BEA- 301 Mathematics-III

UNIT-I

Numerical Methods – 1 Solution of polynomial and transcendental equations – Bisection method, Newton-Raphson method and Regular-Falsi method. Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae.

UNIT-II

Numerical Methods – 2 Numerical Differentiation, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules. Solution of Simultaneous Linear Algebraic Equations by Gauss's Elimination, Gauss's Jordan, Crout's methods, Jacobi's, Gauss-Seidal, and Relaxation method.,

UNIT-III

Numerical Methods – 3 Ordinary differential equations: Taylor's series, Euler and modified Euler's methods. RungeKutta method of fourth order for solving first and second order equations. Milne's and Adam's predicator-corrector methods. Partial differential equations: Finite difference solution two dimensional Laplace equation and Poisson equation, Implicit and explicit methods for one dimensional heat equation (Bender- Schmidt and Crank-Nicholson methods), Finite difference explicit method for wave equation.

UNIT-IV

Transform Calculus Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs by Laplace Transform method, Fourier transforms.

UNIT-V

Concept of Probability Probability Mass function, Probability Density Function, Discrete Distribution: Binomial, Poisson's, Continuous Distribution: Normal Distribution, Exponential Distribution.

Textbooks/References:

1. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
7. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
8. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
9. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley,1968.Statistic

CSA- 302 Discrete Structure

UNIT-I

Set Theory, Relation, Function, Theorem Proving Techniques : Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation, Job-Scheduling problem Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions, pigeonhole principle. Theorem proving Techniques: Mathematical induction, Proof by contradiction.

UNIT-II

Algebraic Structures: Definition, Properties, types: Semi Groups, Monod, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

UNIT-III

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Normal Forms, Universal and existential quantifiers. Introduction to finite state machine Finite state machines as models of physical system equivalence machines, Finite state machines as language recognizers

UNIT-IV

Graph Theory: Introduction and basic terminology of graphs, Planer graphs, Multigraphs and weighted graphs, Isomorphic graphs, Paths, Cycles and connectivity, Shortest path in weighted graph, Introduction to Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs.

UNIT-V

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded and complemented lattices.

Combinatorics: Introduction, Permutation and combination, Binomial Theorem, Multimonial Coefficients Recurrence Relation and Generating Function: Introduction to Recurrence Relation and Recursive algorithms , Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions , Generating functions , Solution by method of generating functions.

References:

1. C.L.Liu, “Elements of Discrete Mathematics” Tata Mc Graw-Hill Edition.
2. Trembley, J.P & Manohar; “Discrete Mathematical Structure with Application CS”, McGraw Hill.
3. Kenneth H. Rosen, “Discrete Mathematics and its applications”, McGraw Hill.
4. Bisht, “Discrete Mathematics”,Oxford University Press
5. Biswal,”Discrete Mathematics & Graph Theory”, PHI

CSA-303 Data Structure

UNIT-I

Review of C programming language. Introduction to Data Structure: Concepts of Data and Information, Classification of Data structures, Abstract Data Types, Implementation aspects: Memory representation. Data structures operations and its cost estimation. Introduction to linear data structures- Arrays, Linked List: Representation of linked list in memory, different implementation of linked list. Circular linked list, doubly linked list, etc. Application of linked list: polynomial manipulation using linked list, etc.

UNIT-II

Stacks: Stacks as ADT, Different implementation of stack, multiple stacks. Application of Stack: Conversion of infix to postfix notation using stack, evaluation of postfix expression, Recursion. Queues: Queues as ADT, Different implementation of queue, Circular queue, Concept of Dqueue and Priority Queue, Queue simulation, Application of queues.

UNIT-III

Tree: Definitions - Height, depth, order, degree etc. Binary Search Tree - Operations, Traversal , Search. AVL Tree, Heap, Applications and comparison of various types of tree; Introduction to forest, multi-way Tree, B tree, B+ tree, B* tree and red-black tree.

UNIT-IV

Graphs: Introduction, Classification of graph: Directed and Undirected graphs, etc, Representation, Graph Traversal: Depth First Search (DFS), Breadth First Search (BFS), Graph algorithm: Minimum Spanning Tree (MST)- Kruskal, Prim's algorithms. Dijkstra's shortest path algorithm; Comparison between different graph algorithms. Application of graphs.

UNIT-V

Sorting: Introduction, Sort methods like: Bubble Sort, Quick sort. Selection sort, Heap sort, Insertion sort, Shell sort, Merge sort and Radix sort; comparison of various sorting techniques. Searching: Basic Search Techniques: Sequential search, Binary search, Comparison of search methods. Hashing & Indexing. Case Study: Application of various data structures in operating system, DBMS etc.

