GOVT. COLLEGE OFENGINEERING, AMRAVATI

B. TECH. (Information Technology)
THIRD SEMESTER
CURRICULUM
Department of Information Technology

GOVERNMENT COLLEGE OFENGINEERING, AMRAVTI.

Department of Information Technology. Proposed

Scheme for B. Tech. (Information Technology) SEM III

Category	Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme						Credits
							Theory			Practical			
			Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	MSE	TA	ESE	ICA	ESE		
PCC	ITU321	Computer Organization & Architecture	3	-	-	3	30	10	60	--	--	100	3
PCC	ITU322	Data Structure & Algorithms	4	--	-	4	30	10	60	--	--	100	4
ESC	ITU323	Digital Logic Design	3		-	3	30	10	60	--	--	100	3
BSC	SHU321B *SHU322B	Transform and Linear Algebra Differential Equation and Transform	2	1	-- -	3	30	10	60	--	--	100	3
MC	SHU322	Introduction to Constitution of India	1	--	-	1	--	--	60	-	--	60	-
HSMC	SHU323	Humanities	3		--	3	30	10	60	---	- --	100	3-
PCC-LC	ITU324	Data Structure & Algorithms Lab	-		2	2	--	--	--	25	25	50	1
ESC-LC	ITU325	Digital Logic Design Lab	-	--	2	2	--	--	--	25	25	50	1
PCC-LC	ITU326	Object Oriented Technologies Lab	2-	--	4	6	--	--	--	50	50	100	4
	Tot		18	1	08	27	150	50	360	100	100	760	22

* For Direct second year admitted students

TA : Teacher Assessment **CT: Class Tests** **ESE: End Semester Examination** **ICA : Internal Continuous Assessment**

Government College of Engineering, Amravati

Department of Information Technology

Program Educational Objectives

PEO 1: To formulate, analyze and solve real life problems in software industry, research academia and society at large.

PEO 2: To provide opportunity to learn the latest trends in information technology and prepare for lifelong learning process.

PEO 3: To exhibit strong communication and interpersonal skills, broad knowledge, and global perspectives to work effectively and ethically in multidisciplinary teams.

Program Specific Outcomes

PSO 1: To develop technically sound human resource that shows inclination to pursue IT career in profession, research and higher education.

PSO 2: To exhibit the knowledge of algorithms, data structures /management, software design, information security, programming languages, computer organization and architecture and data science and analytics as a IT professional.

ITU321 COMPUTER ORGANIZATION AND ARCHITECTURE

Teaching Scheme : 03 L + 00T Total 03 Credits : 03
Evaluation Scheme: 30MSE +10TA+ 60ESE Total Marks: 100
Duration of ESE: 2Hrs.30min

Course Objectives

I. To understand the structure, function and characteristics of computer systems.
II. To understand the design of the various functional units and components of computers.
III. To identify the elements of modern instructions sets and their impact on processor design. IV. To explain the function of each element of a memory hierarchy, V. To identify and compare different methods for computer I/O.

Computer Organization: Computer types, Structure with basic computer components, Function in brief with instruction fetch and execute, Interrupts and I/O communication, Interconnection structure, bus interconnection, Multiple Bus hierarchies, Elements of bus design Performance metrics and measurement.

Computer Memory System: Characteristics of memory system, Memory hierarchy, Cache Memory- Cache memory principles, Elements of cache design- cache address, size, mapping functions, replacement algorithms, write policy, Internal Memory- semiconductor memory, External Memory- Hard Disk organization, RAID.

Input and Output System: I/O modules- Module function and I/O module structure, Programmed I/O , Polling I/O, Interrupt driven I/O , DMA function, Synchronous and Asynchronous serial data communication, Computer peripherals like keyboard, mouse, printer, scanner and display devices.

Processor Organization: Evolution of Intel processor architecture- 4 bit to 64 bit, Control unit Hardwired and microprogrammed, concept of pipelining, Study of microprocessor 8085, Functional pins and Register organization, Memory mapped I/O and I/O mapped I/O schemes.

