DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.I.T., MESRA, RANCHI

BE(Information Technology)

Programme Educational Objectives(PEO)

1. Effectively apply scientific and engineering methodologies to the analysis of problems and design, implementation and evaluation of computerbased solutions. Graduates will possess and convey a professional attitude appropriate for a diverse world community.
2. Utilize their breadth and depth of theoretical computer science. Engineering sciences, basic sciences and mathematics to adapt to emerging technologies and the ever changing needs of industry or in pursuing higher studies. Graduates will have demonstrated appropriate professional attitudes and ethics.
3. Explore their awareness of persistent concepts in computer science and interrelated subjects to understand and be able to effectively utilize current platforms and tools.
4. Make effective use of oral and written communications in their interactions with clients, colleagues, management and subordinates.
5. Display competence and efficiency when working on individual or team.
6. Reflect on their understanding of the ethical and social impact of computer technology as it pertains to their work and deal with them professionally.
7. Continue to enhance their technical skills and their development as mature computing professionas though life-long learning.

Programme Outcomes(PO)

1. An ability to apply knowledge of mathematics, science and engineering to both software and hardware design problems.
2. An ability to design and conduct experiments and to analyze and interpret data related to software and hardware design solutions.
3. An ability to design a system, component or process to meet desired needs within realistic constraints.
4. An ability to function on multidisciplinary teams using current computer engineering tools and technologies.
5. An ability to identify, formulate and solve engineering problems based on a fundamental understanding of concepts of computer engineering topics.
6. An understanding of personal, professional and ethical responsibility.
7. An ability to communicate effectively both in an oral and written form.
8. Recognition of the need for, and an ability to engage in lifelong learning.
9. Knowledge of contemporary issues in computer engineering.
10. An ability to use the techniques, skill and modern engineering tools necessary for computer engineering practice.
11. A Capability to participate and succeed in competitive examinations.

Course Structure (for Session MO-2011 onwards)

BE(IT) - I SEMESTER

CODE	***THEORY***	***CREDIT (L-T-P)***
	Technical English/Principles of Electronics Engineering	*3 (3-0-0)*
	Physics	4 (3-1-0)
	Engineering Chemistry	3 (3-0-0)
	Engineering Mathematics	4 (3-1-0)
	Engineering Mechanics/ Principles of Electrics Engineering	4 (3-1-0)
CODE	**SESSIONAL**	**CREDIT (L-T-P)**
	Engineering Graphics	3 (1-0-3)
CS 1302	Fundamentals of Unix & C Programming	3(1-0-3)
	Physics Lab. / Chemistry Lab	2 (0-0-3)
	Work Shop Practice	2 (0-0-3)
	NCC/NSS/PT & Games/ Creative Arts	1(0-0-2)
	Credit Hours	*29*

BE(IT) - II SEMESTER

CODE	***THEORY***	***CREDIT (L-T-P)***
	Advanced Engineering Maths	4 (3-1-0)
	Principal of Electrical Engineering /Engineering Mechanics	4 (3-1-0)
	Environmental Science	3 (3-0-0)
CS 2301	Fundamentals of Data Structures	4 (3-1-0)
	Principles of Electronics Engineering/Technical English	3 (3-0-0)
	Principles of Mechanical Engineering	3 (3-0-0)
CODE	**SESSIONAL**	**CREDIT (L-T-P)**
	Physics Lab/Chemistry Lab	2 (0-0-3)
	Basic Electrical Engineering Lab/Engineering Mechanics Lab	2 (0-0-3)
	Fundamentals of Data Structure Lab	2(0-0-3)
	Basic Electronics Lab	2 (0-0-3)
	NCC/NSS/PT & Games/Creative Arts	1(0-0-2)
	Credit Hours	*30*

BE(IT) - III SEMESTER

CODE	***THEORY***	***CREDIT (L-T-P)***
	Biological Science/Language (French/German/ Russian etc)	3 (3-0-0)
IT 3021	Discrete Mathematics and Graph Theory	3 (3-0-0)
IT 3023	Java Programming	3 (3-0-0)
EC 3201	Digital Electronics	4 (3-1-0)
IT 3025	Computer Organization and Architecture	4 (3-1-0)
CODE	**SESSIONAL**	**CREDIT (L-T-P)**
IT 3024	Java Programming Lab.	2.0 (0-0-3)
	Basic Electrical Engineering Lab/Engineering Mechanics Lab	2.0 (0-0-3)
	NCC.NSS/P.T. /Games/ Creative Arts	1.0 (0-0-2)

	Credit Hours	*22*

BE(IT) - IV SEMESTER

CODE	***THEORY***	***CREDIT (L-T-P)***
	Language (French/German/ Russian etc)/Biological Science	3 (3-0-0)
IT 4021	Database System Concepts	4 (3-1-0)
IT 4023	Operating System Concepts	3 (3-0-0)
IT 4025	Theory of Computations	3 (3-0-0)
IT 4027	Scientific Computing	3 (3-0-0)
CODE	**SESSIONAL**	**CREDIT (L-T-P)**
IT 4022	Database System Lab.	2 (0-0-3)
IT 4024	Operating System Lab.	2 (0-0-3)
IT 4028	Scientific Computing Lab.	2 (0-0-3)
	NCC.NSS/P.T. /Games/ Creative Arts	1 (0-0-2)
	Credit Hours	*23*

BE(IT) – V SEMESTER

CODE	***THEORY***	***CREDIT (L-T-P)***
	Principle of Management	3 (3-0-0)
IT 5021	Data Communications	3 (3-0-0)
IT 5023	Software Engineering Principles	4 (3-1-0)
IT 5025	Principles of Soft Computing	3 (3-0-0)
IT 5027	Design of Computer Algorithms	4 (3-1-0)
CODE	**SESSIONAL**	**CREDIT (L-T-P)**
IT 5024	Software Engineering Principles Lab.	2 (0-0-3)
IT 5026	Principles of Soft Computing Lab.	2 (0-0-3)
IT 5028	Computer Algorithms Lab.	2 (0-0-3)
	Credit Hours	***23***

BE(IT) – VI SEMESTER

CODE	***THEORY***	***CREDIT (L-T-P)***
	Business Economics	3 (3-0-0)
IT 6021	Communication Theory	4 (3-1-0)
IT 6023	Computer Network and Security	3 (3-0-0)
IT 6025	Information & Coding Theory	3 (3-0-0)
IT 6027	Optimization Techniques	3 (3-0-0)
CODE		**SESSIONAL**

		CREDIT (L-T-P)
IT 6022	Communication System Lab	2 (0-0-3)
IT 6024	Network Security Lab.	2 (0-0-3)
IT 6026	Information & Coding Theory Lab	2 (0-0-3)
	Credit Hours	***22***

BE(IT) – VII SEMESTER

CODE	***THEORY***	***CREDIT (L-T-P)***
	Project Management/ Entrepreneurship	3 (3-0-0)
IT 7021	Data Mining Concepts and Techniques	3 (3-0-0)
	Elective – I	3 (3-0-0)
IT 7041	Parallel & Distributed Computing	3 (3-0-0)
IT 7043	Compiler Design	3 (3-0-0)

CODE	**SESSIONAL**	**CREDIT (L-T-P)**
IT 7022	Data Mining Concepts and Techniques Lab	2 (0-0-3)
	Lab on Elective-I	2 (0-0-3)
IT 7044	Compiler Design Lab	2 (0-0-3)
	Credit Hours	**21**

List of Electives-I

IT 7023 Simulation & Modeling
IT 7025 Artificial Intelligence
IT 7027 Digital Image Processing
IT 7029 Object Oriented Design

IT 7031 System Programming

IT 7033 Web Technology

List of Lab on Electives-I

IT 7024 Simulation & Modeling Lab
IT 7026 Artificial Intelligence Lab
IT 7028 Digital Image Processing Lab
IT 7030 Object Oriented Design Lab
IT 7032 System Programming Lab
IT 7034 Web Technology Lab

BE(IT) – VIII SEMESTER

CODE	***THEORY***	***CREDIT (L-T-P)***
	Elective-II	3 (3-0-0)
CODE	**SESSIONAL**	**CREDIT (L-T-P)**
IT 8020	Project	6(0-0-9)

Credit Hours 9

List of Electives-II

IT 8025 Enterprise Resource Planning
IT 8027 Decision Support Systems
IT 8029 Embedded Systems
IT 8031 Pattern Recognition
IT 8033 Computing & Complexity Theory
IT 8035 Software Reliability & Testing
IT 8037 Distributed Database System
IT 8039 Computer Graphics & Multimedia
IT 8041 Information System Project Management
IT 8043 Distributed Systems
IT 8045 Advance Computer Graphics
IT 8047 Real Time Systems
IT 8049 Modern Telecommunication Systems
IT 8051 Neural Networks & Applications
IT 8053 E-Commerce

Total Credits semesterwise

Semester	Credits Hours
I	29
II	30
III	22
IV	23
V	23
VI	22
VII	21
VIII	9
Total Credit	**179**

COURSE INFORMATION SHEET

Course code: CS 1302
Course title: **Fundamentals Of Unix & C Programming**
Pre-requisite(s): A familiarity with high school algebra is expected, however the course assumes no prior programming knowledge

Course Outcomes:

Students will have the capability:

1. Of logging-in into UNIX operating system, create their own directories and files, move around among different files and directories, create, files in different ways.
2. Of creating, editing, debugging and executing C programs using the Vi-editor.
3. To solve problems related to arrays, strings record and file handling.
4. Classify a problem into functions and synthesize a complete program using Divide and conquer approach
5. To be able to solve the real life problem.

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Module – I

The Free Software Movement, Open source definition, Open source business strategy, Problem Solving and its tools, Flow chart, Pseudo code, Modular programming. Fundamentals of Unix Operating System, Login & Password, Different Commands, Unix directory, Structure and working with directories, Vi-editor, Basic Structure and execution of C programmes, Constants, Variables,

and Data Types and various type of declarations, Different type operators and Expressions, Evaluation of Expressions, Operator Precedence and Associability, Mathematical Functions.

Module–II
Managing Input and Output operations, Decision Making and Branching Decision Making and Looping.

Module – III
One – dimensional Arrays and their declaration and Initialisations, Two-dimensional Arrays and their initialisations, Multidimensional Arrays, String Variables, Reading and Writing Strings, Arithmetic Operations on characters, Putting Strings together, Comparison of Two Strings, String – handling functions.

Module –IV
Need and Elements for user –defined Functions, Definition of Functions, Return values and their types, Function calls and Declaration, Arguments and corresponding return values, Functions that return multiple values, Nesting of functions, Recursion, Passing arrays and strings to functions, The Scope, Visibility and Life time of variables.

Module –V
Defining Structure, Declaring Structure Variable and Accessing Structure Members, Initialisation of Structure, Comparing Structure Variables, Operation on Individual Members, Arrays of Structures, Structures within structures, Structures and Functions, Unions, Size of Structures, Bit Fields.

Module – VI
Understanding Pointers, Accessing the Address of a Variable, Declaration and Initialisation of Pointer Variables, Accessing a Variable through its Pointer, Chain of Pointers, Pointer Expressions, Pointer Increments and Scale Factor, Pointers and Arrays, Pointers and Character Strings, Arrays of Pointers, Pointers and Function Arguments, Functions Returning Pointers, Pointers to Functions, Pointers and Structures,

Module – VII
File Management in C. use of fopen(), fclose(), Formatted file I/O, Searching through files using fseek(), ftell(), rewind().

Text Book :

1. Kernighan K. R., Ritchie D. M. - The C Programming Language, Ansi C Edition, Prentice Hall, India

Reference:

1. E. Balagurusamy – Programming in ANSI C, 3rd Edn. , TMH, New Delhi ; 2004
2. A. N. Kanthane – Programming with ANSI and TURBO C, Pearson Education, New Delhi; 2004
3. Y. Kanetkar – Let us C, 4th Edition, BPB Publication , New Delhi; 2002
4. Chris DiBona, Sam Ockman , Open Sources : Voices from the Open Source Revolution (Web book), Oreilly Press, 2nd edition,1999

COURSE INFORMATION SHEET

Course code: EE 2201
Course title: **Principles of Electrical Engineering**
Pre-requisite(s): Engineering Physics.

Course Outcomes

A student will have-

1. Basic understanding of, and ability to apply techniques for, DC circuit analysis as well as steady-state AC circuit analysis;
2. Thorough understanding of network reduction techniques to analyze complex circuits;
3. Conceptual knowledge about 1-φ and 3- φ circuits, resonance, magnetic circuits;
4. Sufficient practice of solving a variety of problems.

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Text/Reference Books:

1. Basic Electrical Engg. – Nagrath, Kothari, Tata McGraw-Hill
2. Hughes Electrical Technology – Pearson Prentice-Hall.
3. Electrical Technology – Hayt, Kimmerley – Tata McGraw-Hill.

COURSE INFORMATION SHEET

Course code: CH1401
Course title: **Engineering Chemistry**
Pre-requisite(s): High school level chemistry

Course Outcomes: Enables the student to:

1. Draw the phase diagrams showing conditions at which thermodynamically distinct phases can occur at equilibrium in heterogeneous systems, identify the total number of phases , components and calculate the degree of freedom of various heterogeneous systems in equilibrium
2. Classify different types of fuels mainly fossil fuels, evaluate their properties, solve problems pertaining to calorific value determination (both theoretical and experimental), Distinguish between High and low temperature carbonization, conversion of coal into commercially viable products.
3. Depict the concept of refining of crude petroleum, understand the benefits of reforming and cracking, distinguish between petrol run and diesel run IC engine, be able to classify lubricants and discuss their mechanism of action vis a vis their properties.
4. Demonstrate awareness that reactions occur at differing rates, experimentally determine rate of a reaction & analyze the reaction mechanism for a reacting system.
5. Comprehend the role of catalysts in industrial processes, and be able to select the appropriate catalysts for each industrial application.

Text Books:

1. Applied Chemistry: A Text book for engineers and technologists by H.D.Geyser, Plenum publishers
2. Engineering Chemistry: Sashi Chawla/ Jain & Jain

Reference Books

1. Physical chemistry: P.W. Atkins

COURSE INFORMATION SHEET

Course code: HU 1101
Course title: **Technical English**
Pre-requisite(s): Basics of English Language like Vocabulary etc

Course Outcomes: Enables the students to:

1. Develop a range of writing processes appropriate to various writing tasks.
2. Invent the contents of their communications through research and reflection.
3. Observe appropriate generic conventions and formats for letters, résumés, memoranda, and a variety of informal and formal reports.
4. Identify their readers and describe the characteristics of their readers in a way that forms a sound basis for deciding how to write to them.
5. Employ available methods/technology effectively in the solution of communication problems.

Text Books :

1. Henry Holt &Co.N.Y: Reports for science and industry.
2. Berry, Thomas Elliot: The most common mistakes in English Usage; Mcgraw Hill.
3. Best, W.D: The students companion; Rupa& Co.
4. Mohan & Sharma: Report Writing & Business Correspondence; Mcgraw Hill.
5. Stevnsin, B.W, J.R. Spicer and E.C. Ames: English in Business and Engineering; Prentice Hall.

COURSE INFORMATION SHEET

Course code: MA 1201
Course title: **Engineering Mathematics**
Pre-requisite(s): Basic of algebra, Calculus, trigonometry, Coordinate geometry

Course Outcomes: Enable the student to

1. Decide the behavior of sequence and series.
2. Get an understanding of partial derivatives and their applications in finding maxima-minima problems.
3. Apply the principles of integral to solve a variety of practical problems in engineering and sciences
4. Gain an understanding of polar equations of conics, their tangent, normal, chord of contact etc.
5. Solve problems involving derivative (gradient, divergence, curl etc.) and integrals (surface, volume etc.) of vector functions

Text / Reference Books:

1. M.D. Weir, J. Hass and F.R. Giordano: Thomas' calculus, 11th edition, Pearson Education, 2008.
2. Dennis G. Zill, Warren S. Wright: Advanced Engineering Mathematics, 4th edition. Jones Nad Bartlett Publishers, 2010
3. E. Kreyszig: Advanced Engineering Mathematics, 8th Edition John Wiley and sons 1999.
4. T.M. Apostol : Calculus Vols. 1 and 11.2nd Edition. John Wiley and sons, 1967 and 1969.

COURSE INFORMATION SHEET

Course code: CS 2301
Course title: **Fundamentals of Data Structures**
Pre-requisite(s): Knowledge of programming languages like C/C++.

Course Outcomes: Enables the student to

1. Understand the properties of various data structures
2. Identify the strength and weaknesses of different data structures
3. Design and employ appropriate data structures for solving computing problems
4. Analyze and compare the efficiency of algorithms
5. Think critically

Module – I
Algorithms and Analysis of Algorithms: Definition, Structure and Properties of Algorithms, Development of an Algorithm, Data Structures and Algorithms, Data Structure – Definition and Classification, Efficiency of Algorithms, Apriory Analysis, Asymptotic Notations, Time Complexity of an Algorithm using O Notation, Polynomial Vs Exponential Algorithms, Average, Best and Worst case Complexities, Analyzing Recursive Programs, Open source software development process.

Module – II
Arrays, Stacks and Queues: Array Operations, Number of Elements in an Array, Representation of Arrays in Memory, Applications of Array, Stack-Introduction, Stack Operations, Applications of Stack, Queues-Introduction, Operations on Queues, Circular Queues, Other Types of Queues, Applications of Queues.

Module – III

Linked List, Linked Stacks and Linked Queues: Singly Linked Lists, Circularly Linked Lists, Doubly Linked Lists, Multiply Linked Lists, Applications of Linked Lists, Introduction to Linked Stack and Linked Queues, Operations on Linked Stacks and Linked Queues, Dynamic Memory Management and Linked Stack, Implementations of Linked Representations, Applications of Linked Stacks and Linked Queues.

Module – IV

Trees, Binary Trees, BST, AVL Trees and B Trees: Trees: Definition and Basic Terminologies, Representation of Trees, Binary Trees: Basic Terminologies and Types, Representation of Binary Trees, Binary Tree Traversals, Threaded Binary Trees, Applications, BST & AVL Trees: Introduction, BST: Definition and Operations, AVL Trees: Definition and Operations, B Trees: Introduction, m-way search trees: Definition and Operations, B Trees: Definition and Operations.

Module – V

Graphs: Introduction, Definitions and Basic Terminologies, Representations of Graphs, Graph Traversals, Single-Source Shortest-Path Problem, Minimum Cost Spanning Trees.

