

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech. in COMPUTER SCIENCE AND BUSINESS SYSTEMS  
II YEAR COURSE STRUCTURE & SYLLABUS (R18)

Applicable From 2020-21 Admitted Batch

## II YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS310PC	Discrete Mathematics	3	0	0	3
2	CS302PC	Data Structures	3	0	0	3
3	MA303HS	Statistical Modeling	3	0	0	3
4	CS304PC	Computer Organization and Architecture	3	0	0	3
5	CS305PC	Formal Language and Automata Theory	3	0	0	3
6	SM306MS	Business Economics & Financial Management	3	0	0	3
7	CS307PC	Data Structures Lab	0	0	3	1.5
8	MA308HS	Statistical Modeling Lab	0	0	3	1.5
9	*MC309	Gender Sensitization Lab	0	0	2	0
		<b>Total Credits</b>	<b>18</b>	<b>0</b>	<b>8</b>	<b>21</b>

## II YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	SM401MS	Introduction to Innovation, IP Management and Entrepreneurship	3	0	0	3
2	CS417PC	Software Engineering	3	0	0	3
3	CS403PC	Operating Systems	3	0	0	3
4	CS404PC	Database Management Systems	3	0	0	3
5	CS412PC	Object Oriented Programming using Java	3	0	0	3
6	SM402MS	Business Communication and Value Sciences	2	0	0	2
7	CS406PC	Operating Systems Lab	0	0	3	1.5
8	CS407PC	Database Management Systems Lab	0	0	3	1.5
9	CS408PC	Java Programming Lab	0	0	2	1
10	*MC409	Constitution of India	3	0	0	0
		<b>Total Credits</b>	<b>20</b>	<b>0</b>	<b>8</b>	<b>21</b>

**CS310PC: DISCRETE MATHEMATICS****B.Tech. II Year I Sem.**

L	T	P	C
3	0	0	3

**Prerequisites:** An understanding of Mathematics in general is sufficient.**Course Objectives**

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

**Course Outcomes:**

- Ability to understand and construct precise mathematical proofs
- Ability to use logic and set theory to formulate precise statements
- Ability to analyze and solve counting problems on finite and discrete structures
- Ability to describe and manipulate sequences
- Ability to apply graph theory in solving computing problems

**UNIT - I**

**The Foundations: Logic and Proofs:** Propositional Logic, Applications of Propositional Logic, Propositional Equivalence, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy.

**UNIT - II**

Basic Structures, Sets, Functions, Sequences, Sums, Matrices and Relations Sets, Functions, Sequences & Summations, Cardinality of Sets and Matrices Relations, Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

**UNIT - III**

**Algorithms, Induction and Recursion:** Algorithms, The Growth of Functions, Complexity of Algorithms

**Induction and Recursion:** Mathematical Induction, Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness

**UNIT - IV**

**Discrete Probability and Advanced Counting Techniques:** An Introduction to Discrete Probability, Probability Theory, Bayes' Theorem, Expected Value and Variance

**Advanced Counting Techniques:** Recurrence Relations, Solving Linear Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion-Exclusion, Applications of Inclusion-Exclusion

**UNIT - V**

**Graphs:** Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring.

**Trees:** Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees

**TEXT BOOK:**

1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory- Kenneth H Rosen, 7<sup>th</sup> Edition, TMH.

**REFERENCE BOOKS:**

1. Discrete Mathematical Structures with Applications to Computer Science-J.P. Tremblay and R. Manohar, TMH,
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe L. Mott, Abraham Kandel, Theodore P. Baker, 2<sup>nd</sup> ed, Pearson Education.
3. Discrete Mathematics- Richard Johnsonbaugh, 7<sup>th</sup>Edn., Pearson Education.
4. Discrete Mathematics with Graph Theory- Edgar G. Goodaire, Michael M. Parmenter.
5. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, 5<sup>th</sup> edition, Pearson Education.

