RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Computer Science & Engineering, III-Semester

BE-3001 Mathematics-III

(Syllabus for CS, IT, & EC Branches)

COURSE OBJECTIVE- The objective of this course is to fulfill the needs of Engineers to understand the Applications of Fourier Series, Fourier & Laplace Transforms and Statistical Techniques in order to acquire Mathematical knowledge and to Solving a wide range of Practical Problems Appearing in the CS/IT/EC discipline of Engineering.

Course Contents

Fourier Series: Fourier Series for Continuous & Discontinuous Functions, Expansion of odd and even periodic functions, Half-range Fourier series, Complex form of Fourier Series.

Integral Transforms:

Fourier Transform**:** Complex Fourier Transform, Fourier Sine and Cosine Transforms, Applications of Fourier Transform in Solving the Ordinary Differential Equation.

Laplace Transform**:** Introduction of Laplace Transform, Laplace Transform of elementary Functions, Properties of Laplace Transform, Change of Scale Property, First and Second Shifting Properties, Laplace Transform of Derivatives and Integrals. Inverse Laplace Transform & its Properties, Convolution theorem, Applications of Laplace Transform in solving the Ordinary Differential Equations.

Random Variables: Discrete and Continuous Random Variables, Probability Function, Distribution Function, Density Function, Probability Distributions, Mean and Variance of Random Variables.

Distribution: Discrete Distributions- Binomial & Poisson Distributions with their Constants, Moment Generating Functions, Continuous Distribution- Normal Distribution, Properties, Constants, Moments.

Curve Fitting using Least Square Method.

COURSE OUTCOMES- The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concept of Applications of Fourier Series, Fourier & Laplace Transforms and Statistical Techniques.

EVALUATION- Evaluation will be continuous, an integral part of the class as well as through external assessment.

Reference:

1. Probability & Statistics by G Shanker Rao, University Press.
2. Mathematical Statistics by George R., Springer
3. Erwin Kreyszig: Advanced Engineering Mathematics, Wiley India.
4. H C Taneja: Advanced Engineering Mathematics, I.K. International Publishing House Pvt. Ltd.
5. S S Sastri: Engineering Mathematics, PHI
6. Ramana, B.V.: Advance Engg. Mathematics, TMH New Delhi
7. Engineering Mathematics By Samnta Pal and Bhutia, Oxford Publication
8. Probability and Statistics in Engineering, W.W. Hines et. al., Wiley India PVT Ltd.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Computer Science and Engg, III-Semester

CS-3002 Electronic Devices & Circuits

CSE (III Sem) Electronic Device & Circuits

Course Contents

Semiconductor devices, theory of P-N junction, temperature dependence and break down characteristics, junction capacitances. Zener diode, Varactor diode, PIN diode, LED, Photo diode, Transistors BJT, FET, MOSFET, types, working principal, characteristics, and region of operation, load line biasing method**.** Transistor as an amplifier, gain, bandwidth, frequency response, Type of amplifier.

Feedback amplifier, negative feedback, voltage-series, voltage shunt, current series and current shunt feedback, Sinusoidal oscillators, L-C (Hartley-Colpitts) oscillators, RC phase shift, Wien bridge, and Crystal oscillators. Power amplifiers, class A, class B, class A B, C amplifiers, their efficiency and power Dissipation.

Switching characteristics of diode and transistor turn ON, OFF time, reverse recovery time, transistor as switch, Multivibrators, Bistable, Monostable, Astable multivibarators. Clippers and clampers, Differential amplifier, calculation of differential, common mode gain and CMRR using hparameters.

Operational amplifier characteristics, slew rate, full power bandwidth, offset voltage, bias current, application ,inverting , non inverting amplifier , summer, differentiator, integrator, differential amplifier , instrumentation amplifier, log and antilog amplifier , voltage to current and current to voltage converters , comparators Schmitt trigger .

