SCHEME AND SYLLABUS FOR
B.E. (IT)- III TO IV SEMESTERS
UNDER
AICTE MODEL CURRICULUM

B.E. (INFORMATION TECHNOLOGY)

DEPARTMENT OF INFORMATION TECHNOLOGY
CHAITANYA BHARATHI INSTITUTE OF
TECHNOLOGY(A)
HYDERABAD-500 075

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY(A)
AICTE Model Curriculum (with effect from 2019-20)
B.E. (Information Technology)

Semester– III

S.No	Course Code	Title of the Course	Scheme of Instruction		Scheme of Examination			Credits
			Hours per Week		Duration of SEE in Hours	Maximum Marks		
			L/T	P/D		CIE	SEE	
THEORY								
1	18IT C04	Data Structures and Algorithms	3	-	3	30	70	3
2	18IT C05	Discrete Mathematics and Applications	3	-	3	30	70	3
3	18EC C34	Basic Electronics	3	-	3	30	70	3
4	18ME C09	Principles of Management	3	-	3	30	70	3
5	18EE C01	Basic Electrical Engineering	3/1	-	3	30	70	4
6	18CE M01	Environmental Science	2	-	2	-	50	Non-Credit
PRACTICALS								
7	18IT C06	Data Structures and Algorithms Lab	-	2	2	15	35	1
9	18IT C08	Mini Project – I	-	2	-	50	-	1
10	18EC C35	Basic Electronics Lab	-	2	2	15	35	1
11	18EG C03	Soft Skills	-	2	2	15	35	1
12	18EE C02	Basic Electrical Engineering Lab	-	2	2	15	35	1
		TOTAL	**17/1**	**10**	**-**	**260**	**540**	**21**

L: Lecture T: Tutorial D: Drawing P: Practical
CIE-Continuous Internal Evaluation SEE-Semester End Examination

18IT C04

DATA STRUCTURES AND ALGORITHMS

Instruction	3 Hours per week
Duration of SEE	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	3

Course Objectives:

1. To introducerepresentation, specification, and applications of various linear and nonlinear data structures.
2. To familiarize with asymptotic analysis of iterative and recursive functions.
3. To acquaint with various pattern matching algorithms.
4. To present different sorting algorithms.
5. To introduce hashing and collision handling.

Course Outcomes: Upon completing this course, students will be able to:

1. Provide optimal solutions using linear and nonlinear data structures.
2. Analyse time complexity of both iterative and recursive functions.
3. Perform pattern matching.
4. Understand various sorting algorithms and their performance
5. Understand hash functions and collision handling.

UNIT–I

Using Arrays, Storing Game Entries in an Array, Two-Dimensional Arrays. Singly Linked Lists, Implementing a Singly Linked List, Insertion to the front of a Singly Linked List, Removal from the front of a Singly Linked List. Doubly Linked Lists, Insertion into a Doubly Linked List, Removal from a Doubly Linked List, Circularly Linked Lists, Reversing a Linked List. Recursion, Linear Recursion, Binary Recursion, Multiple Recursion, Analysis of Algorithms.

UNIT–II

Stacks, the Stack Abstract Data Type, the STL Stack, A C++ Stack Interface, A Simple Array-Based Stack Implementation, Implementing a Stack with a Generic Linked List, Reversing a Vector Using a Stack, Matching Parentheses and HTML Tags, Queues,the Queue Abstract Data Type, the STL Queue, a C++ Queue Interface, a Simple Array-Based Implementation, Implementing a Queue with a Circularly Linked List. Double-Ended Queues, the Deque Abstract Data Type, the STL Deque, Implementing a Deque with a Doubly Linked List.

Lists, Node-Based Operations and Iterators, the List Abstract Data Type, STL Lists, STL Containers and Iterators.

UNIT–III

General Trees, Tree Definitions and Properties, Binary Trees. The Binary Tree ADT, A C++ Binary Tree Interface, Properties of Binary Trees, a Linked Structure for Binary Trees, a Vector-Based Structure for Binary Trees, Traversals of a Binary Tree, Representing General Trees with Binary Trees.

Pattern Matching Algorithms: Brute Force, the Boyer-Moore Algorithm, the Knuth-Morris-Pratt Algorithm. Tries, Standard Tries, Compressed Tries, Suffix Tries.

UNIT–IV

Binary Search Trees, Searching, Update Operations, C++ Implementation of a Binary Search Tree, AVL Trees, Update Operations, the Priority Queue Abstract Data Type: The Priority Queue ADT.

Merge-Sort, Divide-and-Conquer, Merging Arrays and Lists, Quick-Sort: Performing quick sort on arrays and lists. Linear-Time Sorting: Bucket-Sort and Radix-Sort, Comparing Sorting Algorithms.

The STL priority queue class, Implementing a Priority Queue with a List, Selection-Sort and Insertion-Sort, Heaps, The Heap Data Structure. Complete Binary Trees and their representation, Implementing a Priority Queue with a Heap, Heap Sort, Bottom-Up Heap Construction.

UNIT–V

Hash Tables, Bucket Arrays, Hash Functions, Hash Codes, Compression functions, Collision-Handling Schemes, Load Factors and Rehashing. Graphs, the Graph ADT, Data Structures for Graphs, the Edge List Structure, The Adjacency List Structure, The Adjacency Matrix Structure, Graph Traversals, Depth-First Search, Breadth First Search, Directed Graphs, Traversing a Digraph, Minimum Spanning Trees, Kruskal's Algorithm, The Prim-Jarn´ýk Algorithm.

Text Books:

1. Michael T. Goodrich, Roberto Tamassia, David M. Mount, "Data Structure and Algorithms in C++", 2nd Edition, John Wiley, 2011.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", 3rd Edition Addison-Wesley, 2007.

Suggested Reading:

1. Narasimha Karumanchi, "Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles", CareerMonk Publications, 2016.
2. Narasimha Karumanchi, "Data Structures and Algorithms for GATE", CareerMonk Publications, 2011.
3. D. Samantha, "Classic Data Structures", Prentice Hall India, 2nd Edition, 2013.

Web Resources:

1. http://nptel.ac.in/courses/106102064/1
2. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html
3. https://visualgo.net/en

18IT C05

DISCRETE MATHEMATICS AND APPLICATIONS

Instruction	3 Hours per week
Duration of SEE	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	3

Course Objectives:

1. To introduce Propositional and Predicate Logic Concepts.
2. To gain knowledge in Counting, Permutations and Combinations.
3. To facilitate learningRecurrence relations and Generating Functions.
4. To acquire knowledge in group theory.
5. To familiarize with Graph and Tree concepts.

Course Outcomes: Upon completing this course, students will be able to:

1. Symbolize the given sentence using predicate logic and propositional logic.
2. Apply permutations and combinations to handle different types of objects.
3. Solve recurrence relations using Generating Functions.
4. Understand semi group, monoid group and abelian group.
5. Apply Graph and Tree concepts for basic problem solving.

UNIT-I

Logic – Sets and Functions: Logic, Propositional equivalences – Predicates and Quantifiers – Nested Quantifiers-Rules of Inference-Sets-Set Operations, Functions.

Integers: The Integers and Division, Integers and Algorithms, Applications of Number Theory.

UNIT–II

Mathematical Reasoning, Induction, and Recursion: Proof Strategy, Sequence and Summation, Mathematical Induction, Recursive Definitions and Structural Induction, Recursive Algorithms.