**CS302PC: DATA STRUCTURES****B.Tech. II Year I Sem.**

L	T	P	C
3	0	0	3

**Prerequisites:** A course on “Programming for Problem Solving”.**Course Objectives:**

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

**Course Outcomes:**

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.

**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, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

**UNIT - IV**

**Graphs:** Graph Implementation Methods. Graph Traversal Methods.

**Sorting:** Heap Sort, External Sorting- Model for external sorting, Merge Sort.

**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<sup>nd</sup> 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<sup>nd</sup> Edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning.

**MA303HS: STATISTICAL MODELLING****B.Tech. II Year I Sem.**

L	T	P	C
3	0	0	3

**Course Objectives:** To learn

- The theory of Probability, and probability distributions of single and multiple random variables.
- Mean, Variance of a random Variable, Discrete Probability distributions.
- Continuous Probability Distributions, The Sampling theory.
- Concept of multivariable linear regression model.
- Testing of hypothesis and making inferences.

**Course Outcomes:**

- After learning the contents of this paper the student must be able to
- Apply the concepts of probability and distributions to some case studies.
- Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data. Understand Discrete Probability distributions & its properties.
- Make better decisions using linear regression techniques.
- To analyze the sample data & apply significance of testing of various population parameters.

**UNIT-I:**

Introduction to probability, Conditional Probability, Bayes' Rule, Random Variables, Distribution function, Probability mass function and Probability density function. Introduction to Mathematical Expectations and Moment generating function.

**Discrete Probability Distributions:** Introduction and Motivation, Binomial, Distribution, Poisson Distributions and Geometric distribution and their properties.

**UNIT-II:**

**Continuous Probability Distributions:** Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of Normal Distribution, Normal Approximation to the Binomial, Poisson, Gamma and Exponential Distributions.

**Multivariate Normal Distribution:** Multivariate Normal Distribution Functions, Conditional Distribution and its relation to regression model.

**UNIT-III:**

**Estimation & Tests of Hypotheses:** Introduction, Statistical Inference, Classical Methods of Estimation.: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance and Maximum Likelihood estimation.

**Statistical Hypotheses:** General Concepts, Testing of Statistical Hypothesis, Tests concerning a Single Mean, Tests concerning difference between Two Means, Test on a Single Proportion, Test concerning difference between Two Proportions and test for the ratio of variances.

**UNIT-IV:**

**Multiple Linear Regression Model:** Standard multiple regression models with emphasis on detection of collinearity, outliers, non-normality and autocorrelation, Validation of model assumptions.

**Multivariate Regression:** Assumptions of Multivariate Regression Models, Parameter estimation, Multivariate Analysis of variance and covariance.

**UNIT-V:**

Introduction to stochastic Processes, Markov Process and Markov Chain with examples. Stochastic Matrix, Classification of states with examples and Limiting Probabilities.

**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. An Introduction to Multivariate Statistical Analysis, T.W. Anderson
4. Statistical Tests for Multivariate Analysis, H. Kris

**CS304PC: COMPUTER ORGANIZATION AND ARCHITECTURE****B.Tech. II Year I Sem.**

L	T	P	C
3	0	0	3

**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:**

- Understand the basics of instructions sets and their impact on processor design.
- Demonstrate an understanding of the design of the functional units of a digital computer system.
- Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
- Design a pipeline for consistent execution of instructions with minimum hazards.
- Recognize and manipulate representations of numbers stored in digital computers

**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**

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

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

**UNIT - III**

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

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

**UNIT - IV**

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

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

**UNIT - V**

**Reduced Instruction Set Computer:** CISC Characteristics, RISC Characteristics.

**Pipeline and Vector Processing:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.

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

**TEXT BOOK:**

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

**REFERENCE BOOKS:**

1. Computer Organization – Car Hamacher, Zvonks Vranesic, Safea Zaky, V<sup>th</sup> Edition, McGraw

Hill.

2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.  
Structured Computer Organization – Andrew S. Tanenbaum, 4<sup>th</sup> Edition, PHI/Pearson.

