**II YEAR I SEMESTER**

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | M241ACS301 | Digital Electronics | 3 | 0 | 0 | 3 |
| 2 | M241ACS302 | Advanced Data Structures | 3 | 0 | 0 | 3 |
| 3 | M241ACS303 | Computer Oriented Statistical Methods | 3 | 1 | 0 | 4 |
| 4 | M241ACS304 | Computer Organization and Architecture | 3 | 0 | 0 | 3 |
| 5 | M241ACS305 | Object Oriented Programming through Java | 3 | 0 | 0 | 3 |
| 6 | M241ACS306 | Advanced Data Structures Lab | 0 | 0 | 3 | 1.5 |
| 7 | M241ACS307 | Object Oriented Programming through Java Lab | 0 | 0 | 3 | 1.5 |
| 8 | M241ACS308 | Data visualization- R Programming/ Power BI | 0 | 0 | 2 | 1 |
| 9 | * M241ACS309 | Gender Sensitization Lab | 0 | 0 | 2 | 0 |
| | | **Total** | **15** | **1** | **10** | **20** |

## BOARD OF STUDIES MEMBERS

| S.NO | Name of the Member | Signature | S.No | Name of the Member | Signature |
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| 1 | Dr.J. UJWALA REKHA | | 5 | Mr.P.MARESWARA RAO | |
| 2 | Dr.KONERU SUWARNA VANI | | 6 | Mrs.M. REVATHI | |
| 3 | Dr.A.VISHNUVARDHAN REDDY | | 7 | Mr.CH RAJA JACOB | |
| 4 | Mr.SURENDRA VARMA | | 8 | Mrs. K.NIRUSHA | |

II YEAR II SEMESTER

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | M241ACS401 | Discrete Structures & Graph Theory | 3 | 0 | 0 | 3 |
| 2 | M241ACS402 | Business Economics & Financial Analysis | 3 | 0 | 0 | 3 |
| 3 | M241ACS403 | Operating Systems | 3 | 0 | 0 | 3 |
| 4 | M241ACS404 | Database Management Systems | 3 | 0 | 0 | 3 |
| 5 | M241ACS405 | Software Engineering | 3 | 0 | 0 | 3 |
| 6 | M241ACS406 | Operating Systems Lab | 0 | 0 | 2 | 1 |
| 7 | M241ACS407 | Database Management Systems Lab | 0 | 0 | 2 | 1 |
| 8 | M241ACS408 | Real-time Research Project/ Societal Related Project | 0 | 0 | 4 | 2 |
| 9 | M241ACS409 | Node JS/ React JS/ Django | 0 | 0 | 2 | 1 |
| 10 | * M241ACS410 | Constitution of India | 3 | 0 | 0 | 0 |
| | | **Total** | **18** | **0** | **10** | **20** |

III YEAR I SEMESTER

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | M241ACS501 | Design and Analysis of Algorithms | 3 | 1 | 0 | 4 |
| 2 | M241ACS502 | Computer Networks | 3 | 0 | 0 | 3 |
| 3 | M241ACS503 | DevOps | 3 | 0 | 0 | 3 |
| 4 | | Professional Elective-I | 3 | 0 | 0 | 3 |
| 5 | | Professional Elective -II | 3 | 0 | 0 | 3 |
| 6 | M241ACS504 | Computer Networks Lab | 0 | 0 | 2 | 1 |
| 7 | M241ACS505 | DevOps Lab | 0 | 0 | 2 | 1 |
| 8 | M241ACS508 | Advanced English Communication Skills Lab | 0 | 0 | 2 | 1 |
| 9 | M241ACS506 | UI design- Flutter | 0 | 0 | 2 | 1 |
| 10 | * M241ACS510 | Intellectual Property Rights | 3 | 0 | 0 | 0 |
| | | **Total** | **18** | **1** | **8** | **20** |

III YEAR II SEMESTER

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | M241ACS601 | Machine Learning | 3 | 0 | 0 | 3 |
| 2 | M241ACS602 | Formal Languages and Automata Theory | 3 | 0 | 0 | 3 |
| 3 | M241ACS603 | Artificial Intelligence | 3 | 0 | 0 | 3 |
| 4 | | Professional Elective - III | 3 | 0 | 0 | 3 |
| 5 | | Open Elective-I | 3 | 0 | 0 | 3 |
| 6 | M241ACS604 | Machine Learning Lab | 0 | 0 | 2 | 1 |
| 7 | M241ACS605 | Artificial Intelligence Laboratory | 0 | 0 | 2 | 1 |
| 8 | | Professional Elective-III Lab | 0 | 0 | 2 | 1 |
| 9 | M241ACS606 | Industrial Oriented Mini Project/ Internship/ Skill Development Course (Big data-Spark) | 0 | 0 | 4 | 2 |
| 10 | *M241ACS609 | Environmental Science | 3 | 0 | 0 | 0 |
| | | **Total** | **18** | **0** | **8** | **20** |

Environmental Science in III Yr II Sem Should be Registered by Lateral Entry Students Only.

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| 4 | Mr.SURENDRA VARMA | | 8 | Mrs. K.NIRUSHA | |

**IV YEAR I SEMESTER**

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | M241ACS701 | Cryptography and Network Security | 3 | 0 | 0 | 3 |
| 2 | M241ACS702 | Compiler Design | 3 | 0 | 0 | 3 |
| 3 | | Professional Elective -IV | 3 | 0 | 0 | 3 |
| 4 | | Professional Elective -V | 3 | 0 | 0 | 3 |
| 5 | | Open Elective - II | 3 | 0 | 0 | 3 |
| 6 | M241ACS703 | Cryptography and Network Security Lab | 0 | 0 | 2 | 1 |
| 7 | M241ACS704 | Compiler Design Lab | 0 | 0 | 2 | 1 |
| 8 | M241ACS705 | Project Stage - I | 0 | 0 | 6 | 3 |
| | | **Total Credits** | **15** | **0** | **10** | **20** |

**IV YEAR II SEMESTER**

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | M241ACS801 | Organizational Behavior | 3 | 0 | 0 | 3 |
| 2 | | Professional Elective - VI | 3 | 0 | 0 | 3 |
| 3 | | Open Elective - III | 3 | 0 | 0 | 3 |
| 4 | | Project Stage - II including Seminar | 0 | 0 | 22 | 11 |
| | | **Total Credits** | **9** | **0** | **22** | **20** |

***MC – Satisfactory/Unsatisfactory**

**#Skill Course - 1 credit with 2 Practical Hours**

**Professional Elective – I**

| | |
|---|---|
| M241ACS511PE | Quantum Computing |
| M241ACS512PE | Advanced Computer Architecture |
| M241ACS513PE | Data Analytics |
| M241ACS514PE | Image Processing |
| M241ACS515PE | Principles of Programming Languages |

**Professional Elective - II**

| | |
|---|---|
| M241ACS521PE | Computer Graphics |
| M241ACS522PE | Embedded Systems |
| M241ACS523PE | Information Retrieval Systems |
| M241ACS524PE | Distributed Databases |
| M241ACS525PE | Natural Language Processing |

**Professional Elective - III**

| | |
|---|---|
| M241ACS631PE | Full Stack Development |
| M241ACS632PE | Internet of Things |
| M241ACS633PE | Scripting Languages |
| M241ACS634PE | Mobile Application Development |
| M241ACS635PE | Software Testing Methodologies |

**# Courses in PE - III and PE - III Lab must be in 1-1 correspondence.**

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**Professional Elective -IV**

| | |
|---|---|
| M241ACS741PE | Graph Theory |
| M241ACS742PE | Cyber Security |
| M241ACS743PE | Soft Computing |
| M241ACS744PE | Cloud Computing |
| M241ACS745PE | Ad hoc & Sensor Networks |

**Professional Elective -V**

| | |
|---|---|
| M241ACS751PE | Advanced Algorithms |
| M241ACS752PE | Agile Methodology |
| M241ACS753PE | Robotic Process Automation |
| M241ACS754PE | Blockchain Technology |
| M241ACS755PE | Software Process & Project Management |

**Professional Elective – VI**

| | |
|---|---|
| M241ACS861PE | Computational Complexity |
| M241ACS862PE | Distributed Systems |
| M241ACS863PE | Deep Learning |
| M241ACS864PE | Human Computer Interaction |
| M241ACS865PE | Cyber Forensics |

**Open Elective -1:**

1. M241ACS611OE: Cyber Security
2. M241ACS612OE: Database Management Systems

**Open Elective -2:**

1. M241ACS721OE: Operating Systems
2. M241ACS722OE: Software Engineering

**Open Elective -3:**

1. M241ACS831OE: Algorithms Design and Analysis
2. M241ACS832OE: Introduction to Computer Networks

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## AUTONOMOUS

**B.Tech. in COMPUTER SCIENCE AND ENGINEERING COURSE STRUCTURE & SYLLABUS**
**(M24 Regulations)**
**Applicable from AY 2024-25 Batch**