Counting: Basics of Counting, Pigeonhole Principle, Permutations and Combinations– Binomial Coefficients, Generalized Permutations and Combinations, Generating Permutations and Combinations.

UNIT–III

Advanced Counting Techniques: Recurrence Relations, Solving Linear Recurrence Relations, Divide and Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion–Exclusion, Application of Inclusion – Exclusion.

Relations: Relations & their Properties, N-ary Relations and Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

UNIT–IV

Algebraic Structures: Algebraic System - General Properties, semi groups, Monoids, Homomorphism, Groups, Residue arithmetic, group codes and their applications.

UNIT–V

Graphs: Graphs and Graph Models, Graph Terminology, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest Path Problems, Planar Graphs, Graph Coloring.

Trees: Introduction to Trees, Application of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees.

Text Books:

1. Kenneth H Rosen, "Discrete Mathematics and its applications", 6th Edition, McGraw Hill, 2006.
2. R.K. Bishit, H.S. Dhami, "Discrete Mathematics", Oxford University Press, 2015.

Suggested Reading:

1. J.P.Trembly, R.Manohar, "Discrete Mathematical Structure with Application to Computer Science", McGraw- Hill, 1997.
2. J. K. Sharma, "Discrete Mathematics", 2nd Edition, Macmillan, 2005.
3. Joel. Mott.Abraham Kandel, T.P.Baker, "Discrete Mathematics for Computer Scientist &Mathematicans", Prentice Hall.

Web Resources:

1. https://onlinecourses.nptel.ac.in/noc18_cs53/
2. https://www.coursera.org/learn/discrete-mathematics

18EC C34

BASIC ELECTRONICS

Instruction	3 Hours per week
Duration of SEE	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	3

Course Objectives: This course aims to:

1. Describe semiconductor devices principle and to understand the characteristics of junction diode and transistors.
2. Understand working principles of Oscillators and Amplifiers.
3. Understand the working principle of the regulators and transducers.

Course Outcomes: Upon completion of this course, students will be able to:

1. Use semiconductor devices in making circuits like rectifiers, filters, regulators etc.
2. Design amplifier and oscillators
3. Compare various types of power amplifiers.
4. Analyze the principles and practices for instrument design to development the real world Problems.
5. Apply concepts of various electronic circuits.

Prerequisite: Knowledge about semiconductor physics and basic electrical engineering

UNIT-I

Semiconductor Theory: Energy levels, Intrinsic and Extrinsic Semiconductor, Mobility, Diffusion and Drift current, Hall effect, Law of mass action, Characteristics of P-N Junction diode, current equation, Parameters and Applications.

Rectifiers: Half wave and Full wave Rectifiers Bridge and center tapped with and without filters, Ripple factor, regulation and efficiency.

UNIT-II

Transistors: Bipolar and field effect transistors with their h-parameter equivalent circuits, Basic Amplifiers classification and their circuits (Qualitative treatment only).

Regulators and Inverters: Zener Diode**,** Breakdown mechanisms, Characteristics, Effect of Temperature, Application as voltage regulator.

UNIT-III

Feedback Amplifiers: Properties of Negative Feedback Amplifier, Types of Negative Feedback, Effect of negative feedback on Input impedance and Output impedance, Applications (Qualitative treatment only).

Oscillators: principle of oscillations, LC Type-Hartley, Colpitt and RC Type-Phase shift, Wien Bridge and Crystal Oscillator (Qualitative treatment only).

UNIT-IV

Operational Amplifiers: Basic Principle, Ideal and practical Characteristics and Applications-Summer, Integrator, Differentiator, Instrumentation Amplifier.

Power Amplifiers: Operation of Class A, Class B, Class AB and Class C power amplifiers.

UNIT-V

Data Acquisition systems: Study of transducers-LVDT, Strain gauge.

Photo Electric Devices and Industrial Devices: Photo diode, Photo Transistor, LED, LCD, SCR, UJT Construction and Characteristics and their applications only.

Display Systems: Constructional details of C.R.O and Applications.

Text Books:

1. Robert L. Boylestad, Louis Nashelsky, "Electronic Devices and Circuits Theory", Pearson Education, 9thEdition, LPE, Reprinted, 2006.
2. Morris Mano, "Digital Design", Pearson Education, Asia 2002.

Suggested Reading:

1. Jacob Millman and C., Halkias, "Electronic Devices", McGraw Hill, 8th Edition, Reprint1985.
2. Ramakanth A. Gayakwad, "Op-Amps and Linear Integrated Circuits", Prentice Hall of India, 3rd Edition,1985.
3. W. D. Cooper, A. Helfric, "Electronic Instrumentation and Measurement Techniques", PHI, 4th Edition,2010.

18ME C09

PRINCIPLES OF MANAGEMENT

Instruction	3 Hours per week
Duration of SEE	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	3

Course Objectives: To make the students to

1. Understand basic fundamentals and insights of management
2. Understand the nature and purpose of planning
3. Gain the knowledge about the frame work of organizing
4. Understand the essence and significance of directing
5. Recognize the importance of controlling and its outcomes

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

1. Identify and evaluate the principles of management
2. Demonstrate the ability to have an effective and realistic planning
3. Identify the nature and the type of organization
4. Apply the tools and techniques of directing
5. Explain and evaluate the necessity for controlling and further refinement of an organization.

UNIT–I

Management: Definition of management**,** science or art, manager vs entrepreneur; managerial roles and skills;. Evolution of management, Basic management theories by FW Taylor, Henry Fayol, Types of Business Organizations, sole proprietorship, partnership, company, public and private enterprises; Organization culture and environment; Current trends and issues inmanagement

UNIT–II

Planning: Nature and purpose of Planning, types of Planning, objectives, setting objectives, policies, Strategic Management, Planning Tools and Techniques, Planning plant location and layout, Decision making steps & processes.

UNIT–III

Organizing: Nature and purpose of Organizing, formal and informal organization, organization structure, types, line and staff authority, departmentalization, delegation of authority, centralization and decentralization, job design, human

resource management, HR planning, Recruitment selection, Training & Development, Performance Management, Career planning and Management

UNIT–IV

Directing: Individual and group behavior, motivation, motivation theories, motivational techniques, job satisfaction, job enrichment, leadership, types & theories of leadership, effective communication.

UNIT–V

Controlling: system and process of controlling, budgetary and non-budgetary control techniques, use of computers and IT in management control, productivity problems and management, control and performance, direct and preventive control, reporting.

Text Books:

1. S.P. Robins and M. Couiter, "Management", 10th Edition,Prentice Hall India, 2009.
2. JAF Stoner, RE Freeman and DR Gilbert, "Management", 6th Edition, Pearson Education,2004.

Suggested Reading:

1. P.C. Tripathy & P.N.Reddy, "Principles of Management", Tata McGraw Hill, 1999.
2. Harold Koontz and Cyril O'Donnell "Principles of Management", Tata McGraw Hill, 2017.

18EE C 01

BASIC ELECTRICAL ENGINEERING

Instruction	3 L+1T Hours per week
Duration of SEE	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	4

Course Objectives:

1. To understand the behavior of different circuit elements R,L & C, and the basic concepts of electrical circuit analysis.
2. To know the concepts of AC circuits, RMS value, Average value, Phasor analysis etc.
3. To understand the basic principle of operation of Transformer and DC machines.
4. To understand the basic principle of operation of DC machines and AC machines.
5. To know about different types of electrical wires and cables, domestic and industrial wiring.
6. To understand safety rules and methods of earthing.