**CS305PC: FORMAL LANGUAGES AND AUTOMATA THEORY****B.Tech. II Year I Sem.**

L	T	P	C
3	0	0	3

**Course Objectives:**

- To provide introduction to some of the central ideas of theoretical computer science from the perspective of formal languages.
- To introduce the fundamental concepts of formal languages, grammars and automata theory.
- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- To understand deterministic and non-deterministic machines.
- To understand the differences between decidability and undecidability.

**Course Outcomes:**

- Able to understand the concept of abstract machines and their power to recognize the languages.
- Able to employ finite state machines for modeling and solving computing problems.
- Able to design context free grammars for formal languages.
- Able to distinguish between decidability and undecidability.
- Able to gain proficiency with mathematical tools and formal methods.

**UNIT - I**

**Introduction to Finite Automata:** Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems.

**Nondeterministic Finite Automata:** Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions.

**Deterministic Finite Automata:** Definition of DFA, How A DFA Process Strings, The language of DFA, Conversion of NFA with  $\epsilon$ -transitions to NFA without  $\epsilon$ -transitions. Conversion of NFA to DFA, Moore and Melay machines

**UNIT - II**

**Regular Expressions:** Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions.

**Pumping Lemma for Regular Languages,** Statement of the pumping lemma, Applications of the Pumping Lemma.

**Closure Properties of Regular Languages:** Closure properties of Regular languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

**UNIT - III**

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

**Push Down Automata:** Definition of the Pushdown Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Acceptance by final state, Acceptance by empty stack, Deterministic Pushdown Automata. From CFG to PDA, From PDA to CFG.

**UNIT - IV**

**Normal Forms for Context- Free Grammars:** Eliminating useless symbols, Eliminating  $\epsilon$ -Productions. Chomsky Normal form Griebach Normal form.

**Pumping Lemma for Context-Free Languages:** Statement of pumping lemma, Applications



**Closure Properties of Context-Free Languages:** Closure properties of CFL's, Decision Properties of CFL's

**Turing Machines:** Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine

**UNIT - V**

**Types of Turing machine:** Turing machines and halting

**Undecidability:** Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines, Recursive languages, Properties of recursive languages, Post's Correspondence Problem, Modified Post Correspondence problem, Other Undecidable Problems, Counter machines.

**TEXT BOOKS:**

1. Introduction to Automata Theory, Languages, and Computation, 3<sup>rd</sup> Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Theory of Computer Science – Automata languages and computation, Mishra and Chandrashekar, 2nd edition, PHI.

**REFERENCE BOOKS:**

1. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. A Text book on Automata Theory, P. K. Srimani, Nasir S. F. B, Cambridge University Press.
4. Introduction to the Theory of Computation, Michael Sipser, 3<sup>rd</sup> edition, Cengage Learning.
5. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan, Rama R, Pearson.

**SM306MS: BUSINESS ECONOMICS AND FINANCIAL MANAGEMENT****B.Tech. II Year I Sem.**

L	T	P	C
3	0	0	3

**Prerequisites:** None**Course Objective:**

- To provide a unifying theme of managerial decision making around the theory of firm by introducing tools such as demand and supply analysis and gaining knowledge on important elements like National income, GDP, inflation.
- To get acquainted with various production theories, various costs and their role in cost minimization and various market structures such as perfect and imperfect competition.
- To help the students to develop cognizance of the importance of Financial management, time value of money in investment decisions.
- To enable students to describe how people analyze the corporate leverage under different conditions.
- To introduce Working capital, its importance, valuation of current assets and estimating working capital requirement

**Course Outcome:**

After completion of this course, the student will be able to:

- Explain the theory of the firm and various micro & macroeconomics tools such as demand supply analysis, National income, GDP, inflation that would help in forward planning and decision making.
- Summarize production theories, factors of production, laws of production, various costs and revenue concepts.
- Demonstrate the applicability of the concept of Financial Management and time value of money in evaluating investment proposals.
- Apply the leverage and EBIT EPS analysis associate with financial data in corporate.
- Analyze the complexities associated with working capital management and financing current assets.