**I Year I Semester**

| S. No. | Course Code | Course | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1. | M241ACS101 | Matrices and Calculus | 3 | 1 | 0 | 4 |
| 2. | M241ACS102 | Engineering Chemistry | 3 | 1 | 0 | 4 |
| 3. | M241ACS103 | Programming for Problem Solving | 3 | 0 | 0 | 3 |
| 4. | M241ACS104 | Basic Electrical Engineering | 2 | 0 | 0 | 2 |
| 5. | M241ACS105 | Computer Aided Engineering Graphics | 1 | 0 | 4 | 3 |
| 6. | M241ACS106 | Elements of Computer Science & Engineering | 0 | 0 | 2 | 1 |
| 7. | M241ACS107 | Engineering Chemistry Laboratory | 0 | 0 | 2 | 1 |
| 8. | M241ACS108 | Programming for Problem Solving Laboratory | 0 | 0 | 2 | 1 |
| 9. | M241ACS109 | Basic Electrical Engineering Laboratory | 0 | 0 | 2 | 1 |
| | | Induction Program | | | | |
| | | **Total** | **12** | **2** | **12** | **20** |

**I Year II Semester**

| S. No. | Course Code | Course | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1. | M241ACS201 | Ordinary Differential Equations and Vector Calculus | 3 | 1 | 0 | 4 |
| 2. | M241ACS202 | Applied Physics | 3 | 1 | 0 | 4 |
| 3. | M241ACS203 | Engineering Workshop | 0 | 1 | 3 | 2.5 |
| 4. | M241ACS204 | English for Skill Enhancement | 2 | 0 | 0 | 2 |
| 5. | M241ACS205 | Electronic Devices and Circuits | 2 | 0 | 0 | 2 |
| 6. | M241ACS206 | Python Programming Laboratory | 0 | 1 | 2 | 2 |
| 7. | M241ACS207 | Applied Physics Laboratory | 0 | 0 | 3 | 1.5 |
| 8. | M241ACS208 | English Language and Communication Skills Laboratory | 0 | 0 | 2 | 1 |
| 9. | M241ACS209 | IT Workshop | 0 | 0 | 2 | 1 |
| 10. | *M241ACS210 | Environmental Science | 3 | 0 | 0 | 0 |
| | | **Total** | **13** | **4** | **12** | **20** |

## M241ACS101: MATRICES AND CALCULUS

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

**Pre-requisites:** Mathematical Knowledge at pre-university level

**Course Objectives:** To learn

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solvingthe system of linear equations.
- Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.
- Evaluation of multiple integrals and their applications

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

- Write the matrix representation of a set of linear equations and to analyse the solution of thesystem of equations
- Find the Eigenvalues and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Solve the applications on the mean value theorems.
- Evaluate the improper integrals using Beta and Gamma functions
- Find the extreme values of functions of two variables with/ without constraints.
- Evaluate the multiple integrals and apply the concept to find areas, volumes

**UNIT - I: Matrices** **10 L**

Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordanmethod, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

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

Linear Transformation and Orthogonal Transformation: Eigenvalues, Eigenvectors and their properties, 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 ofQuadratic form to canonical forms by Orthogonal Transformation.

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

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.

Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

**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 and three variables using method of Lagrange multipliers.

**UNIT-V: Multivariable Calculus (Integration) 8 L**

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and(Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.
Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

**TEXT BOOKS:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications,5th Editon, 2016.

**REFERENCE BOOKS:**

1. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition,Pearson, Reprint,2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2008.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and CompanyLimited, New Delhi.

## M241ACS102: ENGINEERING CHEMISTRY

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

**Course Objectives:**

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skillsrequired to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of batterychemistry, significance of corrosion it's control to protect the structures.
3. To imbibe the basic concepts of petroleum and its products.
4. To acquire required knowledge about engineering materials like cement, smart materials andLubricants.

**Course Outcomes:**

1. Students will acquire the basic knowledge of electrochemical procedures related to corrosionand its control.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They can learn the fundamentals and general properties of polymers and other engineering materials.
4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

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

Introduction to hardness of water — Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation- Determination of $F^-$ ion by ion- selective electrode method.

Boiler troubles: Sludges, Scales 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 water — Reverse osmosis.

**UNIT – II Battery Chemistry & Corrosion** [8]

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

**Corrosion:** Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods.

**UNIT - III: Polymeric materials: [8]**

Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples — Nylon 6:6, Terylene **Plastics:** Definition and characteristics- thermoplastic and thermosetting plastics, Preparation,Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP). **Rubbers:** Natural rubber and its vulcanization.

**Elastomers:** Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokolrubber.

**Conducting polymers:** Characteristics and Classification with examples-mechanism of conduction intrans-polyacetylene and applications of conducting polymers.

**Biodegradable polymers:** Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

**UNIT - IV: Energy Sources: [8]**

Introduction, Calorific value of fuel – HCV, LCV- Dulongs formula. Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Transesterification, advantages.

**UNIT - V**: **Engineering Materials: [8]**

**Cement:** Portland cement, its composition, setting and hardening.

**Smart materials and their engineering applications**

Shape memory materials- Poly L- Lactic acid. Thermoresponse materials- Polyacryl amides, Poly vinylamides

**Lubricants:** Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point,pour point, flash point and fire point.

**TEXT BOOKS:**

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning,2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K.Shashikala, Pearson Publications, 2021.
4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

**REFERENCE BOOKS:**

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

## M241ACS103: PROGRAMMING FOR PROBLEM SOLVING

**B.Tech. I Year I Sem.**

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

**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: Introduction to Programming**

Compilers, compiling and executing a program.

Representation of Algorithm - Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number Flowchart/Pseudocode withexamples, Program design and structured programming

**Introduction to C Programming Language:** variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOToperators

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

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

**UNIT - II: Arrays, Strings, Structures and Pointers:**

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays Strings: Introduction to strings, handling strings as array of characters, basic string functions availablein C (strlen, strcat, strcpy, strstr etc.), arrays of strings

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

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

**UNIT - III: Preprocessor and File handling in C:**

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

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

**UNIT - IV: Function and Dynamic Memory Allocation:**

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

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays ofdifferent data types

**UNIT - V: 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), Basic concept of order of complexity through the example programs

**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, (3rdEdition)

**REFERENCE BOOKS:**

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall ofIndia
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

## M241ACS104: BASIC ELECTRICAL ENGINEERING

**B.Tech. I Year I Sem.**

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

**Prerequisites**: Mathematics

**Course Objectives:**

- To understand DC and Single & Three phase AC circuits
- To study and understand the different types of DC, AC machines and Transformers.
- To import the knowledge of various electrical installations and the concept of power, powerfactor and its improvement.

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

- Understand and analyze basic Electrical circuits
- Study the working principles of Electrical Machines and Transformers
- Introduce components of Low Voltage Electrical Installations.

| Course Objectives | Program Outcomes | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| To understand DC and Single & Three phase AC circuits. | 3 | 2 | 1 | | 2 | 0 | 0 | 1 | 2 | 0 | 1 | 2 |
| To study and understand the different types of DC, AC machinesand Transformers. | 3 | 2 | 1 | 1 | 3 | 0 | 0 | 0 | 2 | 0 | 1 | 1 |
| To import the knowledge of various electrical installations and the concept of power, power factor and its improvement. | 3 | 2 | 0 | | 3 | 0 | 0 | 0 | 1 | 2 | 1 | 1 |

| Course Outcomes | Program Outcomes | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| Understand andanalyse basic Electrical circuits | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| Study the working principles of Electrical Machines and Transformers | 3 | 2 | 1 | 0 | 3 | 1 | 0 | 1 | 1 | 2 | 1 | 2 |
| Introduce components ofLow Voltage Electrical Installations. | 3 | 2 | 1 | 1 | 3 | 2 | 0 | 0 | 1 | 0 | 2 | 2 |

**UNIT-I:**

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

**UNIT-II:**

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

**UNIT-III:**

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

**UNIT-IV:**

**Electrical Machines:** Construction and working principle of dc machine, performance characteristics of dc shunt machine. Generation of rotating magnetic field, Construction and working of a three-phase induction motor, Significance of torque-slip characteristics. Single-phase induction motor, Constructionand working. Construction and working of synchronous generator.

**UNIT-V:**

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

**TEXT BOOKS:**

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition,2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition,2008.

**REFERENCE BOOKS:**

1. P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, "Basic Electrical Engineering", S. Chand,2nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989

## M241ACS105: COMPUTER AIDED ENGINEERING GRAPHICS

**B.Tech. I Year I Sem.**

| L | T | P | C |
|---|---|---|---|
| 1 | 0 | 4 | 3 |

**Course Objectives:**

- To develop the ability of visualization of different objects through technical drawings
- To acquire computer drafting skill for communication of concepts, ideas in the design ofengineering products

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

- Apply computer aided drafting tools to create 2D and 3D objects
- sketch conics and different types of solids
- Appreciate the need of Sectional views of solids and Development of surfaces of solids
- Read and interpret engineering drawings
- Conversion of orthographic projection into isometric view and vice versa manually and by usingcomputer aided drafting

**UNIT – I:**

**Introduction to Engineering Graphics:** Principles of Engineering Graphics and their Significance, Scales – Plain & Diagonal, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Introduction to Computer aided drafting – views, commands and conics

**UNIT- II:**

**Orthographic Projections:** Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes. Computer aided orthographic projections – points, lines and planes

**UNIT – III:**

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views, Computer aided projections of solids – sectionalviews

**UNIT – IV:**

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Development of surfaces using computer aided drafting

**UNIT – V:**

**Isometric Projections:** Principles of Isometric Projection — Isometric Scale — Isometric Views — Conventions — Isometric Views of Lines, Plane Figures, Simple and Compound Solids — Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions. Conversion of orthographic projection into isometric view using computer aided drafting.