Instruction Set and Assembly Language Programming: Addressing modes and Formats- immediate, direct, indirect, register, register indirect, displacement and stack, Instruction Cycle machine cycle and Data flow, 8086 instruction set and assembly programming, Time delay concept , stack and subroutines, Interrupt handling, Instruction set architecture RISC and CISC.

Text books

1. "Computer Organization and Architecture", William Stallings, 7th edition, Prentice Hall of India, 2008
2. "The 8086/8088 Microprocessor: Architecture, Programming, and Interfacing", Barry B. Brey, Merrill Publishing Company, 1987

Reference books

1. "Computer Organization", C. Hamacher, V. Zvonko, S. Zaky, 5th edition, McGraw Hill, 2002,
2. "Computer Architecture and Organization", Hayes, J.P., 3rd Edition, Tata Mc-Graw Hill, 1998.
3. "Structured Computer Organization", A. Tannenbaum,6th edition, Pearson Education, 2013

Course outcomes

On completion of the course, student will be able to:

ITU321.1 Describe the organization of a computer system in terms of its main components.
ITU321.2 Demonstrate computer architecture concepts related to design of modern processors memories and I/Os.
ITU321.3 Identify various parts of a system memory hierarchy.
ITU321.4 Analyze the performance of commercially available computers. ITU321.5
Develop logic for assembly language programming.

ITU 322 DATA STRUCTURE AND ALGORITHMS

Teaching Scheme : 04L Total 04 **Credits : 04**
Evaluation Scheme: 30 MSE +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE : 2Hrs.30min

Course Objectives

I. To impart the basic concepts of data structures and algorithms.
II. To understand concepts about searching and sorting techniques
III. To understand basic concepts about stacks, queues, lists, trees and graphs.
IV. To enable them to write algorithms for solving problems with the help of fundamental data structures

Introduction: Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. Searching: Linear Search and Binary Search Techniques and their complexity analysis.

Stacks and Queues: ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

Linked Lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, Doubly ,Circular linked list: operations on it.

Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees .Applications of Binary Trees. B Tree, B+ Tree(Theoretical aspect only)

Sorting and Hashing: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods, Hashing.

Graph: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

Text books

1. "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.
2. "Data structures A Pseudo code Approach with C", Richard Gilberg and Behrouz Forouzan, 2nd edition, 2005,Cengage Learning.

Reference books

1. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
2. "How to Solve it by Computer", 2nd Impression by R.G. Dromey, Pearson Education.
3. "Data structures with C", Seymour Lipschutz, 1st Edition, 2017, Schaum Series,Tata MacGraw Hill **Useful link:**

http://nptel.ac.in/courses/106106130/, IIT Madras http://nptel.ac.in/courses/106103069/, IIT Guwahati

http://nptel.ac.in/courses/106106127/, Prof. Shankar Balachandran, IIT Madras **Course outcomes**

ITU 322.1 For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.

ITU 322.2 For a given Search problem (Linear Search and Binary Search) student will able to implement it.

ITU 322.3 For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.

ITU 322.4 Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.

ITU 322.5 Student will able to implement Graph, Trees search and traversal algorithms and determine the time and computation complexity.

ITU323 DIGITAL LOGIC DESIGN

Teaching Scheme : 03 L Total 03 Credits : 03
Evaluation Scheme: 30 MSE +10 TA+ 60 ESE Total Marks: 100
Duration of ESE : 2Hrs.30min

Course Objectives

I. Systematically use mathematical processes to convert any value between any number systems.
II. Apply knowledge of logic gates to select the appropriate gate for the circuit design.
III. Create truth tables by analyzing existing circuits. Design a circuit based on a truth table.
IV. Solve novel problems by applying the combinational logic design process. V. Implement sequential logic to improve digital circuit design. VI. Design a state machine to accomplish specified design task.