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

1. Acquire the concepts of Kirchhoff's laws and network theorems and able to get the solution of simple dc circuits.
2. Obtain the steady state response of RLC circuits and also determine the different powers in AC circuits.
3. Acquire the concepts of principle of operation of Transformers and DC machines.
4. Acquire the concepts of principle of operation of DC machines and AC machines.
5. Acquire the knowledge of electrical wiring and cables and electrical safety precautions.
6. Recognize importance of earthing and methods of earthing and electrical installations.

UNIT–I

DC Circuits Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation, Superposition, Thevenin and Norton Theorems, Time-domain analysis of firstorder RL and RC circuits.

UNIT–II

AC 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). Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT–III

Transformers Construction, Working principle, EMF Equation, Ideal and Practical transformer, Equivalent circuit of Transformer, OC and SC tests on a transformer, Efficiency and Regulation, Auto transformer.

UNIT–IV

DC and AC Machines DC Generators: Construction, Principle of operation, EMF equation, Classification, Characteristics of shunt, series and compound generators. DC Motors: Classification, Torque equation, Characteristics, Efficiency, Speed Control of Series and Shunt Motors. Three - Phase Induction Motors: Construction, Principle of operation, Torque equation, torque-slip characteristics, Power stages, speed control of induction motors.

UNIT–V

Electrical Installations Electrical Wiring: Types of wires and cables, Electrical Safety precautions in handling electrical appliances, electric shock, first aid for electric shock, safety rules. Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Earthing, Elementary calculations for energy consumption.

Text Books:

1. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
2. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.

Suggested Reading:

1. D. P. Kothari & I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
3. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill,2009
4. P.V.Prasad, S.sivanagaraju, R.Prasad, "Basic Electrical and Electronics Engineering", Cengage Learning, 1st Edition, 2013.

18CE M 01

ENVIRONMENTAL SCIENCE

Instruction	2 Hours per week
Duration of SEE	2 Hours
SEE	50 Marks
CIE	0 Marks
Credits	0

Course Objectives: To enable the student:

1. Identify environmental problems arising due to engineering and technological activities and the science behind those problems.
2. Become aware about the importance of eco system and biodiversity for maintaining ecological balance
3. To identify the importance of interlinking of food chain
4. Learn about various attributes of pollution management and waste management practices.
5. To make the students contribute for capacity building of nation for arresting and/or managing environmental disasters.

Course Outcomes: At the end of the course, the student should have learnt

1. To define environment, identify the natural resources and ecosystems and contribute for the conservation of bio-diversity.
2. To suggest suitable remedial measure for the problems of environmental pollution and contribute for the framing of legislation for protection of environment.
3. To relate the social issues and the environment and contribute for the sustainable development.
4. To follow the environmental ethics.
5. To contribute for the mitigation and management of environmental disasters.

UNIT–I

Environmental Studies: Definition, Scope and importance, need for public awareness.

Natural resources: Use and over utilization of Natural Resources - Water resources, Food resources, Forest resources, Mineral resources, Energy resources, Land resources.

UNIT–II

Ecosystems: Concept of an ecosystem, structure and function of an ecosystem, role of producers, consumers and decomposers, energy flow in an ecosystem,

food chains, food webs, ecological pyramids, Nutrient cycling, Bio-geo chemical cycles, Terrestrial and Aquatic ecosystems.

UNIT–III

Biodiversity: Genetic, species and ecosystem biodiversity, Bio-geographical classification of India, India as a Mega diversity nation. Values of biodiversity, hot-spots of biodiversity, threats to biodiversity, endangered and endemic species of India, methods of conservation of biodiversity.

UNIT–IV

Environmental Pollution: Cause, effects and control measures of air pollution, water pollution, marine pollution, soil pollution, noise pollution and Solid waste management, nuclear hazards

Environmental Legislations: Environment protection Act, Air, Water, Forest & Wild life Acts, issues involved in enforcement of environmental legislation, responsibilities of state and central pollution control boards

UNIT–V

Social issues and the environment: Water conservation methods: Rain water harvesting and watershed management, Environmental ethics, Sustainable development and Climate change: Global warming, Ozone layer depletion, forest fires, and Contemporary issues.

Text Books:

1. Y. Anjaneyulu, "Introduction to Environmental Science", B S Publications, 2004.
2. Suresh K. Dhameja, "Environmental Studies", S. K. Kataria& Sons, 2009.

Suggested Reading:

1. C. S. Rao," Environmental Pollution Control Engineering", Wiley, 1991.
2. S. S. Dara, "A Text Book of Environmental Chemistry & Pollution Control", S. Chand Limited, 2006.

18IT C06

DATA STRUCTURES AND ALGORITHMS LAB

Instruction	2 Hours per week
Duration of SEE	2 Hours
SEE	35 Marks
CIE	15 Marks
Credits	1

Course Objectives:

1. To introduce linked lists and operations.
2. To present Stacks, Queues and their applications.
3. To familiarize pattern matching algorithms.
4. To introduce Sorting algorithms and Hashing.
5. To gain knowledge of trees, graphs and related algorithms.

Course Outcomes: Upon completing this course, students will be able to:

1. Implement linked lists.
2. Develop ADT necessary for solving problems based on Stacks and Queues.
3. Perform pattern matching.
4. Implement various Sorting Algorithms and Hashing.
5. Identify data structures suitable for providing optimal solutions to real world problems.

List of Programs

1. Define Single Linked List ADT and implement its operations.
2. Define Double Linked List ADT and implement its operations.
3. Implement Stack ADT and perform Infix to Postfix Conversion.
4. Perform evaluation of postfix expression using Stack ADT.
5. Implement Queues, Circular Queues and Deques using arrays and linked lists.
6. Define String ADT and implement Boyer Moore pattern matching algorithm.
7. Implement Tries.
8. Implement the following: Insertion Sort, Bubble Sort, Selection Sort, and Shell Sort.
9. Implement the following: Merge Sort, Quick Sort, Heap Sort, and Binary Search.
10. Construct a Binary Search Tree and implement Tree Traversal techniques.

11. Implement Hashing with chaining.
12. Implement Graph traversal techniques.

Text Books:

1. Narasimha Karumanchi, "Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles", CareerMonk Publications, 2016.
2. Michael T. Goodrich, Roberto Tamassia, David M. Mount, "Data Structure and Algorithms in C++", 2nd Edition, John Wiley, 2011.

Suggested Reading:

1. Narasimha Karumanchi, "Coding Interview Questions", CareerMonk Publications, 3rd Edition, 2016
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Addison-Wesley, 3rd Edition, 2007.
3. D. Samantha, "Classic Data Structures", Prentice Hall India, 2nd Edition, 2013.

Web Resources:

1. https://leetcode.com/
2. https://www.hackerearth.com/practice/data-structures/arrays/1-d/tutorial/
3. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html

18IT C08

MINI PROJECT – I

Instruction	2 Hours per week
Duration of SEE	-
SEE	-
CIE	50 Marks
Credits	1

Course Objectives:

1. To enable students learn by doing.
2. To develop capability to analyse and solve real world problems
3. To develop innovative ideas among the students

Course Outcomes: Students should be able to do the following:

1. To provide innovative solutions
2. To work in a team
3. To manage time and resources in the best possible manner

The Students are required to choose a topic for miniproject related to the courses of this semester. The student has to implement and present the project as per the given schedule. During the implementation of the project, Personnel Software Process (PSP) has to be followed. Report of the project work has to be submitted for evaluation.

