



Choice Based Credit System (CBCS)

Name of the Programme (PG): M.C.A

Syllabus for I - Semester and II - Semester

With effect from 2016 - 2017

Specialization /Branch: Master of Computer Applications

Chaitanya Bharathi Institute of Technology (A)

Chaitanya Bharathi (P.O), Gandipet

Hyderabad-50007, Telangana



CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY(A)
Choice Based Credit System (with effect from 2016-17)
MCA (Master of Computer Applications)

SEMESTER - I

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/S		CIE	SEE	
THEORY								
1	16MCC101	Discrete Mathematics	3/1	-	3	30	70	4
2	16MCC102	Computer Programming and Problem Solving	3/1	-	3	30	70	4
3	16MCC103	Elements Of Information Technology	3/1	-	3	30	70	4
4	16MBC128	Managerial Economics and Financial Analysis	3	-	3	30	70	3
5	16EGC101	Professional Communication in English	3	-	3	30	70	3
PRACTICALS								
6	16MCC104	Computer Programming Lab Using C	-	3	3	25	50	2
7	16MCC105	Elements of Information Technology Lab	-	3	3	25	50	2
8	16EGC102	Professional Communication Lab	-	3	3	25	50	2
TOTAL			18	9	-	225	500	24

L: Lecture

T: Tutorial

P: Practical

S: Seminar

CIE: Continuous Internal Evaluation

SEE: Semester End Examination

ASSESSMENT PROCEDURES FOR AWARDING MARKS

The distribution of marks is based on internal assessment (Sessional) by concerned teacher and the Semester End Examination shall be as follows:

Course (in terms of credits)	CIE (Marks)	Semester End Examination (Marks)	Remarks	Duration of Semester End Examination
Three(3)Credits/ Four(4)credits	30*	70**	Theory Course	3 Hours
Two(2) Credits	25	50	Lab Course / Mini project	3 Hours
Two(2) Credits	50	---	Seminar	---
Twelve(12) Credits	100	100	Major Project Work	Viva

* Out of 30 sessional marks, 10 marks are allotted for home assignments (at least two assignments must be given, which covers the entire syllabus of that particular course/subject), and the remaining 20 marks are based on the average of two tests (weightage for each test is 20 marks of one hour duration). The question paper for tests will be in two parts, Part-A and Part-B. Part A is compulsory and carries six (6) marks. Part-B carries fourteen (14) marks (student has to answer two out of three questions).

** The question paper will be in two parts, Part-A and Part-B. Part A is compulsory, and covers the entire syllabus, and carries 10 marks. Part-B carries 60 marks and covers all the units of the syllabus (student has to answer five out of seven questions)

A candidate has earned the credits of a particular course, if he/she secures not less than the minimum marks/grade as prescribed. **Minimum pass marks in the Semester End Examinations plus CIE shall be 40%. Where as for the lab course/project/mini project is 50%.**

A course that has CIE but no semester end examination as per scheme is treated as pass/fail for which pass marks are 50% CIE.

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	4

Course Objectives:

Students will:

1. Gain Logical and Mathematical ability to introduce most of the basic terminologies used in computer science with particular reference to the relationships among the discrete structures.
2. Learn about Boolean algebra.
3. Apply the concepts of Relations, Functions, properties of Integers and Set Theory.
4. Learn about principle of Inclusion, Exclusion and Generating Functions.
5. Understand the concept of Recurrence Relations, Groups and Algebraic Structures
6. Model and analyze the computational processing using combinatorial methods.

Course Outcomes:

After completion of the course the students would be able to:

1. Apply knowledge of the concepts needed to test the logic of a program.
2. Apply knowledge of Boolean algebra and Set Theory.
3. Apply knowledge of Properties of Integers, Relations and Functions.
4. Expose principles of Inclusion and Exclusion, Generating Functions, Recurrence Relations, Groups and Algebraic Structures.
5. Synthesize the indirection of hypothesis and simple indirection methods.
6. Prove elementary properties of modular arithmetic and explain their applications in Computer Science.

UNIT – I

Fundamentals of Logic: Basic Connectives and Truth Tables, Logical Equivalence, Logical Implication, Use of Quantifiers, Definitions and the Proof of Theorems. **Boolean algebra:** Switching Functions, Logic gates, Don't Care Condition **Set Theory:** Sets and Subsets, Set operations and the Laws of Set theory Counting and Venn Diagrams.

UNIT – II

Properties of Integers: The well-ordering principle, Recursive definitions, The Division Algorithm, Euclidean Algorithm, Fundamental theorem of arithmetic. **Functions:** Cartesian product, Functions, Onto Functions, Special Functions, Pigeonhole Principle, Composition and Inverse Functions, Computational Complexity. **Relations:** Partial Order Relations, Lattices, Equivalence Relations and Partitions.

UNIT – III

Principle of Inclusion and Exclusion: Principles of Inclusion and Exclusion, Generalization of principle, Derangements, Rooks Polynomial, Arrangements with Forbidden Positions.

Generating Functions: Introductory examples, Definitions and examples, Partition of Integers, Exponential generating function, Summation operator.

UNIT – IV

Recurrence Relations: First-order linear recurrence relation, Second-order linear homogeneous recurrence relations with constant coefficients, Non-homogeneous recurrence relations, Divide-and-conquer algorithms.

Algebraic Structures: Definition, Examples and properties. **Groups:** Definition, Examples and elementary properties, Homomorphism, Isomorphism and Cyclic groups.

UNIT – V

Graph Theory: Definitions and examples, Sub graphs, Complements and graph isomorphism, Vertex degree, Planar graphs: Hamiltonian paths and Cycles, Graph coloring.

Trees: Definitions, Properties and examples, Rooted Trees, Spanning Trees and Minimum Spanning Trees.

Text Books:

1. Ralph P. Grimaldi, "Discrete and Combinatorial Mathematics", Pearson Education, 4th Edition, 2003.

Suggested Reading:

1. Kenneth H Rosen, "Discrete Mathematics and its Applications" Tata McGraw Hill, 6th Edition, 2007.
2. J.P Tremblay & R. Manohar, "Discrete mathematical Structures with Applications to computer science" McGraw Hill. 1987.
3. Joe L. Mott, A.kandal & T.P. Baker, "Discrete mathematics for compute scientists, & mathematicians", Prentice Hall N.J., 1986
4. Kevin Ferland, "Discrete Mathematics", Houghton Mifflin Company, 2009.