Introduction to IC, Advantages and limitations, IC classification, production process of monolithic IC, fabrication of components on monolithic IC, IC packing, general integrated circuit technology, photolithographic process, un polar IC's, IC symbols.

References:

1. Milliman Hallkias - Integrated Electronics; TMH Pub.
2. Gayakwad; OP-amp and linear Integrated Circuits; Pearson Education
3. Salivahanan; Electronic devices and circuits; TMH
4. Robert Boylestad & Nashetsky; Electronics Devices and circuit Theory; Pearson Ed.
5. Salivahanan; Linear Integrated Circuits; TMH
6. Miliman Grabel; Micro electronics, TMH

List of Experiments:

1. Diode and Transistor characteristics
2. Transistor Applications (Amplifier and switching)
3. OP-Amp and its Applications
4. 555 timer and its Applications

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Computer Science and Engg, III-Semester

CS-3003 Digital Circuit & Design

PREREQUISITE: Electronic Device & Circuits (Transistors, Capacitors, Inductors,), other Hardwares.

OBJECTIVES

To expose the students to perform binary arithmetic and conversion from one number system to another and learn different Boolean simplification techniques. We learn the design and analysis of combinational and sequential circuits.

Course Contents

Number systems & codes, Binary arithmetic, Boolean algebra and switching function. Minimization of switching function, Concept of prime implicant, Karnaugh map method, Quine McCluskey's method,Cases with don't care terms, Multiple output switching function.

Introduction to logic gates, Universal gate, Half adder,Half subtractor, Full adder, Full subtractor circuits, Series & parallel addition, BCD adders, Look-ahead carry generator.

Linear wave shaping circuits, Bistable, Monostable & Astable multivibrator, Schmitt Trigger circuits & Schmitt-Nand gates. Logic families:RTL, DTL, All types of TTL circuits, ECL, I2L, PMOS, NMOS, & CMOS logic, Gated flip- flops and gated multivibrator, Interfacing between TTL to MOS.

Decoders, Encoders, Multiplexers, Demultiplexers, Introduction to various semiconductor memories, & designing with ROM and PLA. Introduction to Shift Registers, Counters, Synchronous & Asynchronous counters, Designing of combinational circuits like code converters.

Introduction of Analog to Digital & Digital to Analog converters, sample & hold circuits and V-F converters.

OUTCOMES: Upon completion of the course, the students will be able to Perform Simplification of Boolean Functions using Theorems and Karnaugh Maps and Convert between digital codes using encoder/decoder .Student can analyze combinational circuits and sequential circuits .

References:

1.M. Mano; " Digital Logic & Computer Design"; Pearson
2.Malvino Leach; "Digital Principles & Applications";TMH
3.Millman & Taub; "Pulse Digital & Switching Waveforms";TMH
4. W.H Gothman; "Digital Electronics";PHI
5. R.P.Jain "Modern Digital Electronics" TMH

List of Experiments :

1.To study and test operation of all logic gates for various IC's)IC#7400, IC#7403, IC#7408, IC#7432, IC#7486)
2.Verification of DeMorgan's Theorem.
3.To construct half adder and full adder.
4.To construct half subtractor and full subtractor circuits.
5.Verification of versatility of NAND gate.
6. Verification of versatility of NOR gate.
7. Designing and verification of property of full adder.
8.Design a BCD to excess-3 code convertor.
9.Design a Multiplexer/Demultiplexer

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Credit Based Grading System

Computer Science and Engg, III-Semester

CS-3004 Data Structures-II

Objectives

Data structures play a central role in modern computer science. In addition, data structures are essential building blocks in obtaining efficient algorithms. The objective of the course is to teach students how to design, write, and analyze the performance of programs that handle structured data and perform more complex tasks, typical of larger software projects. Students should acquire skills in using generic principles for data representation & manipulation with a view for efficiency, maintainability, and code-reuse. Another goal of the course is to teach advance data structures concepts, which allow one to store collections of data with fast updates and queries.