Schedule

S.No	Description	Duration
1.	Problem Identification / Selection	2 weeks
2.	Preparation of Abstract	1 week
3.	Design, Implementation & Testing of the Project	7 weeks
4.	Documentation & Project Presentation	4 weeks

Guidelines for the Award of marks

S.No.	Description	Max. Marks
1.	Weekly Assesment	20
2.	PPT Preparation	05
3.	Presentation	10
4.	Question and Answers	05
5.	Report Preparation	10

Final MiniProject demonstration and PPT presentation is to be evaluated for the entire class together by all the faculty handling MiniProject for that class.

18ECC 35

BASIC ELECTRONICS LAB

Instruction	2 Hours per week
Duration of SEE	2 Hours
SEE	35 Marks
CIE	15 Marks
Credits	1

Course Objectives: This course aims to:

1. Learn about various electronic components and devices.
2. Study the transistor characteristics in different modes.
3. Learn about oscillators and amplifiers.

Course Outcomes: Upon completion of this course, students will be able to:

1. Familiarize on basic electronic components, devices and system.
2. Analyze the measurements of time period, amplitude and phase of different waveforms.
3. Design and analyze the behavior of the regulator and rectifier.
4. Develop various types of oscillators and power amplifiers
5. Design the various circuits using operational amplifiers.

Prerequisite: Knowledge about semiconductor physics and basic electrical engineering.

List of Experiments

1. Study of Electronic components.
2. Characteristics of Semiconductor diodes (Ge, Si and Zener).
3. CRO and its Applications.
4. Half, Full wave rectifiers with and without filters.
5. Voltage Regulator using zener diode.
6. Characteristics of BJT in CE Configuration.
7. Characteristics of FET in CS Configuration.
8. Amplifier with and without feedback.
9. RC Phase shift oscillator
10. Operational Amplifier and its applications.
11. Power Amplifiers Characteristics
12. Realization of Half and Full adder

Text Books:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, "Basic Electronics,a Text - Lab Manual", 7th Edition, TMH, 1994.
2. Paul B. Zbar, "Industrial Electronics, a Text - Lab Manual", 4th Edition, 2008.

18EG C03

SOFT SKILLS

Instruction	2 Hours per week
Duration of SEE	2 Hours
SEE	35 Marks
CIE	15 Marks
Credits	1

Course Objectives: The course will introduce the students to:

1. Imbibe an impressive personality, etiquette, professional ethics & values, effective time management & goal setting.
2. Understand the elements of professional update & upgrade through industry exposure in a mini-live project. Understand confidence building strategies and thereby to make effective presentations through PPTs.
3. Learn what constitutes proper grooming and etiquette in a professional environment. Acquire the necessary skills to make a smooth transition from campus to corporate.

Course Outcomes : After successful completion of the course the students will be able to:

1. Be assertive and set short term and long term goals. Also learn to manage time effectively and deal with stress.
2. Win in professional communication situations and participate in group discussions with confidence. Write abstracts.
3. Write effective resumes. Plan, prepare and face interviews confidently.
4. Adapt to corporate culture by being sensitive - personally and sensible - professionally. Draft an SOP.
5. Apply the soft skills learnt in the mini-live project, by collecting and analyzing data and making oral and written presentations on the same.

Exercise 1

Main Topics: Thinking Skills, Personality Development – Effective Time Management, setting realistic goals, self confidence and assertiveness, stress management, moral values.
Flipped Sessions: Personal Sensitivity & Professional Sensibility (Reading & Discussion)
Writing Input: Writing to Express - Drafting & Delivering a Speech (Free Writing Exercise)

Exercise 2

Main Topics: Advanced Group Discussion with Case studies: Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.

Flipped Sessions: Importance of Professional Updating & Upgrading (Reading & Discussions)
Writing Input: Writing with Precision - Writing Abstracts

Exercise 3

Main Topics: Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, mock interviews. Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skills.
Flipped Sessions: Mock Interviews (Video Sessions & Practice)
Writing Input: Writing to Reflect - Resume Writing

Exercise 4

Main Topic: Corporate Culture – Grooming and etiquette, communication media, academic ethics and integrity
Flipped Sessions: Corporate Culture, Etiquette & Grooming (Video Sessions & Practice through Role-play)
Writing Input: Writing to Define - Writing an effective SOP.

Exercise 5

Main Topic: Mini Project – General/Technical. Research, developing a questionnaire, data collection, analysis, written report and project seminar. Elements & Structure of effective presentation. Presentation tools – Body language, Eye-contact, Props & PPT.
Flipped Sessions: Effective Presentations (Video & Writing Sessions, Practice through Emulation)
Writing Input: Writing to Record - Writing minutes of meeting.

Suggested Reading:

1. Madhavi Apte , "**A Course in English communication**", Prentice-Hall of India, 2007.
2. Dr. Shalini Verma, **"Body Language- Your Success Mantra**", S Chand, 2006.
3. Ramesh, Gopalswamy, and Mahadevan Ramesh, "**The ACE of Soft Skills",** New Delhi: Pearson, 2010.
4. Van Emden, Joan, and Lucinda Becker, "**Presentation Skills for Students**", New York: Palgrave Macmillan, 2004.

* Flipped Class-room: Students explore the concept first and then trainer explains it, students work on their own.

Web Resources:

1. https://www.goskills.com/Soft-Skills
2. https://www.trainerbubble.com
3. https://www.skillsconverged.com

18EE C02

BASIC ELECTRICAL ENGINEERING LAB

Instruction	2 Hours per week
Duration of SEE	2 Hours
SEE	35 Marks
CIE	15 Marks
Credits	1

Course Objectives:

1. To acquire the knowledge of different types of electrical elements.
2. To verify the basic electrical circuit laws and theorems.
3. To determine the parameters and power factor of a coil.
4. To calculate the time and frequency responses of RLC circuits
5. To determine the characteristics of Transformers.
6. To determine the characteristics of dc and ac machines.

Course Outcomes: At the end of the course, the students are expected to

1. Get an exposure to common electrical components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the circuit analysis techniques.
4. Determine the parameters of the given coil.
5. Understand the basic characteristics of transformer.
6. Understand the basic characteristics of dc and ac machines. List of Laboratory

Experiments/Demonstrations:

1. Demonstration of Measuring Instruments and Electrical Lab components
2. Verification of KCL and KVL.
3. Time response of RL and RC circuits.
4. Calculation of permittivity of a choke or coil by Wattmeter Method.
5. Verification of Thevenin's and Norton's theorems.
6. Turns ratio /voltage ratio verification of 1-Ph Transformers.
7. OC and SC tests on a given 1-Ph Transformer.
8. Observation of Excitation Phenomenon in Transformer.
9. Measurement of 3-Ph power in a balanced system (By 2- Wattmeter method).
10. Measurement of 3-Ph Energy by an Energy Meter (Demonstration of Principle).