**TEXT BOOKS:**

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing and graphics Using AutoCAD Third Edition, T. Jeyapoovan, Vikas: S.Chand and company Ltd.

**REFERENCE BOOKS:**

1. Engineering Drawing, Basant Agrawal and C M Agrawal, Third Edition McGraw Hill
2. Engineering Graphics and Design, WILEY, Edition 2020
3. Engineering Drawing, M. B. Shah, B.C. Rane / Pearson.
4. Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford
5. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

**Note:** - External examination is conducted in conventional mode and internal evaluation to be done byboth conventional as well as using computer aided drafting.

## M241ACS106: ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING

**B.Tech. I Year I Sem.**

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

**Course Objective:** To provide an overview of the subjects of computer science and engineering.

**Course Outcomes:**

1. Know the working principles of functional units of a basic Computer
2. Understand program development, the use of data structures and algorithms in problem solving.
3. Know the need and types of operating system, database systems.
4. Understand the significance of networks, internet, WWW and cyber security.
5. Understand Autonomous systems, the application of artificial intelligence.

**UNIT – I**

**Basics of a Computer** – Hardware, Software, Generations of computers. Hardware - functional units, Components of CPU, Memory — hierarchy, types of memory, Input and output devices. Software —systems software, application software, packages, frameworks, IDEs.

**UNIT – II**

**Software development** – waterfall model, Agile, Types of computer languages – Programming, markup, scripting Program Development – steps in program development, flowcharts, algorithms, datastructures – definition, types of data structures

**UNIT – III**

**Operating systems:** Functions of operating systems, types of operating systems, Device & Resource management

**Database Management Systems**: Data models, RDBMS, SQL, Database Transactions, data centers, cloud services

**UNIT – IV**

**Computer Networks:** Advantages of computer networks, LAN, WAN, MAN, internet, WiFi, sensornetworks, vehicular networks, 5G communication.

World Wide Web – Basics, role of HTML, CSS, XML, Tools for web designing, Social media, Onlinesocial networks.

Security – information security, cyber security, cyber laws

**UNIT – V**

**Autonomous Systems:** IoT, Robotics, Drones, Artificial Intelligence – Learning, Game Development, natural language processing, image and video processing.

Cloud Basics

**TEXT BOOK:**

1. Invitation to Computer Science, G. Michael Schneider, Macalester College, Judith L. GerstingUniversity of Hawaii, Hilo, Contributing author: Keith Miller University of Illinois, Springfield.

**REFERENCE BOOKS:**

1. Fundamentals of Computers, Reema Thareja, Oxford Higher Education, Oxford University Press.
2. Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill.
3. Computer Fundamentals, Anita Goel, Pearson Education India, 2010.
4. Elements of computer science, Cengage.

## M241ACS107: ENGINEERING CHEMISTRY LABORATORY

**B.Tech. I Year I Sem.**

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

**Course Objectives:** The course consists of experiments related to the principles of chemistry requiredfor engineering student. The student will learn:

- Estimation of hardness of water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
- Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory.
- Students will learn skills related to the lubricant properties such as saponification value, surfacetension and viscosity of oils.

**Course Outcomes:** The experiments will make the student gain skills on:

- Determination of parameters like hardness of water and rate of corrosion of mild steel in variousconditions.
- Able to perform methods such as conductometry, potentiometry and pH metry in order to findout the concentrations or equivalence points of acids and bases.
- Students are able to prepare polymers like bakelite and nylon-6.
- Estimations saponification value, surface tension and viscosity of lubricant oils.

**List of Experiments:**

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

**II. Conductometry:** Estimation of the concentration of an acid by Conductometry.

**III. Potentiometry:** Estimation of the amount of $Fe^{+2}$ by Potentiomentry.

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

**V. Preparations:**

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

**VI. Lubricants:**

1. Estimation of acid value of given lubricant oil.
2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.

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

**VIII. Virtual lab experiments**

1. Construction of Fuel cell and its 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).

## M241ACS108: PROGRAMMING FOR PROBLEM SOLVING LABORATORY

| 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 likeoperators, 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:**

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

**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 declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction.Read percentage from standard input.
d. Write a program that prints a multiplication table for a given number and the number of rows inthe table. For example, for a number 5 and rows = 3, the output should be:
e. 5 x 1 = 5
f. 5 x 2 = 10
g. 5 x 3 = 15
h. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

**Expression Evaluation:**

a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula s = ut+(1/2)at^2 where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).
b. 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)
c. Write a program that finds if a given number is a prime number
d. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
e. 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.
f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
g. Write a C program to find the roots of a Quadratic equation.
h. Write a C program to calculate the following, where x is a fractional value.i. 1-x/2 +x^2/4-x^3/6
j. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: 1+x+x^2+x^3+.....+x^n. For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

**Arrays, Pointers and Functions:**

a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a function to compute mean, variance, Standard Deviation, sorting of n elements in asingle dimension array.
c. Write a C program that uses functions to perform the following:
d. Addition of Two Matrices
e. Multiplication of Two Matrices
f. Transpose of a matrix with memory dynamically allocated for the new matrix as row and columncounts may not be the same.
g. Write C programs that use both recursive and non-recursive functions
h. To find the factorial of a given integer.
i. To find the GCD (greatest common divisor) of two given integers.
j. To find x^n
k. Write a program for reading elements using a pointer into an array and display the values usingthe array.
l. Write a program for display values reverse order from an array using a pointer.
m. Write a program through a pointer variable to sum of n elements from an array.

**Files:**

a. Write a C program to display the contents of a file to standard output device.
b. Write a C program which copies one file to another, replacing all lowercase characters withtheir uppercase equivalents.
c. Write a C program to count the number of times a character occurs in a text file. The file nameand the character are supplied as command line arguments.
d. Write a C program that does the following:
It should first create a binary file and store 10 integers, where the file name and 10 values aregiven in the command line. (hint: convert the strings using atoi function)
Now the program asks for an index and a value from the user and the value at that index shouldbe changed to the new value in the file. (hint: use fseek function)
The program should then read all 10 values and print them back.

e. Write a C program to merge two files into a third file (i.e., the contents of the first file followedby those of the second are put in the third file).

**Strings:**

a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
c. Write a C program that uses functions to perform the following operations:
d. To insert a sub-string into a given main string from a given position.
e. To delete n Characters from a given position in a given string.
f. 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.)
g. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't contain ch.
h. Write a C program to count the lines, words and characters in a given text.

**Miscellaneous:**

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

b. Write a C program to construct a pyramid of numbers as follows:

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

**Sorting and Searching:**

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

**REFERENCE BOOKS:**

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI
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

## M241ACS109: BASIC ELECTRICAL ENGINEERING LABORATORY

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

**0 0 2 1**

**Prerequisites**: Basic Electrical Engineering

**Course Objectives:**

- To measure the electrical parameters for different types of DC and AC circuits usingconventional and theorems approach.
- To study the transient response of various R, L and C circuits using different excitations.
- To determine the performance of different types of DC, AC machines and Transformers.

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

- Verify the basic Electrical circuits through different experiments.
- Evaluate the performance calculations of Electrical Machines and Transformers throughvarious testing methods.
- Analyze the transient responses of R, L and C circuits for different input conditions.

| Course Objectives | Program Outcomes | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| To measure the electrical parameters for different types of DC and AC circuits using conventionaland theorems approach | 3 | 2 | 1 | | 2 | 0 | 0 | 1 | 2 | 0 | 1 | 2 |
| To study the transient responseof various R, L andC circuits using different excitations | 3 | 2 | 1 | 1 | 3 | 0 | 0 | 0 | 2 | 0 | 1 | 1 |
| To determine the performance of different types of DC, AC machines and Transformers | 3 | 2 | 0 | | 3 | 0 | 0 | 0 | 1 | 2 | 1 | 1 |

| Course Outcomes | Program Outcomes | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| Verify the basic Electrical circuits through different experiments | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods | 3 | 2 | 1 | 0 | 3 | 1 | 0 | 1 | 1 | 2 | 1 | 2 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyse the transient responses of R, L and C circuits for different input conditions | 3 | 2 | 1 | 1 | 3 | 2 | 0 | 0 | 1 | 0 | 2 | 2 |

**List of experiments/demonstrations:**

**PART- A (compulsory)**

1. Verification of KVL and KCL
2. Verification of Thevenin's and Norton's theorem
3. Transient Response of Series RL and RC circuits for DC excitation
4. Resonance in series RLC circuit
5. Calculations and Verification of Impedance and Current of RL, RC and RLC seriescircuits
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of aSingle-Phase Transformer
7. Performance Characteristics of a DC Shunt Motor
8. Torque-Speed Characteristics of a Three- phase Induction Motor.