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	4

Course Objectives:

Students will:

1. Understand algorithms, flow charts and pseudo codes.
2. Learn programming environment.
3. Gain the basic terminology used in computer programming.
4. Understand different data types in C programming.
5. Understand the decision structure, loops, functions, arrays, pointers, strings, structures and files.

Course Outcomes:

After completion of the course, the students would be able to:

1. Design Algorithms and Flowcharts to solve the various problems.
2. Execute the programs.
3. Apply different data types in various programs.
4. Apply the built-in functions, customized functions and preprocessor directives in various programs.
5. Apply the Arrays and Pointers for solving the problems.
6. Apply the Strings and Structures, dynamic memory allocation techniques and files for solving the various problems.

UNIT – I

Algorithm, flowchart, pseudo code, Structured Programming, program development steps, creating and running programs, structure of a C program, character set, keywords, identifiers, constants, basic data types and sizes, variables, operators, operator precedence and associativity, expressions, evaluating expressions, type conversions, basic formatted Input/output statements, decision control structures: if and switch statements, loop control structures: while, do-while and for, continue, break.

UNIT – II

Functions: Basic concepts, user defined functions, parameter passing, local variables, global variables, recursive functions, comparison of iteration and recursion, standard library functions, header files, storage classes, preprocessor.

UNIT – III

Arrays: Basic concepts, one-dimensional array, passing arrays to functions, searching and sorting: linear search, binary search and bubble sort, two-dimensional array, multi-dimensional array.

Pointers: Basic concepts, pointers as function arguments, pointer arithmetic, pointers to pointers, pointers and one-dimensional arrays, pointers and two-dimensional arrays, array of pointers.

UNIT – IV

Strings: Basic concepts, string I/O operations, pointers and strings, string manipulation functions. **Structures:** Declaration, definition and initialization of structures, accessing structures, nested structures, array of structures, structures and functions, pointers to structures, unions, enumerated types, typedef.

UNIT – V

Dynamic memory management functions, command line arguments. **Files:** Basic concepts, text files, binary files, basic file I/O operations, sequential-access files, random-access files.

Text Books:

1. Pradip D & Manas G, "Programming in C", 2nd edition, Oxford University Press, 2007.
2. B.A. Forouzan and R.F. Gilberg, "Computer science, A structured programming approach using C", 3rd edition, Cengage learning, 2007.

Suggested Reading:

1. BW Kernighan DM Ritchie, "The C programming Language", 2nd edition, Prentice Hall India, 1998.
2. P.J Deitel and H.M Deitel , "C How to program" , 6th edition, PHI, 2010.
3. Yashwant Kanetkar, "Let us C", 13th edition, BPB Publications, 2013.
4. E Balaguruswamy, "Programming in ANSI C", 5th edition, Tata McGraw-Hill, 2007.
5. K R Venugopal& S R Prasad, "Mastering C", McGraw-Hill, 2007.

16MCC103	ELEMENTS OF INFORMATION TECHNOLOGY	
Instruction		3L+1T Hours per week
Duration of Semester End Examination		3 Hours
Semester End Examination		70 Marks
Continuous Internal Evaluation		30 Marks
Credits		4

Course Objectives:

Students will:

1. Understand concepts of Information Technology and its applications.
2. Understand the physical and logical structure of the computer.
3. Have knowledge of the concepts of Networks and Communication Technology.
4. Obtain Knowledge of Files and Databases.
5. Understand the flow of information and the various levels of management within an organization.
6. Identifying security issues of computers and communication systems.

Course Outcomes:

After completion of the course, the students would be able to:

1. Get concepts of Information Technology and its Applications.
2. Identify the physical and logical structure of the computer.
3. Gain the knowledge of Network and Communication Technology.
4. Become familiar with the use of Files and Databases.
5. Gain the knowledge of flow of information in an organization and the various levels of management with in an organization.
6. Handle security issues of computers and communication systems.

UNIT -I

Introduction to Information Technology: Data, Information, Basic operations of Computers,

Hardware: Input, Output, Memory, Communication, **Software:** **System software:** Operating System, Device drivers, Utility programs, GUI, **Application software:** Ways to obtain application software, Types of application software, Five sizes of computers, **Common operating systems:** DOS, MAC OS, Windows: XP, VISTA, Windows 7.0, Network OS, Hand held devices OS.

UNIT -II

Hardware: Generations of Computers, Measuring Capacity, Binary Coding Schemes, Number System, Block diagram of Computer, **Micro Computer System Unit:** Computer case, Power supply, Mother Board, Chips, CPU, Memory, Ports and Cables, **Input Devices:** Keyboard, Pointing devices, Source data entry devices, Audio and Video devices, Digital cameras, Speech recognition systems, RFID, Sensors, human biology input device, **Output Devices:** Soft copy output, Hard copy output, Mixed output devices, **Secondary Storage Device:** Floppy disks, hard disks, optical disks, flash memory, magnetic tape, online secondary storage, smart cards.

UNIT -III

Network communications: Digital basics of computers, **Networks:** Benefits of networks, Client – Server and Peer to Peer Networks, Types of Networks, Components of Networks, Intranet, Extranet and VPNS, Network Topologies. **Communications:** Wired and Wireless Communication Media, Cyber threats, Hackers and Safe Guards, **Internet and World Wide Web.**

UNIT- IV

Files & Databases: Data Storage Hierarchy, Types of Files, Key Field, Compression and Decompression, File Management Systems, **Database Management Systems:** Benefits of DBMS, DBA, Database Models, Data Mining, E-Commerce, Ethics of Using Databases.

UNIT -V

Information Systems: Qualities of good information, Information flows within an Organization, Computer Based Information Systems: OIS, TPS, MIS, DSS, ESS and ES. **System Development:** Six phases of system analysis and design. **Software Development:** Programming as a five step procedures. Five Generations of Programming Languages, **Security Issues:** Threats to Computers & Communication Systems. Safe guarding computers and communications.