Introduction to Number systems and codes : Binary number systems , Signed binary numbers, Binary arithmetic,1's and 2's complement, Octal number system, hexadecimal number system, Introduction to gates, Minimization of Boolean function using Karnaugh Map (up to four variable),SOP- POS, Quine - Mclusky methods, Code conversions- Binary code to gray code and gray to binary, BCD to Excess – 3,Excess – 3 to BCD code.

Design of Combinational Logic Circuits: Modular combinational logic elements, Overview & implementation of multiplexer/ demultiplexer, Implementation of Combinational Logic Circuits using mux / demux, Decoders, Encoders, Priority encoders. Design of Ripple carry adder and Carry look ahead adder, Design of Combinational Circuits using Programmable Logic Devices (PLDs): Programmable Read Only Memories (PROMs), Programmable Logic Arrays (PLAs),Programmable Array Logic (PAL) device.

Design of Sequential Logic Circuits: Latches: RS latch and JK latch, Flip-flops-RS, JK, T and D flip flops, Master-slave flip flops, Edge-triggered flip-flops. Analysis and Design of Synchronous Sequential Circuits: Introduction to sequential circuits, Characteristic table, Characteristic equation and Excitation table.

Modular sequential logic circuits: Registers, Design of Synchronous / Asynchronous using different flip-flops. Overview of Shift registers. Counters- Synchronous / Asynchronous, Updown, Ring, Johnson counter.

Algorithm State Machines: ASM charts, notation ,RTL notation and implementation design of simple controller, multiplexer controller method. VHDL: Introduction to HDL, VHDL- Library.

Memories: Random access memory, TTL RAM cell, parameter read write cycles, ROMs EPROM,MOS-static RAM cell, dynamic RAM cell, refreshing, memory cycles.

Text Books

1 M Morris Mano, "Digital Design" 3rd Edition Prentice Hall 2001 ISBN-10 / ASIN: 0130621218 ISBN-13 / EAN: 9780130621214.

2 R.P. Jain, "Modern Digital Electronics", 3rd Edition, Tata McGraw-Hill, 2003, ISBN 0 – 07 – 049492 – 4.

3 A.P. Malvino, D. P. Leach and G.Saha, "Digital Principles and Applications," 7/e, McGraw Hill, 2010. 37.

Reference Books

1 Wakerly Pearon, "Digital Design: Principles and Practices", 3rd edition, 4th reprint, Pearson Education, 2004.

2 A. Anand Kumar, "Fundamentals of digital circuits" 1st edition, PHI publication, 2001.

3 Mark Bach, "Complete Digital Design", Tata MCGraw Hill, 2005.

4 Stephen Brown, "Fundamentals of digital logic design with VHDL" 1st edition, TMH Publication 2002. **Course Outcomes**

Students will be able to:

ITU 323.1 Apply the knowledge of number systems and codes in problem solving related to code conversion and number system.

ITU 323.2 Learn the simplification of logical statements with karnaugh maps.

ITU 323.3 Learn and understand the basic concepts of combinational logic devices and apply the concepts in designing them.

ITU 323.4 Learn the working principles of decoder, encoder.

ITU 323.5 Learn and understand the fundamentals of sequential logic devices and apply the concepts in designing them.

ITU 323.6 Apply and design the logical devices by using all these concepts along with implementation knowledge of hardware and peripheral design.

SHU321B TRANSFORM AND LINEAR ALGEBRA

Teaching Scheme: 02Th+ 01Tut = 03 Total **Credits: 03**
Evaluation Scheme: 30MSE+60ESE+10TA **Total Marks: 100**
Duration of ESE : 2Hrs.30min

Course Objectives

I. To study about the mathematical tool like z-transform and its properties.
II. To introduce the concept of linear algebra which is important in computer software.
III. To introduce the concept of orthogonality and inner product.
IV. To familiarize the students with basic concepts of probability and conditional probability.
V. To study continuous and discrete probability distributions.