Module – VI

Sorting: Introduction, Shell Sort, Quick Sort, Heap Sort.

Module – VII

Searching: Introduction, Binary Search, Transpose Sequential Search, Interpolation Search.

Text Book:

1. G A V Pai – Data Structures and Algorithms: Concepts, Techniques and Applications, 2nd Edn, Tata McGraw-Hill, 2008
2. Horowitz E.Sahni, S., Susan A., Fundamentals of Data Structures in C, 2nd Edition, University Press, 2010

Reference Books:

1. J. P. Tremblay **,** P. G. Sorenson – An Introduction to Data Structures With Applications, 2nd Edn, McGraw-Hill, Inc. New York, NY, USA.
2. Seymour Lipschutz – Data Structures, 6th Edn, 9th Reprint 2008, Tata McGraw-Hill.
3. Adam Drozdek – Data Structures and Algorithms in C++, Thomson Learning, New Delhi – 2007.
4. J. Feller, B. Fitzgerald -Understanding Open Source Software Development, Pearson Education Ltd. New Delhi

COURSE INFORMATION SHEET

Course code: CS 2302
Course title: **Fundamentals of Data Structures Lab**
Pre-requisite(s): Programming Language like C/C++.

Course Outcomes: Enable student to solve programming problems using

1. Arrays, Stacks and Queues
2. Various kinds of Linked Lists
3. Various kinds of Trees and perform appropriate operations.
4. Graphs
5. Sorting and searching techniques.

Text Book:

1. G A V Pai – Data Structures and Algorithms: Concepts, Techniques and Applications, 2nd Edn, Tata McGraw-Hill, 2008
2. Horowitz E.Sahni, S., Susan A., Fundamentals of Data Structures in C, 2nd Edition, University Press, 2010

Reference Books:

1. J. P. Tremblay **,** P. G. Sorenson – An Introduction to Data Structures With Applications, 2nd Edn, McGraw-Hill, Inc. New York, NY, USA.
2. Seymour Lipschutz – Data Structures, 6th Edn, 9th Reprint 2008, Tata McGraw-Hill.
3. Adam Drozdek – Data Structures and Algorithms in C++, Thomson Learning, New Delhi – 2007.
4. J. Feller, B. Fitzgerald -Understanding Open Source Software Development, Pearson Education Ltd. New Delhi.

COURSE INFORMATION SHEET

Course code: EC2001
Course title: **Principles of Electronics Engineering**
Pre-requisite(s): Basics of Electronics Engineering, Semiconductor Devices, Digital Electronics

Course outcomes: Enables the students to
1. Understand RC filter, types of diode and their applications
2. Study the characteristics and configurations of BJT.
3. Analyze transistors at low and high frequencies
4. Understand the concept of amplifiers and oscillators
5. Study the characteristics of FET & MOSFET, also transistor power amplifier

Text Books:
1. "Integrated Electronics" Millman&Halkias, McGraw Hill
2."Digital Logic and Computer Design "M. Mano. PHI
3. "Operational Amplifiers and Linear Integrated Circuits" by R. A. Gayakwad, PHI

Reference Book:
1. "The Art of Electronics", Paul Horowitz and Winfield Hill, Cambridge University Press.
2. "Electronic Devices and Circuit Theory", Nashelesky&Boylestead, PHI/Low price edition.
3. "Microelectronic Circuits", Sedra and Smith.

COURSE INFORMATION SHEET

Course code: EC2002
Course title: **Basic Electronics Engineering Lab**
Pre-requisite(s): Basics of Electronics Engineering, Semiconductor Devices, Digital Electronics

Course outcomes: Enables the students to

1. Understand RC filter, types of diode and their applications
2. Understand the h parameter of transistor and it frequency response.
3. Understand the concept of amplifiers and oscillators
4. Understand the operation, characteristics and application of operational amplifier
5. Understand the concept of basic logic gates using universal gates and verify the truth table.

Text Books:

1. Integrated Electronics by Millman&Halkias, McGraw Hill
2. Digital Logic and Computer Design by M. Mano. PHI
3. Operational Amplifiers and Linear Integrated Circuits by R. A. Gayakwad, PHI

Reference Book:

1. "The Art of Electronics", Paul Horowitz and Winfield Hill, Cambridge University Press.
2. "Electronic Devices and Circuit Theory", Nashelesky&Boylestead, PHI/Low price edition.
3. "Microelectronic Circuits", Sedra and Smith.

COURSE INFORMATION SHEET

Course code: **ME 2001**
Course title: **Principle of Mechanical Engineering**
Pre-requisite(s): Prior knowledge of fundamentals of thermodynamics and Mechanics

Course outcomes: Enables the student to

1. Understand alternative eco friendly sources of energy and its utilization
2. Know different types of used in the industry and steam generation process
3. Examine critically the differences between petrol engines and diesel engines
4. Learn the heat transfer due to conduction through a composite slab and pipe
5. Find out the nature of stress and strain in brittle and ductile material; also design the basic elastic components of machinery under uni axial loading

Text / References Books:

1. Non Conventional Energy Sources by G.D. Rai
2. Power Plant Engineering by P.K.Nag
3. Fundamentals of Classical Thermodynamics – G.J Van Wylen and R.E. Sorntag, Second Edition, Wiley Eastern (1984).
4. Internal combustion engine – E.F. Obert
5. Introduction to Heat Transfer by Incropera and David
6. Strenght of Materials – F.L. Singer
7. Theory of Machines – Thomas Beven

COURSE INFORMATION SHEET

Course code: IT 3021
Course title: **Discrete Mathematics & Graph Theory**
Pre-requisite(s): Prior mathematics knowledge of +2 levels.

Course Objectives:

1. To know the notations used in the discrete mathematics associated with computer science and engineering.
2. To learn the rudiments of elementary mathematical reasoning (elementary proofs; proofs by induction)
3. To understand the theoretical parts of all further courses in IT.
4. To learn logic and Boolean from a mathematical perspective, but relating it to computer engineering applications.
5. To understand basic set theoretical notions; relations, functions, graphs, equivalence relations, and orderings.
6. To relate these notions to applications in IT.

Course Outcomes:

1. Able to understand truth tables, the concept of logical equivalence and its relationship to equivalent logic circuits and Boolean functions. Able to extend this to predicate calculus using quantifiers.
2. Able to express English assertions in propositional calculus and in predicate calculus using quantifiers.
3. Able to understand and use the basics of set theory notation, Boolean operations on sets. Understand why the Boolean algebra of propositional equivalence classes.
4. Able to carry out simple direct and indirect proofs about domains like the integers and the real numbers, using quantified statements about these domains. Able to do simple proofs by mathematical induction.

5. Able to understand and write recursive definitions, in mathematical and programming notation, and to prove their properties using induction.

Module – I

Introduction to Logic: Compound Statements, Proofs in Mathematics, Truth Tables, The Algebra of Propositions, Logical Arguments.

Module - II

Induction and Recursion: Mathematical Induction, Recursively Defined Sequences, Solving Recurrence Relations; The Characteristic Polynomial, Solving Recurrence Relations; Generating Functions.

Module - III

Principles of Counting and Algorithms: The Principle of Inclusion- Exclusion, The Addition and Multiplication Rules, The Pigeon-Hole Principle, What is an Algorithm?, Complexity, Searching and Sorting, Enumeration of Permutations and Combinations

Module - IV & V

Graphs, Paths and Circuits and Applications: A Gentle Introduction, Definitions and Basic Properties, Isomorphism, Eulerian Circuits, Hamiltonian Cycles, The Adjacency Matrix, Shortest Path Algorithms, The Chinese Postman Problem, Digraphs, Tournaments, Scheduling Problems.

Module - VI

Trees and Searching: What is a Tree?, Properties of Trees, Spanning Trees, Minimum Spanning Tree Algorithms, Acyclic Digraphs and Bellman's Algorithm, Depth – First Search.

Module - VII

Planar Graphs, Colorings and Maximal Flows: Planar Graphs, Coloring Graphs, Flows and Cuts, Constructing Maximal Flows, Applications.

Text Books:

1. E.G. Goodaire & M.M Parmenter- Discrete Mathematics with Graph Theory, 2nd Edn Pearson Education, New Delhi - 2002.

Reference Books:

1. B.Kolman et.al- Discrete mathematical Structures, 5th Edn, Pearson Education, New Delhi - 2004.
2. K.H. Rosen – Discrete Mathematics and Its Applications – 4th Edn, Tata McGraw Hill, New Delhi - 2001
3. D.B. West – Introduction to Graph Theory, 2nd Edn, Pearson Education, New Delhi 2002.
4. N.Deo – Graph Theory with Application to Engineering and Computer Science, PHI, New Delhi- 2004.

COURSE INFORMATION SHEET

Course code: IT 3023
Course title: **Java Programming**
Pre-requisite(s): Fundamental of data structures

Course Objectives:

1. Understand the syntax of the java and write simple Java applications using control statements like if, if-else etc.
2. Understand Object Oriented Programming Principles like encapsulation, inheritance, and polymorphism in java.
3. Understand how to use classes, methods and objects.
4. Learn Inheritance,Interfaces and Packages.
5. Manipulate the String & StringBuffer, Date, Collection, Enumeration, and Wrapper classes.
6. Understand the exception handling mechanism in java.
7. Understand the Threading mechanism in java and creating multiple threads, demonstrate the deadlock situation and inter thread communication.
8. Under stands the I/O streams in java and use the classes Streams, Character streams, File class, File stream.
9. Understand the event handling mechanism & difference between AWT and Swing components.
10. Understand the concept of database connectivity and write database applications with java.
11. Understand the concept of java basic networking principles.

Course Outcomes:

1. Understanding basics of java programming.
2. Understanding OOP, creating new classes, methods and objects.

3. Programming for real life situations and complex tasks.
4. Understanding inheritance, multithreading, strings and wrapper classes.
5. Defining exceptions, file handling and GUI.

Module – I

Introduction to Java Applications, Memory Concepts, Arithmetic, Decision making, Equality and Relational Operators. Introduction to Java Applets, Drawing strings and lines.
Control Statements : if, if ... else,selection statements, while statement, compound assignment operators, increment decrement operators, for ... statement, do .... while, switch, break and continue, labeled break and continue, logical operators.
Methods in java : declarations, argument promotions, scope of declarations, method overloading, Recursion.
Arrays : declaring and creating references and reference parameters, passing arrays to methods, multi dimensional arrays.

Module – II

Object based programming, classes, class scope, controlling access to members, this keyword and its use, constructors, overloading constructors, composition, garbage collection, static class members, final instance variables, crating packages, package access, Data abstraction and encapsulation.

Module – III

Inheritance and polymorphism : super class and subclass, protected members, Relation ship between super and sub class. Inheritance hierarchy , abstract classes and methods, final methods and classes, nested classes, Type wrappers.

Module – IV

Exception handling, Java exception hierarchy, rethrowing an exception, finally clause, stack unwinding, chained exception, Declaring new exception types.

Module-V

Multithreading : Life cycle of a thread, priorities and scheduling, creating and executing threads synchronization.

Module – VI

Files and streams, hierarchy, files and streams, File class, Sequential access file manipulation, random access file handling, Introduction to String class and its members.

Module – VII

Fundamental of GUI , Applet and swing programming.

Text Book :

1. Dietel,Dietel - Java How to program , 5th edition; Pearson Education , New Delhi.
2. S. Raj Kamal – Intrernet and Web Technology, Tata McGraw Hill, New Delhi, 2002.

Reference:

1. C. Horstmann,G. Cornell - Core Java 2 Vol I & Vol II ; Pearson Education ,

New Delhi.
1. Balagurusamy -Programming in Java , 2nd Edition; Tata McGraw Hill Publication; New Delhi.
2. Patrick Naghton & H. Schildt – The Complete Reference Java 2, Tata McGraw Hill Publication, New Delhi.

COURSE INFORMATION SHEET

Course code: IT 3025
Course title: **Computer Organization & Architecture**
Pre-requisite(s): General Programming Idea and Basic Electronics

Course Objectives:
1. To expose the students to fundamental concepts that explain the structure of the computer they are programming.
2. To understand how to carry out and interpret quantitative performance evaluations of computer systems
3. To interpret how programs and data are stored in a computer.
4. To master the foundations of computer arithmetic using high speed digital circuits.
5. To familiarize the design of high performance processors using single-cycle, multicycle and pipelined execution of instructions.
6. To learn the concepts of memory hierarchy and do operations with various types of memories.
7. To understand how certain fundamental programming language concepts are translated to the machine level.
   Finally, graduates need to understand basic architectural concepts to pass job
   Application tests given by firms like Intel, Microsoft, Google and many more.

Course Outcomes: Upon successful completion of this course, the student will be able to:
1. Describe performance evaluation of computers, computer architecture and organization.
2. Understand working of CPU design, computer arithmetic and working and organization of Memory.
3. Describe I/O system and interconnection structures of computer.
4. Describe the processor structure and function with emphasis on RISC machines
5. Develop independent learning skills and be able to learn and design different computer architectures

Module - I

Introduction: Organization and Architecture, Structure and Function, Why Study Computer Organization and Architecture?

Computer Evolution and Performance: A Brief History of Computers, Designing for Performance, Pentium and PowerPC Evolution.

Module - II

A Top-Level view of Computer Function and Interconnection: Computer Components, Computer Function, Interconnection Structures, Bus Interconnection, PCI.

Module - III

Cache Memory: Computer Memory System Overview, Cache Memory Principles, Elements of Cache Design, Pentium 4 and PowerPC Cache Organizations.

Internal Memory: Semiconductor Main Memory, Error Correction, Advanced DRAM Organization.

Module - IV

External Memory: Magnetic Disk, RAID, Optical Memory, Magnetic Tape.

Input/Output: External Devices, I/Os, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels and Processors.

Module - V

Computer Arithmetic: The Arithmetic and Logic Unit, Integer Representation, Integer Arithmetic, Floating-Point Representation, Floating-Point Arithmetic.

Module - VI

Instruction Sets- Characteristics and Functions: Machine Instruction Characteristics, Type of Operands, Pentium and PowerPC Data Types, Types of Operations, Pentium and PowerPC Operation Types.

Instruction Sets- Addressing Modes and Formats: Addressing, Pentium and PowerPC Addressing Modes, Instruction Formats, Pentium and PowerPC Instruction Formats.

Module - VII

Processor Structure and Function: Processor Organization, Register Organization, Instruction Cycle, Instruction Pipelining, The Pentium Processor, The PowerPC Processor.

Reduced Instruction Set Computers: Instruction Execution Characteristics, The Use of a Large Register File, Compiler-Based Register Optimization, Reduced Instruction Set Architecture, RISC Pipelining, MIPS R4000, SPARC, RISC versus CISC Controversy.

Text Book:

1. William Stallings- Computer Organization & Architecture: Designing for Performance, 7th Edn, Pearson Education, New Delhi-2006.

Reference Books:

1. C. Hamacher- Computer Organization, 5th Edn, McGraw Hill, Internaional Education, New Delhi-2002.

2. M.M.Mano- Computer System Architecture, 3rd Edn, PHI/Pearson Education, New Delhi-2006.

Course code: IT3024
Course title: JAVA PROGRAMMING LAB
Pre-requisite(s):
Co- requisite(s):
Credits: L: 0 T: 0 P:1.5
Class schedule per week: 3
Class: B.TECH
Semester / Level: III
Branch: IT

Course Objectives:
This course enables the students:

A.	Help students realize the advanced features in JAVA.
B.	Establish the relationship between the core and advanced JAVA frameworks.
C.	Understand problems where Advanced JAVA is required.
D.	Evaluate the advantages and short comings of advanced JAVA
E.	Understand how frameworks and APIs are designed.

Course Outcomes:
After the completion of this course, students will be:

1.	Learn the architecture of advanced swing components and design GUIs using them.
2.	Learn to interface with external data sources with Java.
3.	Leverage Java to create and deploy network programs.
4.	Use Java to design enterprise level Web sites.
5.	Understand Java's component based programming model.

1. WAJP to show the characteristic of a number. {E.g. 24 it has two coefficients 2 in tens position and 4 in units position. It is composed of 2 and 3. It is a positive number. Also show whether it is odd or even.
2. WAJP to take input through command line argument and do the following:

a) Check whether the number is prime.
b) Generate the reverse a number.

3. Write a menu driven program using switch in Java to perform following:
   a) For input of 1, check whether the number is prime
   b) For input of 3, find the factors of the number
   c) For input of 5, check the number is odd or even.
4. Write a program in Java to generate hexadecimal equivalent of a number without using array.
5. WAJP to take two number inputs through command line argument and do the following:
   a) Check whether two numbers are prime to each other or not.
   b) Find LCM of two numbers.
6. WAJP to create a class and exhibit the role of static functions (other than main) by declaring, defining and calling them.
7. WAJP to compute and display the count of occurrence of 4 in a number. E.g. 4564 will compute 2.
8. WAJP to take an angle value in degrees and then compute the equivalent radians and then prove $\sin^2\theta + \cos^2\theta = 1$. Note $180^o = \pi^c$.
9. WAJP to sort a list of numbers in ascending order.
10. WAJP to generate Pascal's Triangle using a square matrix.
11. Write a program in Java to take input of two 3×3 matrices through command line argument and then:
    a) Add them up and display the result
    b) Subtract them and display the result
    c) Multiply them and display product
12. WAJP to count the number of words, characters in a sentence.
13. Write a program in Java to take input of a sentence through command line argument and then count the number of words and vowels.
14. WAJP to handle the Exception using try and multiple catch block; the exceptions that you will handle are, number format error, array bound error and divide by zero.
15. WAJP to create a class called **Room** with two data member length and width and then implement constructor overloading in it.
16. Write a program in Java to explain the role of the following:
    a) Non-parameterized constructor
    b) Parameterized constructor
    c) Copy constructor

Take input and display the output.

17. WAJP to create a class called **Fraction** with data member numerator and denominator; take input (through command line argument) of two fractions and then add, subtract, multiply and divide, finally display the result in reduced term.
18. Write a program in Java to create a class for **Employee** having 2 data member code and name. Then create 3 classes **Officer**, **AdminStaff** and **MStaff**. The **Officer** class has data members designation and pay-scale; the **AdminStaff** has data members grade and pay-band; the **MStaff**has data member department and two sub-classes **Regular** and **Casual**. The **Regular** staff has data members level and consolidated-pay and **Casual** has data member daily-wage.

Take all inputs through constructors and write appropriate methods for displaying one data for each type of class.