Text Book:

1. Williams B.K. Sawyer et.al. "Using information Technology", 9th Edition, Tata McGraw Hill, 2011.

Suggested Reading:

1. Aksoy & DeNardis" Introduction to Information technology", Cengage Learning, 2006.
2. Dennis P. Curtin, Kim Folley, et.al. "Information Technology, The breaking Wave", Tata McGraw Hill, 1998.
3. ITL Edn Solutions Ltd. "Introduction to Information Technology", Education, 2005.

16MBC128 MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	3

Course Objectives:

Students will:

1. Introduce managerial economics and demonstrate its importance in managerial decision making.
2. Develop an understanding of demand and relevance of its forecasting in the business.
3. Examine the economic analysis of production process in relationship with inputs.
4. Explain different costs and their relationship with the output.
5. Explain the concept of Accountancy and provide knowledge on preparation and analysis of Final accounts.
6. Understand the importance of project evaluation in achieving a firm's objective.

Course Outcomes:

After completion of the course, students will be able to:

1. Apply fundamental knowledge of Managerial economics' concepts and tools.
2. Understand various aspects of demand analysis and forecasting.
3. Analyze production function in terms of best combination of inputs.
4. Decision the best cost and benefits to achieve the objectives.
5. Analyze different opportunities and come out with best feasible capital investment decisions.
6. Understand accountancy concepts and conventions, final accounts and financial analysis.

UNIT - I:

Introduction to Managerial Economics : Definition, Nature and Scope of Managerial Economics, Micro Economics vs Macro Economics. Relationship of Managerial economics with other disciplines- Mathematics, Statistics, Accounting, and Operations Research. Role and responsibilities of Managerial economist in Business decisions. Fundamental concepts of Managerial economics - Opportunity cost concept, Principle of Time perspective, Incremental principle, discounting principle, and Equi-marginalism.

UNIT- II:

Demand Analysis : Meaning of Demand, Determinants of demand, types of demand, Individual vs Market Demand, Demand schedule, Demand curve and Demand function. Law of Demand and its exceptions. Elasticity of Demand- Definition, Types, and Measurement of Elasticity of Demand. Demand Forecasting- Factors governing demand forecasting, Methods of demand forecasting (Survey method, Statistical method, Expert opinion method, Test marketing, and judgmental approach).

UNIT - III:

Production and Cost Analysis : Production Analysis: Concept and Meaning of production-Factors of production, Production Function, law of variable proportions (with one variable and two variable inputs), Iso-quants and Iso-costs, Laws of returns, Economies and dis Economies of scale - internal and external economies. Cost analysis: Cost concepts - Actual vs opportunity cost, Incremental and sunk cost, Short run and long run cost, Fixed and variable cost. Cost output relationship in short -run and long-run. Break Even analysis (BEA) – Break even chart, Determination of Break Even Point (simple numerical problems) Margin of safety. Managerial applications, and limitations of BEA.

UNIT - IV:

Introduction to Financial Accounting : Definition, Concepts and conventions of Accounting, Principles of double entry book keeping, Preparation of journal, ledger and Trial balance. Preparation of Financial statements- Trading and profit and loss account, and Balance sheet with simple adjustments.

UNIT –V:

Capital Management and Capital Budgeting: Significance of capital, Types of capital and sources of capital. Meaning of capital budgeting, Importance of capital budgeting. Methods of capital budgeting- Payback period

method, Average rate of Return (ARR), Net present value method (NPV) Internal rate of return method (IRR) Profitability Index. (Simple Numerical Problems).

Text Books:

1. P.L. Mehta, "Managerial Economics – Analysis, Problems and Cases" , Sultan Chand & Sons Educational, 2011.
2. Grawal T.S, Introduction to Accountancy", S.Chand Publishers, 2009.
3. Pandey, I.M, Financial management, 10th Ed. Vikas Publishing House, 2010.

Suggested Reading:

1. Varshney R.L. K.L. Maheswari Managerial economic, Sultan Chand.
2. J.C.Pappas and E.F.Brigham, Managerial Economics.
3. Maheswari, S.N, Introduction to Accountancy, Vikas Publishing House, 2005.
4. M. Kasi Reddy & S.Saraswathi, Managerial economics & Financial Accounting, PHI 2007.

16EGC101**PROFESSIONAL COMMUNICATION IN ENGLISH**

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	3

Course Objectives:

Students will:

1. Understand the role and importance of communication and to develop their basic communication skills in English.
2. Improve the students' listening skills and introduce them to different reading strategies.
3. Train students to use language appropriately for interviews, presentations and public speaking
4. Encourage the all-round development of students by focusing on soft skills.
5. Develop the students writing skills, career skills and make them industry ready.

Course Outcomes:

After completion of the course, students would be able to:

1. Apply critical and creative thinking abilities necessary for effective communication in today's business world.
2. Demonstrate competency in writing effective paragraphs, letters and reports.
3. Become effective, confident speakers and deliver persuasive presentations.
4. Understand the nuances of listening comprehend texts and draw inferences and conclusions.
5. Understand the significance of soft skills in the working environment.

UNIT – I:

Understanding Communication in English: Meaning, definition, Nature and Scope of Communication, Importance of Communication, Process of Communication, Intrapersonal and interpersonal communication, One way vs. Two way communication. Barriers to Effective Communication, Overcoming the Barriers. Communication in a business organization: Internal (Upward, Downward, Horizontal, Grapevine, Problems, Solutions) and External Communication. Strategies for conducting successful business meetings.

UNIT-II

Developing Listening & Reading Skills: Process and Types of listening. Problems in comprehension and retention. Barriers to listening, effective listening strategies. Note – taking. Process and purpose of reading. Reading Techniques-Skimming, Scanning, inferences and conclusion. Reading comprehension-known and unknown passages.

UNIT – III

Soft Skills: Introduction to Soft skills, Hard skills vs Soft skills, Public Speaking, Presentation Skills and techniques, Body Language, Leadership skills, Team Building, Decision Making, Business Etiquette - Email & Telephone Etiquette.

UNIT – IV

Written Communication: Sentence Structures & Paragraph Writing. Letter Writing-form, structure, layout. Sales Letters. Basics of Official Correspondence: Handling Correspondence, Receipt and Dispatch of Mails, Filing system, Classification of Mails; Quotations, Orders, Tenders. Information Transfer.