Z-transform:

Definition, Region of Convergence, Properties of Z-transform, Inverse Z-transform: Partial fraction method, Residue method; Convolution Theorem, Application to solution of difference equations with constant coefficients.

Vector spaces:

Vector spaces and subspaces, null spaces, column spaces and linear transformations, Linear dependence and independence, bases, coordinate systems, dimensions of vector space.

Random variables and Probability Distributions:

Basic concepts of probability and its properties; Conditional probability and independent events; Random variables, discrete and continuous random variables, distribution functions, Mean and variance of Binomial, Poisson and Normal distributions.

Basic Statistics:

Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression

Text Books

1. A text book of Engineering Mathematics, N.P. Bali and Manish Goyal,Laxmi Publications, Reprint,2010.
2. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 44th edition, 2020.
3. Engineering Mathematics (for semester III),Veerarajan T., Tata McGraw-Hill, New Delhi,2010.

Reference Books

1. Advanced Engineering Mathematics, Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006.
2. Introduction to Probability Theory,P. G. Hoel, S. C. Port and C. J. Stone, Universal Book Stall, 2003(Reprint).
3. A First Course in Probability, S. Ross, 6th Ed., Pearson Education India,2002.
4. An Introduction to Probability Theory and its Applications,W. Feller, Vol. 1, 3rd Ed., Wiley,1968.

Course Outcomes

After successful completion of the course the students will be able to

SHU321 B.1 Use the concept of probability and random variables and various discrete and continuous probability distributions in practical problems.
SHU321 B.2 Apply the tool of transform in solving engineering problems.
SHU321 B.3 Analyze the problems related to engineering with the knowledge of linear algebra.

SHU322B DIFFERENTIAL EQUATION AND TRANSFORM

Teaching Scheme: 02Th+ 01Tut = 03 Total **Credits: 03**
Evaluation Scheme: 30MSE+60ESE+10TA **Total Marks: 100**
Duration of ESE: 2Hrs.30min

Course Objectives

I. To study about the mathematical tool like z-transform and its properties.
II. To introduce the concept of linear algebra which is important in computer software.
III. To introduce the concept of orthogonality and inner product.
IV. To familiarize the students with basic concepts of probability and conditional probability.
V. To study continuous and discrete probability distributions.

Ordinary differential equations of higher orders :

Linear differential equation with constant coefficient, complementary function, particular integral, complete solution; method of variation of parameters.

Integral Calculus :

Beta and Gamma functions and their properties; Evaluation of double integrals (Cartesian & polar),change of order of integration.

Z-transform:

Definition, Region of Convergence, Properties of Z-transform, Inverse Z-transform: Partial fraction method,Residue method;Convolution Theorem, Application to solution of difference equations with constant coefficients.

Vector spaces:

Vector spaces and subspaces, null spaces, column spaces and linear transformations, Linear dependence and independence, bases, coordinate systems, dimensions of vector space.

Random variables and Probability Distributions:

Basic concepts of probability and its properties; Conditional probability and independent events; Random variables, discrete and continuous random variables, distribution functions, Binomial, Poisson and Normal distributions.

Text Books

1. A text book of Engineering Mathematics, N.P. Bali and Manish Goyal,Laxmi Publications, Reprint,2010.

2. Higher Engineering Mathematics,B.S. Grewal, Khanna Publishers, 44th edition, 2020.
3. Engineering Mathematics (for semester III),Veerarajan T., Tata McGraw-Hill, New Delhi,2010.

Reference Books

1. Advanced Engineering Mathematics,Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006.
2. Introduction to Probability Theory,P. G. Hoel, S. C. Port and C. J. Stone, Universal Book Stall, 2003(Reprint).
3. A First Course in Probability, S. Ross, 6th Ed., Pearson Education India,2002.
4. An Introduction to Probability Theory and its Applications,W. Feller, Vol. 1, 3rd Ed., Wiley,1968.

