SEMSTER-III

SEMESTER–III

Numerical Analysis & Computer Programming (AS (ID) – 3001)

Course Code	**AS (ID) – 3001**	Credits : 4	**L-3, T-1, P-0**
Name of the Course	**Numerical Analysis & Computer Programming**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

INTRODUCTION TO COMPUTER PROGRAMMING: Review of computer programming in C and C++ languages. Arithmetic expressions, simple programs. The emphasis should be more on programming techniques rather than the language itself.

FINITE DIFFERENCES & INTERPOLATION : Various difference operators and relation between them. Newton's forward and backward interpolation formulae. Central difference Interpolation formula. Gauss's forward and backward interpolation formulae. Lagrange's interpolation formula and Newton's divided difference formulae.

SECTION- B

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS : Bisection method, method of false position, secant method, Iteration method, Newton-Raphson method, Generalized Newton-Raphson method.

SOLUTION OF SIMULTANEOUS ALGEBRAIC EQUATIONS : Jacobi's method, Gauss-seidal method, relaxation method.

SECTION – C

NUMERICAL DIFFERENTIATION AND INTEGRATION : Formulae for derivatives. Trapezoidal rule, Simpson's 1/3rd and 3/8th rules, Boole's and Weddle's rules, Romberg's integration.

SECTION – D

NUMERICAL SOLUTION OF P.D.E.: Finite difference approximations of partial derivatives, solution of Laplace equation (Standard 5-point formula only) One-dimensional heat equation (Schmidt method, Crank – Nicolson DuFort method and Frankel method) and wave equation.

Text books:

1.Numerical Methods in Engg. & Sciences : B.S.Grewal : Khanna Publishers.
2.Numerical methods for Scientific & Engg. Computations : M.K.Jain, S.R.K.Iyengar & R.K.Jain; Wiley Eastern Ltd.

Reference books:

1. Computer Oriented Numerical methods : U.Rajaramanm Orebtuce; Hall of India.
2. Introduction to Numerical Analysis : C.E.Froberg; Addison Wesley.

NOTE: Students will be asked to write computer program of problems discussed in C/C++

SEMESTER – III

Principles of Engineering Economics and Management (AS (ID) – 3002)

Course Code	AS (ID) – 3002	Credits : 4	L-3, T-1, P-0
Name of the Course	**Principles of Engineering Economics and Management**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION - A

ECONOMICS :Definitions, Nature & scope of Economics, Economics Systems-meaning of Capitalism, Socialism & mixed economy.

DEMAND AND SUPPLIES ANALYSIS: Law of demand and supply, exception to the law of demand, Elasticity of demand and supply and their types, Methods of measuring elasticity of demand and supply.

SECTION - B

THEORY OF PRODUCTION : Scales of production, Law of returns, Break even analysis.

MONETARY SYSTEM: Monetary Policy – Meaning, objectives, methods, Fiscal policy – Meaning & objectives of fiscal policy in a developing country like India, Functions of Reserve Bank of India and commercial banks.

ECONOMICS & BUSINESS ENVIRONMENT: Privatization –Growth of private capitalism in India, Business/Trade Cycles – Meaning, Characteristics & classification, Foreign capital & economic development.

SECTION - C

MANAGEMENT PRINCIPLES: Meaning & types of Management, Concept of Scientific Management, Management By Objectives, System Approach to Management.

FINANCIAL MANAGEMENT: Meaning, functional areas of financial management, Sources of Finance, Meaning of financial accounting, accounting principles-concepts & conventions, Importance of final accounts – profit & loss a/c and balance sheet, Need and importance of capital budgeting.

MARKETING MANAGEMENT: Introduction to marketing management, Market segmentation, Developing & managing advertising programs, Deciding on media & measuring effectiveness.

SECTION - D

PRODUCTION MANAGEMENT: Procedure for production planning & Control, Plant Location & Lay-out, Routing, Scheduling, CPM & PERT

QUALITY MANAGEMENT: Statistical Quality Control, introduction Control Charts, X Charts, R Charts, Control Charts for C (N. of defects per unit), Control chart for P(Fraction defective), Advantages & Limitations of SQC

Quality Circles:- Structure, functions & Limitations.