UNIT-V

Career Skills: Resume Writing, Elements of an Effective Resume, Application Letters, Job Interview –Purpose, Types, Interview Skills & Techniques. Grammar & Vocabulary.

Text Books:

1. **Vibrant English**, Orient Blackswan Ltd.

Suggested Reading:

1. M .Ashraf Rizvi, **Effective Technical Communication**, Tata Mc Graw- Hill, New Delhi
2. Meenakshi Raman and Sangeetha Sharma, **Technical Communication - Principles and Practice**, Oxford Univ. Press, New Delhi.
3. Alok Jain, P.S. Bhatia and A.M. Shiekh, **Professional Communication Skills** S. Chand & Company Ltd., 2005
4. R.C.Sharma & Krishna Mohan, **Developing Communication Skills, Business correspondence and report writing** Tata McGraw Hill
5. Evans, D, **Decision maker**, Cambridge University Press, 1997.
6. Shiv Khera, **You Can Win**, Macmillan Books – Revised Edition, 2003
7. Stephen Covey **7 Habits of Highly effective people**, Free Press

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	50 Marks
Continuous Internal Evaluation	25 Marks
Credits	2

Course Objectives:

Students will:

1. Learn programming environment.
2. Gain the basic terminology used in computer programming.
3. Understand different data types in C programming.
4. Understand the decision structure, loops, functions, arrays, pointers, strings, structures and files.

Course Outcomes:

After completion of the course, the students would be able to:

1. Write, compile, debug and execute the programs.
2. Apply various data types in various programs.
3. Apply the built-in functions and customized functions for solving the programs.
4. Use the decision structures, loop structures, functions, and arrays in various programs.
5. Apply pointers, strings and structures in various programs.
6. Write programs using files.

C-Programs:

1. Write a program to calculate the area of a circle, rectangle, square and triangle.
2. Write a program to find the Roots of a Quadratic Equation $ax^2+bx+c=0$, where $a>0$.
3. Write a program to find the biggest of three different numbers by using nested if – else statement.
4. Write a program to find the division of the student using percentage of marks.
5. Write a program, which takes two integer operands and one operator form the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement).
6. Write a program to find max, min and sum of given set of numbers.
7. Write a program to find the sum of individual digits of a positive integer.
8. Write a program to find the factorial of a given positive number.
9. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
10. Write a program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
11. Write a program to find the reverse of the given positive integer and check reverse number is palindrome or not.
12. Write a program to find the $\sin(x)$ value using series expansion. (Hint: $\sin(x) = x - x^3/3! + x^5/5! - \dots$)
13. Write a program to find the $\cos(x)$ value using series expansion. (Hint: $\cos(x) = 1 - x^2/2! + x^4/4! - \dots$)
14. Write program for the following using non-recursive functions.
 - i) To find the factorial of a given integer.
 - ii) To find the GCD (greatest common divisor) of two given integers.
15. Write program for the following using recursive functions.
 - iii) To find the factorial of a given integer.
 - iv) To find the GCD (greatest common divisor) of two given integers.
16. Write programs using functions to perform the following search techniques
 - i) Linear search
 - ii) Binary search
17. Write a program to implement bubble sort technique.
18. Write program using function to perform the Additions of Two Matrices
19. Write program using function to perform the Multiplication of Two Matrices
20. Write program using function to perform the Transpose of a given Matrix
21. Write a program to display the array elements from last index to first index and display the even and odd elements sum.
22. Write a program to demonstrate call by reference mechanism by swapping two integers.
23. Write a program to find the number of characters, words and sentences in the given string.

24. Write a program to copy the contents of one string into another string using pointers.
25. Write a program to concatenate two strings without using strcat library function.

26. Write a program that uses functions to perform the following operations using Structure complex.
 - i) Reading a complex number
 - ii) Displaying a complex number
 - iii) Addition of two complex numbers
27. Write a program that uses functions to perform the following operations using Structure complex.
 - i) Reading a complex number
 - ii) Displaying a complex number
 - iii) Multiplication of two complex numbers
28. Write a program which counts number of characters, words and sentences in the file.
29. Write a program which copies contents of one file into another file.
30. Write programs to demonstrate sequential access files.
31. Write programs to demonstrate random access files.

Suggested Reading:

1. E Balaguruswamy, "Programming in ANSI C", 5th edition, Tata McGraw-Hill, 2007.
2. K R Venugopal & S R Prasad, "Mastering C", McGraw-Hill, 2007.
3. Yashwant Kanetkar, "Let us C", 13th edition, BPB Publications, 2013..

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	50 Marks
Continuous Internal Evaluation	25 Marks
Credits	2

Course Objectives:

Students will:

1. Have knowledge of physical and logical structure of compute system.
2. Have hands on learning of MS-Word features such as section breaks, formatting, Mail Merge, Macros.
3. Gain knowledge of MS-Excel features such as Formulas and Functions and Different type of charts.
4. Acquire knowledge of MS-PowerPoint features.
5. In-depth learning of MS-Access features such as Creation of databases, Queries, Forms and Reports.
6. Learn basic dollar prompt commands in Linux.

Course Outcomes:

After completion of the course, students would be able to:

1. Assemble System and Load Software in the system
2. Create professional MS-Word documents
3. Efficiently generate Excel documents.
4. Give efficient presentations.
5. Handle various database applications.
6. Use basic dollar prompt commands in Linux.