**UNIT – I****Introduction to Economics:**

National income and its components – GNP, NNP, GDP, NDP, Consumption Function, Investment, Government sector – Taxes and Subsidies, External Sector – Exports and Imports, Money – Definition, Demand for Money – Transactionary and Speculative demand, Supply of Money.

**Demand and supply – Law** of demand, elasticity of demand, law of supply, equilibrium and comparative statics.

**UNIT - II**

**Theory of production** -Production Function, Law of Variable Proportions, Isoquants, Returns to scale, Cobb-Douglas Production Function, CES Production Function, Theory of cost-Cost Concepts, Cost output relationship- Short run and Long run,

**Markets** – Types of Market Structures and its features, Equilibrium of the firm under Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly.

**UNIT - III**

**Introduction to Financial Management** – Goals of the Firm, Time Value of the Money, Capital Budgeting: Concepts and Process – Generating Investment Project proposals, Estimating Project after Tax incremental Operating Cash flows, Capital Budgeting techniques, Project Evaluation and Selection – Alternative Methods

**UNIT - IV**

**Leverage:** Operating and Financial leverage, Total leverage, Indifference analysis in leverage study, Cost of Capital: concept, Computation of Specific Costs- Cost of equity, cost of debt, Cost of preference shares, Weighted Average Cost of Capital, Factors effecting cost of capital.

**UNIT - V**

**Working Capital Management:** Overview, working capital issues, financing current assets (short term & long term mix), Estimation of working capital.

**Cash Management:** Motives for holding Cash, Speeding up of Cash receipts, Slowing down Cash payouts, Electronic Commerce, Outsourcing, Cash Balances to maintain, Factoring.

**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 McGraw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt. Ltd. 2012.

**REFERENCE BOOKS:**

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

**CS307PC: DATA STRUCTURES LAB****B.Tech. II Year I Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>

**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:**

- Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

**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) Bubble sort    ii) Selection sort    iii) Insertion sort
7. Write a program that use both recursive and non-recursive functions to perform the following searching operations for a Key value in a given list of integers:
  - i) Linear search    ii) Binary search
8. Write a program to implement the tree traversal methods.
9. Write a program to implement the graph traversal methods.

**TEXT BOOKS:**

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

**MA308HS: STATISTICAL MODELLING LAB****B.Tech. II Year I Sem.**

L	T	P	C
0	0	3	1.5

**Course Objectives:**

- Identify the structural elements and layout of R source code.
- Apply tests of significance.
- Forecast in cross sectional Data.
- Compute Descriptive Statistics.
- Depict data through visualization.

**Course Outcomes:**

- Build various data types for a specified problem.
- Apply tests of significance.
- Compute descriptive Statistics.
- Correlation issue.
- Create Graphics.

**Task 1:** Write R program to create an array, passing in a vector of values and a vector of Dimensions. Also provide names for each dimension.

**Task 2:** Write R program to find the factors of a given number using functions.

**Task 3:** Write R program to create a list of random numbers in normal distribution and count Occurrences of each value.

**Task 4:** Write R program for addition and Multiplication of two matrices.

**Task 5:** Write R program to create a Data Frame which contain details of 5 employees and display summary of the data.

**Task 6:** Write R program to read the .csv file and perform the following:

- (i) Summary statistics on the data, (ii) Remove outliers from the data.

**Task 7:** Plot the data using plot.

**Task 8:** Test a hypothesis about the data using Z and t – tests.

**Task 9:** Write R program for modeling Cross sectional data with Multiple Regression.

**Task10:** Write R program for modeling with correlation issue.

**\*MC309: GENDER SENSITIZATION LAB**  
(An Activity-based Course)

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

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

**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 further 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 labour 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.