Text Books :-

1. Business Organisation & Management – B.P.Singh – T.N.Chabra – Dhanpat Rai & Sons.
2. Modern Economic Theory – K .K. Dewett – S.Chand & Co.

Reference Books :-

1. Marketing Management – Philip Kotler – Prentice Hall of India Pvt. Ltd.
2. Financial Management - I.M. Pandey - Vikas Publishing House Pvt. Ltd.
3. Indian Economic – Ruddar Dutt, K.P.M.Sundaram – S.Chand & Co.
4. Advanced Economic Theory – H.L.Ahuja – S.Chand & Co.
5. Production Operation Management.- Dr. B.S. Goel – Pragati Prakashan.
6. Statistical Quality Control – Grant, Leaven worth – Tata Mc. Graw Hill.
7. Personnel Management – Edwin B.Flippo – Tata Mc. Graw Hill.
8. Management – A Global Perespective – Harold Krontz – Tata Mc. Graw Hill.

SEMESTER – III

Digital Electronics (EC(ID) – 3001)

Course Code	**EC(ID) – 3001**	Credits : 4	L-3, T-1, P-0
Name of the Course	**Digital Electronics**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one section from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION A

Binary, octal & Hexadecimal number systems and their inter conversion. Binary arithmetic (Addition , Subtraction, Multiplication & Division), 1’s & 2’s complements, 9’s & 10’s complement, BCD code, BCD Addition, Gray Code, Error Detection and Correction, Hamming code.

SECTION – B

Logic functions (OR, AND, NOT, NAND, NOR, XOR), Elements of Boolean Algebra (Theorems truth tables and relation’s) Negative & Positive logic, Saturated & non saturated logic, fan in, fan-out, Logic IC’s, de Morgan’s Theorem, minterms and maxterms.

Karnaugh mapping, K-map representation of logical function for 2, 4 variable, simplification of Boolean equations with the help of K-map, Various minimization techniques, Quine’s method and Quinnes Mc-Cluskey method, Half adder, full adder, half subtractor, full subtractor, serial and parallel binary adder.

SECTION – C

Introduction and performance criteria for logic families, various logic families - DCTL, RTL, DTL, TTL & EC working and their characteristics in brief, MOS Gates and CMOS Gates, comparison of various logic families.

SECTION – D

Various kinds of Flip-Flop: RS Flip-Flop, Clocked RS Flip-Flop, Edge triggered D Flip-Flop, Flip-Flop Switching time, JK Flip-Flop, JK Master Slave Flip flop lock wave forms.

555 timer as an astable multivibrator, shift registers: serial in serial out, parallel in parallel out, Ring counters, asynchronous counters, synchronous counters.

D/A Converter, A/D Converter, clipping and clamping circuits, astable, monostable, bistable multivibrators using transistor.

BOOKS:

1. Malvino and Leach, Digital Principles and Applications.
2. Taub and Schilling, Digital Integrated Electronics.
3. Samuel C Lee, Digital Circuits and Logic Design 4.
4. Pulse, Digital and Switching Waveforms – Millman and Taub.
5. R.P.Jain – Modern Digital Electronics.
6. Floydd – Digital Fundamentals.
7. Malvino – Digital Electronics Principles.

SEMESTER – III

Computer Organization (IT(ID)-3001)

Course Code	**IT(ID) – 3001**	Credits : 4	L-3, T-1, P-0
Name of the Course	**Computer Organization**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Section-A

BASICS: An introduction to computers with block diagram, Computers generation, Impact of technology.

LOGIC DESIGN TECHNIQUES : Designing combinations logic using Karnaugh-Maps with building blocks of basic gates , Multiplexers, de-multiplexer, decoders and encoders, arithmetic, logics units .Instruction codes Computers registers and instructions, timing and control, instruction cycle memory reference instruction, I –O interruption

Basic sequential logic blocks flip-flops, registers, shift registers and counters, Finite state Machine using state tables

Sections-B

COMPUTER ARITHMETIC :Adder and Subtractor circuits, Booth Multiplication algorithm Performance bench marks.