19. WAJP to design a class called **Account** using the inheritance and static that show all function of bank (withdrawal, deposit) and generate account number dynamically.
20. WAJP to design an application *Password.java* that produces and prints a random password depending upon name of an individual. If the input is Abdul Kalam then the password would be *33421LAM*. Note: take the first name A=1, B=2, D=4, U=21 where 2+1=3, and L=12, where 1+2=3; so the number comes to be *12433*, so u can find out.
21. WAJP to draw a format like

```
    *
   ***
  *****
 *******
  *****
   ***
    *
```

22. WAJP to take a string count all vowels and then delete the same from the string.
23. Write a **Patient** class which inherits from the **Person** class. Patient can again be of two types, indoor and outdoor. The Patient class requires the following:
    a) a variable to store the patient ID for the patient
    b) a variable to store the department of hospital
    c) a variable to store the ward of hospital
    d) a variable to store the patient 's date of joining the hospital
    e) a variable to store the patient 's address
    f) a variable to store the medical fees that the patient pays
    g) constructor methods, which initialize the variables
    h) a method to calculate the medical fees (for both indoor and outdoor patient)
24. WAJP to take a string as password and check whether it contains at least two numbers, 3 alphabets and no space in it. If any contrary throw message.
25. Write a program in Java to create a class called Rational having two data members for numerator and denominator. Take two inputs of rational numbers and perform multiplication and division. Display the result in reduced form.
26. Write a program in Java to print a format like,

```
* * * * * * *
 * * * * *
  * * *
   *
```

27. Write a class called **Shape** which contains a user-defined interface for **Computation**, which contains methods for calculation of area, perimeter and volume. Write four classes for **circle, rectangle, sphere** and **rectangular parallelepiped**, and all these classes inherit from Shape. Now take input for the following:
    a) radius of circle and compute its area and perimeter
    b) Length and breadth of rectangle and compute its area and perimeter
    c) Length, breadth and height for **rectangular parallelepiped** and compute its area and volume
    d) Radius of sphere and compute its area and volume

** Area of circle= πr^2, perimeter of circle= $2\pi r$, area of sphere= $4\pi r^2$, volume of sphere= $\frac{4}{3}\pi r^3$, volume of rectangular parallelepiped $= l \times b \times h$ area of rectangular parallelepiped= $2(l \times b + b \times h + h \times l)$

28. Write a class called Employee, which requires the following:
    a) a variable to store the employee ID
        a. employee ID should be of format EMP**M**1234, EMP**S**1234, EMP**A**1234, EMP**C**1234, where M=manager, S=supervisor, A=analyst, C=clerk; number can be any no. but first three characters should be EMP
    b) a variable to store the employee name
    c) a variable to store department
    d) a variable to store city
    e) a variable to store basic salary
    f) a method to calculate the salary of employee
        a. if the city is metro then the HRA would be 30% else 20%
        b. if the employee ID contain M then DA would be 120%, if S then DA would be 110%, if A then DA would be 100%, and if C then DA would be 90%
    g) constructor methods, which initialize the variables
29. WAJP to create 4 threads and show exhibit their execution after the call of the "start ( )" method.
30. Write a program in Java to create 3 threads and exhibit their behaviour by changing their priorities in the "main" thread. Display the possible output.

COURSE INFORMATION SHEET

Course code: IT 4021
Course title: **Database System Concepts**
Pre-requisite(s): Fundamental of Data Structures.

Course Objectives:

1. To understand the fundamental concepts, historical perspectives, current trends, structures, operations and functions of different components of databases.
2. To understand the structural constraints of relationships.
3. To understand the types of integrity constraints in a relational database system.
4. To understand the concepts provided by Relational Algebra, Relational Calculus and SQL and able to specify queries on any database using them.
5. To recognize the importance of database analysis and design in the implementation of any database application.
6. To understand how to perform the normalization process of relations before implementation.
7. To understand the primary file organizations and index structures used by different database systems.
8. To describe the role of transaction processing in a database system.
9. To understand various concurrency control mechanisms for a database system.
10. To describe the roles of recovery and security in a database system.

Course Outcomes:

Upon successful completion of this course, the students are expected to:

1. To understand the fundamental and advanced concepts required for modelling and designing the database.
2. Formulate, using relational algebra and SQL, solutions to a broad range of query problems.
3. To effectively model and design the database systems.
4. Have knowledge of Indexing and Hashing mechanisms in a database management system.
5. To understand the concept of Transaction and Concurrency control.

Module-I

Introduction: Purpose of Database System; View of Data, Database Languages, Transaction Management, Database architecture, Database Users and Administrator, Types of database System.

Module-II

Database Design and Entity - Relational Model: Overview of design process, E-R model, Constraints, E – R Diagram, E-R Diagram issues, Weak Entity Sets, Extended E – R Features, Reduction to E – R Schemas.

Module-III

Relational Model: Structure of Relational Database, Codd's Rules, Fundamental Relational Algebra Operations, Additional Relational Algebra Operations, Extended Relational Algebra Operations.

Module-IV

SQL & Advanced SQL: Data definition, Basic structure of SQL queries, Set Operations, Aggregate Functions, Null Values, Nested Sub Queries, complex queries, views, modification of database, Joined relations, SQL data types & schemas, Integrity constraints, authorization, Embedded SQL.

Module-V

Relational Database Design: Functional dependency, Decomposition, Normalization, First normal form, Second normal form, Third normal form, BCNF, Multivalued dependencies and Fourth normal form, Join dependencies and Fifth normal form.

Module-VI

Indexing & Hashing: Ordered Indices, B+ Tree index files, B-Tree index files, Multiple key access Static hashing, Dynamic Hashing, Comparison of ordered indexing and hashing, Index definition in SQL.

Query Processing: Measure of Query Cost, Selection Operation, Evaluation of Expressions.

Module-VII

Transaction & Concurrency Control: Transaction Concepts & ACID Properties, Transaction States, Implementation of Atomicity & Durability, Concurrent Executions, Serializability & Its Testing, Recoverability, Lock-Based protocols, Validation based protocol, Multiple Granularity, Multiversion Schemes, Deadlock Handling.

Text Book:

1. A.Silberschatz et.al - Database System Concepts, 5/e, Tata Mc-Graw Hill, New Delhi – 2000.

Reference Books:

1. Date C.J. - An Introduction to Database System, Pearson Education, New Delhi- 2005
2. R.Elmasri, Fundamentals of Database Systems, Pearson Education, New Delhi, 2005.
3. S.K.Singh.-Database Systems, Pearson Education, New Delhi- 2006

COURSE INFORMATION SHEET

Course code: IT 4023
Course title: **Operating System Concepts**
Pre-requisite(s): Computer Organization and Architecture

Course Objectives:
1. To provide brief insight of operating system and its goals and services.
2. To know the concepts of different kinds of Operating systems.
3. To understand the concepts processes threads, schedulers, and CPU scheduling.
4. To learn different concurrency control mechanisms.
5. To understand various Memory Management techniques.
6. To understand I/O Management, Disk Scheduling, and File Management techniques.

COURSE OUTCOMES:
1. An ability to appreciate the role of an operating system.
2. An ability to become aware of the issues in the management of resources like processor, memory and input-output.
3. An ability to select appropriate productivity enhancing tools or utilities for specific needs like filters or version control.
4. An ability to get Insight into the design of an operating system.
5. An ability to differentiate different types of Operating Systems.

Module - I

Operating-System Structures: Operating-System Services, User Operating-System Interface, System Calls, Types of System Calls, System Programs, Operating-System Design and Implementation, Operating-System Structure, Virtual Machines, Operating-System Debugging, Operating-System Generation

Module - II

Processes: Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication
Threads: Overview, Multithreading Models, Thread Libraries, Threading Issues

Module - III

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Operating System Examples, Algorithm Evaluation

Module - IV

Process Synchronization: The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization Examples, Atomic Transactions

Module - V

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

Module - VI

Memory Management: Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation

Virtual Memory: Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames,Thrashing, Memory-Mapped Files, Allocating Kernel Memory, Other Considerations

Module - VII

File-System Interface: File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, File Sharing, Protection

File-System Implementation: File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery, NFS

Module - VIII

Mass-Storage Structure: Overview of Mass-Storage, Structure, Disk Structure, Disk attachment, Disk Scheduling, Disk Management, Swap-Space Management, RAID Structure, Stable-Storage Implementation, Tertiary-Storage Structure

Text Book:

1. Avi Silberschatz, Peter Baer Galvin,Greg Gagne, "Operating System Concepts", Eight Edition. John Wiley & Sons,

Reference Books:

1. D.M. Dhamdhere- Operating Systems: A Concept-Based Approach, 2nd Edn, TMH, New Delhi-2006.
2. C.Cronsley-Operating Systems: A Design-Oriented Approach, TMH, New Delhi, 2002.
3. H.M.Deitel-Operating Systems, 2nd Edn, Pearson Education, 2003.
4. A.S.Tanenbaum-Operating System:Design and Implementation, PHI, New Delhi, 2002.

COURSE INFORMATION SHEET

Course code: IT 4025
Course title: **Theory of Computations**
Pre-requisite(s): Discrete Mathematics and Graph Theory

Course Outcomes:
1. Understand the basis mathematics necessary for the subject
2. Design Abstract machine for various problems
3. Learn the functionalities of Abstract machines with their limitations
4. Relate formal languages and mathematical models of computation
5. Analyze decidable, undecidable, P, NP, NP-C, NP-Hard problems

Module I & II:
Sets, Relations, and Languages- Sets, Relations and functions, Special types of binary relations, Finite and infinite sets, Three fundamental proof techniques, Closures and algorithms, Alphabets and languages, Finite representations of languages.
Finite Automata: Deterministic finite automata, Nondeterministic finite automata, Finite automata and regular expressions, Languages that are and are not regular, State minimization, Algorithmic aspects of finite automata.

Module III & IV:
Context-free Languages - Context-free grammars, Parse trees, Pushdown automata, Pushdown automata and context-free grammars, Languages that are and are not context-free, Algorithms for context-free grammars, Determinism and parsing.

Module V & VI:
Turing Machines - Definition and Computing with Turning machines, Extensions of Turning machines, Random access Turing machines, Nondeterministic Turing machines, Grammars, Numerical functions.
Module VII:
Undecidability- The Church-Tuning thesis, Universal Turing machines, The halting problem, Unsolvable problems about Turing machines, Unsolvable problems about grammars, Properties of recursive languages.

Text Book:
1.H.R. Lewis & C.H. Papadimitriou, Elements of the theory of computation – 2nd Edn. Pearson Education.
Reference Books:

1. Fundamentals of the Theory of Computation: Principles and Practices: HorcourtIndia Pvt. Ltd. 2000 Morgan Kaufmann Publishers.

2. J.C. Martin – Introduction to Languages and the theory of computation, 2nd Edn.,TMH, New Delhi 2000

3. K.L.P. Misra – et.al., "Theory of Computer Science", 2nd Edn. PHI, New Delhi, 2000

COURSE INFORMATION SHEET

Course code: IT 4027
Course title: **Scientific Computing**
Pre-requisite(s): Programming knowledge and High school level Mathematics

Course Objectives:

1. To develop skill to represent and solve a problem in Computer
2. To develop understanding of basic of computation methodologies
3. Understating the functionality of Abstract machines with their limitations

Course Outcomes

1. Able to map a problem in the computer domain so that with the help of computer it can be solved
2. Able to understand the basic of computing methodologies that done with computers

Module - I

High Speed Computation: Introduction, Computer Arithmetic, Errors, Machine Computation.
Transcendental and Polynomial Equations: Introduction, Bisection Method, Iterative Methods, Rate of Convergence, Methods for Complex Roots, Polynomial Equations.

Module - II

System of Linear Algebraic Equations and Eigenvalue Problems: Introduction, Direct Methods, Error analysis, Iteration Methods, Eigenvalues and Eigen Vectors.
Interpolation and Approximation: Introduction to Lagrange and Newton Interpolations, Finite difference operators, Interpolating polynomial using finite differences, Hermite interpolations, Piecewise and spline interpolation.

Module - III

Differentiation and Integration: Introduction, Numerical differentiation, Numerical integration, Methods based on interpolation.
Ordinary Differential Equations: Introduction, Euler methods, Single and Multistep methods, Predictor-corrector methods.

Module - IV

Empirical and Probability Distributions : Basic Concepts, The Mean Variance, and Standard Deviation, Continuous-Type Data, Exploratory Data Analysis, Graphical Comparisons of Data Sets, Probability Density and Mass Functions.
Probability : Properties of Probability, Methods of Enumeration, Conditional Probability,

Independent Events, Bayes Theorem.

Module – V & VI

Discrete, Continues & Multivariable Distributions : Random Variables of the Discrete Type, Mathematical Expectation, Bernoulli Trials and the Binomial Distribution, The Moment-Generating Function, The Poisson Distribution, Random Variables of the Continuous Type, The Uniform and Exponential Distributions, The Gamma and Chi-Square Distributions, The Normal Distribution, Distributions of Functions of a Random Variable, Distributions of Two Random Variables.

Sampling Distribution Theory : Independent Random Variables, Distributions of Sums of Independent Random Variables, Random Functions Associated with Normal Distributions, The Central Limit Theorem, Approximations for Discrete Distributions, The t and F Distributions.

Module - VII

Estimation & Tests of Statistical Hypotheses : Point Estimation, Confidence Intervals for Means, Confidence Intervals for Difference of Two Means, Sample Size,
Tests About Proportions, Tests of the Equality of Two Normal Distributions, Chi-Square Goodness of Fit Tests, Contingency Tables, Tests of the Equality of Several Means.

Text Books:

1. Jain,M.K., etal : Numerical Methods for Scientific and Engineering Computation, 3rd Edn. New Age Publication, New Delhi, 1999
2. Hogg, R.V. & Tanis E. A. : Probability and Statistical Inference, 6th Edn., Pearson Education, New Delhi , 2004.

Reference Books :

1. Sastrty, S.S. – Introductory Methods of Numerical Analysis, 4th Edn., PHI, New Delhi, 2005
2. Hines, W.W. et_al – Probability and Statististics in Engineering, 4th edn., John Witey, Singapore (Indian Reprint), 2003.
3. Veerarajan, T. – Probability, Statististics and Random Processes, 2nd Edn., TMH, New Delhi, 2003.

Course code: IT4022
Course title: DATABASE SYSTEM LAB

Course Objectives

This course enables the students:

1. To observe that how the real world data is stored, retrieved, and communicate under the DBMS environment
2. To design a logical model which having the unique relation between the Data.
3. To apply the query for the modification of the system.
4. To develop a conceptual design which allows as to avoid anomalies in superior's data.
5. To discuss a system which allows to restrict the uncontrolled exaction and provide rigorous variation of the task.

Course Outcomes

After the completion of this course, students will be:

1. Evaluate and understand the role of database management systems in information technology applications within organizations. Generalize a physical design for a database from its logical design.
2. Illustrate the SQL data definition and SQL query languages and recognize the use of contemporary logical design methods and tools for databases
3. Formulate the operation of Transaction and concurrent task to ensure the results as quickly as possible.
4. Construct a distributed collections of data across multiple physical locations
5. Develop sophisticated queries to extract information from large datasets. Prepare the system having data redundancy which improve data integrity

Consider the following tables:
emp(empno,ename,job,mgr,hiredate,sal,comm,deptno,gr),
dept(deptno,dname,loc)
Write the following queries:

1. List all information about all department from emp table.
2. List all employee names along with their salaries from emp table.
3. List all department numbers, employee numbers and their managers numbers in descending order of deptno from emp table.
4. List department names and locations from the dept table.
5. List the employees belonging to the department 20.
6. List the name and salary of the employees whose salary is more than 1000.
7. List the names of the clerks working in the department 20.
8. List the names of analysts and salesmen.
9. List the details of the employees who have joined before the end of September 81.
10. List the names of employees who are not managers.
11. List the names of employees whose employee number are 7369, 7521, 7839, 7934, 7788.
12. List the employee details not belonging to the department 10, 30, and 40.
13. List the employee name and salary, whose salary is between 1000 and 2000.
14. List the employee names, who are not eligible for commission.(salary having >15,000 eligible for commission)
15. List the employees who are eligible for commission.
16. List the details of employees, whose salary is greater than 2000 and commission is NULL.
17. List the employees whose names start with an "S" (not"s").

18. List the name, salary and PF amount of all the employees(PF is calculated as 10% of salary).
19. List the empno, ename, sal in ascending order of salary.
20. List the employee name, salary, job and Department no descending order of Department No and salary.
21. List the employee details in ascending order of salary.
22. List the employee details in descending order of salary
23. Display name, and sal and commission of all employees whose monthly salary is greater than their commission.
24. Select SMITH HAS WORKED IN THE POSITION OF CLERK IN DEPT 20.Display result in this format.
25. Generate a statement which prompts the user at runtime. The intention is to display employees hired between 2 given dates.
26. Define a variable representing an expression used to calculate total annual remuneration. Use the variable in a statement which finds all employees who earn $30000 a year or more.
27. List all the employees name and salaries increased by 15% and expressed as a whole number of dollars.

28. Produce the following

EMPLOYEE AND	**JOB**
SMITH	CLERK
ALLEN	SALESMAN

29. Produce the following output:

SMITH (Clerk)
ALLEN (Salesman)

30. Do a case sensitive search for a list of employees with a job that the user enters.
31. It has been discovered that the sales people in dept. 30 are not all male. Please produce the following output.

ENAME	**DEPTNO**	**JOB**
ALLEN	30	Sales Person

32. Display each employees name and hiredate of dept 20.
33. Display each employees name, hiredate and salary review date. Assume salary review date is one year from hiredate. Output should be in ascending review date.
34. Print list of employees displaying just salary, if more than 1500. If exactly 1500 display " On Target". If less than 1500 display " Below 1500".
35. Write a query which returns DAY of the week (i.e. MONDAY) for any date entered in the format DD/MM/YY.
36. Write a query to calculate length of service of each employee.
37. Find the minimum salary of all employees.
38. Find the maximum, minimum, and average salaries of all employees.
39. List the maximum and minimum salary of each job type.
40. Find how many managers are in each dept.
41. Find the average salary and average total remuneration of each job type. Remembers sales man earn commission.
42. Find out the difference between highest and lowest salary.
43. Find all department s which have more than three employees.
44. Check whether all employee nos are unique. (No Duplicate)

45. List lowest paid employee working for each Manager. Exclude any groups where the minimum salary is less than 1000. Sort the output by salary.
46. Produce a list showing employees 'salary grade'.(> 10000 A, >10000 &<20000 B, >20000 C)
47. Show only employee on Grade C.
48. .Show all employee in Dallas.
49. List the employees name, job, salary, grade and department for everyone in the company except clerks. Sort on salary, displaying the highest first.
50. List the following details of employees who earn $36000 a year or who are clerks.