**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 OutIs 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, Duggirala Vasanta, 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%

**SM401MS: INTRODUCTION TO INNOVATION, IP MANAGEMENT & ENTREPRENEURSHIP****B.Tech. II Year II Sem****L T P C****3 0 0 3****Course Objectives:**

The major emphasis of the course will be on creating a learning system through which management students

- Can enhance their innovation and creative thinking skills,
- Acquaint themselves with the special challenges of starting new ventures
- Turn market opportunities into a business plan
- Use IPR as an effective tool to protect their innovations and intangible assets from exploitation.

**Course Outcomes:**

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

- **CO-1:** Learn to be familiar with creative and innovative thinking styles
- **CO-2:** Learn to investigate, understand and internalize the process of founding a startup
- **CO-3:** Learn to manage various types of IPR to protect competitive advantage
- **CO-4:** Independently formulate a business plan based on a business idea in technology, plan and implement a development project in a team,

**UNIT – I:****Innovation: What and Why?**

Innovation as a core business process, Sources of innovation, Knowledge push vs. need pull innovations.

Class Discussion- Is innovation manageable or just a random gambling activity?

**UNIT – II:**

**Building an Innovative Organization:** Creating new products and services, Exploiting open innovation and collaboration, Use of innovation for starting a new venture Class Discussion- Innovation: Co-operating across networks vs. 'go-it-alone' approach

**UNIT – III:****Entrepreneurship:**

- Opportunity recognition and entry strategies
- Entrepreneurship as a Style of Management
- Maintaining Competitive Advantage- Use of IPR to protect Innovation

**UNIT – IV:****Entrepreneurship- Financial Planning:**

- Financial Projections and Valuation
- Stages of financing
- Debt, Venture Capital and other forms of Financing

**UNIT – V:****Intellectual Property Rights (IPR)**

- Introduction and the economics behind development of IPR: Business Perspective
- IPR in India – Genesis and Development
- International Context
- Concept of IP Management, Use in marketing

**UNIT – VI:****Types of Intellectual Property**

- Patent- Procedure, Licensing and Assignment, Infringement and Penalty
- Trademark- Use in marketing, example of trademarks- Domain name
- Geographical Indications- What is GI, Why protect them ?



- Copyright- What is copyright
- Industrial Designs- What is design? How to protect ?

**Class Discussion-** Major Court battles regarding violation of patents between corporate companies

**HOME ASSIGNMENT:**

Case study materials book will be given to students. Students are required to meet in groups before coming to class and prepare on the case for the day. Instructor may ask the student groups to present their analysis and findings to the class.

Further, the topic for class discussion will be mentioned beforehand and students should be ready to discuss these topics (in groups) in class. Students are required to meet in groups before coming to class and prepare on the topic. Few topics are mentioned below as examples. Instructor can add or change any topic as per requirement.

**Topic 1-** Is innovation manageable or just a random gambling activity?

**Topic 2-** Innovation: Co-operating across networks vs. 'go-it-alone' approach

**Topic 3-** Major Court battles regarding violation of patents between corporate companies

**TEXT BOOKS:**

1. Joe Tidd, John Bessant. Managing Innovation: Integrating Technological, Market and Organizational Change
2. Case Study Materials: To be distributed for class discussion

**CS417PC: SOFTWARE ENGINEERING****B.Tech. II Year II Sem.**

L	T	P	C
3	0	0	3

**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**

- 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).
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

**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 patterns, process assessment, personal and team process models.

**Process models:** The waterfall model, incremental process models, evolutionary process models, the unified process.

**UNIT - II**

**Software Requirements:** Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

**Requirements engineering process:** Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

**System models:** Context models, behavioral models, data models, object models, structured methods.

**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.

**Product metrics:** Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

**UNIT - V**

**Metrics for Process and Products:** Software measurement, metrics for software quality.

**Risk management:** Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.

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

**TEXT BOOKS:**

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6<sup>th</sup> edition, Mc Graw Hill International Edition.
2. Software Engineering- Sommerville, 7<sup>th</sup> edition, Pearson Education.