CONTROL PATH DESIGN: Sequence counter method, Micro programmed controllers address sequencing, symbolic micro –instructions

Section-C:

CENTRAL PROCESSING UNIT: Registers general register origination, stack origination, Instruction formats, address instructions, addressing modes, data transfer and manipulations, programmed control RISC instruction set design, three address instructions and arithmetic pipelines with example of floating point adder, instruction pipe lines, advanced pipe lining using instruction level parallelism

Section –D

MEMORY ORGANISATION: Memory device characteristics, random access memory, serial access memory virtual memory associative memory cache memory, memory management hardware .

I/O ORGANISATION: I/O interface asynchronous data transfer DMA interrupt, I/O processor

BOOKS:

1. **M. Moris Mano , Computer System &Architecture PHI**
2. **Hayes J. P Computer Architecture & Organization .**
3. **M. Morris & Charles R . Kire , Logic and Computer Design Fundamental –PHI 1995**

SEMESTER – III

Object Oriented Methods & Programming (IT(ID) – 3002)

Course Code	**IT(ID) – 3002**	Credits : 4	L-3, T-1, P-0
Name of the Course	**Object Oriented Methods & Programming**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION-A

Introduction to object oriented concepts : Overview, Abstract data type :Object , Modularization , classes, creating and destroying objects, garbage collection strategies , overloading , dynamic binding, polymorphism , constants.

Inheritance: class inheritance, inheriting instance variable inheriting methods, meta classes , object inheritance , multiple and multilevel inheritance

SECTION B

C++ programming language: overview: programming paradigm support for data abstraction and object oriented programming , declaration and constant , expression and statements , functions and files

Classes and objects : Definitions of class declaration , data numbers class function definition , member function definition scope resolution operator , private and public member function, nesting of member function , creating objects , accessing class data member functions , array of objects, objects as function arguments

Operator overloading :Operator function, user defined typed conversion large objects, assignment and initialization and subscripting and functions call, referencing, increment and decrement, a string class, friends and members.

SECTION –C

Inheritance thorough extending classes: Base and drive classes, visibility modes, single inheritance , protect member and inheritance , multilevel inheritance , nesting of classes .

Streams templates and design of libraries .output, input, formatting files and streams, C-I/O , Design of libraries.

SECTION –D

Objected oriented analysis and design: Object oriented analysis and system design , objected design , semantic and entity relationship modeling , contrasting design for data bases and OOA,OOD.

Books:

1. The C++ programming language , Bjarne Stroustrup ,Addison Wesley , 2000.
2. Obejcting Moudling and design, James ,Rumbaugh, Michel Blha , William Premerlani,Fredetrick Eddy and William Lorence , PHI-1998
3. Object oriented programming in turbo C++ , Robbet Lofre, Galgotia Publication Pvt Ltd. 1994.
4. Object oriented Programming with C++ , Balaguruswamy, Tata Mcgraw Hill Publication Co. Ltd 2000.
5. Programming with C++, D. Ravichandern, Tata Mcgraw Hill 1996..

SEMESTER – III

Data Structures & Algorithms (IT(ID) – 3003)

Course Code	**IT(ID) – 3003**	**Credits: 4**	**L-3, T-1, P-0**
Name of the Course	**Data Structures & Algorithms**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

Basic concepts and notions, data structures and data structure operation, mathematical notation and functions algorithm complexity, linked list, representation of linked list, multi- linked structures.

SECTION – B

Trees – definitions and basic concept, linked tree representation, representations in contiguous storage, binary trees, binary tree traversal, searching insertion and deletion in binary trees, heap trees, heap sort algorithm, height balanced trees and AVL trees.

SECTION – C

Graphs an their application, sequential and linked representation of graph, adjacency matrix, operation on graph, traversing a graph , Dijkstra’s algorithm for shortest distance.

Tables, searching sequential tables Hash tables and symbol tables.

SECTION - D

Searching and sorting: Use of various data structure for searching and sorting, linear and binary search, insertion sort, selection sort, Merge sort , Radix sort and bubble sort.

Note:

1.Programs are implemented in C.

2.Insertion, deletion, Search and transversal operation are to be performed on all the data structures.

Books:

1.Tenebaum , A. Lanhgsam Y and Augensatein , A. J: Data structures using C , Prentice Hall of India.