**PART-B (any two experiments from the given list)**

1. Verification of Superposition theorem.
2. Three Phase Transformer: Verification of Relationship between Voltages and Currents(Star-Delta, Delta-Delta, Delta-star, Star-Star)
3. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
4. Measurement of Active and Reactive Power in a balanced Three-phase circuit
5. No-Load Characteristics of a Three-phase Alternator

**TEXT BOOKS:**

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition,2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition,2008.

**REFERENCE BOOKS:**

1. P. Ramana, M. Suryakalavathi, G.T.Chandrasheker,"Basic Electrical Engineering", S. Chand,2nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1stEdition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic ElectricalEngineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

# MOTHER TERESA INSTITUTE OF SCIENCE AND TECHNOLOGY
## AUTONOMOUS

**B.Tech. in COMPUTER SCIENCE AND ENGINEERING COURSE STRUCTURE & SYLLABUS**

**(M24 Regulation)**

**II YEAR I SEMESTER**

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | M241ACS301 | Digital Electronics | 3 | 0 | 0 | 3 |
| 2 | M241ACS302 | Advanced Data Structures | 3 | 0 | 0 | 3 |
| 3 | M241ACS303 | Computer Oriented Statistical Methods | 3 | 1 | 0 | 4 |
| 4 | M241ACS304 | Computer Organization and Architecture | 3 | 0 | 0 | 3 |
| 5 | M241ACS305 | Object Oriented Programming through Java | 3 | 0 | 0 | 3 |
| 6 | M241ACS306 | Advanced Data Structures Lab | 0 | 0 | 3 | 1.5 |
| 7 | M241ACS307 | Object Oriented Programming through Java Lab | 0 | 0 | 3 | 1.5 |
| 8 | M241ACS308 | Data visualization- R Programming/ Power BI | 0 | 0 | 2 | 1 |
| 9 | *M241ACS309 | Gender Sensitization Lab | 0 | 0 | 2 | 0 |
| | | **Total** | **15** | **1** | **10** | **20** |

**II YEAR II SEMESTER**

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | M241ACS401 | Discrete Structures & Graph Theory | 3 | 0 | 0 | 3 |
| 2 | M241ACS402 | Business Economics & Financial Analysis | 3 | 0 | 0 | 3 |
| 3 | M241ACS403 | Operating Systems | 3 | 0 | 0 | 3 |
| 4 | M241ACS404 | Database Management Systems | 3 | 0 | 0 | 3 |
| 5 | M241ACS405 | Software Engineering | 3 | 0 | 0 | 3 |
| 6 | M241ACS406 | Operating Systems Lab | 0 | 0 | 2 | 1 |
| 7 | M241ACS407 | Database Management Systems Lab | 0 | 0 | 2 | 1 |
| 8 | M241ACS408 | Real-time Research Project/ Societal Related Project | 0 | 0 | 4 | 2 |
| 9 | M241ACS409 | Node JS/ React JS/ Django | 0 | 0 | 2 | 1 |
| 10 | *M241ACS410 | Constitution of India | 3 | 0 | 0 | 0 |
| | | **Total** | **18** | **0** | **10** | **20** |

L - Lecture T - Tutorial P - Practical D - Drawing CH - Contact Hours/Week C - Credits
SE - Sessional Examination CA - Class Assessment ELA - Experiential Learning Assessment
SEE - Semester End Examination D-D - Day to Day Evaluation LR - Lab Record CP - Course Project
PE - Practical Examination

**BOARD OF STUDIES MEMBERS**

| S.NO | Name of the Member | Signature | S.No | Name of the Member | Signature |
|---|---|---|---|---|---|
| 1 | Dr.J. UJWALA REKHA | | 5 | Mr.P.MARESWARA RAO | |
| 2 | Dr.KONERU SUWARNA VANI | | 6 | Mrs.M. REVATHI | |
| 3 | Dr.A.VISHNUVARDHAN REDDY | | 7 | Mr.CH RAJA JACOB | |
| 4 | Mr.SURENDRA VARMA | | 8 | Mrs. K.NIRUSHA | |

**M241ACS301: DIGITAL ELECTRONICS** **L T P C**

**3 0 0 3**

**B.Tech. II Year I Sem.**

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 3 | 0/0 | 3 |

| EVALUATION SCHEME | | | | |
|---|---|---|---|---|
| SE | CA | ELA | SEE | TOTAL |
| 30 | 5 | 5 | 60 | 100 |

**Course Objectives:** This course aims at through understanding of binary number system, logic gates, combination logic and synchronous and asynchronous logic.

**COURSE OUTCOMES**

**C0-1** under stand the knoweledge on Boolean algebra and logic gates

**C0-2:**apply the concepts of Boolean algebra to minimize the digital systems **C0-3:**design combinational circuit for various digital applications

**C0-4** analyze and design sequential circuits for digital applications **C0-5:** acquire the knowledge on semiconductor memories

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | **PROGRAM OUTCOMES(PO)** | | | | | | | | | | | **PROGRAM SPECIC OUTCOMES (PS0)** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PSO1** | **PSO2** | **PSO3** |
| **CO1** | 3 | 3 | 3 | 2 | 2 | | | | | | | 2 | | 2 |
| **CO2** | 3 | 3 | 3 | 2 | 2 | | | | | | | 2 | | 2 |
| **CO3** | 3 | 3 | 3 | 2 | 2 | | | | | | | 2 | | 2 |
| **CO4** | 3 | 3 | 3 | 2 | 2 | | | | | | | 2 | | 2 |
| **CO5** | 3 | 3 | 3 | 2 | 2 | | | | | | | 3 | | 3 |

**UNIT - I:**

**BOOLEAN ALGEBRA AND LOGIC GATES:** Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.

Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, Digital logic gates.

**UNIT - II:**

**GATE – LEVEL MINIMIZATION:** The map method, Four-variable map, Five-Variable map, product of sums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive - Or function.

**UNIT - III:**

**COMBINATIONAL LOGIC:** Combinational Circuits, Analysis procedure Design procedure, Binary Adder-Subtractor Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

**UNIT - IV:**

**SEQUENTIAL LOGIC:** Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, state Reduction and Assignment, Design Procedure**.** Registers, shift Registers, Ripple counters, synchronous counters, other counters.

**UNIT - V**

**MEMORIES AND ASYNCHRONOUS SEQUENTIAL LOGIC:** Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array programmable Array logic, Sequential Programmable Devices.

Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and Flow Tables, Race-Free state Assignment Hazards, Design Example.

**TEXT BOOKS:**

1. Digital Design – Third Edition, M. Morris Mano, Pearson Education/PHI.
2. Digital Principles and Applications Albert Paul Malvino Donald P. Leach TATA McGraw Hill Edition.
3. Fundamentals of Logic Design, Roth, 5th Edition, Thomson.

**REFERENCE BOOKS:**

1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2. Switching and Logic Design, C.V.S. Rao, Pearson Education
3. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
4. Fundamentals of Digital Logic and Microcomputer Design, 5TH Edition, M. Rafiquzzaman John Wiley.

## M241ACS302: ADVANCED DATA STRUCTURES

**B.Tech. II Year I Sem.**

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

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 3 | 0/0 | 3 |

| EVALUATION SCHEME | | | | |
|---|---|---|---|---|
| SE | CA | ELA | SEE | TOTAL |
| 30 | 5 | 5 | 60 | 100 |

**Prerequisites:** 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**

**CO-1:** Ability to select the data structures that efficiently model the information in a problem.

**CO-2 :** Ability to assess efficiency trade-offs among different data structure implementations or com binations.

**CO-3** Implement and know the application of algorithms for sorting and pattern matching.

**C0-4** Design programs using a variety of data structures, including hash tables, binary and generaltree structures, search trees, tries, heaps, graphs, and AVL-trees.

**CO:5**: Explain the advanced Data Structures Pattern matching Algoritham.

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 2 | 3 | 2 | 1 | | | | 1 | 1 | 1 | | | 2 | 1 |
| CO2 | 3 | 2 | 2 | 2 | 1 | | | | 1 | 1 | 1 | | | 2 | 1 |
| CO3 | 3 | 2 | 3 | 2 | 1 | | | | 1 | 1 | 1 | | | 2 | 1 |
| CO4 | 3 | 2 | 2 | 2 | 1 | | | | 1 | 1 | 1 | | | 2 | 1 |
| CO5 | 3 | 2 | 2 | 2 | 1 | | | | 1 | 1 | 1 | | | 2 | 1 |

**UNIT - I**

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks- Operations, array and linked representations of stacks, stack applications, Queues- operations, array and linked representations.

**UNIT - II**

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.

Hash Table Representation: hash functions, collision resolution -separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

**UNIT - III**

Search Trees: Binary Search Trees, Definition, Implementation, Operations - Searching, Insertion and Deletion, B- Trees, B+ Trees, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red -Black, Splay Trees.