Course Outcomes

After successful completion of the course the students will be able to

SHU322 B.1 Use the concept of probability and random variables and various discrete and continuous probability distributions in practical problems.

SHU322 B.2 Apply the tool of transform in solving engineering problems.

SHU322 B.3 Analyze the problems related to engineering with the knowledge of linear algebra.

SHU322 INTRODUCTION TO CONSTITUTION OF INDIA

Teaching Scheme: 1L **Credit:00 Evaluation scheme: 60ESE** **Total Marks:60**

Course Objectives

I. To acquaint students about constitution of India, Fundamental rights, fundamental duties, electoral process and role of central, state and local government and its administration.

Introduction to Constitution of India

Salient features of the Constitution ofIndia, Preamble of the Constitution, fundamentalrights and fundamentalduties, Directive Principles of State Policy and relevance of directive principles. Parliamentary Form of Government in India- President, Vice-President, Prime Minister along with council of Minister,Parliament,Supreme court,Electoral process in India.Amendment Procedure.

State executivesGovernor, chief minister, state legislature, high courts of state,

Role and functions of local self government- Municipalities in India, with special reference to 73rd amendment. Panchayat Raj in India with special reference to 74th amendment.

Reference Books

1. An Introduction to Constitution of India, M.V.Pylee, Vikas Publishing, 2002

2. Constitution of India, Dr. B. R. Ambedkar, Government of India Publication
3. Latest Publications of Indian Institute of Human Rights, New Delhi

Course outcomes

On the successful completion of this course, Students shall be able to

SHU322.1 Understand and remember the knowledge of basic information about Indian Constitution.

SHU322.2 Apply the knowledge of fundamental rights and fundamental duties.

ITU324 DATA STRUCTURE AND ALGORITHMS LAB

Teaching Scheme : 02 P **Total 02** **Credit : 01**
Evaluation Scheme: 25 ICA+25ESE **Total Marks: 50**
Duration of ESE : 3Hrs.

Course Objectives

I. Have a good understanding of how several fundamental algorithm works, particularly those concern with searching and sorting.
II. Have a good understanding of fundamental data structures used in computer science.
III. Be able to analyze space and time efficiency of most algorithms.
IV. To be able to design new algorithms or modify existing one for new applications

Suggested List of Experiments/Assignments but not limited to the given list of experiments:

Students have to performMinimum 10 practical's, One mini project (Simulation)

1. Implementation of Linear Search and Binary Search and its Applications
2. Implementation of Stack and its Applications
3. Implementation of Queue/Circular Queue/Priority Queue and its Applications
4. Implementation of Singly Linked List and its Applications
5. Implementation of Doubly Linked List and its Applications
6. Implementation of Binary Tree/Binary Search Tree/Tree traversal techniques and its Applications
7. Implement Sorting algorithm and their applications
8. Implement Graph/Graph Traversal and their applications
9. Write following applications using custom designed data structures.
    - Simulate an air traffic controller.
    - Create the game of maze.
    - Write a program to generate and solve Sudoku problems.
    - Implement an editor.

Web References

1. http://www.tutorialspoint.com/data_structures_algorithms
2. http://www.geeksforgeeks.org/data-structures/
3. http://www.studytonight.com/data-structures/
4. http://www.coursera.org/specializations/data-structures-algorithms

Course Outcomes

At the end of the course, a student will be able to

ITU 324.1 Interpret and compute asymptotic notations to describe work done by an algorithm and relate to the consumption of resources (time/space).

ITU 324.2 Exemplify and implement how abstract data types such as stack, queue and linked list can be implemented to manage the memory using static and dynamic allocations.

ITU 324.3 Apply various data structures trees(Binary tree, Binary Search trees), graphs to solve programming challenges

ITU 324.4 Develop and compare the comparison-based search algorithms and sorting algorithms.