2.Seymour Lipschutg : Theory an practice of Data structure , Mc. Graw Hill 1998.

3.Horowitz E and Sahni S: Data structure with Pascal 3rd edition , Galgotia 1991.

SEMESTER – III

Numerical Analysis & Computer Programming Lab (AS (ID)- 3003)

Course Code	**AS (ID) – 3003**	Credits : 2	L-0, T-0, P-2
Name of the Course	**Numerical Analysis & Computer Programming Lab**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time : 3 hrs**	**Max. Marks : 50**	**Min. Pass Marks : 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

Performing a practical examination assigned by the examiner (25 marks).

Viva-voce examination (25 marks).

Viva-voce examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

Write down and execute following programs using C/C++ language

1. To find the roots of non-linear equation using Bisection method/Muller's method.
2. To find the roots of non-linear equation using Newton's method/Muller's method.
3. Curve fitting by least-squares approximations.
4. To solve the system of linear equations using Gauss-Elimination method.
5. To solve the system of linear equations using Gauss-Seidal iteration method.
6. To solve the system of linear equations using Gauss-Jordan method.
7. To solve integral equation numerically using Trapezoidal rule.
8. To solve integral equation numerically using Simpson's rule.
9. Find the largest Eigen value of a matrix by power – method.
10. To find numerical solution of ordinary differential equations by Euler's method.
11. To find numerical solution of ordinary differential equations by Runga-Kutta method.
12. To find numerical solution of partial differential equation/laplace equation/ wave equation/heat equation.
13. To find numerical solution of ordinary differential equations by Milne's method.
14. To solve a given problem using Newton's forward interpolation formula.
15. To solve a given problem using Lagrange's forward interpolation formula.

NOTE : Minimum 10 experiments are to be performed.

SEMESTER – III
DIGITAL ELECTRONICS LAB (EC (ID) – 3004)

Course Code	**EC (ID) – 3004**	Credits : 2	L-0, T-0, P-2
Name of the Course	**Digital Electronics Lab**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 50**	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).

ii) Viva-voice examination (25 marks).

Viva-voice examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

LIST OF EXPERIMENTS

1.Verify truth tables of AND, OR, NOT, NAND, NOR and XOR gates.

2.Implement (i) half adder (ii) full adder using AND – OR gates.

3.Implement full adder using NAND gates as two level realization.

4.Implement full subtractor using 8 to 1 multiplexer.

5.Verify truth tables of RS & JK flip flops and convert JK flip flops into D type & T type flip flops.

6.Use 555 timer as (i) monostable (ii) astable multivibrator.

7.(a) Use of 4-bit shift register for shift left and shift right operations.

(b) Use 4-bit shift register as a ring counter.

8.Implement mod – 10 counter and draw its output wave forms.

9.Implement 4-bit DAC using binary weighted resistance technique/R-2R ladder network technique.

10.Implement 8 – bit ADC using IC (ADC 0800/0801).

11.a) Implement (i) Single level clipping circuit (ii) Two level clipping circuit.

b)Implement clamping circuit to clamp, at peak +ve voltage/peak –ve voltage of an input signal.

ADDITIONAL EXERCISES:

1.Construct bounce less switch.

2.Construct a pulser of 1 Hz and 10 Hz, 1k/Hz and manual.

3.Construct logic state detector.

4.Construct opto – sensor based.

5.Measurement rotational speed of motor.

6.Measurement time elapse between two events.

7.Measurement of linear velocity.

8.Measurement of acceleration.

9.Construct a memory using TTL Circuits. Read and write data onto a memory from bus.

10.Construct a security latch that can be operated by an identity card.

NOTE:-Record to be maintained both electronically and hard copy for evaluation

SEMESTER – III

Data Structure Laboratory (IT(ID)-3005)

Course Code	**IT(ID) – 3005**	Credits : 2	L-0, T-0, P-2
Name of the Course	**Data Structures Laboratory**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 50**	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).

ii) Viva-voce examination (25 marks).