    Ename Job Annual Sal Dept no Dname Grade
51. Display all employees who earn less than their managers.
52. Display all employees by name and eno along with their managers name and number.
53. Modify above spoliation to display KING who has no MANAGER.
54. Find the job that was files in the first half of 1983 and the name job that was filled in the same period in 1984.
55. Find all employees who have joined before their manager.

    EMPLOYEE HIREDATE MANAGER HIREDATE
56. Find the employees who earn the highest salary in each job, type, sort in descending order of salary.
57. Find the employees who earn the minimum salary for their job, Display the result in descending order of salary
58. Find the most recently hired employees in the department. Order by hiredate.
59. Show the details of any employee who earns a salary greater than the average for their department. Sort in department number order.
60. List all department where there are no employees.

Text book:

1. SQL, PL/SQL the programming Language of Oracle, Ivan Bayross, 4th edition

Course code: IT4024
Course title: OPERATING SYSTEM LAB
Pre-requisite(s): Data Structure, Computer System Architecture, Basic Course on Computer Programming
Co- requisite(s):
Credits: L: 0 T: 0 P:1.5
Class schedule per week: 3
Class: B.TECH
Semester / Level: IV
Branch: IT

Course Objectives
This course enables the students to:

1.	Present the main components of OS and their working
2.	Introduce the concepts of process and thread and their scheduling policies
3.	Handling synchronization of concurrent processes and deadlocks
4.	Analyze the different techniques for managing memory, I/O, disk and files
5.	Design the components of operating system

Course Outcomes
After the completion of the course student will be able to:

1.	Describe the main components of OS and their working
2.	Explain the concepts of process and thread and their scheduling policies
3.	Solve synchronization and deadlock issues
4.	Compare the different techniques for managing memory, I/O, disk and files
5.	Design components of operating system

1. Implement in C the following UNIX commands using System calls : cat and mv
2. WAP in C to Determine the size of a file using the lseek command.
3. WAP to calculate the number of blocks assigned for the file.
4. Write a C program that deletes a directory with all its subfolders. The name of the directory should be read from the command line.

5. Write a program that deletes every 5th byte from a file, but without using a temporary file or allocating a buffer in the memory.
6. WAP in C to implement FCFS CPU scheduling Algorithm.
7. WAP in C to implement SJF CPU scheduling Algorithm.
8. WAP in C to implement Priority CPU scheduling Algorithm.
9. WAP in C to implement Round Robin (RR) CPU scheduling Algorithm.
10. WAP in c to read from the buffer & produce desired output.
11. WAP ii C to create Userid& Password.
12. WAP in c to implement and find how many Users currently login in NetWork.
13. WAP in c to create your won system call just like a copy.
14. WAP in c to create your won system call just like a delete.
15. WAP in c to find the Disk Space.
16. WAP In C to find The number of pages in the process.
17. WAP In C to find The number of frames allocated to the process.
18. WAP in c to find the no. of blocks occupied by a file.
19. WAP in c to create your won system call just like a delete.
20. WAP in c to create your won system call just like a ls.
21. WAP in c to find a PID no. of any Process.

COURSE INFORMATION SHEET

Course code: IT 5021
Course title: **Data Communications**
Pre-requisite(s): Operating System Concepts

Course Objectives:
1. To study the components of the data communication model ans communications architecture.
2. To understand the differences and similarities between the OSI model and the TCP model
3. To understand the fundamentals of the theory of signaling
4. To understand the characteristics of signals propagated through different transmission media, including concepts of attenuation and noise
5. To study characteristics of communication mediums
6. To understand techniques for detecting and correcting errors that occur in the data communications process
7. To understand the basic principles of signal encoding techniques, error-detection, and error-correction techniques.
8. To understand the characteristics of analog signaling and digital signaling and the strengths and weaknesses of each method

Course Outcomes:
1. An ability to identify the elements of a communication network
2. An ability to recognize data communications and networking standards and the standard organizations
3. An ability to identify basic communication hardware and software components of a computer network
4. An ability to recognize the infrastructures of the networking industry and identify the services provided by the major data communications carriers.
5. An ability to design and implement a simple LAN and a WAN that meet a specific set of criteria

Module - I
Data Communications and Networking Overview: A Communications Model, Data Communications, Data Communication Networking.
Protocol Architecture: The Need for Protocol Architecture, A Simple Protocol Architecture, OSI, The TCP/IP Protocol Architecture

Module - II
Data Transmission: Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments, Channel Capacity.
Guided and Wireless Transmission: Guided Transmission Media, Wireless Transmission, Wireless Propagation, Line-of-Sight Transmission.

Module - III
Signal Encoding Techniques: Digital Data Digital Signals, Digital Data Analog Signals, Analog Data Digital Signals, Analog Data Analog Signals.

Module - IV
Digital Data Communication Techniques: Asynchronous and Synchronous Transmission, Types of Errors, Error Detection, Error Correction, Line Configurations, Interfacing.

Module - V
Data Link Control: Flow Control, Error Control, High-Level Data Link Control (HDLC).
Multiplexing: Frequency Division Multiplexing, Synchronous Time Division Multiplexing, Statistical Time Division Multiplexing.

Module - VI
Circuit Switching and Packet Switching: Switching Networks, Circuit-Switching Networks, Circuit-Switching Concepts, Control Signaling, Soft switch Architecture, Packet-Switching Principles, X.25, and Frame Relay.

Module -VII
Asynchronous Transfer Model: Protocol Architecture, ATM Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Service Categories, ATM Adaptation Layer.
Routing in Switched Networks: Routing in Circuit-Switching Networks, Routing in Packet-Switching Networks, Least-Cost Algorithms

Text Book:
1. W. Stallings - Data and Computer Communications, 7th Edn., Pearson Edn./ PHI, New Delhi, 2006
Reference Books:
1. B. A. Forouzan - Data Communications and Networking, 4th Edn. TMH, New Delhi 2006
2. P.C. Gupta – Data Communications and Computer Networks, PHI, New Delhi 2006

COURSE INFORMATION SHEET

Course code: IT 5023
Course title: **Software Engineering Principles**
Pre-requisite(s): Database System Concepts and Java Programming

Course Objectives:

1. To impart a firm understanding of what it means to be a software engineer.
2. To impart an understanding of software development lifecycles, the phases and activities of the lifecycle and the artefacts (documents and code) created in each phase of a lifecycle.
3. To cover requirements analysis including use cases traditional requirements gathering techniques and user interface prototypes as a tool for obtaining customer feedback.
4. Explore UML class diagrams for domain analysis, systems design, use-case analysis, modeling, etc.Familiarize with standards and conventions.
5. To discuss various software metrics.
6. Explore issues of maintenance, reengineering.

Course Outcomes:

1. Can understand the principles of software engineering.
2. Can understand and use of software engineering terminology and nomenclature.
3. Be capable of intelligently communicating with most members in a software development organization (management, analysts, architects, developers, etc.)
4. Be able to create and use planning, requirements analysis, domain analysis and design artifacts and carry them into code.
5. Be capable of taking on the role of systems analyst in a software development organization.

Module – I

Introduction: Some Definitions, FAQs about software engineering, The evolving role of software, Software characteristics, SW applications
Software Processes: Software process models, Waterfall model, the Prototyping model, Spiral model, RAD and Incremental model.

Module – II

Project Management : Management activities, Project planning, Project scheduling, Risk Management.

Module – III

Software Requirements : Functional and non functional requirements, User requirements, System requirements, The software requirements document. IEEE standard of SRS, Quality of good SRS.
Requirement Engineering Process : Feasibility study, Requirements elicitation and analysis, Requirements validation, Requirement management.

Module – IV

Software Design : Design Concepts and Principles, Architectural Design, Object oriented Design, User interface design
UML : Class diagram, Sequence diagram, Collaboration diagram

Module – V

Verification and Validation : Verification and Validation Planning, S/W inspection, static analysis.

Software Testing : Testing functions, Test care design, White Box testing, Black box testing, Unit testing, Integration Testing, System testing, Reliability.

Module – VI

Management : SW cost estimation : Estimation techniques, Algorithmic cost modelling, Project duration and staffing.

Quality Management : Quality assurance and standards, Quality planning, Quality control.

Module – VII

Software Change : Program Evolution Dynamic, S/W Maintance in detail.

Text Book :

I. Sommerville : Software Engineering, Pearson Education Publication, 7th ed.

Reference Books:

1. R. S. Pressman : Software Engineering : A Practiioners Approach, 5th Edn., TMA, New Delhi.
2. J. F. Peters & W. Pedrycz– Software Engineering, John Wiley & Sons,Inc. 2000
3. A.Behforooz & F.J. Hudson – Software Engineering Fundamentals, Oxford Univ. Press, New York, 2000.

COURSE INFORMATION SHEET

Course code: IT 5025
Course title: **Principle of Soft Computing**
Pre-requisite(s): Concept of mathematics (set theory, differential calculus etc.), Programming languages like C, MATLAB.

Course Objectives:

1. To understand the concept of fuzzy logic and able to solve problems on fuzzy sets and fuzzy reasonings.
2. Students are expected to solve and develop fuzzy inference system.
3. To understand the concept of optimization technique and to solve problems using Genetic Algorithm.
4. Students are expected to understand the concepts of Artificial Neural Network.
5. Able to implement Neural Network model in various applications.

Module -I

Fuzzy Set Theory: Basic Definition and Terminology, Set Theoretic Operations, MF Formulation and Parameterization, MF of two dimension, Fuzzy Union, Intersection and Complement.

Module -II

Fuzzy Rules and Fuzzy Reasoning : Extension Principles and Fuzzy Relations, Fuzzy IF THEN Rules, Fuzzy Reasoning.

Module –III

Fuzzy Inference System Introduction, Mamdani Fuzzy Models, Other Variants, Sugeno Fuzzy Models, Tekamoto Fuzzy Models.

Module –IV

Fundamentals of Genetic Algorithms: Basic Concepts Creation, Offsprings Encoding, Fitness functions, Reproduction, Genetic Modelling: Inheritance Operators, Cross over, Inversion and detection, Mutation operator, Bitwise operators.

Module -V

Introduction, Architecture, Back Propagation and feed Forward Networks, Offline Learning, Online Learning.

Module -VI

Supervised Learning of Neural Networks : Introduction, Perceptrons, Adaline, Back Propagation Multilayer Perceptrons, Back Propagation Learning Rules, Methods of Speeding. Radical Basis Function Networks, Functional Expansion Networks.

Module -VII

Unsupervised Learning : Competitive Learning Networks, Kohonen self-organising networks, Hebbian Learning, The Hopfield Network

Text Book :

1. J.S.R. Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing" PHI/Pearson Education, New Delhi 2004.
2. S. Rajasekaran& G.A. Vijayalakshmi Pai, PHI, New Delhi 2003

Reference Book:

1. T. J. Ross, " Fuzzy Logic with Engineering Applications." TMH, New York, 1997.

COURSE INFORMATION SHEET

Course code: IT 5027
Course title: **Design of Computer Algorithms**
Pre-requisite(s): Java Programming

Course Objectives:

1. Upon completion of this course, students will be able to do the following:
2. Analyse the asymptotic performance of algorithms.
3. Write rigorous correctness proofs for algorithms.
4. Demonstrate a familiarity with major algorithms and data structures.
5. Apply important algorithmic design paradigms and methods of analysis.
6. Synthesize efficient algorithms in common engineering design situations.

Course Outcomes:

1. Through unit tests, class tests, model exam, assignments, guest lectures and seminars it is revealed that the following outcomes are achieved.
2. After the completion this course, students will be able to have a clear understanding on
3. Solving the problems systematically.
4. Linear and non-linear data structures.
5. Implementation of graph and trees.

Module-I

Introduction: Some linear and non-linear Data structures, Asymptotic notation to measure complexity, of algorithms, Analysis of algorithms efficiency, Analysis of non recursive & recursive algorithms, Space and Time trade-offs

Module-II&III

Divide & Conqure: Merge Sort, Quick sort, Binary search, Large integer- multiplication, Strassens matrices multiplication, Closest pair & convex hull problems
Decrease & Conquer: DFS& BFS, decrease-by –a-constant-factor algorithms, Variable-Size-decrease algorithms
Transform & Conquer: Horner's Rule & Binary exponentiation, Problem reduction : Input enhancement in string matching

Module- IV

Greedy Techniques: Knapsack problem, Job-scheduling, Prim's & Krushkal algorithms, Dijkstra's algorithm, Huffman coding alg.,

Module- V

Dynamic Programming: Warshall's & Floyd's algorithm, Optional binary search trees, Knapsack problem ,

Module- VI

Backtracking, Branch and Bound Methods.

Module-VII

Limitations of Algorithm Power: Lower bound arguments-decision trees, P,NP & NP Complete problem, Approximation algorithms for NP-hard problems

Text Book:

1. Thomas H. Cormen, An Introduction to Algorithms, PHI publication,2009

Reference Books:

1. Fundamentals of Computer algorithms,Horowitz & sahni,Galgothia publications.
2. Introduction to Design & Analysis of Algorithms, Anany Levitin,Pearson Education 2003.

COURSE INFORMATION SHEET

Course Code: IT 5024
Course Title: Software Engineering Lab

Course Objectives
This course enables the students:

1. To understand the concept of UML
2. To gain knowledge of various diagrams.
3. Learn about software requirement specification.
4. To gain knowledge about software design specification.
5. To learn about the relationships among different UML diagrams.

Course Outcomes
After the completion of this course, students will be able to:

1. Identify the software requirement capturing process.
2. Elaborate knowledge about dynamic view of system.
3. Analyseabout static view of software system.
4. Analysis about the relationship among static and dynamic view of system.
5. Identify the process of deployment of software system.

SYLLABUS

List of Programs as Assignments:
Q1. Draw use case diagram for online banking system.
Q2. Draw use case diagram for online library system
Q3. Draw use case diagram for online railway reservation system
Q4. Draw use case diagram for employee information system.
Q5. Draw use case diagram for inventory control system
Q6.. Draw use case diagram for student information system.
Q 7. Draw use case diagram for online hotel management system.
Q8. Draw use case diagram for online bus reservation system.
Q9. Draw use case diagram for online course registration system
Q10. Draw use case diagram for online teacher information system.
Q11. Draw sequence diagram for online banking system.
Q12. Draw sequence diagram for online library system.
Q13. Draw sequence diagram for online railway reservation system.
Q14. Draw sequence diagram for employee information system.
Q15. Draw sequence diagram for inventory control system.
Q16.. Draw sequence diagram for student information system.
Q 17. Draw sequence diagram for online hotel management system.
Q18. Draw sequence diagram for online bus reservation system.
Q19. Draw sequence diagram for online course registration system.
Q20. Draw sequence diagram for online teacher information system.
Q21. Draw activity diagram for online banking system.
Q22. Draw activity diagram for online library system.
Q23. Draw activity diagram for online railway reservation system.

Q24. Draw activity diagram for employee information system.
Q25. Draw activity diagram for inventory control system.
Q26.. Draw activity diagram for student information system.
Q27. Draw activity diagram for online hotel management system.
Q28. Draw activity diagram for online bus reservation system.
Q29. Draw activity diagram for online course registration system
Q30. Draw activity diagram for online teacher information system.
Q31. Draw class diagram for online banking system.
Q32. Draw class diagram for online library system
Q33. Draw class diagram for online railway reservation system
Q34. Draw class diagram for employee information system.
Q35. Draw class diagram for inventory control system
Q36.. Draw class diagram for student information system.
Q37. Draw class diagram for online hotel management system.
Q38. Draw class diagram for online bus reservation system.
Q39. Draw class diagram for online course registration system
Q40. Draw class diagram for online teacher information system.

COURSE INFORMATION SHEET

Course code: IT 6021
Course title: **Communication Theory**
Pre-requisite(s): Data Communications

Course Objectives:
1. To have understanding about different types of AM communication systems (Transmitters & Receivers)
2. To study in detail the different types of FM transmitters & Receivers and PM Transmitters and Receivers
3. To gain knowledge about different digital modulation techniques for digital transmission
4. To have knowledge about base band transmission ISI and distortion free base band transmission
5. To know the spread spectrum modulation techniques and different multiple access methods

Course Outcomes:
1. Different types of communication techniques
2. Digital communication and transmission patterns
3. Spectrum analysis
4. Satellite communication systems

Module –I

Signal Analysis: Introduction of Signal, Representation of Signals in the Frequency and Time Domain**,** Fourier Transform and its Application to signal Analysis. The Discrete Spectrum, The Continuous Spectrum, Dirac Delta Functions, Energy Density Spectra.

Module -II

Amplitude Modulation System: Basics Communication system, Modulation, Need of Modulation, Introduction of Amplitude Modulation, Frequency spectrum of Amplitude Modulation, Modulator: Square law Modulator, Switching Modulator, Demodulator: Envelop Detector, Square law detector, AM-DSB-SC, Balanced Modulator and Ring Modulator, AM-SSB-SC, Generation of SSB-SC signal and demodulation of SSB-SC and DSB-SC signal. Comparisons of Various AM systems

Module -III

Angle Modulation System: Introduction, Concept of Angle Modulation, Frequency and phase Modulations, Types of Frequency Modulation, Generation of FM wave: Direct and Indirect Method Detection of FM wave using slope detector, Balanced Slope Detector and Phase Discriminator, Comparison of Frequency Modulation and Amplitude Modulation.

Module –IV

Multiplexing: Introduction and its classification, Frequency division Multiplexing. Time Division Multiplexing.

Module –V

AM and FM receivers: Introduction, Classification of Radio receiver, Superheterodyne receiver, Sensitivity, Selectivity, Fidelity and Image rejection ratio.

Module -VI

Random Signal Theory: Random Variables, Continuous and Statistically Independent random variables, Examples of probability Density functions of Uniform, Gaussian, Rayleigh functions. Stationary & Ergodic Processes, Auto Correlation Functions, Energy Spectral Density.

Module -VII

Noise: White Noise, Atmospheric Noise, Thermal Noise, Equivalent Noise Band width
Shot noise, Partition Noise, Flicker Noise, Noise Figure, Signal to Noise Ratio, Noise Factor, Noise Temperature. Equivalent Noise figure of Amplifiers.