Lab Experiments:

1. Identify and describe the relationships and role of the components of the "Logical" Diagram of the computer. (e.g. processor, RAM, ROM, BIOS, input, output, storage.)
2. Relate the "logical" diagram of a computer system to the "physical" system by Identifying physical components of a computer and describing their purpose. (e.g. the Processor, memory chips, motherboard, disk drives, and controller cards such as AGP Board, network cards, sound card, as well as parallel and serial ports etc.)
3. Assemble the computer which they will use and load the OS with partitions for Windows and Linux, configure for network connection
4. Troubleshoot his/her PC
5. Install/Uninstall SW/HW on his/her PC from time to time
6. Identify and distinguish between various types of application software. by describing and using them. (e.g. word processor, spreadsheet, database, browser, mailers etc.)
7. Distinguish between various commercially available systems by relating the cost to Features available on each system
8. **MS Word:** Create documents with standard formatting commands, single/multi Column, breaks, insert pictures/objects, drawings, hyperlinks, header/footer, and tables, Mail Merge, Macros.
9. **MS Power Point:** Create presentations with preset animations, using different layouts, Backgrounds, slide master, insert pictures/objects, drawings, hyperlinks, header/footer, Tables
10. **MS Excel:** Creating worksheets with various kinds of data, making charts, conditional Formatting, awareness of the various functions- statistical, date/time, math/trig etc, ability to explore (help) and use these functions if need be, demonstration through some Common functions like sum, average, standard deviation, logical and information.
11. **MS-Access:** Creation of database, queries, forms, Reports using student information system.
12. Learning of basic Dollar prompt commands in Linux.

Suggested Reading:

1. Williams B.K. Sawyer et.al. "Using information Technology", 9th Edn. Tata Mc-Graw Hill, 2011.
2. Srivastava S.S. "MS OFFICE", Laxmi Publications, New Delhi.
3. Behrouz A Fourzan, Richard F Gilberg "Unix and Shell Programming: A Text Book", Thompson Learning 2003.

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	50 Marks
Continuous Internal Evaluation	25 Marks
Credits	2

Course Objectives:

Students will:

1. Introduce to phonetics and the different sounds in English.
2. Familiarize with the software and give them sufficient practice in correct pronunciation.
3. Speak English correctly with focus on stress and intonation.
4. Participate in group discussions with confidence and to make effective presentations.
5. Plan and prepare for an interview, process of interview and interview techniques.

Course Outcomes:

After completion of the course, students would be able to:

1. Understand the speech sounds in English and the nuances of pronunciation.
2. Understand tone, intonation and rhythm and apply stress correctly.
3. Participate in group discussions with clarity and confidence.
4. Speak confidently on stage with appropriate body language.
5. Plan, prepare and face interviews with confidence.

Syllabus:

1. Introduction to English Phonetics: Introduction to auditory, acoustic and articulatory phonetics, organs of speech: the respiratory, articulatory and phonatory systems.
2. Sound system of English: Phonetic sounds and phonemic sounds, introduction to International Phonetic Alphabet, classification and description of English phonemic sounds, minimal pairs. The syllable: types of syllables, consonant clusters
3. Word stress: Primary stress, secondary stress, functional stress, rules of word stress.
4. Listening skills – practice with IELTS and TOEFL material
5. Situational dialogues and role play.
6. Group Discussions – dynamics of group, intervention, summarizing, modulation of voice and body language.
7. Presentation Skills – Elements of effective presentation – Structure of presentation – Presentation tools – Body language. Creating an effective PPT
8. Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, mock interviews.

Suggested Reading:

1. E. Suresh Kumar et al, **English for Success** (with CD), Cambridge University Press India Pvt, Ltd. 2010.
2. T Balasubramanian, **A Textbook of English Phonetics for Indian Students**, Macmillan, 2008.
3. J Sethi et al. **A Practical Course in English Pronunciation** (with CD), Prentice Hall India, 2005.
4. Edgar Thorpe. **Winning at Interviews**, Pearson Education, 2006
5. Priyadarshi Patnaik. **Group Discussions and Interviews**, Cambridge University Press Pvt Ltd 2011



CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY(A)
Choice Based Credit System (with effect from 2016-17)
MCA (Master of Computer Applications)

SEMESTER-II

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/S		CIE	SEE	
THEORY								
1	16MCC106	Object Oriented Programming(OOP)	3/1	-	3	30	70	4
2	16MCC107	Computer Organization	3/1	-	3	30	70	4
3	16MCC108	Software Engineering	3/1	-	3	30	70	4
4	16MCC109	Data Structures Using C++	3/1	-	3	30	70	4
5	16MCC110	Operations Research	3/1		3	30	70	4
6	16MTC102	Probability and Statistics	3/1	-	3	30	70	4
PRACTICALS								
7	16MCC111	Object Oriented Programming Lab Using Java	-	3	3	25	50	2
8	16MCC112	Data Structures Lab Using C++	-	3	3	25	50	2
TOTAL			24	6	-	230	520	28

L: Lecture T: Tutorial P: Practical
CIE: Continuous Internal Evaluation

S: Seminar
SEE: Semester End Examination

ASSESSMENT PROCEDURES FOR AWARDING MARKS

The distribution of marks is based on internal assessment (Sessional) by concerned teacher and the Semester end examination shall be as follows:

Course (in terms of credits)	CIE (Marks)	Semester End Examination (Marks)	Remarks	Duration of Semester End Examination
Three(3)Credits/ Four(4)credits	30*	70**	Theory Course	3 Hours
Two(2) Credits	25	50	Lab Course / Mini project	3 Hours
Two(2) Credits	50	---	Seminar	---
Twelve(12) Credits	100	100	Major Project Work	Viva

* Out of 30 sessional marks, 10 marks are allotted for home assignments (at least two assignments must be given, which covers the entire syllabus of that particular course/subject), and the remaining 20 marks are based on the average of two tests (weightage for each test is 20 marks of one hour duration).The question paper for tests will be in two parts, Part-A and Part-B. Part A is compulsory and carries six (6) marks. Part-B carries fourteen (14) marks (student has to answer two out of three questions).

** The question paper will be in two parts, Part-A and Part-B. Part A is compulsory, and covers the entire syllabus, and carries 10 marks. Part-B carries 60 marks and covers all the units of the syllabus (student has to answer five out of seven questions)

A candidate has earned the credits of a particular course, if he/she secures not less than the minimum marks/grade as prescribed. **Minimum pass marks in the Semester End Examinations plus CIE shall be 40%.Where as for the lab course/project/mini project is 50%.**

A course that has CIE but no semester end examination as per scheme, is treated as pass/fail for which pass marks are 50% CIE.

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	4

Course Objectives:

Students will:

1. Learn java basics & object oriented programming principles.
2. Know the concepts of interfaces, packages.
3. Get the concepts of exception handling in java.
4. Acquire the concept of multithreading
5. Interpret the concepts on I/O package.
6. Understand the basic concepts of Applets and AWT.