Course Contents

Introduction –Common operations on data structures, Types of data structures, Data structures & Programming, Program Design, Complexities, Time Complexity, order of Growth, Asymptotic Notation.

Advanced Data Structures-Hash tables ,Heaps , Complexity , Analysis of Heap Operations , Application of Heap , AVL tress , Insertion & Deletion in AVL tree , Red Black Trees , Properties of Red Black trees ,Insertion & Deletion in Red Black tree .

Sorting –Need for sorting , Types of sorting algorithm-Stable sorting Algorithm, Internal & External sorting algorithm , Outline and offline algorithm ,Sorting Techniques-Insertion , Shell , Selection , Merge ,Quick sort, Radix sort ,bucket sort .

Augmenting Data structures – Augmenting a red black trees, Retrieving an element with a given rank , Determining the rank of element ,Data structure Maintenance ,An augmentation strategy ,Interval Trees.

File structures- Basic file operations, File organization –Sequential file organization, Indexed sequential file organization, Direct file organization. External merge sort, Multiway Merge sort, Tournament Tree ,Replacement Selection .

REFERENCES:

1. Horowitz and Sahani, “Fundamentals of data Structures”,University Press
2. Trembley and Sorenson , “Data Structures”, TMH Publications
3..A. M. Tenenbaum, “Data Structures using C & C++”, Pearson Pub
4. Venkatesan , Rose, “Data Structures” Wiley India Pvt.Ltd
5. Pai; Data structure and algorithm , TMH Publications
6. T.H.Coreman,”Introduction to algorithm”,PHI.

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Computer Science and Engg, III-Semester

CS-3005 Discrete Structures

Objective-This course introduces the applications of discrete mathematics in the field of computer science. It covers sets, logic, proving techniques, combinatorics, functions, relations, Graph theory and algebraic structures. These basic concepts of sets, logic functions and graph theory are applied to Boolean Algebra and logic networks while the advanced concepts of functions and algebraic structures are applied to finite state machines and coding theory.

Course Contents

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.

Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, 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.

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

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.

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.

Outcome:-After this completion student will be familiar with relational algebra,Functions and graph theory.

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

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Credit Based Grading System

Computer Science and Engg, III-Semester

CS-3006 Computer Programming-I (Java Technologies)

Objective: To introduce and understand students to programming concepts and techniques using the Java language and programming environment, class, objects , also learn about lifetime, scope and the initialization mechanism of variables and improve the ability general problem solving abilities in programming. Be able to use the Java SDK environment to create, debug and run simple Java program.

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods,Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un-modifiable Collections.

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI,Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions, Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips

Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

References:

1. E. Balaguruswamy, “Programming In Java”; TMH Publications
2. The Complete Reference: Herbert Schildt, TMH
3. Deitel & Deitel, ”JAVA, How to Program”; PHI, Pearson.
4. Cay Horstmann, Big JAVA, Wiley India.
5. Merlin Hughes, et al; Java Network Programming , Manning Publications/Prentice Hall

List of Program :

1. Installation of J2SDK
2. Write a program to show Scope of Variables
3. Write a program to show Concept of CLASS in JAVA
4. Write a program to show Type Casting in JAVA
5. Write a program to show How Exception Handling is in JAVA
6. Write a Program to show Inheritance
7. Write a program to show Polymorphism
8. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA
9. Write a program to show use and Advantages of CONTRUCTOR
10. Write a program to show Interfacing between two classes
11. Write a program to Add a Class to a Package
12. Write a program to show Life Cycle of a Thread
13. Write a program to demonstrate AWT.
14. Write a program to Hide a Class
15. Write a Program to show Data Base Connectivity Using JAVA
16. Write a Program to show “HELLO JAVA ” in Explorer using Applet
17. Write a Program to show Connectivity using JDBC
18. Write a program to demonstrate multithreading using Java.
19. Write a program to demonstrate applet life cycle.
20. Write a program to demonstrate concept of servlet.