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

1. Write a program to search an element in a two-dimensional array using linear search.
2. Using iteration & recursion concept write programs for finding the element in the array using Binary Search Method.
3. Write a program to perform following operations on tables using functions only

   a) Addition b) Subtraction c) Multiplication d) Transpose
4. Using iteration & recursion concept write the program for Quick Sort Technique.
5. Write a program to implement the various operations on string such as length of string , string concatenation, reverse of a string & copy of a string to another.
6. Write a program for swapping of two numbers using ‘call by value’ and ‘call by reference’ strategies.
7. Write a program to implement Binary search tree. (Insertion & deletion in binary search tree)
8. Write a program for implementation of a file and performing operations such as insert, delete and update a record in a file.
9. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list.

10. Create a linked list and perform the following operation on it

a) Add a node b) Delete a node c) Count no. of nodes d) Sum of nodes

11. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000 elements.

12. Write a program to simulate the various graph traversing algorithms.

13. Write a program, which simulates the various tree traversal algorithms.

14. Circular double linked list

15. Sorting

a)Bubble sort

b)Merge sort

c)Insertion sort

d)Selection sort

16.Write down a program to implement polynomial equation addition in single linked list

17.Stack implementation using

a)Array b) Linked list

18. Queue implementation using

a)Array b) Linked list

Note: At least 5 to 10 more exercises to be given by the teacher concerned.

SEMESTER – III

Object Oriented Methods and Programming Lab (IT(ID)-3006)

Course Code	IT(ID)-3006	Credits-2	**L-0, T-0, P-2**
Name of the Course	Object Oriented Methods and Programming Lab		
Lectures to be delivered	**26 hours of Lab Work**		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 50	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

1. Performing a practical examination assigned by the examiner (25 marks).
2. Viva-voce examination (25 marks).

Viva-voce examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

Laboratory Exercise:

1. Raising a number n to a power of p is the same as multiplying n by itself p times. Write a function called power( ) that takes a double value for an int value for p and returns the result as double value . Use a default argument of 2 of p, so that if this argument is omitted, the number will be squared. Write a main ( ) function that gets values from the user to test this function .

2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example (4,5) represents point 4 unit to the right of origin along the X axis and 5 units up the y-axis . The sum of the two points can be defined as new point whose X and Y coordinates.

   Write a program that uses a structure called point to model a point . Define three points and have the user input values to two of them. Than set the third point equal to the sum of the other two. And display the value of new points. Interaction with the program might look like this.

```
Enter Coordinate of P1:           3        4
Enter Coordinate of P2:           5        7
Coordinates of P1+P2 are :        8       11
```

3. Create the equivalent of four function calculator . The program should request the to user to enter a number , an operator and another number . It should carry out the specified arithmetical operation: adding, subtracting, multiplying ,or dividing the two numbers. (it should use a switch statement to select the operation) finally it should be display the result.

When it finishes the calculation , the program should ask if the user want to do another calculation. The response can be ‘Y’ or ‘N’ . Some sample interaction with the program might look like this.

```
Enter first   number ,operators and second number 12+100
 Answer =112
  Do another (Y/N)?N
```

4. A phone no. such as (212)767-8900 , can be thought of as having three parts area code(212), the exchange (767) and the number (8900). Write a program that uses a structure to store these three parts of phone both no. separately . Call the structure phone . create two structure Enter your area code Exchange and number : 415 555 1212

   My number is (415)555-1212

5. Create two classes DM and DB which stores the value of distances DM stores distance in meters and centimeters and DB in feet and inches . Write a program that can read value for the classes objects and add one object of DM with another object DB.

   Use a friend function to carry out the addition operation .The object that stores the result may be a Dm object or DB object depending on the units in which result are required .

   The display should be in the format of feet and inches or meters and centimeters depending on the object on display.

6. Create a class rational which represents numerical value by two double value NUMERATOR & DENOMENATOR . Include the following public member functions:

   - Constructor with no arguments.(defaults)
   - Constructor with two arguments.
   - Void reduce( ) that reduce the rational number by eliminating the highest common factor between the numerator and denominator .
   - Overload +operator to add two rational number
   - Overload operator >> operator to be enabled input through cin
   - Overload <<operator to be enabled input through count.