Course Outcomes:

After completion of the course, the students would be able to:

1. Gain the knowledge on object oriented programming concepts.
2. Create classes and objects.
3. Acquire knowledge on multithreading and exception handling.
4. Understand the role of Strings and I/O Streams.
5. Design and Develop the GUI Components.
6. Perform event driven programming.

UNIT -I

Object Oriented Programming: History of java, and evolution of java, java Buzzwords, Object Oriented Programming, Data types, Variables and Arrays, Operators, Control Statements,

UNIT -II

Introduction To Classes: Classes, Methods, Constructors, This keyword, finalize method, Garbage Collection, Overloading, Overriding, Recursion, nested classes,

Inheritance: Inheritance and its types, super, overriding, Abstract Classes, Using final.

Packages And Interfaces: packages, Access protection, Importing packages, Implementing Interfaces

UNIT -III

Exceptional Handling: Exception–handling fundamentals, Exception types, Using try and Catch, throw, throws and finally clauses.

Multithreaded Programming: java Thread Model, Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter thread communication.

UNIT - IV

String Handling: String class, String buffer class, String length, Special String operations, string comparison, Primitive type wrappers

Java I/O classes and Interfaces, Files, Stream and Byte Classes, Character Streams, Serialization. Deserialization.

UNIT –V

GUI and Event Driven Programming: Applet Class, Event Handling, Delegation event model, event classes, event listener Interfaces.

Using AWT Controls, Layout Managers and Menus: AWT classes, Window fundamentals, labels, Buttons, Checkboxes, lists etc, layout managers, Handling Events by extending AWT components.

Text Books:

1. Patrick Naughton “JAVA, The Complete Reference” Tata McGraw Hill, 4th Edition 2005. (For Unit : I,II,III and IV)
2. Richard A.Johnson, “Java Programming and Object-Oriented Application Development” Cengage Learning, India edition 2009. (For Unit : V)

Suggested Reading:

1. John Dean and Raymond “Introduction Programming with Java A problem solving approach”, McGraw Hill 2008.
2. Joe Wigglesworth and Paula McMillan, ”Java Programming: Advanced Topics” Cengage Learning. 3rd Edition 2009.

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	4

Course Objectives:

Students will:

1. Understand the basics of Boolean algebra.
2. Learn the concepts of digital circuits.
3. Understand the various computer micro operations.
4. Acquire the knowledge of computer organization and design.
5. Learn various topics pertaining to the operations of Central Processing Unit.
6. Understand the basic principles of concurrent and parallel processing.

Course Outcomes:

After completion of the course, the students would be able to:

1. Acquainted with the representations of number systems.
2. Understand the concepts of Boolean algebra and KMaps.
3. Learn the basic computer organization and its design.
4. Understand the components of CPU and their functionality.
5. Learn the input–output and memory organization.
6. Understands Parallel processing and its applicability.

UNIT -I

Data Representation: Data types, Complements, Fixed and Floating Point Representation, Other binary codes and error Detection codes.

Digital Logic Circuits: Digital Computers, Logic Gates, Boolean algebra, Map Simplification, Combinational Circuits, Flip Flops, Sequential Circuits.

Digital Components: Integrated Circuits, Decoder, Multiplexers, Registers, Shift Registers, Binary counter, Memory unit.

UNIT -II

Register Transfer And Micro Operations: Register Transfer language, Register transfer, Bus and Memory Transfer, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations and Arithmetic logic shift unit.

Basic Computer Organization And Design: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycles, Memory Reference Instructions, Input, Output and Interrupts, Design of Accumulator logic.

UNIT -III

Central Processing Unit: Micro programmed Control, Control Memory, Address Sequencing, Micro program Example, Design of Control Unit. General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control.

UNIT -IV

Input–Output And Memory Organization: Peripheral Devices, I/O output interface, Asynchronous data transfer, Modes of transfer, Priority Interrupt, DMA, Input output Processor, Serial Communication. : Memory Hierarchy, Main Memory, Cache Memory.

UNIT -V

Parallel Processing: Trends of Parallel Processing, UniProcessor Architecture, Parallel Processing Mechanism, Multi Programming and Time Sharing, Pipeline Computers, Array Computers, Multi-Processor Systems, Serial Vs Parallel Processing, Parallelism Vs Pipelining.

Text Books:

1. M. Morris Mano, "Computer System Architecture", Pearson Asia/Prentice Hall, 3rd edn.2007. (For Units I,II,III and IV)
2. Kai Hwang and Faye A.Briggs, "Computer Architecture and Parallel Processing" International edn., 1984 (For Unit : V),

Suggested Reading:

1. William Stallings "Computer Organization & Architecture", Pearson Education, Sixth Edition, 2003.

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	4

Course Objectives:

Students will:

1. Provide the basic definition and understanding of software engineering.
2. Acquaint the software engineering paradigms.
3. Familiarize with the concepts of software requirement specifications.
4. Understand the software design concepts.
5. Learn the concepts of software testing.

Course Outcomes:

After completion of the course, the students will be able to:

1. Understand the basics of software engineering principles
2. Acquire the knowledge on software development models.
3. Translate the problems into software design models.
4. Acquaint with the basics of software design principles.
5. Understand the basics software testing approaches and strategies.
6. Learn the concepts of software reengineering, reverse engineering and software maintenance activities.

UNIT-I

Introduction to Software Engineering: Software Engineering Challenges, Software Engineering approach, Software Process, Waterfall, Iterative, Prototype, Incremental, Spiral, Models.

UNIT- II

Software Requirement Analysis and specification: Software Requirements, Need for SRS, Problem analysis, Requirements specification, IEEE format of SRS, Function Oriented Design: Design Principles, Module-level concepts, Design notations and specifications

UNIT-III

Structured design methodology, Software Architecture: Role of Software Architecture, Architecture views, Component and Connector view. Risk Engineering - Risk Analysis and Management. RMMI Techniques.