**UNIT – IV**

Sorting Techniques: Quick Sort, Heap Sort, Merge Sort

Graphs Algorithms Elementary Graph Algorithms: Topological sort, Single Source Shortest Path Algorithms: Dijkstra's, Bellman-Ford, All-Pairs Shortest Paths: Floyd-Warshall's Algorithm.

**UNIT – V**

Pattern Matching and Tries: Pattern matching algorithms -Brute force, the Boyer -Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

**TEXT BOOKS:**

1. Fundamentals of Data Structures in C, 2 nd 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, 2 nd Edition, R. F. Gilberg and B.A.Forouzan, Cengage Learning.

**B.Tech. II Year I Sem.**

**M241ACS303: COMPUTER ORIENTED STATISTICAL METHODS**

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 3 | 1/0 | 4 |

| EVALUATION SCHEME | | | | |
|---|---|---|---|---|
| SE | CA | ELA | SEE | TOTAL |
| 30 | 5 | 5 | 60 | 100 |

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

**COURSE PRE-REQUISITES**: Mathematics courses of first year of study

**COURSE OBJECTIVES**:

- The theory of Probability, Probability distributions of single and multiple random variables
- The sampling theory, testing of hypothesis and making statistical inferences
- Stochastic process and Markov chains.

**COURSE OUTCOMES**:

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

CO-1 Apply the concepts of probability and distributions to case studies.

CO-2Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.

CO-3Apply concept of estimation and testing of hypothesis to case studies.

CO-4:Correlate the concepts of one unit to the concepts in other units

CO-5: Model the linear relationship between the explanatory (independent) Variables and response(dependent)variables

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 2 | 1 | 1 | 1 | | | | | | | 1 | 1 | 1 |
| CO2 | 3 | 3 | 2 | 2 | 2 | | | | | | | 1 | 1 | 1 |
| CO3 | 3 | 2 | 1 | 1 | | | | | | | | 2 | 1 | 1 |
| CO4 | 3 | 3 | 2 | 2 | 2 | | | | | | | 2 | 1 | 1 |
| CO5 | 3 | 2 | | | | | | | | | | 1 | 1 | 1 |

**UNIT - I: Probability** **10 L**

Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Baye's Rule,

**Random Variables and Probability Distributions:** Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions.

**UNIT - II: Expectation and discrete distributions** **10 L**

Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.

**Discrete Probability Distributions:** Binomial Distribution, Poisson distribution.

**UNIT - III: Continuous and Sampling Distributions** **10 L**

Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions.

**Fundamental Sampling Distributions:** Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, t - Distribution, F-Distribution.

**UNIT - IV: Sample Estimation & Tests of Hypotheses 10 L**

Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the mean, standard error of a point estimate, prediction interval. Two sample: Estimating the difference between two means, Single sample: Estimating a proportion, Two samples: Estimating the difference between two proportions, Two samples: Estimating the ratio of two variances.

Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests concerning a single mean, Two samples: tests on two means, One sample: test on a single proportion. Two samples: tests on two proportions, Two- sample tests concerning variances.

**UNIT-V: Stochastic Processes and Markov Chains 8L**

Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n-step transition probabilities, Markov chain, Steady state condition, Markov analysis.

**TEXT BOOKS:**

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics For Engineers & Scientists, 9th Ed. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
3. S.D.Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi.

**REFERENCE BOOKS:**

1. T.T. Soong, Fundamentals of Probability and Statistics For Engineers, John Wiley & Sons, Ltd, 2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press.

**Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations**

## M241ACS304: COMPUTER ORGANIZATION AND ARCHITECTURE

**B.Tech. II Year I Sem.**

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 3 | 0/0 | 3 |

| EVALUATION SCHEME | | | | |
|---|---|---|---|---|
| SE | CA | ELA | SEE | TOTAL |
| 30 | 5 | 5 | 60 | 100 |

**L T P C**

**3 0 0 3**

**Co-requisite:** A Course on "Digital Electronics".

**Course Objectives**

- The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
- It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
- Topics include computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors

**Course Outcomes**

**CO-1** Understand the basics of instruction sets and their impact on processor design.

**CO-2 :** Demonstrate an understanding of the design of the functional units of a digital computer system.

**CO-3** Evaluate cost performance and design trade-offs in designing and constructing a computerprocessor including memory.

**CO-4:** Design a pipeline for consistent execution of instructions with minimum hazards.

**CO-5:** Recognize and manipulate representations of numbers stored in digital computers

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 2 | 3 | | | | 2 | | | | | | 1 | 2 | 3 |
| CO2 | 2 | 3 | 2 | 3 | 2 | 2 | | | | | 2 | 1 | 3 | 3 |
| CO3 | 3 | 3 | | 3 | | | | | | | | 1 | 3 | 3 |
| CO4 | 2 | 3 | | 2 | 3 | 2 | 2 | | | | | 1 | 2 | 3 |
| CO5 | 2 | 3 | | 2 | 3 | 2 | 2 | | | | 3 | 1 | 3 | 3 |

**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 micro operations, 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**

Microprogrammed 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, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence.

**TEXT BOOK:**

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

**REFERENCE BOOKS:**

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

## M241ACS305: OBJECT ORIENTED PROGRAMMING THROUGH JAVA

**B.Tech. II Year I Sem.**

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

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 3 | 0/0 | 3 |

| EVALUATION SCHEME | | | | |
|---|---|---|---|---|
| SE | CA | ELA | SEE | TOTAL |
| 30 | 5 | 5 | 60 | 100 |

**Course Objectives**

- To Understand the basic object-oriented programming concepts and apply them in problem solving.
- To Illustrate inheritance concepts for reusing the program.
- To Demonstrate multitasking by using multiple threads and event handling
- To Develop data-centric applications using JDBC.
- To Understand the basics of java console and GUI based programming

**Course Outcomes**

**CO-1** :Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection.
**CO-2**: Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords
**CO-3** : Use multithreading concepts to develop inter process communication.
**CO-4** :Understand the process of graphical user interface design and implementation using AWT or swings.
**CO-5:** Develop applets that interact abundantly with the client environment and deploy on the server.

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | | 1 | 3 | 2 | 1 |
| CO2 | 3 | 2 | 2 | 2 | 2 | | | 2 | 1 | 1 | 1 | 2 | 1 | 2 |
| CO3 | 3 | 2 | 3 | 2 | 2 | | | | | | | 2 | 2 | 2 |
| CO4 | 3 | 3 | 2 | 2 | 2 | 2 | | 1 | 1 | 1 | | 3 | 2 | 1 |
| CO5 | 3 | 3 | 2 | 2 | 3 | | 2 | 1 | | | 1 | 3 | 2 | 2 |

**UNIT - I**

Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world - Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and lifetime of variables, arrays, operators, expressions, control statements, type conversion and casting, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, nested and inner classes, exploring string class.

**UNIT - II**

Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.using final with inheritance, polymorphism- method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences betweenL

classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

**UNIT - III**

Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception subclasses. String handling, Exploring java.util. Differences between multithreading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication, thread groups, daemon threads. Enumerations, autoboxing, annotations, generics.

**UNIT - IV**

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, checkbox groups, choices,lists panels - scrollpane, dialogs, menubar, graphics, layout manager - layout manager types - border,grid, flow, card and grid bag.

**UNIT - V**

Applets - Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Swing - Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons - The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

**TEXT BOOKS:**

1. Java the complete reference, 7th edition, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson education.

**REFERENCE BOOKS:**

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2. An Introduction to OOP, third edition, T. Budd, Pearson education.
3. Introduction to Java programming, Y. Daniel Liang, Pearson education.
4. An introduction to Java programming and object-oriented application development, R.A. Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S. Horstmann and Gary Cornell, eighth Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S. Horstmann and Gary Cornell, eighth Edition, Pearson Education
7. Object Oriented Programming with Java, R.Buyya, S.T.Selvi, X.Chu, TMH.
8. Java and Object Orientation, an introduction, John Hunt, second edition, Springer. 9. Maurach's Beginning Java2 JDK 5, SPD.

## M241ACS306: ADVANCED DATA STRUCTURES LAB

**B.Tech. II Year I Sem.**

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 0 | 0/3 | 1.5 |

| EVALUATION SCHEME | | | | | |
|---|---|---|---|---|---|
| D-D | PE | LR | CP | SEE | TOTAL |
| 10 | 10 | 10 | 10 | 60 | 100 |

**L T P C**

**0 0 3 1.5**

**Prerequisites:** 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:**

**CO.-1:**Ability to develop C programs for computing and real-life applications using basic elements likecontrol statements, arrays, functions, pointers and strings,
**CO-2:**Ability to Implement searching and sorting algorithms
**CO-**3:Implement linear data structures such as Stacks and Queues using array and linked-list representations.
**CO-**4: Implement non linear data structures such as trees and graphs.
**CO-5:** implement data structures like stacks, queues and linked lists.