11. Load test of DC Shunt motor.
12. Speed control of DC Shunt motor.
13. Load test of 3-Ph Induction motor.
14. Demonstration of LT Switchgear Equipment/Components.
15. Demonstration of cut - out section of Machines like DC Machine, Induction Machine etc.

Note: At least TEN experiments should be conducted in the semester.

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY(A)
AICTE Model Curriculum (with effect from 2019-20)
B.E. (Information Technology)

Semester– IV

S.No	Course Code	Title of the Course	Scheme of Instruction		Scheme of Examination			Credits
			Hours per Week		Duration of SEE in Hours	Maximum Marks		
			L/T	P/D		CIE	SEE	
THEORY								
1	18IT C03	Digital Logic and Computer Architecture	3	-	3	30	70	3
2	18IT C09	Database Management Systems	3	-	3	30	70	3
3	18IT C10	Java Programming	2	-	2	20	50	2
4	18IT C11	Design and Analysis of Algorithms	3	-	3	30	70	3
5	18MT C09	Probability and Statistics	3/1	-	3	30	70	4
6	18EG M01	Indian Constitution	2	-	2	-	50	Non - Credit
PRACTICALS								
8	18IT C07	IT Workshop	-	2	-	50	-	1
9	18IT C12	Database Management Systems Lab	-	2	2	15	35	1
10	18IT C13	Java Programming Lab	-	2	2	15	35	1
8	18IT C14	Mini Project - II	-	2	-	50	-	1
		TOTAL	16/1	8	-	270	450	19

L: Lecture T: Tutorial D: Drawing P: Practical
CIE-Continuous Internal Evaluation SEE-Semester End Examination

18IT C03

DIGITAL LOGIC AND COMPUTER ARCHITECTURE

Instruction	3 Hours per week
Duration of SEE	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	3

Course Objectives:

1. To familiarize with logic gates, combinational and Sequential logic circuits.
2. To provide understanding of Data representation.
3. To present the operation of the Central Processing Unit.
4. To facilitate with the techniques that computers use to communicate with input and output devices.
5. To introduce the concept of memory hierarchy and memory management.

Course Outcomes: Upon completing this course, students will be able to:

1. Understand simplification of logic gates,fundamentals of combinational and sequential logic gates.
2. Design of registers, counters and representation of data using numbers.
3. Understand the architecture and functionality of central processing unit.
4. Discuss the techniques that computers use to communicate with I/O devices for data transfer.
5. Comprehend memory hierarchy, cache memory and virtual memory.

UNIT–I

Digital Logic Circuits : Digital Computers, Logic Gates, Boolean Algebra, Map simplification, Product –of-sums Simplification, Don't –Care Conditions, Combinational Circuits , Half-Adder, Full –Adder, Flip-Flops: SR,D,JK,T Flip-Flops, Edge triggered Flip-Flops, Excitation Tables, Digital Components: Integrated circuits, Decoders. Encoders, Multiplexers

UNIT–II

Registers: Register with Parallel load, Shift Register, Counters. **Data Representation:** Data Types, Number Systems, Octal and Hexadecimal Numbers, Decimal Representation, Alphanumeric Representation, Complements: (r-1)'s Complement, r's Complement, Subtraction of Unsigned Numbers, Fixed–Point Representation, Floating –Point Representation, Other Binary Codes, Error Detection Codes.

UNIT–III

Central Processing Unit: General register Organization, Stack Organization: Register Stack, Memory Stack, Reverse Polish Notation, Instruction Formats: ThreeAddress Instructions, Two-Address Instructions, One-Address Instructions, Zero-Address Instructions, RISC Instructions, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC): CISC Characteristics, RISC Characteristics.

UNIT–IV

Input-Output Organization: Peripheral Devices: ASCII AlphanumericCharacters, Input-output Interface: I/O Bus and Interface Modules, Asynchronous Data Transfer: Strobe Control, Handshaking, Asynchronous Communication Interface, First-In- First-Out Buffer, Modes of Transfer: Interrupt-Initiated I/O, Priority Interrupt: Daisy Chaining Priority, Parallel Priority Interrupt, Priority Encoder, Direct Memory Access (DMA): DMA Controller.

UNIT–V

Memory Organization: Memory Hierarchy, Main Memory: RAM and ROM Chips, Memory Address Map, Memory Connection to CPU, Auxiliary memory: Magnetic Disks, Magnetic Tapes, Associative Memory: Hardware Organization, Match Logic, Read and Write Operations, Cache Memory: Associative Mapping, Direct Mapping, Set-Associative Mapping, Virtual Memory: Address Space and Memory Space, Address Mapping using Pages, Associative Memory Page Table, Page Replacement.

Text Book:

1. M.Morris Mano, "Computer System Architecture", 3rd Edition, Pearson Education.

Suggested Reading:

1. Stephen Brown, ZvonkoVranesic, "Fundamentals of Digital Logic with VHDL design", 2nd Edition, McGraw Hill, 2009.

2. ZVI Kohavi, "Switching and Finite Automata Theory", 2nd Edition, Tata McGraw Hill, 1995.
3. William Stallings, "Computer Organization and Achitecture", 8th Edition,PHI.
4. Carl Hamachar, Vranesic, Zaky, "Computer Organization", 5th Edition, McGraw Hill.

Web Resources:

1. https://nptel.ac.in/courses/117106114Week1%20Slides1.1Introduction.pdf
2. https://ece.gmu.edu/coursewebpages/ECE/ECE545/F10/viewgraphs/ECE545_lecture1_digital_logic_review.ppt
3. http://www.nptelvideos.in/2012/11/computer-organization.html

18IT C09

DATABASE MANAGEMENT SYSTEMS

Instruction	3 Hours per week
Duration of SEE	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	3

Course Objectives:

1. To introduce the fundamental concepts and the role of a database system in an organization.
2. To acquire knowledge on Data base design models, constraints and notations.
3. To familiarize with querying databases using SQL.
4. To acquaint with design and implementation issues of a database system.
5. To discuss the concepts of database security, concurrency and recoverability.

Course Outcomes: Upon completing this course, the students will be able to:

1. Understand the purpose of database systems and design any domain specific database using E-R model.
2. Design and implement a database using Relational data model, formulate Relational algebra expressions. Use SQL for efficient data retrieval queries.
3. Access databases from high level languages, define triggersand apply normalization.
4. Efficiently organize and manage data using indexing and hashing.
5. Understand the conceptsof database transactions, locking protocols, concurrency control, backup and recovery.

UNIT–I

Introduction: Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information Retrieval Specialty Databases, Database Users and Administrators. **Database Design and the E-R Model:** Overview of the Design Process, the EntityRelationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational

Schemas, Entity-Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling Data.

UNIT–II

Introduction to the Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations. **Introduction to SQL:** Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database**. Intermediate SQL:** Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization.

UNIT–III

Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries, Advanced Aggregation Features. **Relational Database Design:** Features of Good Relational, Designs, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Functional-Dependency Theory,Algorithms for Decomposition, Decomposition using Multivalued Dependencies.

UNIT–IV

Indexing and Hashing: Basic Concepts, Ordered Indices, B+ Tree Index Files, Multiple-Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices, Index Definition in SQL **Transactions:** Transaction Concept, a Simple Transaction Model, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels.

UNIT–V

Concurrency Control: Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multiversion Schemes, Snapshot Isolation, Insert Operations, Delete Operations and Predicate Reads. **Recovery System:** Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, ARIES, Remote Backup Systems.