UNIT-IV

Effort & Schedule Estimation, Software Project Estimation, COCOMO, Function Point Analysis. Testing Techniques & Strategies: white box, black box, basis path testing, Unit testing, Integration testing, Validation testing & System Testing

UNIT-V

Software Maintenance, Maintenance activities, Software Reengineering, Reverse Engineering, Forward Engineering, Software configuration management.

Text Books:

1. Roger S, Pressman, "**Software Engineering: A Practitioner's Approach**", 6th edition, Tata Mc Graw Hill, 2010.

Suggested Reading:

1. Pankaj Jalote "**An Integrated Approach to Software Engineering**", 3rd edition, Narosa Publishing House, 2010.

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	4

Course Objectives:

Students will:

1. Know the basic concepts of C++.
2. Acquire the knowledge on classes and Inheritance concepts.
3. Aware of different linear data structures concepts.
4. Get the knowledge on different sorting techniques.
5. Understand the concept of hashing and collision resolution techniques.
6. Aware of different non-linear data structures.

Course Outcomes:

After completion of the course, students would be able to:

1. Gain knowledge on basic concepts of C++.
2. Get the knowledge on classes and inheritance concepts.
3. Learn various linear data structures concepts.
4. Distinguish between different sorting techniques.
5. Implements different collision resolution techniques on hashing.
6. Acquire knowledge on various non-linear data structures.

UNIT- I

C++ Introduction: Overview, Program Structure, namespace, identifiers, variables, constants, data types, enum, operators, Overloading of functions, default arguments, this pointer, inline functions, dynamic memory allocation and De allocation (new and delete), operator overloading.

UNIT- II

C++ Class Overview: Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and destructors, friend functions. Function and class templates, Inheritance basics, base and derived classes, inheritance types, base class access control, overriding, runtime Polymorphism using virtual functions.

UNIT- III

Sparse Matrix: Representation and its efficiency in storage.

Stacks: Definition and Operations and Applications, Array and Linked Representation of Stacks.

Queues: Definition and Operations. Array and Linked Representation of Queues and their Applications.

Linked Lists: Definition and Operations, Double linked list representation, Circular linked lists.

UNIT- IV

Sorting: Bubble sort, Merge Sort, Selection Sort, heap sort, Quick sort, Insertion sort , Posterior Analysis, Sequential Search, binary search.

Hashing :Hash table, its implementation, Hash table representation, types of hashing,collision resolution techniques.

UNIT- V

Trees: Definitions and Properties, Representation of Binary Trees, Operations. Binary Tree Traversal, Binary search trees, operations- insertion, deletion and searching, heap trees. AVL Tress and Operations on AVL Trees.B-Trees and its operations.

Graphs: Definition and representation of graphs, data structures for representing graphs- edge list structures, adjacency list structures, adjacency matrix,Graph traversals – BFS and DFS. Spanning trees, minimum spanning trees, prim's and kruskal's algorithms.

Text Books:

1. Object Oriented Programming with C++, E. Balaguru Swamy, Tata McGraw Hill,4th Edition, 2008.
2. Data structures, Algorithms and Applications in C++, S. Sahani, Universities Press. 2nd Edition, 2006.

Suggested Reading:

1. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI. 2nd Edition, 2002.
2. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and D.Mount, Wiley student edition, seventh edition, John Wiley and Sons, 2011.
3. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, 3rd Edition, Pearson Education. Ltd., 2007.

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	4

Course Objectives:

The students will:

1. Understand and analyze managerial problems in industry to utilize resources effectively.
2. Formulating the mathematical models for real world managerial problems in industry.
3. Minimizing loss and maximizing profit of an organization.
4. Find the shortest paths to the transportation problems.
5. Provide networks and queuing models which are applicable to manage organizational functionalities.
6. Learn techniques to solve linear programming problems using different methods.
7. Solve problems using dynamic programming.

Course Outcomes:

After completion of the course, the students would be able to:

1. Apply the methods to utilize organizational resources effectively.
2. Formulate mathematical models for real world problems.
3. Apply the methods of maximization and minimization to get more profits and reduced losses.
4. Solve linear programming problems.
5. Model and solve the managerial problems using dynamic programming.
6. Apply networks and queuing models to solve organizational problems.

UNIT - I

Linear Programming: Introduction, Concepts of Linear Programming Model, Development of LP models, Graphical Method, Linear Programming Methods, Special cases of Linear Programming, Duality.

UNIT - II

Transportation Problem: Introduction, Mathematical Model for Transportation Problem, Types of Transportation problem, Methods to solve Transportation Problem, Transshipment Model.

UNIT - III

Assignment Problem: Introduction, Zero-One Programming Model for Assignment Problem, Types of Assignment Problem, Hungarian Method, Branch-and-Bound Technique for Assignment Problem.

Network Techniques: Introduction, Shortest path models – Systematic Algorithm, Dijkstra's Algorithm, Floyd Algorithm, Minimum Spanning Tree Problems – PRISM, Kruskal's Algorithms.

UNIT - IV

Dynamic Programming: Introduction, Applications of Dynamic Programming, Solution of Linear Programming Problem through Dynamic Programming.

UNIT - V

Game Theory: Introduction, Game with Pure Strategies, Game with Mixed Strategies, Dominance Property, Graphical Method for $2 \times n$ or $m \times 2$ Games, Linear Programming Approach for Game Theory.

Text Books:

1. Panneerselvam "Operations Research", Second Edition, PHI, 2006.

Suggested Reading:

1. Prem Kumar Gupta and DS Hira, "Operations Research", S. Chand, 2011.
2. JK Sharma, "Operations Research Theory and Applications", Fourth Edition, MacMillan, 2010.
3. Rathindra P sen, "Operations Research- Algorithm and Application", PHI, 2010.
4. K.Swarup, P.K. Gupta and Man Mohan "Operations Research" Sultan Chand & Sons, 2012.

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
Continuous Internal Evaluation	30 Marks
Credits	4

Course Objectives:

The students will:

1. Extend and formalize knowledge of the theory of probability and random variables.
2. Introduce new techniques for carrying out probability calculations and identifying probability distributions.
3. Motivate the use of statistical inference in practical data analysis.
4. Study the elementary concepts and techniques in statistical methodology.
5. Provide the introduction to subsequent statistics courses.