Text Books

1. AM Tanenbaum, Y Langsam& MJ Augustein, "Data structure using C and C++", Prentice Hall India.
2. Robert Kruse, Bruse Leung, "Data structures & Program Design in C", Pearson Education.

Reference Books

1. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Pearson Education.
2. N. Wirth, "Algorithms + Data Structure = Programs", Prentice Hall.
3. Jean – Paul Trembly , Paul Sorenson, "An Introduction to Structure with application", TMH.
4. Richard, GilbergBehrouz, Forouzan ,"Data structure – A Pseudocode Approach with C", Thomson press.

List of experiments

1. To read the numbers and display it.
2. To demonstrate the concept of one dimensional array finding the sum of array elements.
3. To insert an element in an array.
4. To add two matrix A and B.
5. Implementation of linked list using array.
6. Implementation of stack using array.
7. Implementation of binary search tree using array.
8. Implement linear search.
9. To Search an element using binary search.
10. Implement bubble sort.

CSA- 304 Digital Systems

UNIT-I

Review of number systems and number base conversions. Binary codes, Boolean algebra, Boolean functions, Logic gates. Simplification of Boolean functions, Karnaugh map methods, SOP-POS simplification, NAND-NOR implementation.

UNIT-II

Combinational Logic: Half adder, Half subtractor, Full adder, Full subtractor, look- ahead carry generator,BCD adder, Series and parallel addition, Multiplexer – demultiplexer, encoder-decoder, arithmetic circuits, ALU

UNIT-III

Sequential logic: flip flops, D,T, S-R, J-K Master- Slave, racing condition, Edge & Level triggered circuits, Shift registers, Asynchronous and synchronous counters, their types and state diagrams. Semiconductor memories, Introduction to digital ICs 2716, 2732 etc. & their address decoding. Modern trends in semiconductor memories such as DRAM, FLASH RAM etc. Designing with ROM and PLA.

UNIT-IV

Introduction to A/D & D/A convertors & their types, sample and hold circuits, Voltage to Frequency & Frequency to Voltage conversion. Multivibrators : Bistable, Monostable, Astable, Schmitt trigger, IC 555 & Its applications. TTL, PMOS, CMOS and NMOS logic. Interfacing between TTL to MOS.

UNIT-V

Introduction to Digital Communication: Nyquist sampling theorem, time division multiplexing, PCM, quantization error, introduction to BPSK & BFSK modulation schemes. Shannon's theorem for channel capacity.

References:

1. Morris Mano, Digital Circuits & Logic Design, PHI
2. Gothman, Digital Electronics, PHI
3. Tocci, Digital Electronics, PHI
4. Mavino& Leach, Digital Principles & Applications, PHI
5. Taub and schilling, Digital Integrated electronics.
6. Simon Haykin, Introductionto Analog& Digital Communication, Wiley.
7. Lathi B.P., Modern analog& digital communication , Oxford University.

List of Experiments:

1. To study and verify the truth tables of various Logic gates.
2. To verify the properties of NAND and NOR gates as Universal Building Blocks.
3. Simplification and implementation of a Boolean function.
4. Implementation of basic Boolean arithmetic logic circuits such as Half-adder, Half-subtractor, Full adder and Full subtractor.
5. Conversion from Binary to Gray and Gray to Binary code.
6. To construct a binary multiplier using combinational logic and to verify with the truth table
7. To verify 2-bit Magnitude comparator for all possible conditions
8. Generation of various logical functions using 8-to-1 multiplexer
9. Construction of a 4-bit ripple counter and study of its operation.
10. Operation of IC-555 Timer as Monostable, Astable and Bistablemultivibrators.
11. To characterize binary ladder type digital to analog (D/A) and analog to digital (A/D) convertor.
12. Comparison of various Logic families.
13. Design and implementation of various types of flip-flops using JK flip-flop.
14. To study natural sampling of continuous time waveforms using different sampling rates.
15. To study Pulse-Code modulation with Time-division multiplexing (PCM-TDM)
16. To study generation and detection of BPSK and QPSK waveforms.

CSA- 305 Object Oriented Programming & Methodology

Unit-I

Introduction to Object Oriented Thinking & Object Oriented Programming: Comparison with Procedural Programming, features of Object oriented paradigm– Merits and demerits of OO methodology; Object model; Elements of OOPS, IO processing.

UNIT-II

Encapsulation and Data Abstraction- Concept of Objects: State, Behavior & Identity of an object; Classes: identifying classes and candidates for Classes Attributes and Services, Access modifiers, Static members of a Class, Instances, Message passing, and Construction and destruction of Objects.

UNIT-III

Relationships – Inheritance: purpose and its types, 'is a' relationship; Association, Aggregation. Concept of interfaces and Abstract classes.