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 1 | 2 | 1 | 2 | 1 | | | | 1 | 1 | 1 | 2 | 2 | 1 |
| CO2 | 2 | 2 | 1 | 2 | 1 | | | | 1 | 1 | 1 | 1 | 2 | 1 |
| CO3 | 2 | 2 | 1 | 2 | 1 | | | | 1 | 1 | 1 | 1 | 2 | 1 |
| CO4 | 2 | 2 | 1 | 2 | 1 | | | | 1 | 1 | 1 | 1 | 2 | 1 |
| CO5 | 2 | 2 | 2 | 2 | 1 | | | | 1 | 2 | 1 | 1 | 2 | 1 |

**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) Pointers
5. Write a program that implement Queue (its operations) using
   i) Arrays ii) Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers

in ascending order
i) Quick sort ii) Heap sort iii) Merge 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 v) Red - Black trees
9. Write a program to implement the graph traversal methods.
10. Implement a Pattern matching algorithms using Boyer- Moore, Knuth-Morris-Pratt

**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.

## M241ACS307: OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

**B.Tech. II Year I Sem.**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 0 | 0/3 | 1.5 |

| EVALUATION SCHEME | | | | | |
|---|---|---|---|---|---|
| D-D | PE | LR | CP | SEE | TOTAL |
| 10 | 10 | 10 | 10 | 60 | 100 |

**Course Objectives:**

- To write programs using abstract classes.
- To write programs for solving real world problems using the java collection framework.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands-on experience with java programming.

**Course Outcomes:**

**CO-1**: Able to write programs for solving real world problems using the java collection framework.
**CO-2**: Able to write programs using abstract classes.
**CO-3** :Able to write multithreaded programs.
**CO-4:** Able to write GUI programs using swing controls in Java.
**CO-5**: Develop java application connect database using JDBC

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 3 | 2 | 3 | | 2 | | | 2 | | 1 | 3 | 3 | 2 |
| CO2 | 3 | 2 | 3 | 2 | | | | | 2 | 1 | | 3 | 3 | 2 |
| CO3 | 3 | 3 | 2 | 3 | | | | | 2 | | 2 | 2 | 2 | 2 |
| CO4 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | | 2 | 1 | 2 | 3 | 3 | 2 |
| CO5 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 2 | 1 | 1 | 3 | 3 | 3 |

Note:

1. Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the use of the Eclipse platform.

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

**List of Experiments:**

1. Use Eclipse or Net bean platform and acquaint yourself with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

3. A) Develop an applet in Java that displays a simple message.

B) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

4. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.

6. Write a Java program for the following:
Create a doubly linked list of elements.

Delete a given element from the above list.
Display the contents of the list after deletion.

7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in the selected color. Initially, there is no message shown.

8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas.
Write a java program to display the table using Labels in Grid Layout.

10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

12. Write a Java program that correctly implements the producer – consumer problem using the concept of inter thread communication.

13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.

**REFERENCE BOOKS:**

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education.
2. Thinking in Java, Bruce Eckel, Pearson Education.
3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson.

**M241ACS308: DATA VISUALIZATION - R PROGRAMMING/ POWER BI**

**B.Tech. II Year I Sem.**

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

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 0 | 0/2 | 1 |

| EVALUATION SCHEME | | | | | |
|---|---|---|---|---|---|
| D-D | PE | LR | CP | SEE | TOTAL |
| 10 | 10 | 10 | 10 | 60 | 100 |

**Course Objectives:**

- 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:** At the end of the course a student should be able to

**CO-1:**Understand How to import data into Tableau.

**CO-2 :**Understand Tableau concepts of Dimensions and Measures.

**CO-3:**Develop Programs and understand how to map Visual Layouts and Graphical Properties.

**CO-4:**Create a Dashboard that links multiple visualizations.

**CO-:5 :**Use graphical user interfaces to create Frames for providing solutions to real world problems.

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | **PROGRAM OUTCOMES(PO)** | | | | | | | | | | | **PROGRAM SPECIC OUTCOMES (PS0)** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PSO1** | **PSO2** | **PSO3** |
| **CO1** | 2 | 2 | 2 | 3 | 3 | | | | | | | 3 | 2 | |
| **CO2** | 1 | 1 | 2 | 2 | 3 | | | | | | | 2 | 2 | |
| **CO3** | 2 | 2 | 1 | 1 | 3 | | | | | | 1 | 3 | 2 | 2 |
| **CO4** | 2 | 2 | 1 | 1 | 2 | | | | | | 1 | 2 | 3 | 3 |
| **CO5** | 1 | 1 | 2 | 2 | 1 | | | | | | 2 | 2 | 2 | 2 |

**Lab Problems:**

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.

**REFERENCE BOOKS:**

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

*** M241ACS309: GENDER SENSITIZATION LAB**

**B.Tech. II Year I Sem.**

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

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 0 | 0/2 | 0 |

| EVALUATION SCHEME | | | | | |
|---|---|---|---|---|---|
| D-D | PE | LR | CP | SEE | TOTAL |
| 10 | 10 | 10 | 10 | 60 | 100 |

**COURSE DESCRIPTION**

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies - to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will fu rther explore the impact of gender-based violence on education, health and development.

**Objectives of the Course**

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

**Learning Outcomes**

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labor and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 2 | 2 | 2 | 3 | 3 | | | | | | | 3 | 2 | |
| CO2 | 1 | 1 | 2 | 2 | 3 | | | | | | | 2 | 2 | |
| CO3 | 2 | 2 | 1 | 1 | 3 | | | | | | 1 | 3 | 2 | 2 |
| CO4 | 2 | 2 | 1 | 1 | 2 | | | | | | 1 | 2 | 3 | 3 |
| CO5 | 1 | 1 | 2 | 2 | 1 | | | | | | 2 | 2 | 2 | 2 |

**Unit-I: UNDERSTANDING GENDER**

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men - Preparing for Womanhood. Growing up Male. First lessons in Caste.

**Unit – II: GENDER ROLES AND RELATIONS**

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

**Unit – III: GENDER AND LABOUR**

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work. -Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

**Unit – IV: GENDER - BASED VIOLENCE**

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "*Chupulu".*

Domestic Violence: Speaking Outls Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

**Unit – V: GENDER AND CULTURE**

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.

Note: **Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.**

- ***Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic***

***materials related to the topics given in the syllabus on "Gender".***

- **ESSENTIAL READING**: The Textbook, "*Towards a World of Equals: A Bilingual Textbook on Gender"* written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu **published by Telugu Akademi, Telangana Government in 2015.**

ASSESSMENT AND GRADING:

- Discussion & Classroom Participation: 20%
- Project/Assignment: 30%
- End Term Exam: 50%

## M241ACS401: DISCRETE STRUCTURES & GRAPH THEORY

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

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

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 3 | 0/0 | 3 |

| EVALUATION SCHEME | | | | |
|---|---|---|---|---|
| SE | CA | ELA | SEE | TOTAL |
| 30 | 5 | 5 | 60 | 100 |

**Course Objectives:**

- Introduces elementary discrete mathematics for computer science and engineering.
- Topics include formal logic notation, methods of proof, induction, sets, relations, algebraic structures, elementary graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

**Course Outcomes:**

**CO-1:** Understand and construct and mathematical logic
**CO-2**: explain the various fundamental concept of the set theory
**CO-3:** Analyze and solve algebraic structures and identify and prove properties of groups
**CO-4:**explain the oncept of functions and combinatiories
**CO-5:** apply graph theory in solving computing problems

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 2 | 1 | 1 | | | | | | | | 3 | 2 | |
| CO2 | 3 | 2 | | 1 | | | | | | | | 3 | 2 | |
| CO3 | 3 | 2 | 1 | 1 | | | | | | | | 3 | 2 | |
| CO4 | 3 | 2 | | 1 | | | | | | | | 3 | 2 | |
| CO5 | 3 | 2 | 1 | 1 | | | | | | | | 3 | 2 | |

**UNIT - I**

**Mathematical logic:** Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

**UNIT - II**

**Set theory:** Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.

**UNIT - III**

**Algebraic Structures:** Introduction, Algebraic Systems, Semi groups and Monoids, Lattices as Partially Ordered Sets, Boolean algebra.

**UNIT - IV**

**Elementary Combinatorics:** Basics of Counting, Combinations and Permutations, Enumeration of

Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutation with Constrained Repetitions, Binomial Coefficient, The Binomial and Multinomial Theorems, The Principle of Exclusion.

**UNIT - V**

**Graph Theory:** Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Minimum spanning Tree-prim's and kruskal's algorithms, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

**TEXT BOOKS:**

1. Discrete Mathematical Structures with Applications to Computer Science: J.P. Tremblay, R. Manohar, McGraw-Hill, 1st ed.
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe l. Mott, Abraham Kandel, Teodore P. Baker, Prentis Hall of India, 2nd ed.

**REFERENCE BOOKS:**

1. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, Pearson education, 5th edition.
2. Discrete Mathematical Structures: Thomas Kosy, Tata McGraw Hill publishing co.