ITU325 DIGITAL LOGIC DESIGN LAB

Teaching Scheme: 02 P **Total 02** **Credit: 01 Evaluation Scheme: 25 ICA + 25 ESE** **Total Marks: 50 Duration of ESE: 3Hrs.**

Course Objectives

I. Students will learn and understand the Basics of digital electronics.

II. Student will learn to design basic logic circuits, combinational and sequential circuits. III. To test/verify the functionality of the logic circuits.

List of Experiments:

1. Implementation of Boolean function using Gates.

2. Code converters:

- Binary to gray
- Gray to binary Excess – 3 code to BCD
- BCD to Excess – 3 code.

3. Design of -

- Half adder, full adder.
- Design of half subtract or, full subtract or.
- K-map examples implementation
- Quine-Mc'clusky examples implementation.

4. Design of:

- 3 bit odd Parity Checker
- 4 bit odd Parity Checker
- 3 bit even Parity Checker

• 4 bit even Parity Checker

5. Implementation of Multiplexer and Demultiplexer.

6. BCD adder using 4 bit adder IC.

7. Study of flip flops-

• RS flip-flop
• D flip-flop
• T flip-flop
• J-K flip-flop

8. Design of Synchronous Counter.

• Design of up / down counters.
• Design of Sequence generator.
• Design of Ring counter.
• Design of Johnson Counter

9. Study practicals on VHDL programming.

Course Outcomes

The students will be able to:

ITU 325.1	Distinguish between analog and digital systems.
ITU 325.2	Identify the various digital ICs and understand their operation.
ITU 325.3	Apply Boolean laws and K-map to simplify the digital circuits.
ITU 325.4	Understand the function of elementary digital circuits under real and simulated environment.
ITU 325.5	Prepare a report on basics of digital electronics and handling of ICs.

ITU326 OBJECT ORIENTED TECHNOLOGY LAB

Teaching Scheme : 02 L + 00T+04P Total 06 Credits : 04
Evaluation Scheme: 50 ICA+ 50 ESE Total Marks: 100
Duration of ESE: 03Hrs.

Course Objectives

I. Gain knowledge about basic language syntax and semantics to write programs
II. Understand the fundamentals of object-oriented programming in C++, Java including defining classes, objects, invoking methods.
III. Understand the principles of inheritance, polymorphism, friend function , virtual function. IV. Understand the principles of file handling, exception handling.

Object Oriented Programming: Design Principles: Objects, classes, Messages and methods, Implementation of Object-oriented Programming,

Object oriented programming with Java/C++: Program structure, Object and class declarations, constructors, inheritance, polymorphism, access specification, interfaces, packages, Friend Function, Friend Class, Virtual Functions, Virtual Class , exception handling, I/O, GUI development, threads and multithreads, Socket Programming, Collection, STL.

The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.

Experiment 1	Implementation of Array, string and structure
Experiment 2	Implementation of Class Objects, Constructor, destructor, constructor overloading.
Experiment 3	Implementation of Multiple and multilevel inheritance with function overriding.
Experiment 4	Implementation of Virtual base class and Virtual function
Experiment 5	Implementation of static variable and static function.
Experiment 6	Implementation of friend function and friend class.
Experiment 7	Implementation of function over loading and operator overloading.
Experiment 8	Implementation of dynamic memory allocation using New and delete operators
Experiment 9	Implementation of Virtual function and pure virtual function
Experiment 10	Implementation of exception handling.
Experiment 11	Implementation of java packages.
Experiment 12	Implementation of Graphics and color classes.
Experiment 13	Implementation of Applets.
Experiment 14	Implementation of GUI
Experiment 15	Implement a mini project based on above experiments.

Course Outcomes

At the end of the course, the student will be able to

ITU 326.1 To identify classes, objects, members of a class and relationships among them needed for a specific problem.

ITU 326.2 To write application programs using OOP principles and proper program structuring.

ITU 326.3 To demonstrate the concepts of polymorphism and inheritance.

ITU 326.4 To implement concept of I/O ,GUI, exception handling.

ITU 326.5 To demonstrate concept of socket programming.