UNIT-IV

Polymorphism: Introduction, Method Overriding & Overloading, static and run time Polymorphism.

UNIT-V

Strings, Exceptional handling, Introduction of Multi-threading and Data collections. Case study like: ATM, Library management system.

Text Books

1. Timothy Budd, "An Introduction to Object-Oriented Programming", Addison- Wesley Publication, 3rd Edition.
2. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I, Fundamentals", Prentice Hall publication.

Reference Books

1. G. Booch, "Object Oriented Analysis& Design", Addison Wesley.
2. James Martin, "Principles of Object Oriented Analysis and Design", Prentice Hall/PTR.
3. Peter Coad and Edward Yourdon, "Object Oriented Design", Prentice Hall/PTR.
4. Herbert Schildt, "Java 2: The Complete Reference", McGraw-Hill Osborne Media, 7th Edition.

List of Experiment:-

1. Write a program for multiplication of two matrices using OOP.
2. Write a program to perform addition of two complex numbers using constructor overloading. The first constructor which takes no argument is used to create objects which are not initialized, second which takes one argument is used to initialize real and imag parts to equal values and third which takes two argument is used to initialized real and imag to two different values.
3. Write a program to find the greatest of two given numbers in two different classes using friend function.

4. Implement a class string containing the following functions:

   Overload + operator to carry out the concatenation of strings.
   Overload = operator to carry out string copy.
   Overload <= operator to carry out the comparison of strings.
   Function to display the length of a string.
   Function tolower( ) to convert upper case letters to lower case.
   Function toupper( ) to convert lower case letters to upper case.

5. Create a class called LIST with two pure virtual function store() and retrieve().To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.

6. Write a program to define the function template for calculating the square of given numbers with different data types.

7. Write a program to demonstrate the use of special functions, constructor and destructor in the class template. The program is used to find the bigger of two entered numbers.

8. Write a program to perform the deletion of white spaces such as horizontal tab, vertical tab, space, line feed ,new line and carriage return from a text file and store the contents of the file without the white spaces on another file.

9. Write a program to read the class object of student info such as name , age ,sex ,height and weight from the keyboard and to store them on a specified file using read() and write() functions. Again the same file is opened for reading and displaying the contents of the file on the screen.

10. Write a program to raise an exception if any attempt is made to refer to an element whose index is beyond the array size.

CSA- 306 Computer Workshop

UNIT - I

Basic components: - Type of component, Active and Passive, A.C. and D.C. Resistors: Types of resistors, color code. Capacitors: Type of capacitors, color code. Inductor: inductance and its type, concept of a coil. Diode: Introduction working and types. Transistors: Introduction and its type.

UNIT-II

Transformer: Introduction, working and its type. Function Generator: Introduction and its type. SMPS: Introduction, working and its type. LED: Introduction, working and its type. Voltage Regulator: Introduction, working and its type. Battery: Introduction, working and its type. IFT: Introduction, working and its type. Relay: Introduction, working and its type.

UNIT – III

Testing & Measurement Tools: Introduction, Working and uses of Multimeter, Voltmeter, Ammeters, Wattmeter and CRO.

UNIT – IV

Printed Circuit Board: Introduction, Manufacturing Process, PCB Type, Designing, Etching Component Assembly, Soldering.

UNIT – V

Personal Computer Assembling: Assemble All Computer parts like Motherboard, RAM, Hard Disk, SMPS, Cable, Buses, Keyboard, Mouse.

References:

1. Electronic Device and Circuit,Jacob Millman, Christos C. Halkias, McGraw-Hill
2. Hardware bible By : Winn L Rosch, Techmedia publications.
3. Modern All about printers By: Manohar Lotia, Pradeep Nair, Bijal Lotia BPB publications.
4. The complete PC Upgrade and maintenance guide, Mark Minasi BPB Publication

List of Experiments :-

1. Testing of NPN and PNP Transistor using Multimetre
2. Testing of Ceramic and Electrolytic Capacitor using Multimetre
3. Testing of Inductor using Multimetre.
4. Testing of Values Voltages at different points on PCB using Multimetre.
5. Testing of Current at different points on PCB using Multimetre.
6. Testing of SMPS using Multimetre. Testing of Step Up and Step down Transformers using Multimetre.
7. Testing of IFT(Intermediate Frequency Transformer) using Multimetre
8. Testing of Resistance using Multimetre and Reading of Resistance using Colour Coding Table.
9. Assemble Mono Stable, Astable, and Bistable multivibrator(Clocked and Unclocked) using PCB.

CSA 307 Self Study / Gd Seminar

Objective of GD and seminar is to improve the mass communication and convincing/understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves. Evaluation will be done by assigned faculty based on group.