3. The unified modeling language user guide Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education.

**REFERENCE BOOKS:**

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

**CS403PC: OPERATING SYSTEMS****B.Tech. II Year II Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Prerequisites:**

- A course on “Computer Programming and Data Structures”.
- 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:**

- Will be able to control access to a computer and the files that may be shared
- Demonstrate the knowledge of the components of computer and their respective roles in computing.
- Ability to recognize and resolve user problems with standard operating environments.
- Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

**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

**UNIT - II**

**Process and CPU Scheduling** - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Interposes Communication, Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling.

**System call interface for process management**-fork, exit, wait, waitpid, exec

**UNIT - III**

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

**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.

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

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

**CS404PC: DATABASE MANAGEMENT SYSTEMS****B.Tech. II Year II Sem.**

L	T	P	C
3	0	0	3

**Prerequisites**

1. 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, transaction control, concurrency control, storage structures and access techniques.

**Course Outcomes:**

- Gain knowledge of fundamentals of DBMS, database design and normal forms
- Master the basics of SQL for retrieval and management of data.
- Be acquainted with the basics of transaction processing and concurrency control.
- Familiarity with database storage structures and access techniques

**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 data base design, introduction to views, destroying/altering tables 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 data bases.

**Schema Refinement:** Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multi-valued dependencies, FOURTH normal form, FIFTH normal form.

**UNIT - IV**

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log-Based Recovery, Recovery with Concurrent Transactions.

**UNIT - V**

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

**TEXT BOOKS:**

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, *Tata Mc Graw Hill* 3rd Edition
2. Database System Concepts, Silberschatz, Korth, *Mc Graw hill*, V edition.

**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*.

**CS412PC: OBJECT ORIENTED PROGRAMMING USING JAVA****B.Tech. II Year II Sem.**

L	T	P	C
3	0	0	3

**Course Objectives:**

- To introduce the object-oriented programming concepts.
- To understand object-oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
- To introduce the implementation of packages and interfaces
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

**Course Outcomes:**

- Able to solve real world problems using OOP techniques.
- Able to understand the use of abstract classes.
- Able to solve problems using java collection framework and I/o classes.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for web applications.
- Able to design GUI based applications

**UNIT - I**

**Object-Oriented Thinking-** A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling.

**Inheritance**– Inheritance concept, Inheritance basics, Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism-ad hoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance-specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

**UNIT - II**

**Packages-** Defining a Package, CLASSPATH, Access protection, importing packages.

**Interfaces-** defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

**Stream based I/O (java.io)**– The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, auto boxing, generics.

**UNIT - III**

**Exception handling** - Fundamentals of exception handling, Exception types, Termination or resumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built-in exceptions, creating own exception sub classes.

**Multithreading-** Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, inter thread communication.

**UNIT - IV**

**The Collections Framework (java.util)**- Collections overview, Collection Interfaces, The Collection classes- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators, Collection algorithms, Arrays, The Legacy Classes and Interfaces- Dictionary, Hashtable, Properties, Stack, Vector

More Utility classes, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner

**UNIT - V**

**GUI Programming with Swing** – Introduction, <sup>24</sup>limitations of AWT, MVC architecture, components,



containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.

**Event Handling-** The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.

**A Simple Swing Application, Applets** – Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, **The Swing Buttons-** JButton, JToggleButton, JCheckBox, JRadioButton, JTabbedPane, JScrollPane, JList, JComboBox, Swing Menus, Dialogs.

**TEXT BOOKS:**

1. Java The complete reference, 9<sup>th</sup> edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming 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. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, University Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2<sup>nd</sup> edition, Oxford Univ. Press.
5. Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning.