**M241ACS402: : BUSINESS ECONOMICS AND FINANCIAL ANALYSIS**

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

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

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 3 | 0/0 | 3 |

| EVALUATION SCHEME | | | | |
|---|---|---|---|---|
| SE | CA | ELA | SEE | TOTAL |
| 30 | 5 | 5 | 60 | 100 |

**Course Objective:** To learn the basic business types, impact of the economy on Business and Firms specifically. To analyze the Business from the Financial Perspective.

**Course Outcome:**

**CO1:**The students will understand the various Forms of Business and the impact of economic variables on the Business.

**CO-**2: The Demand, Supply, Production, Cost, Market Structure, Pricingaspects are learnt.

**CO-**3 The Students can study the firm's financial position by analysing the Financial Statements of a Company

CO-4

CO-5

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | **PROGRAM OUTCOMES(PO)** | | | | | | | | | | | **PROGRAM SPECIC OUTCOMES (PS0)** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PSO1** | **PSO2** | **PSO3** |
| **CO1** | | | | | | | | 1 | 2 | 1 | 3 | 1 | | |
| **CO2** | | | | | | | | 1 | 2 | 1 | 3 | 1 | | |
| **CO3** | | | | | | | | 1 | 2 | 1 | 3 | 1 | | |
| **CO4** | | | | | | | | 1 | 2 | 1 | 3 | 1 | | |
| **CO5** | | | | | | | | 1 | 2 | 1 | 3 | 1 | | |

**Unit – I: Introduction to Business and Economics**

**Business**: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

**Economics:** Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply and Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

**UNIT - II: Demand and Supply Analysis**

**Elasticity of Demand:** Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

**Supply Analysis:** Determinants of Supply, Supply Function and Law of Supply.

**UNIT - III: Production, Cost, Market Structures & Pricing**

**Production Analysis:** Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.
**Cost analysis**: Types of Costs, Short run and Long run Cost Functions.
**Market Structures**: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, Monopolistic Competition. **Pricing:** Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume Profit Analysis.

**UNIT - IV: Financial Accounting:** Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, Preparation of Final Accounts (Simple Problems).

**UNIT - V: Financial Ratios Analysis:** Concept of Ratio Analysis, Importance and Types of Ratios, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios - Analysis and Interpretation (simple problems).

**TEXT BOOKS:**

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
2. Dhanesh K Khatri, Financial Accounting, Tata Mc -Graw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata Mc Graw Hill Education Pvt. Ltd. 2012.

**REFERENCE BOOKS:**

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, VikasPublications, 2013.

## M241ACS403: OPERATING SYSTEMS

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

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

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 3 | 0/0 | 3 |

| EVALUATION SCHEME | | | | |
|---|---|---|---|---|
| SE | CA | ELA | SEE | TOTAL |
| 30 | 5 | 5 | 60 | 100 |

**Prerequisites:**

1. A course on "Computer Programming and Data Structures".
2. A course on "Computer Organization and Architecture".

**Course Objectives:**

- Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
- Introduce the issues to be considered in the design and development of operating system
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

**Course Outcomes:**

**CO:1**: Will be able to control access to a computer and the files that may be shared

**CO-2**: Demonstrate the knowledge of the components of computers and their respective roles incomputing.

**CO-3:** Ability to recognize and resolve user problems with standard operating environments.

**CO-4**: Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

**CO-5** Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 3 | 1 | |
| CO2 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 3 | 1 | |
| CO3 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 3 | 1 | |
| CO4 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 3 | 1 | |
| CO5 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 3 | 1 | |

**UNIT - I**

**Operating System - Introduction**, Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls

**Process -** Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads

**UNIT - II**

**CPU Scheduling** - Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling. System call interface for process management-fork, exit, wait, waitpid, exec

**Deadlocks** - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock

**UNIT - III**

**Process Management and Synchronization** - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors

**Interprocess Communication Mechanisms:** IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

**UNIT - IV**

**Memory Management and Virtual Memory** - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

**UNIT - V**

**File System Interface and Operations** -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

**Case Study:** Windows Operating system, Linux Operating System.

**TEXT BOOKS:**

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Advanced programming in the UNIX environment, W.R. Stevens, Pearson education.

**REFERENCE BOOKS:**

1. Operating Systems- Internals and Design Principles, William Stallings, Fifth Edition-2005, Pearson Education/PHI
2. Operating System A Design Approach- Crowley, TMH.
3. Modern Operating Systems, Andrew S. Tanenbaum 2nd edition, Pearson/PHI
4. UNIX programming environment, Kernighan and Pike, PHI/ Pearson Education
5. UNIX Internals -The New Frontiers, U. Vahalia, Pearson Education.

**M241ACS404: DATABASE MANAGEMENT SYSTEMS** **L T P C**

**B.Tech. II Year II Sem.** **3 0 0 3**

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | \C |
| 3 | 0/0 | 3 |

| EVALUATION SCHEME | | | | |
|---|---|---|---|---|
| SE | CA | ELA | SEE | TOTAL |
| 30 | 5 | 5 | 60 | 100 |

**Prerequisites**: A course on "Data Structures".

**Course Objectives:**

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- Topics include data models, database design, relational model, relational algebra, transactioncontrol, concurrency control, storage structures and access techniques.

**Course Outcomes:**

**CO-1:**Gain knowledge of fundamentals of DBMS, database design and normal forms
**CO-2:**Master the basics of SQL for retrieval and management of data.
**CO-3:** Improve the database design by normalization
**CO-4:**Be acquainted with the basics of transaction processing and concurrency control.
**CO-5:** Familiarity with database storage structures and access techniques

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | **PROGRAM OUTCOMES(PO)** | | | | | | | | | | | **PROGRAM SPECIC OUTCOMES (PS0)** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PSO1** | **PSO2** | **PSO3** |
| **CO1** | 3 | 1 | 3 | 2 | 3 | 2 | 2 | | 1 | | | 1 | 2 | 3 |
| **CO2** | 2 | 2 | 3 | 3 | 3 | 2 | 3 | | 1 | | | 2 | 2 | 3 |
| **CO3** | 2 | 3 | 1 | 3 | 1 | | 2 | | 1 | | | 1 | 3 | 3 |
| **CO4** | 3 | 2 | 1 | 1 | 1 | | 3 | | | | | 1 | 2 | 2 |
| **CO5** | 2 | 2 | 1 | 1 | 1 | | 3 | | | | | 2 | 2 | 2 |

**UNIT - I**

**Database System Applications**: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS

**Introduction to Database Design:** Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

**UNIT - II**

**Introduction to the Relational Model:** Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical database design, introduction to views, destroying/alteringtables and views.

Relational Algebra, Tuple relational Calculus, Domain relational calculus.

**UNIT - III**

**SQL:** QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL,triggers and active databases.

**Schema Refinement:** Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, First, Second, Third normal forms, BCNF, lossless join decomposition, multivalued dependencies, Fourth normal form, Fifth normal form.

**UNIT – IV**

Transaction Management: Transaction state, Implementation of atomicity and Durability, Concurrent executions - Serializability, Recoverability.

Concurrency Control: Lock Based Protocols, Timestamp Based Protocols, Validation Based Protocols, Multiple Granularity, Dead Lock Handling

Recoverability: Failure Classification, Storage Structure, Recovery and Atomicity- Log Based recovery, Recovery with concurrent transactions, Checkpoints.

**UNIT - V**

File Organization: Organization of records in file, Data Dictionary Storage.

Indexing and Hashing: Basic Concepts, Ordered Indices, B tree Index files, B+ tree index files, Static Hashing, Dynamic Hashing - Comparison of Indexing with Hashing.

**TEXT BOOKS:**

1. Database System Concepts, Silberschatz, Korth, Sudarshan, 7th Edition, McGraw-Hill
2. Introduction to Database Systems, C. J. Date, Pearson Education

**REFERENCES:**

1. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TataMcGraw-Hill
2. Fundamentals of Database Systems, Elmasri Navathe, Pearson Education
3. Database Systems Design, Implementation, and Management, Peter Rob & CarlosCoronel, 7th Edition, Cengage Learning

**M241ACS405: SOFTWARE ENGINEERING** **L T P C**

**B.Tech. II Year II Sem.** **3 0 0 3**

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 3 | 0/0 | 3 |

| EVALUATION SCHEME | | | | |
|---|---|---|---|---|
| SE | CA | ELA | SEE | TOTAL |
| 30 | 5 | 5 | 60 | 100 |

**Course Objectives**

- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

**Course Outcomes**

**CO-1:**Ability to translate end-user requirements into system and software requirements, using e.g.UML, and structure the requirements in a Software Requirements Document (SRD).

**CO-2**:Identify and apply appropriate software architectures and patterns to carry out high level designof a system and be able to critically compare alternative choices.

**CO-3:**Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

**CO-4:** Deliver quality software products by applying software testing strategies and product metrics over the entire system life cycle

**CO-5**: Specify contemporary issues of handling risk management and quality management in software development

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 3 |
| CO3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 3 |
| CO4 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 1 | 3 | 3 |
| CO5 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 1 | 3 | 3 |

**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, the capability maturity model integration (CMMI).

**Process models**: The waterfall model, Spiral model and Agile methodology

**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.

**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, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

**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.
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.
**Quality Management:** Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

**TEXT BOOKS:**

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.