Text Book:

1. Abraham Silberschatz, Henry F Korth, S. Sudarshan, "Database System Concepts", 6th Edition, McGraw-Hill International Edition, 2010**.**

Suggested Reading:

1. RamezElmasri, Shamkant B. Navathe, "Fundamentals of Database System", 6th Edition, Addison-Wesley, 2011.
2. Raghu Ramakrishnan,JohannesGehrke, "Database Management Systems", 3rd Edition, McGraw-Hill International Edition, 2014
3. Rick F Vander Lans, "Introduction to SQL", 4th Edition, Pearson Education, 2007.
4. Benjamin Rosenzweig, Elena Silvestrova, "Oracle PL/SQL by Example", 5th Edition, Pearson Education, 2015.

Web Resources:

1. http://db-book.com/
2. https://www.tutorialspoint.com/dbms/
3. https://www.w3schools.in/dbms/
4. http://www.oracle-dba-online.com/sql/oracle_sql_tutorial.htm.
5. http://www.tutorialspoint.com/plsq

18IT C10

JAVA PROGRAMMING

Instruction	2 Hours per week
Duration of SEE	2 Hours
SEE	50 Marks
CIE	20 Marks
Credits	2

Course Objectives:

1. To familiarize with fundamentals of object-oriented programming paradigm.
2. To impart the knowledge of string handling, interfaces, packages and inner classes.
3. To acquaint with Exception handling mechanisms and Multithreading.
4. To gain knowledge on collection framework, stream classes.
5. To familiarize with event driven GUI and Database connectivity.

Course Outcomes: After successful completion of this course, student will be able to:

1. Understand object-oriented concepts.
2. Create Java applications using best OOP practices e.g. Inheritance, interfaces, packages, and inner classes.
3. Implement the concepts of Exception Handling and Multi threading.
4. Develop applications using Collections framework.
5. Design and Develop GUI applications with JDBC.

UNIT–I

Introduction to Java: Objects, Classes, structure a java program, difference betweenjdk and jre, Java Primitive Types, Basic Operators, Conditional and Logical statements.

Defining Classes: Adding Instance Fields and Methods, Constructors, Access Modifiers (Visibility Modes), Object Creation Examples, Method Overloading and Constructor Overloading, Use of static andfinalkeywords, Objects as parameters, Difference between local variable and instance field, importance of Object class.

UNIT–II

Inheritance, Interfaces and Packages in Java: Defining super / sub classes, Abstract classes, Method overriding, Interfacesand new features in latest version.

Packages: Defining, Creatingand Accessing a Package, importing packages.

Arrays,StringsinJava: Howtocreateanddefinearrays,Introductionto java.util. Array class, Difference between String &String Buffer classes, String Tokenizer class and Wrapperclassesandconversionbetween Objects and primitives, Autoboxing and unboxing

Inner classes in Java: Types of inner classes, Creating static / non-static inner classes, Local and anonymous innerclasses.

UNIT–III

Exception Handling in Java: What are exceptions, Error vs. Exception, usage of try, catch, throw throws and finally clauses, writing your own exception classes, Difference between checked vs. unchecked Exceptions.

Generics: Need of Generics concept, Generic classes, bounded types, Generic methods and interfaces.**Multithreading in Java:** The java Thread Model, How to create threads, Thread class in java, Thread priorities, Inter thread communication, Thread synchronization.

UNIT–IV

Collections: Overview of Java Collection Framework, Collection Interfaces – Collection, Set, List, Map, Commonly used Collectionclasses – ArrayList, LinkedList, HashSet, TreeSet, HashMap, TreeMap, legacy and class, Iteration over Collections – Iterator and ListIterator, Enumeration interfaces, differentiate Comparable and Comparator

File Handling: Stream classes, Reader and Writer classes, File and Directory class, How to read user input fromkeyboard. New Features in java 8 and 9

UNIT–V

GUI Design & Event Handling: Component, Container, Color,GUI Controls, Layout Managers, Introduction to Swings, Delegation Event Model, Event Classes, Source of Events, Event Listener Interfaces. Handlingbutton click, mouse and keyboard events, and Adapter classes. Writing GUI Based applications, Applets, life cycle of an Applet, Developing and running applets, passing parametersto applets.

Database Handling in Java: Java Database Connectivity (JDBC) using MySQL.

Text Books:

1. Herbert Schildt, "Java: The Complete Reference", 8th Edition, TataMcGraw Hill Publications, 2011.
2. Cay S. Horstmann, Gary Cornell,"Core Java, Volume I—Fundamentals", 8th Edition, Prentice Hall, 2008.

Suggested Reading:

1. Sachin Malhotra, Saurabh Choudhary, "Programming in Java", Oxford University Press, 2nd Edition, 2014.
2. C.ThomasWu, "An Introduction to Object-Oriented Programming with Java", TataMcGraw-Hill, 4th Edition, 2010.

Web Resources:

1. https://www.cse.iitb.ac.in/~nlp-ai/javalect_august2004.html
2. https://nptel.ac.in/courses/106106147/2
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-092-introduction-to-programming-in-java-january-iap-2010/lecture-notes/

18IT C11

DESIGN AND ANALYSIS OF ALGORITHMS

Instruction	3 Hours per week
Duration of SEE	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	3

Course Objectives:

1. To analyze the performance of various algorithms.
2. To illustrate different paradigms of problem solving.
3. To learn about various algorithm design techniques and illustrates them using a number of well known problems and applications.
4. To familiarize graph traversal and search techniques.
5. To discuss NP hard and NP complete problems and their applications.

Course Outcomes: Upon completing this course, students will be able to:

1. Analyse best, average and worst case complexities of algorithms and choose appropriate data structure for designing algorithm.
2. Design solutions using Divide and Conquer, Greedy techniques.
3. Design algorithms using dynamic programming approach, apply various traversal and search techniques.
4. Design algorithms using backtracking, branch and bound techniques.
5. Identify P, NP, NP-Complete and NP-Hard classes to which an algorithm belongs and design a feasible solution.

UNIT-I

Introduction: Algorithm Specification, Performance analysis: Space Complexity, Time Complexity, Asymptotic Notation (O, Omega, Theta), Practical Complexities, Performance Measurement, **Elementary Data Structures:** Stacks and Queues, Trees, Dictionaries , Priority Queues, Sets and Disjoint Set Union.

UNIT-II

Divide and Conquer: The general method, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Selection Sort, Strassen's Matrix Multiplication.
Greedy Method: The General Method, Knapsack Problem, Job Sequencing with Deadlines, Minimum Cost Spanning Trees, Optimal Storage on Tapes, Optimal Merge Patterns, Single Source Shortest Paths.

UNIT-III

Dynamic Programming: The General Method, Multistage graphs, All Pair Shortest Paths, Single Source Shortest Paths, Optimal Binary Search Trees, 0/1 Knapsack, Reliability Design, The Traveling Salesperson Problem.
Traversal and Search Techniques: Breadth First Search and Traversal, Depth First Search and Traversal, Connected Components and Spanning Trees, Bi-connected Components and DFS.

UNIT-IV

Backtracking: The General Method, 8-Queens Problem, Graph Colouring, Hamilton cycles, Knapsack Problem.
Branch and Bounds: The Method: Least Cost (LC) Search, The 15 puzzle, FIFO Branch and Bound, LC Branch and Bound, 0/1 Knapsack Problem, Traveling Salesperson Problem.