Text Book:

1. Communication Systems by S. Haykin; 4^{th} Edition-2001

Reference Books:

1. D. Roddy & J. Coolen: Electronics Communication 4^{th} Edition, PHI-2005

COURSE INFORMATION SHEET

Course code: IT 6023
Course title: **Computer Network and Security**
Pre-requisite(s): Data Communications

Course Objectives:
1. Overview of data communication and Networking, Physical level
2. Data link layer, Medium access sub layer
3. Network layer
4. Transport layer

Course Outcomes:
1. Concepts underlying digital and analog transmission, multiplexing techniques, various transmission media and multiple access techniques
2. The ability to identify various type's of networks, various types of multiplexing schemes, transmission media and various types of multiple access techniques
3. The ability to understand the designing of local area networks as per the needs and specifications
4. Knowledge of professional and ethical responsibilities in monitoring, securing and administering the various types of networks

Module-I

OSI Security Architecture: Classical Encryption techniques – Cipher Principles – Data Encryption Standard – Block Cipher Design Principles and Modes of Operation .

Module-II

Evaluation criteria for AES: AES Cipher – Triple DES – Placement of Encryption Function – Traffic Confidentiality.

Module-III

Key Management: Diffie-Hellman key Exchange – Elliptic Curve Architecture and Cryptography
Introduction to Number Theory: Confidentiality using Symmetric Encryption – Public Key Cryptography and RSA.

Module-IV

Authentication requirements: Authentication functions – Message Authentication Codes Hash Functions – Security of Hash Functions and MACs.

Module-V

MD5 message Digest algorithm: - Secure Hash Algorithm – RIPEMD – HMAC Digital Signatures – Authentication Protocols – Digital Signature Standard

Module-VI

Authentication Applications: Kerberos – X.509 Authentication Service – Electronic Mail Security – PGP – S/MIME - IP Security – Web Security.

Module-VII

Intrusion detection: password management – Viruses and related Threats – Virus Counter measures – Firewall Design Principles – Trusted Systems.

Text Book

1. William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, fifth Edition, 2009.

Reference Book

1. Atul Kahate, “Cryptography and Network Security”, Tata McGraw-Hill, 2003.
2. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2001.

COURSE INFORMATION SHEET

Course code: IT 6025
Course title: **Information and Coding Theory**
Pre-requisite(s): Data Communications

Course Objectives:
1. To understand the role of information theory for an efficient, error-free and secure delivery of information using binary data streams.
2. To have a complete understanding of error-control coding.
3. To understand encoding and decoding of digital data streams.
4. To introduce methods for the generation of these codes and their decoding techniques.
5. To have a detailed knowledge of compression and decompression techniques.
6. To evaluate the performance of various coding techniques over noisy communication channels.

Course Outcomes:
1. To be able to understand the principles behind an efficient, correct and secure transmission of digital data stream.
2. To be familiar with the basics of error-coding techniques.
3. To have knowledge about the encoding and decoding of digital data streams.
4. Generation of codes and knowledge about compression and decompression techniques.
5. To be able to understand the performance requirements of various coding techniques.

Module – I & II

The concept of Amount of Information, Average Information, Entropy, Information rate, Shannon's Theorem, Channel Capacity & Coding: Introduction to Channel Capacity & Coding, Channel Models, Channel Capacity Theorem, Shannon Limit.

Module-III

Data Compression Techniques: RLE, Lempel-Ziv Algorithm, Introduction to Image Compression, The JPEG standard for loss less and Lossy Image Compression & Decompression.

Module – IV & V

Error Control Coding: Introduction, Forward & Backward error Correction, Hamming Weight and Hamming Distance, Linear Block Codes, Encoding and decoding of Linear Block-codes, Parity Check Matrix, Syndrome Decoding, Hamming Codes.

Module – VI

Cyclic Codes: Introduction, Method for generating Cyclic Codes, Matrix description of Cyclic codes, Burst error correction, Cyclic redundancy check (CRC) codes, Circuit implementation of cyclic codes.

Module – VII

Convolutional Codes: Introduction, Polynomial description of Convolutional Codes, Generating function, Matrix description of Convolutional Codes, Viterbi Decoding of Convolutional codes.

Text Book:

1. Ranjan Bose, Information Theory, Coding & Cryptography", TMH, 2001, New Delhi.

Reference Books:

1. Salvatore Gravano, Introduction to Error-Control Codes, Oxford Unv. Press, New Delhi, 2010

COURSE INFORMATION SHEET

Course code: IT 6027
Course title: **Optimization Techniques**
Pre-requisite(s): IT-4027 scientific computing (sem-IV), discrete mathematics, Design and analysis of computer algorithms.

Course Objectives:
1. To introduce the fundamental concepts of optimization techniques
2. To make the learners aware of the importance of optimization in real scenarios.
3. To provide the concepts of various classical and modern methods for constrained and unconstrained problems in both single and multivariate.
4. To introduce the optimization in network and graph models.
5. To introduce the concept of Queuing models in real life.

Course Outcomes:
1. Making the subject fundamental clear in the light of optimization.
2. Developing the skill of formulating the optimization problem mathematically.
3. Able to apply the concept of various classical and modern methods for constrained and unconstrained problem in single variable as well as multivariable.
4. Applying the optimization technique in network and graph models.
5. Able to apply methods of optimization methods in real life solution using queueing models.

Module -I

Introduction To Linear Programming: Prototype Example, The Linear Programming Model, Assumptions of Linear Programming, Additional Examples, Some Classic Case Studies.
Solving Linear Programming Problems- The Simplex Method : The Essence of the Simplex Method, Setting Up the Simplex Method, The Algebra of the Simplex Method, The Simplex Method in Tabular Form, Tie Breaking in the Simplex Method, Adapting to Other Model Forms, Post optimality Analysis.

Module -II

The Theory Of The Simplex Method : Foundations of the Simplex Method ,The revised Simplex Method, A Fundamental Insight.
Duality Theory And Sensitivity Analysis : The Essence of Duality Theory, Economic Interpretation of Duality, Primal-Dual relationships, Adapting to Other Primal Forms, The Role of Duality Theory in Sensitivity Analysis.

Module -III

Other Algorithms For Linear Programming : The Dual Simplex Method, Parametric Linear Programming, The Upper Bound Techniques, An Interior-Point Algorithm.

Network Optimization Models: Prototype Example, The Terminology of Networks, The Shortest-Path Problem, The Minimum Spanning Tree Problem, The Maximum Flow Problem, The Minimum Cost flow Problem, The Network Simplex Method.

Module -IV

Dynamic Programming : A Prototype Example for Dynamic Programming, Characteristics of Dynamic Programming Problems, Deterministic Dynamic Programming, Probabilistic Dynamic Programming.

Module -V

Integer Programming : Prototype Example, Some BIP Applications, Innovative Uses of Binary Variables in Model Formulation, Some Formulation examples, Some Perspectives on Solving Integer Programming Problems, The Branch-and-Bound Technique and Its Application to Binary Integer Programming, A Branch-and-Bound Algorithm for Mixed Integer.

Module -VI

Nonlinear Programming : Sample Applications, Graphical Illustration of Nonlinear Programming Problems, Types of Nonlinear Programming Problems, One-Variable Unconstrained Optimization, Multivariable Unconstrained Optimization, The Karush-Kuhn-Tucker (KKT) Conditions for Constrained Optimization, Quadratic Programming, Separable Programming , Convex Programming.

Text Book:

1. S. Hiller & G.J. Lieberman – Operations Research, 8th Edn, TMH, New Delhi – 2006.

Reference Books:

1. H.A.Taha – Operations Research, 8/e , Pearson Education , New Delhi-2007.
2. J.K. Sharma – Operations Research, 3/e, Mcmillan , India Ltd, 2007.

COURSE INFORMATION SHEET

Course code: IT 7021
Course title: **Data Mining Concepts and Techniques**
Pre-requisite(s): Database system Concepts and Principles of Soft Computing

Course Objectives:
The course intends to allow the students to:
1. Understand the need of building warehouses and performing data mining activities.
2. Differentiate between data warehouses and databases and enumerate the steps involved in data mining.
3. Identify the methods of pre-processing data and performing activates related to ETL.
4. Understand the design principles in building warehouses, the common schema structures used in warehouses and compare their efficiency.
5. Appreciate the common activities in data mining and the algorithms involved in performing such activities.

Course Outcomes:
On completion of the course the students should be able to:
1. Assess the problem and decide what data mining activities are required to obtain the desired objectives.
2. Distinguish between the specific operations, data structures and schema that are used in data warehouses vis a vis databases.
3. Mathematically perform pre-processing operations on datasets to ensure the validity of the data is improved.
4. Design schema and write DMQL corresponding to elementary data warehouses.
5. Understand, analyse and evaluate algorithms for performing common data mining activities like Association rule mining, Classification, Clustering etc.

Module - I

Data Mining: Introduction, Relational Databases, Data Warehouses, Transactional databases, Advanced database Systems and Application, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining.

Module – II

Data Processing: Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.
Data Warehouse: Introduction, A Multidimensional data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology, From Data Warehousing to Data Mining.

Module - III

Data Mining Primitives, Languages and System Architecture: Data Mining Primitives, DMQL, Architectures of Data Mining Systems.

Module – IV

Concept Description: Data Generalization & Summarization – Based Characterization, Analytical Characterization, Mining class Comparisons, Mining Descriptive Statistical Measures in Large Databases.

Module - V

Mining Association Rules in Large Databases: Association Rule Mining, Single – Dimensional Boolean Association Rules, Multilevel Association Rules from Transaction Databases, Multi Dimensional Association Rules from Relational Databases, From Association Mining to Correlation Analysis, Constraint – Based Association Mining.

Module - VI

Classification and Prediction: Classification & Prediction, Issues Regarding Classification & Prediction, Classification by decision Tree Induction, Bayesian Classification, Classification by Backpropagation, Classification based on concepts & Association Rule Analysis, Other Classification Methods, Prediction, Classification Accuracy.

Module - VII

Cluster Analysis: Introduction , Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Method - k- Medoids Algorithm, CLARANS, Hierarchical Methods - BIRCH, ROCK Density-Based Methods - DBSCAN, Grid-Based Methods – STING, WaveCluster

Text Book :

1. Jiawei Han & Micheline Kamber - Data Mining Concepts & Techniques

Publisher Harcout India. Private Limited, Second Edition

Reference Books :

1. G.K. Gupta – Introduction to Data Mining with case Studies, PHI, New Delhi – 2006.
2. A. Berson & S.J. Smith – Data Warehousing Data Mining, COLAP, TMH, New Delhi – 2004
3. H.M. Dunham & S. Sridhar – Data Mining, Pearson Education, New Delhi, 2006.

COURSE INFORMATION SHEET

Course code: IT 7023
Course title: **Simulation & Modelling**
Pre-requisite(s):

Course objective:
1. To understand the concepts of system, system state and mathematical models.
2. To understand the simulation of single server, double server and various continuous and discrete systems.
3. To know the different simulation supporting languages.
4. To understand the simulation of manufacturing systems.
5.To understand the statistical models in simulation.
6.To understand the concepts of random number generation.
7.To understand the input modeling.

Course outcomes:
1. The student should understand the relationship between system, entities and attributes.
2. The student should know how to design the model of the any system through simulation.
3. The student should be in position to compare his own computer-simulated system to real world system.

Module-I

The concepts of a system, System Environment , Stochastic Activities,continueous and discrete systems,System Modeling,Types of models.
The full corporate Model.

Module-II

The technique of simulation, the monte carlo method, comparison of simulation and analytical methods, experimental nature of simulation, types of system simulation, numerical computation technique for continueous & discrete models,distributed lag models,cobweb models.
Continoueou system models,differential equations,analog computers & methods, hybrid computers.CSSLs,CSMP-III, Feedback Systems, Simulation of an Autopilot.

Module-III

Exponential Growth & decay models, modified exponential growth models, logistic curves, generalization of growth models, system dynamics diagrams,Simple system dynamics diagrams,multi –segment models,representation of time delays.

Module-IV

Stocastic variables, discrete & continueuos probability functions,measures of probability functions,numerical evaluation of continoues probability functions, continous uniformly distributed random numbers, a uniform random number numbers,generating discrete distributions, non-uniform continousely distributed random no,s. the rejection method.
Random no’s Generation : Techniques for generating random numbers. Tests for random numbers.
Random variate Generation: Inverse transform technique, exponential distribution,uniform distribution.

Module-V

Congestion in systems, arrival patterns , poisson arrival patterns, the exponential distribution, the erlang distribution, service times, normal distributions, queuing disciplines, measures of queues.

Module-VI

Discrete events, representation of time, generation of arrival patterns, simulation of a telephone system, delyed calls, simulation programming tasks, measuring utilization and occupancy.

Module-VII

GPSS programs, general description, action times, succession of events, choice of paths, simulation of a Manufacturing shop, facilities and storage, gathering statics, conditional transfers. Program control statements.simcript:

Text Book:

1. Gordon Geoffrey, System Simulation, 4nd edition, PHI, 2008.

Reference Book:

1. Simulation Modeling and Analysis Third Edition by Law kelton Mc Graw Hill Publication.

Course code: IT7034
Course title: Web Programming LAB

Course Objectives
This course enables the students:

1. To learn about basics of web programming
2. Learn HTML, Java Script, XML for scripting
3. Learn web based programming using ASP.NET
4. Learn PHP based programming
5. Learn Making static and dynamic websites

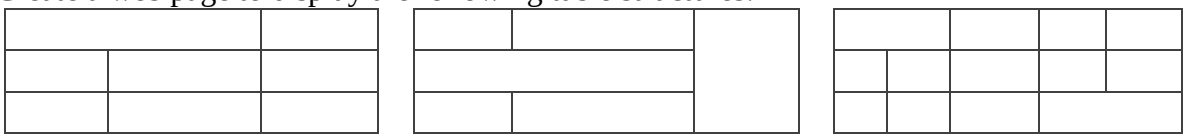
Course Outcomes
After the completion of this course, students will be able to:

1. Know the fundamentals of web programming
2. Identify .NET technology and framework
3. Elaborate on the web based programming
4. Perform web based programming.
5. Design static and dynamic websites

SYLLABUS

1. Create a web page having background color Navy, text color Chocolate and title 'My home page'.
2. Create a web page giving details of your enrolment no., name and address with all possible text formatting style.
3. Create a web page to display 'Internet & Web Technology' with different heading.
4. Create a web page to display a marquee (containing both text and images) in all possible direction. While doing so control the speed of marquee. Use also different behavior values.
5. Create a web page which contains two divisions with different appearance.
6. Create a web page which will implement all the elements available in head section.
7. Create a web page showing a nested ordered list of the index page of your book.
8. Create a web page showing a nested unordered list containing the branches available in your centre.
9. Create a web page which will implement the definition list.
10. Create a web page to create an external link to a hypermedia document. Use the target attribute.
11. Create a web page to create a bookmark in the same document.
12. Create a web page to create a vertical menu using unordered list and hyperlinks.
13. Create a web page which contains images in four corners of the web document.

14. Create a web page which will implement the image mapping.
15. Create a web page to run swf (flash file) using object element.
16. Create a web page to display the following table structures:



17. Create a web page which contains a table as follows: (enter at least 5 records & use appropriate table heading, caption and footer)

Roll No.	Name			Marks obtd.				
	First	Middle	Surname	I&WT		DBMS		CN
				Theory	Lab	Theory	Lab	

18. Create a web page having two equal frames, one containing link and other containing page to be displayed. When the link is clicked the appropriate content should be displayed in second frame.
19. Create a web page to perform the above task using iframe.
20. Create a web page which contains header, container and footer sections. The container section further subdivided into left, middle and right subsection. Use **css** to design this web page.
21. Create a simple form accepting:
    Enrolment Number
    Student Name
    A Submit and Reset button
    (while doing the above process try to understand the difference between get & post methods)
22. Design a Resume form with all possible type of form elements.

    Color: Black, Bisque, Chocolate, Crimson, Darkgrey, Navy, Lime
23. Write a JavaScript asking first name, middle name and surname and then print Hello [User Name].
24. Write a JavaScript to create a dialogue box containing “Welcome to my website”.
25. Write a JavaScript to calculate simple interest using prompt, alert and confirm.
26. Write a JavaScript to calculate simple interest using html form.
27. Write a JavaScript to display a time and print message accordingly for eg. Good Morning.
28. Using JavaScript display a digital clock.
29. Using JavaScript create a simple calculator using html form.
30. Write a JavaScript that would ask the user if he wants a greeting message and if he does, display a Gif file called Greeting.gif and display “Hello Greeting of the day!” in the document window following the image Greeting.gif otherwise flash an alert “Bad day!”
31. Write a JavaScript to scroll the text on status bar.
32. Write a program to change color of current html document’s background randomly.
33. Write a JavaScript to move a text with mouse pointer.

34. Write a JavaScript to implement an image rotator.

35. Write a JavaScript to implement a banner changer.

36. Write a JavaScript code to create a pull down menu box using a div.

37. Create a web page using two image file which switch b/w one another as the mouse pointer moves over the image.

38. Write a JavaScript to create small window in main window.

39. Create a web page which will implement the image mapping. Write JavaScript to display different information (use show/hide div) on selecting the different segment of the image.

40. Write a JavaScript to check for null & empty string.

41. Using JavaScript create a web page with two forms one customer copy and one office copy when user enters date in customer copy it gets updated in office copy.

42. Create a student Grade entry form. Use JavaScript for authentication and verification of the textboxes in the html form developed by you.

43. Write a JavaScript to verify whether email address provided by user is valid or invalid.

44. Create a well formed xml document which will display a Telephone directory. Use css.

45. Create a valid xml document which contains the DTD (both internal & external) structure of the Cd catalog. Use Xsl (XSLT is the recommended style sheet language of XML).

46. Create a SAX Parser to display the Cd catalog data stored in a valid xml document.

47. Using <xsl:for-each> display all records available in well-formed xml document containing book info.

48. Create a Jsp page to implement a simple calculator.

49. Create a Jsp page to display day of the week.

50. Create a Jsp page to perform database connectivity with either MS Access or Oracle.

COURSE INFORMATION SHEET

Course code: IT 7025
Course title: **Artificial Intelligence**
Pre-requisite(s):

Course Objectives:

1. 1.To present fundamental concepts of artificial intelligence, both theory and practice.
2. To develop problem solving methodologies
3. To look at directions in artificial intelligence research.
4. To develop logical representation of natural language sentences.
5. To develop an expert systems for given knowledge base.
6. To understand different learning strategies.