Course Outcomes:

After completion of the course, the students would be able to:

1. Describe discrete data graphically and compute measures of centrality and dispersion.
2. Compute probabilities by modeling sample spaces and applying rules of permutations and combinations, additive and multiplicative laws and conditional probability
3. Construct the probability distribution of a random variable, based on a real-world situation, and use it to compute expectation and variance.
4. Compute probabilities based on practical situations using the binomial and normal distributions.
5. Use of statistical inference in practical data analysis.

UNIT –I:

Introduction to Statistics: Over view, origin and development of Statistics, Managerial applications of statistics. Methods for collection of data, constructing a graphical methods (Histogram, Ogive curve, Pie-Chart, Stem and Leaf diagram) Measures of Central Tendency, Measures of Dispersion: Skewness and Kurtosis.

UNIT-II:

Probability and Random Variables - Introduction to Probability: Concepts and Definitions of probability-classical and axiomatic approach. Sampling theorems- Addition theorem, multiplication theorem and conditional probability and Bayes Theorem.

Random variables: Expectation and variance of a random variable, Probability distribution function, properties of discrete and continuous probability distribution functions.

UNIT-III:

Probability distributions- Discrete probability distributions: Binomial distribution, Properties and applications - Poisson distribution, Properties and applications.

Continuous probability distributions: Normal distribution, Standard normal random variable, Properties and applications, Exponential distribution Properties and applications.

UNIT-IV:

Sampling Estimation-Statistical estimation: Point and interval estimation, confidence interval.

Testing of Hypothesis: Steps for statistical testing, Type I and Type II errors. Large sample tests-Test for one and two proportions, Test for one and two means, Test for equality of variances.

UNIT-V:

Hypothesis testing for Small samples and Curve Fitting-Small sample tests: t- distribution- Properties and applications, Testing for one and two means.

Chi-square distribution: Test for goodness of fit, Test for independence of attributes

Curve fitting: Correlation-Properties, Regression-Lines of Regression-Properties. Fitting of Straight Line and Growth Curves.

Text Books:

1. S.C.Guptha & V.K.Kapoor “Fundamentals of Mathematical Statistics” , Sultan Chand Pub.,2014.
2. S.C.Guptha “Fundamentals of Statistics”, Himalaya Publishing, 7th Edition , 2014.

Suggested Reading:

1. A.K. Md. Ehsanes Saleh Vijay K. Rohatgi, “An Introduction to Probability and Statistics”, Wiley, 2008.
2. Anthony J. Hayter “Probability and Statistics for Engineers and Scientists”, Brooks/Cole; International edition, 4th Revised edition, 2012

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	50 Marks
Continuous Internal Evaluation	25 Marks
Credits	2

Course Objectives:

Students will be able to:

1. Memorize the object oriented programming concepts.
2. Create classes, objects and constructors.
3. Know the difference of overloading and overriding.
4. Learn the concepts of exception handling and multithreading.
5. Acquire the knowledge on I/O package.
6. Learn the Applets and AWT components.

Course Outcomes:

After completion of the course, students would be able to:

1. Write programs using object oriented programming.
2. Develop classes, objects and constructors.
3. Implement multithreading and exception handling concepts.
4. Create programs on strings and I/O streams.
5. Develop Applets and AWT Components
6. Apply event handling and arrange layout managers.

List of Sample Problems/Experiments:

1. Write programs to perform basic operations (Operators, Control Structures, Arrays etc..)
2. Write a program to create classes, objects
3. Write Programs using constructor
4. Write programs using method overloading
5. Write programs using method overriding, dynamic method dispatch
6. Write Programs using inheritance
7. Write programs on interfaces
8. Write programs on packages
9. Write programs on Exception handling
10. Write programs on Multithreading
11. Write programs using wrapper classes
12. Write Programs using I/O streams and files
13. Write programs on applets
14. Write Programs using AWT
15. Write programs using Event handling, Layout managers

Suggested Reading:

1. Patrick Naughton “Java, the Complete Reference” Tata McGraw Hill 2005.
2. Richard A.Johnson, “Java Programming and Object-Oriented Application Development” Cengage Learning, India edition 2009.

16MCC112**DATA STRUCTURES LAB USING C++**

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	50 Marks
Continuous Internal Evaluation	25 Marks
Credits	2

Course Objectives:

Students will:

1. Know the concepts of classes, constructors and destructors.
2. Acquire the knowledge on inheritance concepts.
3. Aware of different linear data structures concepts.
4. Get the knowledge on different sorting techniques.
5. Understand the concept of hashing and collision resolution techniques.
6. Aware of different non-linear data structures.

Course Outcomes:

After completion of the course, students would be able to:

1. Design classes, constructors and destructors.
2. Implement programs on various inheritance types.
3. Develop programs on various linear data structures.
4. Implement the programs on different sorting techniques.
5. Implements different collision resolution techniques on hashing.
6. Develop programs on various non-linear data structures.

List of Sample Problems/Experiments:

1. Write a C++ program to illustrate the concept of Class with Constructors, Methods.
2. Write a C++ program to illustrate the concept of Inheritance.
3. Write a C++ programs for implementing Stack using following:
 - a) Arrays
 - b) Linked Lists
4. Write a C++ programs for implementing Queues using following:
 - a) Arrays
 - b) Linked Lists
5. Write a C++ programs for implementing Linked Lists:
 - a) Single Linked Lists
 - b) Double Linked Lists
 - c) Circular Linked Lists
6. Write a program for infix to postfix conversion.
7. Write a C++ program for implementing Binary Search Trees.
8. Write a C++ program for implementing Hashing.
9. Write a C++ program for implementing Quick Sort.
10. Write a C++ program for implementing Insertion Sort.
11. Write a C++ program for implementing Selection Sort.
12. Write a C++ program for implementing Merge Sort.
13. Write a C++ program for implementing Graph Traversals DFS and BFS.

Suggested Reading:

1. Complete reference to C++, 4th Edition, Herbert Schildt., 2003.
2. Object Oriented Programming with C++, E. BalaguruSwamy, Tata McGraw Hill, 4th Edition, 2008.
3. Advanced Data structures & Algorithms in C++, V.V.Muniswamy, Jaico Publishing House.
4. Data structures via C++, A.M. Berman, Oxford University Press.