**SM402MS: BUSINESS COMMUNICATION AND VALUE SCIENCE****B.Tech. II Year II Sem.**

L	T	P	C
2	0	0	2

**Course Pre-Requisite(S):**

- Basic Knowledge of English (verbal and written)

**Course Objectives:**

- Develop technical writing reading, presentation and discussion skills and personality development
- Introduce students to Self-analysis techniques like SWOT & TOWS
- Introduce students to values, morality, diversity, life skills and business communication
- Introduce students to key concepts of: Pluralism & cultural spaces, Cross-cultural
- Communication & Science of Nation building

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

- CO-1: Recognize the need for life skills, values, morality behavior and beliefs; Diversity & inclusion
- CO-2: Tenets of Business Communication, effective writing, reading, presentation and group discussion
- CO-3: Identify the best practices of technical writing and Understand, apply & analyze the tools of technical writing
- CO-4: Apply & analyze the basic principles of SWOT & life positions. personality traits and Teamwork
- CO-5: Identify & respect pluralism in cultural spaces- Analyze cross cultural communication and apply the science of nation building
- CO-6: Understand and apply the concepts of Global, global and translocational
- CO-7: Recognize the roles and relations of different genders.

**UNIT – I: Business Communication**

Overview of Business Communication, Application of reading and writing skills, Creation of communication material, Experiencing diversity and organizing events to support inclusion, Assignment – Assimilation of concepts and present them effectively, Analyzing personality traits and team player style, Understanding the concepts of Morality, Diversity and Inclusion.

**UNIT – II: Basic principles of SWOT and Life Positions**

SWOT and Life Positions, Apply SWOT in real life scenarios, Create SWOT, SWOT Vs. TOWS-The Balancing Act, Stress management Working with rhythm and balance, Team work, Need for Life skills and values, importance, Critical life skills, Multiple Intelligences- Embracing diversity, Values: dealing with ambiguity, motivation, result orientation.

**UNIT – III: Role of science in nation building**

Role of scientists and mathematicians from ancient India, Role of science post- independence, Inventions – Inventors-Institutes-Information technology, Introduction to technical writing, Basic rules of technical writing.

**UNIT – IV: Artificial intelligence –Voice of the future**

Artificial intelligence in Everyday Life, Communicating with machines, Applying technical writing in profession, Scenario-based technical writing, Best practices of Technical writing

**UNIT – V: Technical Writing**

Summarizing & Synthesizing, Abstract Writing, Report Writing, Product Description, Vocabulary Enrichment: Exposure to words from General Service List (GSL) by West & Academic word list (AWL) technical specific terms.

**Project Work**

Visit rural area/underprivileged parts of city to address some of the local issues; if relevant, suggest a practical technology solution to the issues.

**REFERENCES:**

1. Strategic Writing, Charles Marsh
2. The Seven Basic Plots, Christopher Booker
3. Business Communication, Saroj Hiremath

4. English vocabulary in Use, Alan McCarthy and O'Dell
5. Guiding Souls : Dialogues on the purpose of life; Dr. A.P.J Abdul Kalam, 2005; Coauthor-- Arun Tiwari
6. The Family and the Nation; Dr. A.P.J Abdul Kalam, 2015; Co- author: Acharya Mahapragya
7. The Scientific India: A twenty First Century Guide to the World around Us; Dr. A.P.J Abdul Kalam, 2011; Co-author- Y.S.Rajan
8. Forge Your Future: Candid, Forthright, Inspiring ; Dr. A.P.J Abdul Kalam, 2014 5. Abundance: The Future is Better Than You Think; Peter H. Diamandis and Steven Kotler, 21 Feb, 2012; Free Press
9. Start With Why: How Great Leaders Inspire Everyone to Take Action; Simon Sinek, 6 October 2011; Penguin
10. Advertising & IMC: Principles and Practice; Sandra Moriarty, Nancy D. Mitchell, William D. Wells, 15 June 2016; Publiher: Pearson Education India