Course Outcome:

1. An ability to comprehend the concept of artificial intelligence from several perspectives, in terms of defining principles, philosophical issues, problem-solving model, and construction of programs with the characteristics formulated therein.
2. An ability to understand and express the fundamental results and problems in several sub-disciplines/domains of artificial intelligence.
3. An ability to conduct intensive problem-solving and inquiry based efforts over several days to formulate proto-types of AI domain constructs.
4. An ability to formulate alternate representations of knowledge leading to computer-based AI processing.an ability to apply their background in calculus and probability & statistics to formulate probabilistic models of intelligent systems such as expert systems, neural nets, and Bayesian inference systems.
5. An ability to apply classical logic in AI context. After introduction to mechanized resolution- based inference and theorem proving, they will solve logic problems of progressively more complex natures.

Syllabus

MODULE – I

Overview of Artificial Intelligence : Definition & Importance of AI.
Knowledge : General Concepts : Introduction, Definition and Importance of Knowledge, Knowledge-Based Systems, Representation of Knowledge, Knowledge Organization, Knowledge Manipulation, Acquisition of Knowledge.

MODULE – II

LISP and Other AI Programming Languages : Introduction to LISP : Syntax and Numeric Function, Basic List Manipulation Functions in LISP, Functions, Predicates and Conditionals, Input, Output and Local Variables, Iteration and Recursion, Property Lists and Arrays, Miscellaneous Topics, PROLOG and Other AI Programming Languages.

MODULE – III

Knowledge Representation : Introduction, Syntax and Semantics for Propositional logic, Syntax and Semantics for FOPL, Properties of Wffs, Conversion to Clausal Form, Inference Rules, The Resolution Principle, No deductive Inference Methods, Representations Using Rules.

MODULE – IV

Dealing With Inconsistencies and Uncertainties : Introduction, Truth Maintenance Systems, Default Reasoning and the Closed World Assumption, Predicate Completion and Circumscription, Modal and Temporal Logics.

Probabilistic Reasoning : Introduction, Bayesian Probabilistic Inference, Possible World Representations, Dumpster-Shafer Theory, Ad-Hoc Methods.

MODULE – V

Structured Knowledge : Graphs, Frames and Related Structures : Introduction, Associative Networks, Frame Structures, Conceptual Dependencies and Scripts.

Object-Oriented Representations : Introduction, Overview of Objects, Classes, Messages and Methods, Simulation Example using an OOS Program.

MODULE – VI

Search and Control Strategies : Introduction, Preliminary Concepts, Examples of Search Problems, Uninformed or Blind Search, Informed Search, Searching And-Or Graphs.

Matching Techniques : Introduction, Structures Used in Matching, Measures for Matching, Matching Like Patterns, Partial Matching.

MODULE – VII

Knowledge Organization and Management : Introduction, Indexing and Retrieval Techniques, Integrating Knowledge in Memory, Memory Organization Systems.

Text Book :

Dan W. Patterson - Introduction to Artificial Intelligence and Expert Systems, PHI, New Delhi, 2006.

Reference Books:

1. E. Rich & K. Knight - Artificial Intelligence, 2/e, TMH, New Delhi, 2005.
2. P.H. Winston - Artificial Intelligence, 3/e, Pearson Edition, New Delhi, 2006.
3. D.W. Rolston,- Principles of AI & Expert System Development, TMH, New Delhi.

COURSE INFORMATION SHEET

Course code: IT 7027
Course title: **Digital Image Processing**
Pre-requisite(s):

Course Objectives:

1. To understand the image acquisition and digital representation process.

2. To know the elements of a digital image processing system.
3. To be acquainted with the basic algorithms and mathematical theory that constitutes foundation for image enhancement and restoration.
4. To introduce the working of image compression algorithms.
5. To understand the concepts of information theory in image coding.

Course Outcomes:

1. To be familiar with standard procedures for image acquisition and their storage.
2. To be able to implement image enhancement and restoration algorithms.
3. Will have domain knowledge of image filters.
4. To create trained graduates who will be leaders in software industry.
5. To produce professionals who will be able to conduct research in image processing.

Syllabus:

MODULE - I

Introduction : Background, Digital Image Representation, Fundamental Steps in Image Processing, Elements of a Digital Image Processing System.

Digital Image Fundamentals : Elements of Visual Perception, A Simple Image Model, Sampling and Quantization, Some Basic Relationships between Pixels, Imagining Geometry.

MODULE - II

Image Transforms : Introduction to the Fourier Transform, The Discrete Fourier Transform, Some Properties of the Two-Dimensional Fourier Transform, Other Separable Image Transforms.

MODULE - III

Image Enhancement : Spatial Domain Methods, Frequency Domain Methods, Some Simple Intensity Transformations, Histogram Processing, Image Subtraction, Image Averaging, Background, Smoothing Filters, Sharpening Filters, Lowpass Filtering, Highpass Filtering, Generation of Spatial Masks from Frequency Domain Specifications.

MODULE – IV & V

Image Restoring : Degradations Model - Definitions, Degradation Model for Continuous Functions, Diagonalization of Circulant and Block-Circulant Matrices, Circulant Matrices, Block Circulant Matrices, Effects of Diagonalization on the Degradation Model, Algebraic Approach to Restoration, Unconstrained Restoration, Constrained Restoration, Inverse Filtering – Formulation, Removal of Blur Caused by Uniform Linear Motion, Restoration in the Spatial Domain, Geometric Transformation.

MODULE – VI & VII

Image Compression : Fundamentals – Coding Redundancy, Interpixel Redundancy, Psychovisual Redundancy, Fidelity Criteria. Image Compression Models – The Source Encoder and Decoder, The Channel Encoder and Decoder. Elements of Information Theory – Measuring Information, The Information Channel, Fundamental Coding Theorems, Using Information Theory. Error-Free Compression – Variable-Length Coding, Bit-Plane Coding, Lossless Predictive Coding. Lossy Compression – Lossy Predictive Coding, Transform Coding.

Text Book :

1. Rafael. C. Gonzalez & Richard E.Woods.- Digital Image Processing, 2/e Pearson Education, New Delhi - 2006

Reference Books :

1. W.K.Pratt.-Digital Image Processing ,3/e Edn., John Wiley & sons, Inc. 2006
2. A.K.Jain.- Fundamentals of Digital Image Processing, PHI, New Delhi, 2006
3. M. Sonka et.al Image Processing, Analysis and Machine Vision, 2/e, Thomson, Learning, India Edition, 2007.

COURSE INFORMATION SHEET

Course code: IT 7029
Course title: **Object-Oriented Design**

Course Objectives:

1. Describe the Unified Process (UP) as a System Development Methodology, Review Object-Oriented (OO) concepts, and List tools to Support system development
2. Review Project Management concepts, examine the Unified Process and the Inception Phase, describe completing the Inception Phase, and explain Project Monitoring and Control.
3. Define the Requirements Discipline in more detail, describe Systems Requirement, Models and Modeling techniques for Information Gathering, and describe validating the requirements.
4. Define Events and Use Cases; Analyze Problem Domain Classes, and Draw UML Class Diagram.
5. Structure the UML Class Diagram, Analyze use cases, and the domain model, & iteration planning.
6. Examine System Processes, A Use Case/Scenario View – The Activity diagram, and Identify Inputs and Outputs–The system sequence diagram
7. Identify Object Behavior & use the state-chart diagram, Analysis of business scenarios for Developing State Chart Diagram and integrate Object-Oriented models.
8. Interactive Demonstration on use of a software case tool to draw Use Case Diagram, Activity Diagram, SSD Diagram and State Chart Diagram.

9. Understand elements of design & design discipline activities, understand deployment environment Examine software architecture & outline network design.
10. Use Design Classes and Design Class Diagrams, Updating the Design Class Diagram, Design using detailed Sequence Diagrams, and Designing with Communication Diagrams
11. Interactive Demonstration on use of a software case tool to draw Design Class Diagram and detailed Sequence Diagram.
12. Review Databases and Database Management Systems Distinguish Object-Oriented DB and Relational Databases Describe Object-Relational Interaction and Design Database within the UP.

13. Identify and Classify I/O & Understand the User Interface, List guidelines for designing user interfaces Document dialog designs, and Guidelines for designing windows, browser forms & web sites.

Course Outcomes:

Upon completion of this course, students should be able to:

1. Describe the object-oriented approach to system development, modeling objects, relationships and interactions.
2. Analyze business events and design the corresponding Use Case diagrams
3. Analyze business scenarios and design Domain Class Diagram
4. Analyze Use Case descriptions and Design activity diagrams and system sequence diagrams
5. Develop state chart diagrams to model object behavior

Syllabus :

Module-I

What Is Object-Orientation: Introduction, Basic Concepts, The Origins of Object-Orientation, Object-Oriented languages Today.
Modelling Concepts: Introduction, Models and diagrams, Drawing Activity Diagrams.

Module-III& III

Requirements Capture: Introduction, User Requirements, Fact Finding Techniques, User Involvement, Documenting Requirements, Use Cases, Requirements Capture and Modelling.
Requirements Analysis: Introduction, What Must a Requirements Model Do, Use Case Realization, The Class Diagram, Drawing a Class Diagram, CRC (Class Responsibility Collaboration) Cards, Assembling the Analysis Class Diagram.
Refining The Requirements Model: Introduction, Component-based Development, Adding Further Structure, Software Development Patterns.

Module-IV

Object Interaction: Introduction, Object Interaction and Collaboration, Interaction Sequence Diagrams, Collaboration Diagrams, Model Consistency.
Specifying Operations: Introduction, The Role of Operation Specifications, Contracts, Describing Operation Logic, Object Constraint Language, Creating an Operation Specification.

Module-V

Specifying Control: Introduction, States and Events, Basic Notation, Further Notation, Preparing a Statechart, Consistency Checking, Quality Guidelines, Summary.

Moving Into Design: Introduction, How is Design Different from Analysis, Logical and Physical Design, System Design and Detailed Design, Qualities and Objectives of Analysis and Design, Measurable Objectives of Analysis and Design, Measurable Objectives in Design, Planning for Design.

Module-VI

System Design: Introduction, The Major Elements of System Design, Software Architecture Concurrency, Processor Allocation, Data Management Issues, Development Standards, Prioritizing Design Trade-offs, Design for Implementation.

OBJECT DESIGN: Introduction, Class Specification, Interfaces, Criteria for Good Design, Designing Associations, Integrity Constraints, Designing Operations, Normalization.

Module-VII

Design Patterns: Introduction, Software Development Patterns, Documenting Patterns-Pattern Templates, Design Patterns, How to Use Design Patterns, Benefits and Dangers of Using Patterns. Designing Boundary Classes: Introduction, The Architecture of the Presentation Layer, Prototyping the User Interface, Designing Classes, Designing Interaction with Sequence Diagrams, The Class Diagram Revisited, User Interface Design Patterns, Modelling the Interface Using Statecharts.

Text Book:

1. S.Bennett, S.Mc Robb and R.Farmer – Object- Oriented Systems Analysis and Design Using UML 2nd edn, TMH, New Delhi – 2007.

Reference Books:

1. M.Blaha and J.Runbangh – Object- Oriented Modeling and Design with UML 2./e, Pearson Education, New Delhi,2007.
2. J.W. Satzinger, B.R. Jackson and S.D. Burd – Object –Oriented Analysis and Design, Thomson Learning, India Edition, 2007.
3. G. Booch – Object Oriented Analysis and Design with Applications,2/e, CA;Benjamin/Cumming,1994.

COURSE INFORMATION SHEET

Course code: IT 7031
Course title: **System Programming**
Pre-requisite(s):

Course Objectives:

1. Understanding the structure of a computer machine .
2. Introducing model of programming where the programming language exposes details of how the hardware stores and executes software .
3. Providing convenient environment for programming development and execution .
4. Building capacity to write programming for chip, cctv cameras, scanners, etc.

Course Outcome:

1. Understand in detail the system level and support required
2. Understand the issues involves in studying data and design distributed algorithms

Syllabus :

Module – I

Background : Introduction, System Software and Machine Architecture, The Simplified Instructional Computer (SIC), Traditional (CISC) machines, RISC Machines.

Module – II& III

Assemblers : Basic Assembler Functions, Machine – Dependent Assembler Features, Machine – Independent Assembler Features, Assembler Design Options, Implementation Examples.

Module – IV & V

Loaders and Linkers : Basic Loader Functions, Machine - Dependent Loader Features, Machine – Independent Loader Features, Loader Design Options, Implementation Examples.

Module – VI

Macro Processors : Basic Macro Processor Functions, Machine – Independent Macro Processor Features, Macro Processor Design Options, Implementation Examples.

Module – VII

Software Engineering Issues : Introduction to Software Engineering Concepts, System Specifications, Procedural System Design, Object – Oriented Design, System Testing Strategies.

Text Book :

1. L. L. Beck – System Software – An Introduction to Systems Programming, 3/e, Pearson Education, New Delhi, 2004

Reference Books:

2. J.J. Donovan – System Programming, McGraw Hill , New Delhi, 1993.

3. D.M. Dhamdhere – System Programming and Operating Systems, 2/e., Tata McGraw Hill , New Delhi, 2000

COURSE INFORMATION SHEET

Course code: IT 7033
Course title: **Web Technology**
Pre-requisite(s):

Course Objective:

The course on "Web Technology" is effectively designed so as to facilitate the following in students who successfully complete the course :-

1. Appreciate the importance of the web and visualize the fundamental functioning of web based programs.
2. Acquire a firm understanding of the available technologies for programming the web and a comparison with normal desktop programming.
3. Understand the design principles and techniques unique to web programming and their importance and relevance.
4. Have sufficient expertise in testing the survivability of a web program under severe load and techniques for measuring the load.

Course Outcomes :

1. To facilitate the learning outcomes from the course the design of the course introduces students .
2. The basic architectures found in web sites with brief introduction to n-tier architectures.
3. Available programming language choices from the established stables like .NET, PHP, Java etc .and their relative strengths and weaknesses. Students are also introduced to data access techniques and optimizations.
4. Web programming skills like handling of cookies, sessions, state management, style sheets, themes etc.
5. Web server architectures and features available to configure web servers for optimal performance under high load.

Syllabus :

Module-I

Web Essentials : Clients , Server and Communication, The Internet, Basic Internet Protocols , The World Wide Web , Http Request Message, HTTP Response Message , Web Clients , Web Servers . Markup Languages : XHTML 1.0 , Introduction to HTML ,History and Versions, Basic XHTML Syntax and Semantics, Some Fundamental HTML Elements , Relative URIs , List , Tables , Frames , Forms, Defining XHLML Abstract syntax : XML, Creating HTML Documents .

Module- II

Style Sheets : CSS , Introduction to Cascading Style Sheets and features , CSS Code Syntax , Style Sheets and HTML , Style Rule Cascading and Inheritance , Text Properties, CSS Box Model, Normal Flow Box Layout, Beyond the Normal Flow , Other useful style properties .

Module-III

Client – Side Programming : The Java Script Language , History and Introduction ,Java Script Perspective ,Basic Syntax , Variables and Data Types , Statements , Operators , Literals , Functions , Objects , Arrays , Build in Objects, Java Scripts Debuggers .

Module- IV

Host Objects : Browsers and the DOM, Introduction to Document Object Model , DOM History and Model, Intrinsic Event Handling , Modifying Elements Style, The Document Tree , DOM Event Handling .

Module- V

Server Side Programming : Java Servlet Architecture over view , Servelet generating Dynamic Content , Servlet life Cycle , Parameter Data , Session , Cookies , URL Rewriting , Other Servelet Capabilities , Data Storage , Servelets and Concurrency.

Module- VI

Representing Web Data : XML Documents , vocabularies, versions , declarations, Namespaces , Java Script and XML: AJAX, DOM based XML Processing , Event oriented Parsing :SAX, Transforming XML Documents

Module- VII

JSP Technology : Introduction JSP and Servlets , Running JSP Applications , JSP Basic , Java Beans classes and JSP, Tag Libraries and Files ,Support for Model View Controller Paradigm . Web Services : Concepts , Writing Java Web Services , Writing Java Web Service Client, Describing Web services : WSDL , Representing Data Types : XML Schema , Communication Object Data :SOAP

Text Book :

1. Web Technologies: A Computer Science Perspective , Jeffrey C Jackson , Pearson Education , India.
2. Reference Book : Web Technology by Uttam K. Roy , Oxford University Press 2010

COURSE INFORMATION SHEET

Course code: IT 7041
Course title: **Parallel And Distributed Computing 3 (3-0-0)**
Pre-requisite(s): Concept of mathematics (set theory, differential calculus etc.), Programming

Course Objectives :

1. To understand the concept of fuzzy logic and able to solve problems on fuzzy sets and fuzzy reasonings.
2. Students are expected to solve and develop fuzzy inference system.
3. To understand the concept of optimization technique and to solve problems using Genetic Algorithm.
4. Students are expected to understand the concepts of Artificial Neural Network.
5. Able to implement Neural Network model in various applications.

Syllabus:

Module -I

Fuzzy Set Theory: Basic Definition and Terminology, Set Theoretic Operations, MF Formulation and Parameterization, MF of two dimension, Fuzzy Union, Intersection and Complement.

Module -II

Fuzzy Rules and Fuzzy Reasoning :Extension Principles and Fuzzy Relations, Fuzzy IF THEN Rules, Fuzzy Reasoning.

Module –III

Fuzzy Inference System Introduction, Mamdani Fuzzy Models, Other Variants, Sugeno Fuzzy Models, Tekamoto Fuzzy Models.

Module –IV

Fundamentals of Genetic Algorithms: Basic Concepts Creation, Offsprings Encoding, Fitness functions, Reproduction, Genetic Modelling: Inheritance Operators, Cross over, Inversion and detection, Mutation operator, Bitwise operators.

Module -V

Introduction, Architecture, Back Propagation and feed Forward Networks, Offline Learning, Online Learning.

Module -VI

Supervised Learning of Neural Networks : Introduction, Perceptrons, Adaline, Back Propagation Multilayer Perceptrons, Back Propagation Learning Rules, Methods of Speeding. Radical Basis Function Networks, Functional Expansion Networks.

Module -VII

Unsupervised Learning :Competitive Learning Networks, Kohonen self-organising networks, Hebbian Learning, The Hopfield Network

Text Book :

1. J.S.R. Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing" PHI/Pearson Education, New Delhi 2004.
2. S. Rajasekaran& G.A. Vijayalakshmi Pai, PHI, New Delhi 2003

Reference Book:

1. T. J. Ross, " Fuzzy Logic with Engineering Applications." TMH, New York, 1997.

COURSE INFORMATION SHEET

Course code: IT 7043
Course title: **Compiler Design 3 (3-0-0)**
Pre-requisite(s):

Course Objectives :

1. An Understanding The Need Of Interface Between Users And Machine .
2. To Introduce The Major Concept Areas Of Language Translation And Compiler Design .
3. To Develop An Awareness Of The Function And Complexity Of Modern Compilers .
4. To Make User Friendly Interface Between Domains .
5. Enhancing Knowledge For Developing Tool For Natural Language Processing.