UNIT-V

NP-Hard and NP-Complete Problems: Basic Concepts: Non-Deterministic Algorithms, the Classes NP Hard and NP Complete. Cook's theorem, NP-Hard Graph Problems: Node Cover Decision Problem, Chromatic Number Decision Problem, Directed Hamiltonian Cycle, Traveling Salesperson Decision Problem, NP Hard Scheduling Problems: Job Shop Scheduling.

Text Books:

1. Ellis Horowitz, Sartaj Sahani, Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithm, 2nd Edition", Universities Press, 2011.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", 2nd Edition, Prentice Hall of India Private Limited, 2006.

Suggested Reading:

1. AnanyLevitin, "Introduction to the Design & Analysis of Algorithms", Pearson Education, 2003.
2. Aho, Hopcroft, Ullman, "The Design and Analysis of Computer Algorithm", Pearson Education, 2000.
3. Parag H.Dave, Himanshu B. Dave, "Design and Analysis of Algorithms", 2nd Edition, Pearson Education, 2014.

Web Resources:

1. http://nptel.ac.in/courses/ 106101060
2. http://nptel.ac.in/courses/106106131

18MT C09

PROBABILITY AND STATISTICS

Instruction	3 L+1T Hours per week
Duration of SEE	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	4

Course Objectives:

1. Able to learn and Analysing data in Linear and Non-Linear form.
2. Able to fit the hypothetical data using probability distribution.
3. Understand the data using the testing of Hypothesis.
4. Able to Analysing time series data using trend analysis.
5. Able to formulate and get the solution of real world problem.

Course Outcomes: On successful completion of this course the students shall be able to

1. Use the principle of Least Squares approximating for estimating the value.
2. Use the basic probability for fitting the Random phenomenon.
3. Analysing data using different methods of hypothesis testing.
4. Use the Moving Averages Methods for trend analysis.
5. Analyse the random phenomena of real world data.

UNIT-I

Basic Statistics: Measures of Central Tendency, Measures of Dispersion, Skewness (SKP & SKB) for frequency distribution, Kurtosis, Curve fitting by the Method of Least Squares, Fitting of Straight lines, Second degree parabola and Growth curve ($y = ae^{bx}$, $y = ax^b$ and $y = ab^x$).

UNIT-II

Discrete Probability Distributions: Basic probability, Conditional probability, Bayes theorem, Random variable, Discrete random variable, continuous random variable, Properties of probability mass function, probability density function, Mathematical expectation variance, co-variance and properties, Poisson distribution, Poisson Distribution is a limiting form of Binomial Distribution), MGF, CGF, fitting of Poisson distribution.

UNIT-III

Continuous Probability Distribution and Bivariate Distribution: Continuous probability distribution-Normal distribution-Standard Normal random variable (MGF, Expectation, Variance, Properties of Normal Curve)-Areas under Normal curve-Exponential distribution (MGF, CGF, Expectation, Variance)-Uniform distribution (MGF, Expectation, Variance)-Bivariate data two dimensional Discrete random variable, continuous random variable, Marginal probability function, Properties of joint probability function-sum and differences.

UNIT-IV

Small Sample Test: Inferential statistics-Test of significance-Large sample test for single proportion, difference of proportions, single mean, difference of means and differences of standard deviations. Small sample test-test for single mean, differences of Means, test for ratio of variances, Chi-Square test for goodness of fit and independent of attributes.

UNIT-V

Time Series Analysis and ANOVA: One way classification-Assumptions for ANOVA Test-ANOVA for fixed effect model-Two way classification-ANOVA for fixed effect model-Components of Time series-Measurement of Trend-Method of semi Averages- Moving Averages Method (3 Years and 5 Years).

Text books:

1. S.C.Gupta, V.K.Kappoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons, 2014.
2. S.C.Gupta, V.K.Kappoor, "Fundamentals of Applied Statistics", Sultan Chand and Sons, 2014.
3. Sheldon Ross, "A First Course in Probability", 9th Edition, Pearson publications, 2014.

Suggested Reading:

1. W. Feller, "An Introduction to Probability Theory and its Applications", Vol. 1, 3rd Edition, Wiley, 1968.

18EG M01

INDIAN CONSTITUTION

Instruction	2 Hours per week
Duration of SEE	2 Hours
SEE	50 Marks

Course Objectives: The course will introduce the students to:

1. The history of Indian Constitution and how it reflects the social, political and economic perspectives of the Indian society.
2. Address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indiannationalism.
3. Have knowledge of the various Organs of Governance and Local Administration.

Course Outcomes: After successful completion of the course the students will be able to :

1. Understand the making of the Indian Constitution and its features.
2. Have an insight into various Organs of Governance - composition and functions.
3. Understand powers and functions of Municipalities, Panchayats and Co-operativeSocieties.
4. Be aware of the Emergency Provisions in India.
5. Understand the Right To equality, the Right To freedom and the Right To Liberty.

UNIT-I

Constitution of India: Introduction and salient features, Constitutional history. Directive Principles of State Policy - Its importance and implementation.

UNIT-II

Union Government and its Administration: Structure of the Indian Union: Federalism, distribution of legislative and financial powers between the Union and the States.
Parliamentary form of government in India. President: role, power and position.

UNIT-III

Emergency Provisions in India: National emergency, President rule, Financial emergency

UNIT-IV

Local Self Government: District's Administration Head: Role and Importance. Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation.
Panchayati Raj: Introduction, Zilla Panchayat, Elected officials and their roles, CEO Zilla Panchayat: Position and role. Block level: Organizational Hierarchy (Different departments). Village level: Role of Elected and officials.

UNIT-V

Scheme of The Fundamental Rights & Duties: Fundamental Duties - The legal status.
Scheme of The Fundamental Rights - To Equality, to certain Freedom Under Article 19, to Life And Personal Liberty Under Article 21.

Suggested Reading:

1. The Constitution of India, 1950 (Bare Act), GovernmentPublication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar, Framing of Indian Constitution, 1st Edition,2015.
3. M. P. Jain, Indian Constitution Law, 7th Edition, Lexis Nexis,2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis,2015.

Web Resource:

1. http://www.nptel.ac.in/courses/103107084/Script.pdf

18IT C07

IT WORKSHOP

Instruction	2 Hours per week
Duration of SEE	-
SEE	-
CIE	50 Marks
Credits	1

Course Objectives:

1. To understand the basic components and peripherals of a computer.
2. To become familiar in configuring a system.
3. To impart the usage of productivity tools.
4. To acquire knowledge about the netiquette and plagiarism.
5. To get hands on experience in LATEX.

Course Outcomes: Upon successful completion of the course students will be able to:

1. Identify the basic components and peripherals of a computer.
2. Installation of Operating System and various Device Drivers.
3. Work on MS Office Packages.
4. Understand Net etiquette and Plagiarism tools.
5. Create documents using LATEX.

List of Experiments

1. System Assembling, Disassembling and identification of Parts / Peripherals.
2. **Operating System Installation** - Install Operating Systems like Windows, Linux along with necessary Device Drivers.
3. **MS-Office:Word** - Formatting, Page Borders, Reviewing, Equations, symbols. **Spread Sheet** - organize data, usage of formula, graphs, charts.**Power point** - features of power point, guidelines for preparing an effective presentation.
4. **Essentials:** Search Engines & Net etiquette, Plagiarism, Open source tools and other Utility Tools.
5. **LATEX** - basic formatting, handling equations and images.