**REFERENCE BOOKS:**

1. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
3. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.
4. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

**M241ACS406: OPERATING SYSTEMS LAB** **L T P C**

**B.Tech. II Year II Sem.** **0 0 2 1**

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 0 | 0/2 | 1 |

| EVALUATION SCHEME | | | | | |
|---|---|---|---|---|---|
| D-D | PE | LR | CP | SEE | TOTAL |
| 10 | 10 | 10 | 10 | 60 | 100 |

**Prerequisites:** A course on "Programming for Problem Solving", A course on "Computer Organization and Architecture".

**Co-requisite:** A course on "Operating Systems".

**Course Objectives:**

- To provide an understanding of the design aspects of operating system concepts through simulation
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

**Course Outcomes:**

**CO:1**: Will be able to control access to a computer and the files that may be shared

**CO-2**: Demonstrate the knowledge of the components of computers and their respective roles incomputing.

**CO-3:** Ability to recognize and resolve user problems with standard operating environments.

**CO-4**: Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

**CO-5** Gain practical knowledge of how programming languages, operating systems, andarchitectures interact and how to use each effectively

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 2 | 1 | 1 | 1 | | | | 3 | 1 | 1 | 3 | | |
| CO2 | 3 | 2 | 1 | 1 | 1 | | | | 3 | 1 | 1 | 3 | | |
| CO3 | 3 | 2 | 1 | 1 | 1 | | | | 3 | 1 | 1 | 3 | | |
| CO4 | 3 | 2 | 1 | 1 | 1 | | | | 3 | 1 | 1 | 3 | | |
| CO5 | 3 | 2 | 1 | 1 | 1 | | | | 3 | 1 | 1 | 3 | | |

**List of Experiments:**

1. Write C programs to simulate the following CPU Scheduling algorithms a) FCFS b) SJF c) Round Robin d) priority

2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, opendir, readdir)

3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.

4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.

5. Write C programs to illustrate the following IPC mechanisms a) Pipes b) FIFOs c) Message Queues d) Shared Memory

6. Write C programs to simulate the following memory management techniques a) Paging b) Segmentation

7. Write C programs to simulate Page replacement policies a) FCFS b) LRU c) Optimal

**TEXT BOOKS:**

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

**REFERENCE BOOKS:**

1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition-2005, Pearson Education/PHI
2. Operating System - A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition, Pearson/PHI
4. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education
5. UNIX Internals: The New Frontiers, U. Vahalia, Pearson Education

## M241ACS407: DATABASE MANAGEMENT SYSTEMS LAB

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

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

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 0 | 0/2 | 1 |

| EVALUATION SCHEME | | | | | |
|---|---|---|---|---|---|
| D-D | PE | LR | CP | SEE | TOTAL |
| 10 | 10 | 10 | 10 | 60 | 100 |

**Co-requisites:** "Database Management Systems"

**Course Objectives:**

- Introduce ER data model, database design and normalization
- Learn SQL basics for data definition and data manipulation

**Course Outcomes:**

**CO-1:**Design database schema for a given application and apply normalization
**CO-2**:Acquire skills in using SQL commands for data definition and data manipulation.
**C0-3**:Develop solutions for database applications using procedures, cursors and triggers
**CO**-4: Applying PL/SQL for processing database
**CO-5:** Develop solutions using database concepts for real time requirements

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 1 | 3 | 3 | 2 | 1 | 2 | | | 2 | 2 | 2 | 2 | 3 |
| CO2 | 3 | 1 | 3 | 3 | 1 | 1 | 2 | | | | | 3 | 2 | 3 |
| CO3 | 2 | 1 | 2 | 3 | 1 | 1 | 2 | | | 2 | | 3 | 2 | 3 |
| CO4 | 3 | 2 | 2 | 3 | 1 | 1 | 2 | | | | | 3 | 2 | 3 |
| CO5 | 3 | 2 | 3 | 3 | 1 | 1 | 2 | | | 3 | | 3 | 3 | 3 |

**List of Experiments:**

1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. A. Querying (using ANY, ALL, UNION, INTERSECT, JOIN, Constraints etc.)
   B. Nested, Correlated subqueries
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

**TEXT BOOKS:**

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill, 3rd Edition
2. Database System Concepts, Silberschatz, Korth, Sudarshan, 7th Edition, McGraw-Hill

**REFERENCE BOOKS:**

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. Introduction to Database Systems, C.J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

**M241ACS409: NODE JS/ REACT JS/ DJANGO**

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

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

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 0 | 0/2 | 1 |

| EVALUATION SCHEME | | | | | |
|---|---|---|---|---|---|
| D-D | PE | LR | CP | SEE | TOTAL |
| 10 | 10 | 10 | 10 | 60 | 100 |

**Prerequisites:** Object Oriented Programming through Java, HTML Basics

**Course Objectives:**

- To implement the static web pages using HTML and do client side validation using JavaScript.
- To design and work with databases using Java
- To develop an end to end application using java full stack.
- To introduce Node JS implementation for server side programming.
- To experiment with single page application development using React.

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

**CO-1:** Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
**CO-2:** Demonstrate Advanced features of JavaScript and learn about JDBC
**CO-3:** Develop Server - side implementation using Java technologies like
**CO-4:** Develop the server - side implementation using Node JS.
**CO-5:** Design a Single Page Application using React.

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | | 2 | 1 | 1 | 2 | 3 | 1 |
| CO2 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | | 2 | 1 | 1 | 2 | 2 | 1 |
| CO3 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | | 2 | 1 | 1 | 1 | 2 | 2 |
| CO4 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | | 2 | 1 | 1 | 1 | 1 | 1 |
| CO5 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | | 2 | 1 | 1 | 2 | 1 | 1 |

**Exercises:**

1. Build a responsive web application for shopping cart with registration, login, catalog and cart pages using CSS3 features, flex and grid.
2. Make the above web application responsive web application using Bootstrap framework.
3. Use JavaScript for doing client - side validation of the pages implemented in experiment 1 and experiment 2.
4. Explore the features of ES6 like arrow functions, callbacks, promises, async/awai t. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page.
5. Develop a java stand alone application that connects with the database (Oracle / mySql) and perform the CRUD operation on the database tables.
6. Create an xml for the bookstore. Validate the same using both DTD and XSD.
7. Design a controller with servlet that provides the interaction with application developed in experiment 1 and the database created in experiment 5.
8. Maintaining the transactional history of any user is very important. Explore the various session

tracking mechanism (Cookies, HTTP Session)

9. Create a custom server using http module and explore the other modules of Node JS like OS, path, event.
10. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)
11. For the above application create authorized end points using JWT (JSON Web Token).
12. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
13. 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
14. Create a TODO application in react with necessary components and deploy it into github.

**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.

## * M241ACS410: CONSTITUTION OF INDIA

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

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

| TEACHING SCHEME | | |
|---|---|---|
| L | T/P | C |
| 3 | 0/0 | 0 |

| EVALUATION SCHEME | | | | |
|---|---|---|---|---|
| SE | CA | ELA | SEE | TOTAL |
| 30 | 5 | 5 | 60 | 100 |

**Course Objectives:** Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rightsperspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutionalrole and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolutionin 1917 and its impact on the initial drafting of the Indian Constitution.

**Course Outcomes:** Students will be able to:

**CO-1:**Discuss the growth of the demand for civil rights in India for the bulk of Indians before thearrival of Gandhi in Indian politics.

**CO-2:**Discuss the intellectual origins of the framework of argument that informed theconceptualization of social reforms leading to revolution in India.

**CO-3:**Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP]under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution

**CO-4:**Discuss the passage of the Hindu Code Bill of 1956.

**CO-5:** Discuss: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

**COURSE ARTICULATION MATRIX**: (Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

| | PROGRAM OUTCOMES(PO) | | | | | | | | | | | | PROGRAM SPECIC OUTCOMES (PS0) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | 1 | | | | | 2 | 2 | 3 | | 2 | 1 | | 1 | 1 | 1 |
| CO2 | 1 | | | | | 3 | 2 | 3 | | 1 | 1 | | 1 | 1 | 1 |
| CO3 | 1 | | | | | 2 | 2 | 3 | | 2 | 1 | | 1 | 2 | 1 |
| CO4 | 1 | | | | | 3 | 2 | 3 | | 1 | 1 | | 1 | 1 | 1 |
| CO5 | 1 | | | | | 2 | 2 | 3 | | 2 | 1 | | 1 | 1 | 1 |

**Unit - 1** History of Making of the Indian Constitution- History of Drafting Committee.

**Unit - 2** Philosophy of the Indian Constitution- Preamble Salient Features

**Unit - 3** Contours of Constitutional Rights & Duties - Fundamental Rights

- Right to Equality
- Right to Freedom
- Right against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights

- Right to Constitutional Remedies
- Directive Principles of State Policy
- Fundamental Duties.

**Unit - 4** Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powersand Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

**Unit - 5** Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayat raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO ZilaPanchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

**Unit - 6** Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

**Suggested Reading:**

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.

D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015