Course Outcomes :

1. To be able to understand the principles of compiler design.
2. To be familiar with the basic techniques of compiler design.

Syllabus

Module-I

Introduction to Compiling, Analysis of the source program, The phases of the compiler, Lexical Analysis, The role of the lexical analyzer, Tokens, Patterns, Lexemes, Input buffering, Specifications of a token, Recognition of a tokens, Finite automata, From a regular expression to an NFA, From a regular expression to NFA, From a regular expression to DFA, Design of a lexical analyzer generator.

Module-II & III

Syntax Analysis, The role of a parser, Context free grammars, Writing a grammar, Top down Parsing, Non-recursive Predictive parsing (LL), Bottom up parsing, Operator precedence parsing, LR parsers (SLR, LALR), Parser generators (YACC).

Module-IV

Syntax directed translation, Syntax director definitions, Construction of syntax trees, Bottom-up evaluation of S attributed definitions, L attributed definitions, Bottom-up evaluation of inherited attributes.

Module-V

Type checking, Specification of a simple type checker, Equivalence of type expressions, Type conversions, Run time environments, Storage allocation strategies, Parameter passing (call by value, call by reference, copy restore, call by name), Symbol tables, dynamic storage allocation techniques.

Module-VI

Intermediate code generation, Intermediate languages, Graphical representation, Three-address code, Implementation of three address statements (Quadruples, Triples, Indirect triples).

Module-VII

Code optimization, Basic blocks & flow graphs, Transformation of basic blocks, DAG, representation of basic blocks, The principle sources of optimization, Loops in flow graph, Code generations, Issues in the design of code generator, a simple code generator, Register allocation & assignment.

Text Book:

1. Aho, Sethi, Ullman - “Compiler Principles, Techniques and Tools” - Pearson Education, New Delhi, 2007.

Reference Book:

1. Holub - “Compiler Design in C” – PHI, New Delhi, 2004

Course code: IT 8025
Course title: **Enterprise Resource Planning**
Pre-requisite(s): General knowledge of computer

Course Objectives:

1. To know the evolution of ERP.
2. To understand the key implementation issues of ERP.
3. To know the different business modules of ERP.
4. To be aware of some popular products in the area of ERP.
5. To appreciate the future trends in ERP.
6. To know other related technologies which helps business.

Course Outcomes:

Can appreciate the evolution of the business requirement of ERP:

1. Will be aware of the ERP implementation issues.
2. Will have domain knowledge of ERP modules.
3. Will know some popular ERP products.
4. Will know different other software product categories used by current businesses.

Syllabus:

Module - I

Introduction to ERP : Evolution of ERP, What is ERP, Reasons for the growth of the ERP market, Advantages of ERP, Reasons of Failure.

Module - II

Enterprise- An overview : Integrated Management information, Business Modeling, Integrated Data Model.

Module- III

ERP and Related Technologies : BRP (Business Process Reengineering), MIS (Management Information System), DSS (Decision Support System), EIS (Executive Information system), Data Warehousing, Data Mining, OLAP, Supply Chain Management.

Module - IV

A Manufacturing Perspective : ERP, CAD/CAM, Material Requirement Planning, Bill of Material, Closed loop MRP, MRP-II, Distributed Requirement Planning, JIT and Kanban, Product Data Management, Benefit of PDM, Data Management, Market to Order, Market to Stock, Assemble to order, Engineer to order, Configure to order.

Module -V

ERP Modules: Finance, Sales and distribution, Manufacturing, Human Resources, Plant Maintenance, Quality Management, Material Management.

Module - VI

Benefits of ERP :
ERP Market : SAP, BAAN, Oracle Corporation, People Soft.
ERP Implementation Life Cycle : Different phases of ERP implementation

Module - VII

Vendors, Consultants & Users's : In – house Implementation – pros & cons, Vendors, Consultants, End-users.
Future Directions in ERP: New Markets, New channels, Faster Implementation methodologies, Business Models and BAPIs, New business segments, Web enabaling
ERP Case Studies.

Text Book :

1. Alexis Leon - Enterprise Resource Planning, TMH, New Delhi 2001.

Reference Book:

1. E. Monk & B. Wagner – Concepts in Enterprise source planning, 2/e, Thomson Learning, India Edition 2007.

COURSE INFORMATION SHEET

Course code: IT 8027
Course title: **Decision Support Systems**
Pre-requisite(s): General knowledge of computer

Course Objectives:

1. Understand the foundations of Decision Support Systems (DSS).
2. To know the concept of information systems and its evolution and to classify DSS into various forms.
3. To have a clear understanding of various information system models and its analysis.
4. Understand the concepts of business intelligence.

5. To learn various methodologies for the development of different types of decision support systems.
6. To have an understanding of knowledge acquisition, representation and reasoning.
7. To understand the application of DSS in various engineering disciplines.
8. OUTCOMES:
9. To be able to understand the principles of decision support systems
10. To be familiar with the basic techniques of decision support systems

Syllabus :

Module-I

DSS Defined, history of DSS , Ingredients of a DSS, Data and Model Management, DSS Knowledge Base, User Interfaces, The DSS User, Categories and classes of DSSs.

Module-II

Decision Makers :who are they?, decision Styles, decision Effectiveness, how can a DSS help?, why are decision So hard?, A typology of decisions, decision theory and simon's model of problem solving, rational decision making, bounded rationality ,the process of choice, Cognitive Processes, biases and heuristics in decision making, effectiveness and efficiency.

Module-III

Understanding the organization, Organizational Culture, power and politics, supporting organizational Decision making, defining the problem and its structure, decision models, types of probability, techniques for forecasting probabilities calibration and sensitivity.

Module-IV

Group decision making, the problem with groups ,MDM support technologies, managing MDM activities, the virtual workplace, What Exactly is an EIS?, EIS history, EIS components, making the EIS work, the future of executive decision making and the EIS.

Module-V

The concepts of expertise, the intelligence of AI, the concepts and structure of expert systems, designing and building Expert Systems, evaluating the benefits of expert systems.

Module-VI

The concept of knowledge, knowledge Acquisition for expert systems, validating and verifying the knowledge base, Fuzzy logic and artificial neural networks, genetic algorithms , Application of machines that learn.

Module-VII

Stores, warehouses, and Marts, the data Warehouse Architecture, data have data-the metadata, interviewing the data-metadata extraction, implementing the data warehouse, data ware house technologies, the future of data warehousing.

Text Book:

1. George M. Markas, Decision support Systems in the 21st Century, 2nd edition, Pearson Education 2005.

Reference Book:

1. E. Turban, J.E. Aronson & T.P.Liang- Decision Support Systems and Intelligent Systems, 7/e, Pearson Education, New Delhi- 2006.

COURSE INFORMATION SHEET

Course code IT 8029
Course title: **Embeded Systems**
Pre-requisite(s): Basic Electronics

Course Objectives:

1. To introduce students to the embedded systems, processor and IC technology.
2. To understand the concept of combinational and sequential logic.
3. To explain programming concepts and to understand the concepts of general purpose processor design.
4. To introduce the working of peripherals and there interfacing.
5. To understand the design trade offs made by different models of embedded systems.

Course Outcomes:

1. To be familiar with modern hardware/software tools for building prototypes of embedded systems.
2. To be able to design and implement an embedded system.
3. Will have domain knowledge of memory, peripherals and interfacing.
4. To create trained graduates who will be leaders in semiconductor industry.
5. To produce professionals who will be able to conduct research in embedded systems.

Syllabus

Module - I

Introduction :Embedded systems overview, Design challenge, Processor technology, IC technology, Design Technology, Trade offs

Module - II

Custom Single-purpose processors: Hardware :Introduction, Combinational Logic, Sequential logic

Module -III

General-purpose processors: Software :Introduction, Basic architecture, Operation, Development environment, Application-specific instruction-set processors (ASIP's), Selecting a microprocessor, General-purpose processor design

Module - IV

Standard single-purpose processors: Peripherals : Introduction, Timers, counters, and watchdog timers, UART, Pulse width modulator, LCD controller, Keypad controller, Stepper motor controller, Analog-digital converters, Real-time clocks.

Module - V

Memory : Introduction, Memory write ability and storage permanence, Write ability, Storage permanence, Common memory types, Composing memories, Memory hierarchy and cache, Advanced RAM

Module - VI

Interfacing: Introduction, Communication basics, Microprocessor interfacing: I/O addressing, Microprocessor interfacing: interrupts, Microprocessor interfacing: Direct memory access, Arbitration, Multi-level bus architectures, Advanced communication principles, Serial Protocols, Parallel protocols, Wireless protocols

Module - VII

State machine and concurrent process models : Introduction, Models vs. languages, text vs. graphics, A basic state machine model: finite-state machines (FSM), Finite-state machines with data path model: FSMD, Using state machines, Hierarchal/Concurrent state machine model (HCFSM) and the State charts language, Program-state machine model (PSM), The role of an appropriate model and language, Concurrent process model, Concurrent processes, Communication among processes, Synchronization among processes, Implementation, Data flow model, Real-time systems,

Text Book:

1. Embedded System Design: A Unified Hardware/Software Introduction by Frank Vahid and Tony Givargis, John Wiley & Sons 2002

COURSE INFORMATION SHEET

Course code IT 8031
Course title: **Pattern Recognition**
Pre-requisite(s): Discrete Mathematics

Course Objectives:

1. 1. To teach the essentials behind the methods and also the potential of developing new techniques.
2. 2. To present in a unified way used techniques and methodologies for Patter Recognition.
3. 3. To teach how to apply in image analysis, speech and audio recognition, biometrics, bioinformatics, data mining and information retrieval.
4. Emphasis on most generic of the methods those are currently available.
5. Emphasis on real life case studies.
6. 6. Teach corpus of techniques that can be used in extracting from the available data,information related to data categories, important hidden patterns and trends.

Course Outcomes:

1. The computer application to different areas of real problems.
2. How to classify the objects using Priori knowledge.
3. Character recognition in automation and information handling.
4. Computer aided diagnosis aiming at assisting doctors in making diagnostic decisions.
5. Building intelligence machines for speech recognition, data mining and biomedical applications.

Syllabus:

Module – I

Pattern Recognition Overview : Overview, Pattern Recognition, Classification and Description, Patterns and Feature Extraction, Training and Learning in PR Systems, Pattern Recognition Approaches.

Module – II

Statistical Pattern Recognition : Introduction, The Gaussian case and Class Dependence Discriminate Functions, Extensions, Classifier Performance, RISK and Errors.

Module – III

Supervised Learning : Parametric Estimation and Supervised Learning, Maximum Likelihood Estimation Approach, Bayesian Parameter Estimation Approach, Non – Parametric Approaches, Parzen Windows, K-nn Non-Parametric Estimation. Nearest Neighbour Rule.

Module – IV

Linear Discriminate Functions and The Discrete and Binary Feature Cases : Introduction, Discrete and Binary Classification Problems, Techniques to Directly Obtain Linear Classifiers.

Module – V&VI

Syntactic Pattern Recognition : Overview Quantifying Structure in Pattern Description and Recognitions, Grammar Based Approach and Application, String Generation as Pattern Description.Recognition by String Matching and Parsing. The Cocke-Younger Kasami ((ck) parsing algorithm.

Module – VII

Neural Pattern Recognition: Introduction to Neural Networks, Neural Network Structure from Pattern Recognition Applications. Physical Neural Network. The Artificial Neural Network Model, Neural Network Based Pattern Associators.

Text Book :

1. Robort Schalkoff - Pattern Recognition, Statistical, Structural and Neural Approach, John Wiley, Indian Edition, 200.

Reference Book :

1. R. U. Duda – Pattern Classification, John Wiley, Indian Edition, 2006.

COURSE INFORMATION SHEET

Course code IT 8033
Course title: **Computing And Complexity Theory**
Pre-requisite(s): Computer Algorithms

Course Objectives:

1. Discuss the concept of finite state machines and familiar.
2. Design a deterministic finite state machine to accept a specified language.
3. Generate a regular expression to represent a specified language.
4. Explain why the halting problem has no algorithmic solution.
5. Design a context-free grammar to represent a specified language.
6. Define the classes P and NP. Explain the significance of NP-completeness.

Course Outcomes:

1. How to apply these in computer problems.
2. Do a priori analysis of algorithms.
3. Test all kind of scenarios for the Turing machine.
4. To devolves the knowledge on decidable languages.
5. Able to reduce and map complex problems to simple problems.

Syllabus :

Module - I

The Church- Turing Thesis : Turing Machines- Formal definition of a Turing machine, Examples of Turing machines; Variants of Turing Machines- Multitape Turing machines, Nondeterministic Turing machines, Enumerators, Equivalence with other models; The Definition of Algorithm- Hilbert's problems, Terminology for describing Turing machines.

Module - II

Decidability : Decidable Languages- Decidable problems concerning regular languages, Decidable problems concerning context-free languages; The Halting Problem- The diagonalization method, The halting problem is undecidable.

Module - III

Reducibility: Undecidable Problems from Language Theory- Reductions via computation histories; A Simple Undecidable Problem; Mapping Reducibility-Computable functions, formal definition of mapping reducibility.

Module – IV

Advanced Topics In Computability Theory:- The Recursion Theorem, Self-reference, Terminology for the recursion theorem, applications; Decidability of logical theories- A decidable theory, An undecidable theory; Turing Reducibility; A Definition of Information- Minimal length descriptions, Incompressible strings and randomness.

MODULE – V&VI

Time Complexity: Measuring Complexity- Big-O and small-o notation, Analyzing algorithms, Complexity relationships among models; The Class P- Polynomial time, Examples of problems in P; The Class NP- Examples of problems in NP, The P versus NP question; NP-completeness- Polynomial time reducibility, Definition of NP-completeness, The Cook-Levin Theorem; Additional NP-complete Problems- The vertex cover problem, The Hamiltonian path problem, The subset sum problem.

Module - VII

Space Complexity: Savitch's Theorem, The Class PSPACE, PSPACH-completeness – The TQBF problem, Winning strategies for games, Generalized geography; The Classes L and NL, NL-completeness- Searching in graphs; NL equals coNL.

Text Book:

1. Michael Sipser – Introduction to the Theory of Computation, 2/e, Thomson Learning – India Edition 2006.

Reference Books:

1. R.G.Taylor – Models of Computation and Formal Languages, Oxford University New York, 1998.
2. 2. B.M. Moret – The Theory of Computation , Pearson Education, New Delhi 2002.

COURSE INFORMATION SHEET

Course code IT 8035
Course title**: Software Reliability And Testing**
Pre-requisite(s): Software Engineering

Course Objectives:

1. Illustrate the importance, objectives, principles and limitations of software testing.
2. Discuss the need for test case design, two broad approaches for it and the .
3. commonly used white-box and black-box techniques for designing test cases.
4. Evaluates the aspects involved in planning for software testing and in selecting the Test strategy for a software project.
5. Understands the testing process, driven either by legal or financial requirements can be expensive and may thwart the planned deployment of the application.

Course Outcomes:

1. Appreciate the fundamentals of software testing and its application through the software Life cycle.
2. Appreciate the role of software testing in systems development, deployment and Maintenance.
3. Demonstrate a given software product matching its requirement specifications.
4. Validate the quality of software testing using the minimum cost and efforts.
5. Able to apply various software metrics and how they relate to testing.

Syllabus :

Module – I

Introduction : Software Reliability & Hardware Reliability, Basic Concepts, Availability, Modeling.

Module – II

Selected Models : Execution Time Component, Calendar Time Component, Model Choice.

Module - III

Applications : System Engineering, Project Management, Management of Operational Phase, Evaluation of S/W Engg. Technologies.

Module – IV

System Definition : Failure definition, System Configuration, Text Run Selection.

Module – V

Parameter Determination : Execution Time Component, Calendar Time Component.

Module – VI&VII

Project Specific Techniques : Unobserved Failures, Failure Time Measurement, Evolving Programs, Changes in Environment, Other Consideration.

Text Book :

1. J. D. Musa, et.al - Software Reliability: Measurement, Prediction & Application, Mc-Graw Hill, New York.

Reference Books:

1. Hoang. Pham, et.al - Software Reliability and testing, IEEE Computer Society press.
2. Glenford J. Myers, Tom Badgett, Todd M. Thomas, Corey Sandler - The art of software testing, John Wiely & Sons, Inc.

COURSE INFORMATION SHEET

Course code IT 8037
Course title**:** Distributed Database System
Pre-requisite(s): Database Systems

Course Objectives:

1. to understand the structure of databases distributed over the network.
2. to understand the benefits and drawbacks of databases distributed over the network.
3. to understand how to create a distributed database using horizontal fragmentation.
4. to understand how to create a distributed database using vertical fragmentation.
5. to understand the concept of replication and allocation and rules used to replicate and allocate data.
6. to understand how transaction processing is carried out in a distributed environment.
7. to understand how concurrency control is performed in a distributed environment.
8. to understand fault tolerance and reliabilty of database.

Course Outcomes:

1. learn the details about architecture of distributed database.
2. learn how to design a distributed database for any environment using horizontal and vertical fragmentation.
3. learn how transactions are taken care of in a distributed environment.
4. learn about rules and protocols used in concurrent access of a distributed database.
5. learn about reliability of databases.

Syllabus :

Module – I

Introduction: Distributed Data Processing ,Promises of DDBs ,Complicating Factors, Problem areas. Distributed DBMS Architecture : DBMS Standardization , Architectural Models for Distributed DBMS s, Distributed DBMS Architecture.

Module – II

Distributed Database Design: Alternative Design Strategies, Distribution design issues, Fragmentation, Allocation. Semantic Data Control : View management, Data security, Semantic Integrity control.

Module-III

Overview of Query Processing: Query Processing Problem ,Objective of Query Processing , Complexity of Relational Algebra operations , Characterization of Query Processing , Layers of Query Processing.

Module- IV

Query Decomposition and Data Localization : Query Decomposition , Localization of Distributed Data, Optimization of Distributed Queries : Query optimization , Centralized Query optimization , Join ordering in fragment Queries , Distributed Query Optimization Algorithms.