#### **WEB REFERENCES:**

1. Examples of Technical Writing for Students  
<https://freelance-writing.lovetoknow.com/kinds-technical-writing>.
2. Skills of a Good Technical Writer  
<https://clickhelp.com/clickhelp-technical-writing-blog/11-skills-of-a-good-technical-writer>.
3. Benefits and challenges of cultural diversity in the workplace.  
<https://www.hult.edu/blog/benefits-challenges-cultural-diversity-workplace/>
4. Ethics Fundamentals and Approaches to Ethics  
<https://www.eolss.net/Sample-Chapters/C14/E1-37-01-00.pdf>
5. A Framework for Making Ethical Decisions  
<https://www.brown.edu/academics/science-and-technology-studies/framework-making-ethical-decisions>.
6. Five Basic Approaches to Ethical Decision.  
[http://faculty.winthrop.edu/meelerd/docs/rolos/5\\_Ethical\\_Approaches.pdf](http://faculty.winthrop.edu/meelerd/docs/rolos/5_Ethical_Approaches.pdf)

#### **Online Resources:**

- <https://youtu.be/CsaTslhSDI>
- [https://m.youtube.com/watch?feature=youtu.be&v=IIKvV8\\_T95M](https://m.youtube.com/watch?feature=youtu.be&v=IIKvV8_T95M)
- <https://m.youtube.com/watch?feature=youtu.be&v=e80BbX05D7Y>
- [https://m.youtube.com/watch?v=dT\\_D68RJ5T8&feature=youtu.be](https://m.youtube.com/watch?v=dT_D68RJ5T8&feature=youtu.be)
- <https://m.youtube.com/watch?v=7sLLEdBgYYY&feature=youtu.be>
- <https://youtu.be/CsaTslhSDI>
- [https://m.youtube.com/watch?feature=youtu.be&v=IIKvV8\\_T95M](https://m.youtube.com/watch?feature=youtu.be&v=IIKvV8_T95M)
- <https://m.youtube.com/watch?feature=youtu.be&v=e80BbX05D7Y>
- [https://m.youtube.com/watch?v=dT\\_D68RJ5T8&feature=youtu.be](https://m.youtube.com/watch?v=dT_D68RJ5T8&feature=youtu.be)
- <https://m.youtube.com/watch?v=7sLLEdBgYYY&feature=youtu>

**CS406PC: OPERATING SYSTEMS LAB  
(Using UNIX/LINUX)**

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

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

**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:**

- Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
- Able to implement C programs using Unix system calls

**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
  6. Pipes      b) FIFOs      c) Message Queues      d) Shared Memory
7. Write C programs to simulate the following memory management techniques
8. a) Paging   b) Segmentation

**TEXT BOOKS:**

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7<sup>th</sup> 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, 2<sup>nd</sup> edition, Pearson/PHI.
4. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education.
5. UNIX Internals: The New Frontiers, U. Vaharia, Pearson Education.

**CS407PC: DATABASE MANAGEMENT SYSTEMS LAB****B.Tech. II Year II Sem.**

L	T	P	C
0	0	3	1.5

**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**

- Design database schema for a given application and apply normalization
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for database applications using procedures, cursors and triggers

**List of Experiments**

1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
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, McGraw Hill, V edition.

**REFERENCES 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*.

**CS408PC: JAVA PROGRAMMING LAB****B.Tech. II Year II Sem.****L T P C****0 0 2 1****Course Objectives:**

- To write programs using abstract classes.
- To write programs for solving real world problems using java collection frame work.
- 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:**

- Able to write programs for solving real world problems using java collection frame work.
- Able to write programs using abstract classes.
- Able to write multithreaded programs.
- Able to write GUI programs using swing controls in Java.

**Note:**

1. Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the use of 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 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 factorialValue 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 random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of 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 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 interthread communication.
13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.
14. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order
15. Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

#### REFERENCE BOOKS

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10<sup>th</sup> 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, 9<sup>th</sup> edition, Cay S. Horstmann and G Cornell, *Pearson*.

**\*MC409: CONSTITUTION OF INDIA****B.Tech. II Year II Sem.**

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The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the “basic structure” of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of “Constitutionalism” – a modern and progressive concept historically developed by the thinkers of “liberalism” – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of “constitutionalism” in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America.

The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India’s legacy of “diversity”. It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be “static” and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it “as one of the strongest court in the world”.

**Course content**

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation
7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21.