Write a main ( ) to test all the functions in the class

7. Consider the following class definition class father {

```
Protected : int age;

Public:

Father (int x){age = x;}

Virtual void  iam ()

{

{cout <<"I AM THE FATHER , my age is ",<<age<<endl;}

};
```

Derive the two classes son and daughter from the above classes and for each define iam() to write our similar but appropriate message .You should also define suitable constructors for these classes

Now write a main ( ) that creates objects of three classes and then call iam( ) them .Declare pointer to father , successively assign addresses of object of the two derived classes to this pointer and in each case , call iam( ) through the pointer to demonstrate polymorphism in action.

8. Write a program that create a binary files by reading the data from the students from the terminal .The data of each student consist of roll no, name(a string of 30 or lesser no. of character) and marks.

9. A hospital wants to create a database regarding its indoor patients. The information to store include.

a) Name of the patient

b) Date of admission

c) Disease

d) Date of discharge

Create a structure to store the data (year, month, date as its members). Create a base class to store the above information. The member function should include function to enter information and display a list of all the patients in database Create a drive class to store the age of patients. List the information about all to store the age of the patients. List the information about all the pediatric (less then twelve years in age)

10. Makes a class Employee with the name and salary . Makes a class manager inherit from the Employee Add an instance variable named :department, type : string. Supply a method to String that print the manager's name, department and salary. Make a class Executive inherit from information store in the manager super class object . Supply a test program that test these classes and methods.

11. Imagine a tollbooth with a class called Toll booth . The two data item are a type unsigned into to hold the total number of cars and type double to hold the total amount of money collected . A constructor initializes both these to 0. A member function called nopaycar( ). Increments the car total and adds 0.50 to the cash total. Another function, called nopaycar( ), increment the car total but adds nothing to the cash total. Finally , a member function called display the two totals . Include a program to test this class . This program should allow the user to push one key to count paying a car ,and another to count a non paying car . Pushing the ESC key should cause the program to print out the total cars and total cash and than exit

12. Write a function called reverse it ( ) that reverses a string(an array of char) use a for loop that swap the first and last characters, then the second and next to last character and so on .

    the string should be passed to reversesit ( ), and print out the result. Use an input method that allows embedded blanks. Test the program with Napoleon’s famous phrase , “Able was ere I saw Elba”.

13. Create some objects of the string class, and put them in a Deque – some at the head of the Deque and some at the tail. Display the contents of the Deque using the for Each( ) function and a user written display function . Then search the Deque for a particular strings, using the first That ( ) Function and display any string that match, finally remove all the item from the date using the get left( ) Function and display each item. Not ice is the order in which the item are displayed: Using Get Left ( ), Those inserted on the left (head),of the Deque are removed in “last and first out” order while those put on the right side are removed in “first in first out” order. The opposite would be true if Get right ( ) were used

14. Assume that a blank maintain two kinds of accounts for customer. One called as saving accounts and another is current account . The saving account provides compound interest and withdrawal facility but no cheque book facility, The current account provides cheque book facility but no interest Current account holders should also maintain a minimum balance and if the balance false below this level , a service charge is imposed.

Create a class account that store customer name, account number and type of account. From this drive the classes cur_acct and sav_account to make them more specific to their requirement. Include necessary member function in order to achieve the following task

a) Accept deposit from a customer and update the balance

b) Display the balance

c) Compute and deposit interest

d) Permit withdrawal and update the balance

e) Check for the minimum balance, impose penalty ,necessary and update the balance.

f) Do not use any constructor , use member function to initialize the class members

15. Create a base class called shape .Use this class to store two double type values that could be used to compute the area of figure, Derive to specific classes called triangle and rectangle from the base shape . Add to the base class, a member function get data ( ) to initialize base class data member and another member function display area ( ), To compute and display the area of figures make display area ( ) as virtual function and redefine this function in the derived classes to suit the requirements.

Using this three classes design a program that will accept dimension of triangle or rectangle interactively and display the area

Remember the two value given as input will be treated as length of two sides in the case of rectangle and as base and height in the case of triangle and used as follows

Area of rectangle = x * y

Area of triangle =1/2 * x * y

Programming of exercise in C++ in the form of project (based on “object oriented programming in TURBO C++”) , Robert lafore , Galgotia Publication Pvt. Ltd.1994 to be done in consultation with the faculty incharge for the course

Note: Record to be maintained both electronically and hard copy of evaluation