3rd Semester

Fundamentals of Economics

Section A

Market Dynamics: Demand Theory and demand forecasting, Production Theory, Cost Theory, X-inefficiency, Forms of Market, elements of Competition, Monopoly and Price Discrimination, Imperfect Competition Oligopoly.

Section B

Theory of Firm: Profit Concepts and Measurements, entry Deterring Pricing, Predatory Pricing, Implicit Price Fixing, Multi-product pricing, Peak Load Pricing, Two Part Tariff , Product Life Cycle, Information Problems, and Associated Cost, Objectives of the Firm, Types of Firm, firm versus Markets, Uncertainty and Firm, Vertical and Horizontal Integration, Diversification, Merges and takeovers.

Section C

Macro Economy: Macroeconomic Aggregates and Concepts, simple Macroeconomic Models, Business Cycles, Inflation, Unemployment, Input-Output Analysis.

Section D

Indian Economy : Pre and Post Colonial Characteristics, Planning In India, Trends in Economic growth, Saving, Investment and Foreign Trade(BOP), Project Formulation and Appraisal, India's Overall Economic Policy since Independence, Sustainable Development, Economic Liberalization, Global trade Regimes.

Books:

1. Alfred W Stonier & Douglus C Hauge, A Textbook of Economic Theory, 5th edition 1980, Lomgman. London
2. A. Kotosoyiannis, Modern Microeconomics, 2nd edition, English Language Book society, Macmillan, London
3. James M Anderson, Richard E. Quandt., Microeconomic Theory,1980
4. Hal R. Varian, Intermediate Microeconomics: A Modern Approach , 2nd Edition, Norton, International Student Edition, Norton and Company, London
5. Rudiger Dornbusch and Stanley Fischer, Macroeconomics, sixth edition,1994, Mc Graw Hill,

3rd Semester

BASIC ORGANIZATION

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

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

3rd Semester

OBJECT ORIENTED METHODS & PROGRAMMING

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

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..

3rd Semester

DATA STRUCTURES & ALGORITHM

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.

3rd Semester

COMPUTER GRAPHICS

Section A

Graphic Hardware: The functional characteristics of systems are emphasized

Input Devices: Keyboards, Touch Panel, Light Pens, Graphics Tablets, Joysticks, Trackball, Data glove, Digitizer, Image scanner, Mouse, Voice Systems.

Hard Copy Devices: Impact and non-impact printers, such as line printer, dot matrix, laser, ink-jet, electrostatics, flatbed and drum plotters.

Video Display Devices: Refresh cathode- ray tube, raster scan displays, random scan displays, color CRT-monitors, direct view storage tube, flat-panel display, 3D viewing devices, virtual reality, raster scan systems, random scan systems, graphics monitors and workstations.

Section B

Scan Conversion algorithms for line, circle and ellipse, Bresenham's algorithms area filling techniques, character generation.

2-dimensional Graphics: Cartesian and Homogeneous co-ordinate system, Geometric transformations, (Translation, Scaling, Rotation, Shearing), Composite transformation, Affine transformation, Two dimensional viewing transformation and clipping (line, polygon and text)

Section C

3-dimensional graphics: Geometric transformation (Translation, Scaling, Rotation, Reflection, Shearing), Composite transformation, Mathematics of projections (parallel and perspective) , 3-D viewing transformation and clipping.

Hidden line and surface elimination algorithms, z-buffer, scan line, sub-division, and Painter's algorithm.

Section D

Shading: Modeling Light intensities: Diffuse reflection, Specular reflection, refracted light, texture surface patterns, halftoning.

Surface Shading Methods: Constant intensity method, Gauraud Shading, Phong Shading.

Animation: Principles of animation, animation techniques- draw – erase, animation with lookup table, Storyboards for animation, key frame system, basic requirements in animation, animation softwares.

Books:

1. Foley, van Dam et al: Computer Graphics: principles and Practice In C, 2nd Ed., Addison Wesley, 1997.
2. Hearn and Baker: Computer Graphics, 2nd Ed., Prentice Hall of India, 1999.
3. Woo, Neider, Davis, and Shreiner: Open GL Programming Guide, 3rd Addison Wesley, 2000.
4. Steven Harrington: Computer Graphics: A programming approach, 2nd Addison Wesley, 1997.
5. A. Watt: Three-dimensional Computer Graphics, 3rd Ed. Addison Wesley, 2000.
6. D.F. Rogers: Procedural Elements of Computer Graphics, 2nd Ed., McGraw Hill International Editions.

3rd Semester

DIGITAL ELECTRONICS

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. Pulse, Digital and Switching Waveforms – Millman and Taub.
2. R.P.Jain – Modern Digital Electronics.
3. Floydd – Digital Fundamentals.
4. Malvino – Digital Electronics Principles

DIGITAL ELECTRONICS LAB

3rd Semester

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 practical 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.

3rd Semester

DATA STRUCTURE LAB

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 practical performed/projects executed by the candidate related to the paper during the course of the semester.

List Of Experiments

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.

3rd Semester

OBJECT ORINTED METHODS & PROGRAMMING LAB

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 practical 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.

- Coordinates of P1+P2 are :
- 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. 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".

10. 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

3rd Semester

COMPUTER GRAPHICS LAB

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 practical performed/projects executed by the candidate related to the paper during the course of the semester.

List of programs to be developed:

1. Familiarize yourself with creating and storing digital images using scanner and digital camera (compute the size of image when stored in different formats) and convert the stored images from one format to another (BMP, GIF, JPEG, TIFF, PNG, etc.) and analyze them.
2. Implement bresenham's line algorithm. Also provide Provision to change attributes of graph primitives such as stippling (Dotted and Dashed pattern), colors and Butt & round Caps.
3. Implement bresenham's circle algorithm. Also provide to change attributes of graph primitives such as stippling (Dotted and Dashed pattern) and colors.
4. Implement 2-D transformation with translation, scaling, rotation, reflection, Shearing and scaling
5. Construct Bezier curves and Spline curves with 6 or more control points entered through mouse.
6. Construct fractal geometric shapes using linear or non-linear procedures.
7. Consider a scene with two or more three dimensional polygonal object. Generate Different perspective views of scene by changing various 3D viewing parameters interactively.
8. Implement tweening procedure for animation with key frames having equal or different no. of edges.
9. Write a program for 2D line drawing as Raster Graphics Display