Text Books:

1. K.L. James, "Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance", Eastern Economy Edition.

2. Gary B. Shelly, Misty E. Vermaat, Thomas J. Cashman, "Microsoft Office 2007: Introductory Concepts and Techniques", Windows XP Edition, 2007.
3. Leslie Lamport," LATEX- User's Guide and Reference manual", 2nd Edition, Pearson, LPE.

Suggested Reading:

1. Scott. Mueller, "Scott Mueller's Upgrading and Repairing PCs", 18th Edition, QUE, Pearson,2008.
2. Cheryl A Schmidt, "The Complete Computer upgrade and repair book", 3rd Edition, Dreamtech.

Web Resources:

1. https://en.wikibooks.org/wiki/How_To_Assemble_A_Desktop_PC/Assembly
2. https://www.auburn.edu/citizenship/netiquette.html
3. https://tex.stackexchange.com/questions/79051/how-to-style-text-in-hyperref-url

18IT C12

DATABASE MANAGEMENT SYSTEMS LAB

Instruction	2 Hours per week
Duration of SEE	2 Hours
SEE	35 Marks
CIE	15 Marks
Credits	1

Course Objectives:

1. To introduce the basic commands of SQL, functions and procedures.
2. To familiarize with query processing.
3. To impart knowledge on triggers and DML.
4. To introduce database security methods.
5. To familiarize with design and development of database applications.

Course Outcomes: Upon completion of this course, the students will be able to:

1. Design and implement database schemas by enforcing integrity constraints.
2. Use SQL for database administration, data manipulation and retrieval.
3. Write PL/SQL programs, define triggers and cursors for the databases.
4. Enforcesecurity features for database applications.
5. Design, Create Forms and Reports from multiple tables.

List of Programs

1. Creation of database (Exercising commands like DDL and DML) (Note: use constraints while creating tables).
2. Exercising simple to complex queries
   a. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSECT Constraints.
   b. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING clause and Creation and dropping of Views.
   c. Exercising all types of Joins.
3. Demonstration of PL/SQL Blocks and Cursors.
4. Demonstration of Procedures and Functions.
5. Usage of Triggers (BEFORE and AFTER Triggers, Row and Statement level Triggers and INSTEAD OF Triggers).
6. Demonstrate Exception Handling by PL/SQL procedures for data validation.
7. Creating Password and Security features for applications.

8. Usage of File locking, table locking facilities in applications.
9. Creation of Forms and Generation of SQL reports.
10. Creation of full-fledged database application spreading over to 3 sessions

Text Books:

1. Rick F Vander Lans, "Introduction to SQL", 4th Edition, Pearson Education, 2007.
2. Benjamin Rosenzweig, Elena Silvestrova, "Oracle PL/SQL by Example", 5th Edition, Pearson Education, 2015.
3. Alan Beaulieu, "Learning SQL",2nd Edition,O'Reilly,2009.

Suggested Reading:

1. Albert Lulushi, "Oracle Forms Developer's Handbook", Pearson Education, 2006.

Web Resources:

1. http://www.oracle-dba-online.com/sql/oracle_sql_tutorial.htm
2. https://www.javatpoint.com/pl-sql-tutorial

18IT C13

JAVA PROGRAMMING LAB

Instruction	2 Hours per week
Duration of SEE	2 Hours
SEE	35 Marks
CIE	15 Marks
Credits	1

Course Objectives:

1. To gain the fundamental programming knowledge of OOPs.
2. To use Exception handing mechanisms in application development.
3. To provide the knowledge of generics and Collections Framework.
4. To acquaint with GUI design and Event hanling using AWT andSwing.
5. To provide the knowledge of writing applications using JDBC.

Course Outcomes: After successful completion of this course, student will be able to:

1. Develop Java applications using the concepts of Inheritance, interfaces, packages and access controlspecifiers.
2. ImplementtheconceptsofExceptionHandling and Multithreading injavaApplications.
3. Read and write data using different Java I/Ostreams.
4. Develop applications using Collections framework.
5. Create GUI applications using AWT, Swing Packages withJDBC.

List of Programs

1. Program(s) to illustrate the concepts of constructor overloading, method overloading, static and final keywords usage.
2. Program(s) to illustrate the concepts of Inheritance, method overriding, super keyword usage, and Dynamic polymorphism.
3. Program(s) to illustrate concept of abstract class &interfaces.
4. Program(s) to demonstrate Stringhandling with String, StringBuffer and StringTokenizer classes.
5. Program(s) to demonstrate various types of inner classes, Packages creation and usage.
6. Program(s) to demonstrate concept of exception handling and user definedexceptions.
7. Program(s) to demonstrate concept of Multithreading and Thread synchronization.

8. Program(s) using Generics, Collection framework classes and Interfaces.
9. Porograms(s) on Comparator and Comparableinterfaces to define customized sorting order on collection objects.
10. Program(s) to illustrate the usage of I/O streams.
11. Program(s) toillustrate GUI with different controls, eventhandling and applets.
12. Program to connect to a database using JDBC using various databases.

Text Books:

1. HerbertSchildt, "Java:The Complete Reference", 8th Edition,Tata McGraw Hill Publications,2011.
2. Cay S. Horstmann, Gary Cornell: "Core Java, Volume I—Fundamentals", 8th Edition, Prentice Hall, 2008.

Suggested Reading:

1. Sachin Malhotra, Saurabh Choudhary: "Programming in Java", Oxford University Press, 2nd Edition, 2014.
2. C. Thomas Wu, "Anintroduction to Object - Oriented Programming with Java", Tata Mc Graw- Hill Publishing company Ltd., 4th Edition, 2010.

Web Resources:

1. https://www.cse.iitb.ac.in/~nlp-ai/javalect_august2004.html
2. https://nptel.ac.in/courses/106106147/2
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-092-introduction-to-programming-in-java-january-iap-2010/lecture-notes/

18IT C14

MINI PROJECT – II

Instruction	2 Hours per week
Duration of SEE	-
SEE	-
CIE	50 Marks
Credits	1

Course Objectives:

1. To enable students learn by doing.
2. To develop capability to analyse and solve real world problems
3. To develop innovative ideas among the students

Course Outcomes: Students should be able to do the following:

1. To provide innovative solutions
2. To work in a team
3. To manage time and resources in the best possible manner

The Students are required to choose a topic for miniproject related to the courses of this semester. The student has to implement and present the project as per the given schedule. During the implementation of the project, Personnel Software Process (PSP) has to be followed. Report of the project work has to be submitted for evaluation.

Schedule

S.No	Description	Duration
1.	Problem Identification / Selection	2 weeks
2.	Preparation of Abstract	1 week
3.	Design, Implementation & Testing of the Project	7 weeks
4.	Documentation & Project Presentation	4 weeks

Guidelines for the Award of marks

S.No.	Description	Max. Marks
1.	Weekly Assesment	20
2.	PPT Preparation	05
3.	Presentation	10
4.	Question and Answers	05
5.	Report Preparation	10

Final Mini Project demonstration and PPT presentation is to be evaluated for the entire class together by all the faculty handling MiniProject for that class.