Module – V

Introduction to Transaction Management: Definition of Transaction , Properties of Transactions, Types of Transactions .

Distributed Concurrency Control : Serializability Theory , Taxonomy of Concurrency Control Mechanisms, , Locking Based Concurrency control Algorithm , Time Stamp based concurrency control Algorithms, Optimistic Concurrency Control Algorithms ,Dead Lock management, RELAXED Concurrency Control.

Module – VI

Distributed DBMS Reliability: Reliability Concepts and Measures , Failures and Fault Tolerance in Distributed systems, Failures in Distributed DBMS, Local Reliability Protocols , Distributed Reliability Protocols, Dealing with Site Failures, Network Partitioning.

Module – VII

Parallel Database Systems : Data Base Servers , Parallel Architectures , Parallel DBMS Techniques , Parallel Execution Problems , Parallel Execution for Hierarchical Architecture.

Text Book:

1. M. Tamer Ozsu, Patrick Valduriez , S.Sridhar - Principles of Distributed Database Systems 2nd Edn., Pearson Education Asia,2001.

Reference Book :

1. Stefano Ceri , Guiseppe Pelagatti ,- Distributed Databases Principles and Systems Tata McGraw-Hill Edition 2008

COURSE INFORMATION SHEET

Course code IT 8039
Course title**: Computer Graphics And Multimedia**
Pre-requisite(s): Computer Graphics

Course Objectives:

1. To know different uses and applications of computer graphics. I
2. To know different display devices and computer graphics architectures. I
3. To understand principles of scan conversion. I
4. To understand different geometric transformations and curve generation. I
5. To understand principles of multimedia. I, VII

Course Outcomes:

1. To be able to utilise information on computer display and basic drawing.
2. To be able to apply geometric transformation
3. To be able to use curves for design.
4. To be able to generate realistic drawing.
5. To be able to use multimedia in application

Syllabus :

Module- I

Introduction to computer graphics & graphics systems, Overview of computer graphics, representing pictures, preparing, presenting & interacting with pictures for presentations; Visualization & image processing; RGB color model, direct coding, lookup table; storage tube graphics display, Raster scan display,3D viewing devices, Plotters, printers, digitizers, Light pens etc.; Active & Passive graphics devices; Computer graphics software.

Module- II

Scan conversion: Points & lines, Line drawing algorithms; DDA algorithm, Bresenham's line algorithm, Circle generation algorithm; Ellipse generating algorithm; scan line polygon, fill algorithm, boundary fill algorithm, flood fill algorithm.

Module- III & IV

2D transformation & viewing, Basic transformations: translation , rotation, scaling ; Matrix representations & homogeneous coordinates, transformations between coordinate systems; reflection shear; Transformation of points, lines , parallel lines, intersecting lines. Viewing pipeline, Window to view port co-ordinate transformation , clipping operations , point clipping , line clipping, clipping circles , polygons & ellipse.

3D transformation & viewing

3D transformations: translation, rotation, scaling & other transformations. Rotation about an arbitrary axis in space, reflection through an arbitrary plane; general parallel projection transformation; clipping, view port clipping, 3D viewing.

Module- V & VI

Curves, Curve representation, surfaces , designs , Bezier curves , B-spline curves, end conditions for periodic B-spline curves, rational Bspline curves.

Hidden surfaces, Depth comparison, Z-buffer algorithm, Back face detection, BSP tree method, the Printer's algorithm, scan-line algorithm; Hidden line elimination, wire frame methods , fractal - geometry.

Color& shading models, Light &color model; interpolative shading model; Texture;

Module- VII

Multimedia: Introduction to Multimedia: Concepts, uses of multimedia, hypertext and hypermedia.; Image, video and audio standards. Audio: digital audio, MIDI, processing sound, sampling, compression. Video: MPEG compression standards, compression through spatial and temporal redundancy, inter-frame and intra-frame compression . Animation: types, techniques, key frame animation, utility, morphing. Virtual Reality concepts.

Text Books:

1. Hearn, Baker – " Computer Graphics (C version 2nd Ed.)" – Pearson education, New Delhi, 2001
2. Buford J. K. – "Multimedia Systems" – Pearson Education, New Delhi, 2001
3. Andleigh&Thakrar, Multimedia, PHI, New Delhi, 2004.

Reference Books:

1. D. F. Rogers, J. A. Adams – " Mathematical Elements for Computer Graphics (2nd Ed.)" – TMH, New Delhi
2. Mukherjee, Fundamentals of Computer graphics & Multimedia, PHI, New Delhi, 2001
3. Foley, Vandam, Feiner, Hughes – "Computer Graphics principles (2nd Ed.) – Pearson Education, New Delhi, 2006
4. 4.Elsom Cook – "Principles of Interactive Multimedia" – McGraw Hill, New Delhi, 2001

COURSE INFORMATION SHEET

Course code IT 8041

Course title**: Information System Project Management**

Pre-requisite(s): Software Engineering

Pre-requisites:

Course Objectives:

1. Understand different information system.
2. Define and highlight importance of software project management.
3. Describe the software project management activities.
4. Provide training in software project planning, tracking, risk assessment and oversight in the implementation of the software project.

Course Outcomes:

1. To be able to conceptualize information system requirement.
2. To be able to develop and maintain a project management plan (PMP).
3. To be able to track and control project execution through collecting artifacts and metrics .

Syllabus:

Module – I

Information Systems: Information as a resource, Concept of Information System, Components of Information Systems and their roles. Types of Information System. Information Economy.

Module - II

Introduction to Project Management: Project –Definition and Characteristics. Projects as Systems, Project Entities, The Information Systems Project Environment, Primary Reasons for Information Systems Project Failure, Perceptions of Project Success

Module - III

Project Adoption: Project Selection and Approval - Measurement of Project Effect, Selection Practice , Project Evaluation Techniques , Information Systems Project Approval , Cost/Benefit Analysis, Value Analysis, Multiple Objectives, Budget Optimization
Requirements Analysis: Analysis of User Needs, Methods of Elicit User Requirements
Risk Identification and Analysis.

Module - IV

System Development: Overview of Analysis and Design Methods, Software Development Standards , Information Systems Project Types , System Development Approach
Estimation: Planning Process, Software Estimation , Planning for Change.

Module - V

Quantitative Project Scheduling Methods : The Critical Path Method , Project Crashing , Resource Leveling , Resource Smoothing , Critical Path Criticisms
Probabilistic Scheduling Models: PERT , Simulation for Project Scheduling

Module - VI

Implementation: Project Organization: Alternate Organization Structures, Comparison of Organizational Structures in Projects , Levels of Project Organization
Project Implementation : Information Systems Project Success , Company- Wide Information System , Information Systems Project failure , Information Technology Failure , Critical Success Factors , Quality Control in Project Implementation , User Involvement in Project Implementation , Integrated Requisitioning System

Module - VII

Project Control and Assessment: Project Control Failures, Risk Management, The Control Process and Project Evaluation

Text Book:

1. David L . Olson : "Introduction to Project Management" Irwin McGraw – Hill, 2001

COURSE INFORMATION SHEET

Course code IT 8043
Course title**: Distributed Systems**
Pre-requisite(s): Operating System

Course Objectives:

1. At the end of the course, students will be able to
2. understand the need for concurrency control in operating systems and applications, both mutual exclusion and condition synchronisation
3. understand how multi-threading can be supported and the implications of different approaches
4. be familiar with the support offered by various programming languages for concurrency control and be able to judge the scope, performance implications and possible applications of the various approaches
5. be aware that dynamic resource allocation can lead to deadlock
6. understand the concept of transaction; the properties of transactions, how concurrency control can be assured and how transactions can be distributed
7. understand the fundamental properties of distributed systems and their implications for system design
8. be familiar with a range of distributed algorithms

9. understand the effects of large scale on the provision of fundamental services and the tradeoffs arising from scale

Course Outcomes:

1. To be able to understand the principles of modern telecommunication system.
2. To be familiar with the basic techniques modern telecommunication system.

Syllabus:

Module-I

Characterization of Distributed Systems : Introduction, Examples of distributed systems, Resource sharing and the Web, Challenges.

System Models : Introduction, Architectural models, Fundamental models, Summary.

Module-II

Networking and Internetworking : Introduction, Types of network, Network Principles, Internet protocols, Case studies: Ethernet, WiFi, Bluetooth and ATM.

Module-III

Interprocess Communicaion : Introduction, The API for the Internet protocols, External data representation and marshalling, Client-server communication, Group communication, Case study interprocess communication in UNIX.

Module-IV

Time and Global States : Introduction, Clocks, events and process states, Synchronizing physical clocks, Logical time and logical clocks, Global states, Distributed debugging.

Coordination and Agreement : Introduction, Distributed mutual exclusion, Elections, Multicast communication.

Module-V

Transactions and Concurrency Control : Introduction, Transactions, Nested transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Module-VI

Distributed Transactions : Introduction, Flat and nested distributed transactions, Atomic commit protocols, Concurrency control in distributed transactiuons. Distributed deadlocks, Transactions recovery.

Module-VII

Replication : Introduction, System model and group communication, Fault-tolerant services, Case studies of highly available services : the gossip architecture, Bayou and Coda, Transaction with replicated data.

Text Book:

1. G. Coulouris et. al. - Distributed Systems : concepts and Design, 4/e, Pearson Education, New Delhi.

COURSE INFORMATION SHEET

Course code IT 8045
Course title**: Advanced Computer Graphics**
Pre-requisite(s): Computer graphics

Course Objectives:

1. To know different curve and mesh representation.
2. To know different colour and illumination rmodels.
3. To understand various approaches toward virtual reality.
4. To understand advances architectures in computer graphics.

Course Outcomes:

1. To be able to participate computer graphics application development
2. To pursue further research in the field of computer graphics.
3. To be able to pursue career in computer graphics software development.

Syllabus:

Module-I

Representing Curves and Surfaces : Polygon Meshes, Parametric Cubic Curves, Parametric Bicubic Surfaces, Quadratic Surfaces.

Module-II

Achromatic and Colored Light Achromatic Light, Chromatic Color, Color Models for Raster Graphics, Reproducing color, Using Color in Computer Graphics.

Module-III

The Quest for Visual Realism Why Realism, Fundamental Difficulties, Rendering Techniques for Line Drawings, Rendering Techniques for Shaded Images, Improved Object Model, Dynamics, Stereopsis, Improved Displays, Interacting with Our Other Senses, Aliasing and Antialiasing.

Module-VI

Visible-Surface Determination : Functions of Two Variables, Techniques for Efficient Visible-Surface Algorithms, Algorithms for Visible-Line Determination, The z-Buffer Algorithm, List Priority Algorithms, Scan-Line Algorithms, Area-Subdivision Algorithms, Algorithms for Octrees, Algorithms for Curved Surfaces, Visible-Surface Ray Tracing.

Module-V

Illumination and Shading : Illumination Models, Shading Models for Polygons, Surface Detail, Shadows, Transparency, Interobject Reflections, Physically Based Illumination Models, Extended Light Sources, Spectral Sampling.

Module-VI

Advanced Raster Graphics Architecture : Simply Raster-Display System, Display-Processor Systems, Standard Graphics Pipeline, Introduction to Multiprocessing, Pipeline Front-End Architectures, Parallel Front-End Architectures, Multiprocessor Rasterization Architectures.

Module-VII

Advanced Geometric and Raster Algorithms : Clipping, Scan-Converting Primitives, Antialiasing, The Special Problems of Text, Filling Algorithms, Making copyPixel Fast, The Shape Data Structure and Shape Algebra.

Text Book:

1. J.D. Foley et. al. – Computer Graphics Principles & Practical 2/e , Pearson Education, New Delhi, 2004.

Course code IT 8047
Course title**: Real Time Systems**
Pre-requisite(s): Operating Systems

Course Objectives:

1. To understand the basics of hardware design, advance concepts in software design and validation techniques for real time systems.
2. To study the operating system issues & scheduling tasks.
3. To know the communication protocols.
4. To study the failure management algorithms.
5. Discusses synchronization clock.
6. Be able to familiar fault tolerance and architectural issues.
7. To understand the concept of processor architecture,network and architecture.

Course Outcomes:

1. Demonstrate an understanding of the characteristics of real-time systems and the key issues and challenges in the design of real-time software, including meeting deadlines, execution predictability, and space, energy limitations.
2. Apply the development methodology for real-time systems and compute the trade offs between hard and soft real-time systems.
3. Gain experience with schedule validation techniques and how these techniques differ between hard and soft deadlines in real-time systems.
4. Evaluate the timing, synchronization and fault tolerance issues of real-time software development.

Syllabus

Module-I

Basic Real-Time Concepts: Terminology, Real-Time System Design Issues, Example Real-Time Systems, Common Misconceptions, Brief History.

Module-II

Hardware Considerations: Basic Architecture, Hardware Interfacing, Central Processing Unit, Memory, Input/Output, Enhancing Performance, Other Special Devices, Non-von-Neumann Architectures.

Module-III

Real-Time Operating Systems: Real-Time Kernels, Theoretical Foundations of Real-Time Operating Systems, Intertask Communication and Synchronization, Memory Management, Case Study: POSIX.

Module-IV

Software Requirements Engineering: Requirements-Engineering Process, Types of Requirements, Requirements Specification for Real-Time Systems, Formal Methods in Software Specification, Structured Analysis and Design, Object-Oriented Analysis and the Unified Modeling Language,

Organizing the Requirements Document, Organizing and Writing Requirements, Requirements Validation and Review.

Module-V

Software System Design: Properties of Software, Basic Software Engineering Principles, The Design Activity, Procedural-Oriented Design, Object-Oriented Design, Appendix: Case Study in Software Requirements Specification for Four-Way Traffic Intersection Traffic Light Controller System.

Module-VI

Programming Languages And The Software Production Process: Introduction, Assembly Language, Procedural Languages, Object-Oriented Languages.

Module-VII

Performance Analysis And Optimization: Theoretical Preliminaries, Performance Analysis, Application of Queuing Theory, I/O Performance, Performance Optimization.

Text Book:

1. Phillip A. Laplante- Real-Time Systems: Design and Analysis, John Wiley- India Edition, 2006.

Reference Books:

1. Rajib Mall- Real Time Systems; Theory and Practice, Pearson Edition, New Delhi- 2007.
2. J.W.S.Liu – Real Time Systems, Pearson Education, New Delhi – 2004.
3. C.M.Krishna & K.G. Shiv – Real Time Systems, Mc Graw Hill – 1997.

COURSE INFORMATION SHEET

Course code IT 8049
Course title**: Modern Telecommunication Systems**
Pre-requisite(s): Data Communications, Computer Networks

Course Objectives:

1. To understand the role of modern telecommunication system.

2. To have a complete understanding of intricacies of modern telecommunication system.

Course Outcomes:

1. To be able to understand the principles of modern telecommunication system.
2. To be familiar with the basic techniques modern telecommunication system.

Syllabus:

Module – I & II

Introduction to Switching System : General principles of switching , signaling and control, stored program control concepts, Space Division and Time Division switching, 2 -, 3- , and n – stage networks, Blocking and Non – Blocking switching, Digital Exchange (basic concept only).

Module – III

ISDN & ATM : ISDN user interface, architecture and user access, ISDN channels. B – ISDN, concepts of ATM and user – network Interface. Brief descriptions and functions of different layers of ATM protocol.

Module – IV & V

Mobile Cellular telecommunications : Basic Cellular systems, components and operation of Cellular systems , mobile propagation and fading, co channel and adjacent channel interferences , frequency reuse channels, near - end - interferences , Handoff . Channel assignment and frequency assignment . spread Spectrum technique , Multiple Access Techniques : Introduction to FDMA, TDMA & CDMA.

Module – VI & VII

Mobile Antennas : Antenna parameters (Gain , Directivity , Efficiency , Effective Aperture etc.) and radiation characteristics . Qualitative description of Dipole antenna, LP antenna , Discone antenna , Helical antenna , Horn antenna , Patch and slot antenna . PIFA. Characteristics of cell site and mobile antennas .

Text Books :

1. T. Vishwanathan - Telecommunication Switching Systems and Networks - PHI, 2/e, New Delhi, 2002
2. Roy Blake - Wireless Communication Technology ,Thomson Asia Pvt. Ltd , Singapore 2002.
3. W.C.Y. Lee - Mobile Cellular telecommunications - Mc Graw – Hill Int. Edition,Singapore, 1995.

COURSE INFORMATION SHEET

Course code IT 8051
Course title**: Neural Networks & Applications**
Pre-requisite(s): Soft Computing

Course Objectives:

1. To understand the basics of neural networks.
2. To simulate Biological neurons with artificial neurons.
3. To develop pattern classification using different types of neural nets.
4. To understand different types of learning methods, such as supervised, unsupervised and reinforcement learning.
5. Understand the different training mechanisms.

Course Outcomes:

1. Ability to understand basic neural networks(NN), a new approach for modeling, formulating, and solving problems.
2. Develop Networks of neuron-like units and extensive inter-unit connections have shown impressive performance in applications in various fields such as pattern analysis, nonlinear control, combinatorial optimization, and knowledge acquisition.
3. Analysis and design of different nets for classification and recognition.

4. An ability to design multilayer perceptions.
5. Ability to develop recurrent networks.

Syllabus :

Module - I

Recurrent Networks And Temporal Feedforward Networks: Introduction , Overview of Recurrent Neural Networks, Hopfield Associative Memory , Simulated Annealing, Boltzmann Machine , Overview of Temporal Feedforward Networks, Simple Recurrent Network, Time-Delay Neural Networks, Distributed Time-Lagged Feedforward Neural.

Module - II

Neural Networks For Optimization Problems : Introduction, Neural Networks for Linear Programming Problems, Neural Networks for Quadratic Programming Problems, Neural Networks for Nonlinear Continuous Constrained Optimization Problems.

Module - III

Solving Matrix Algebra Problems With Neural Networks: Introduction, Inverse and Pseudoinverse of a Matrix , LU Decomposition, QR Factorization, Schur Decomposition, Spectral Factorization-Eigenvalue Decomposition (EVD)(Symmetric Eigenvalue Problem), Neural Network Approach for the Symmetric Eigenvalue Problem.

Module – IV&V

Solution Of Linear Algebraic Equations Using Neural Networks: Introduction, Systems of Simultaneous Linear Algebraic Equations, Least-Squares Neurocomputing Approach for Solving Systems of Linear Equations, Conjugate Gradient Learning Rule for Solving Systems of Linear Equations, A Generalized Robust Approach for Solving Systems of Linear Equations Corrupted with Noise, Regularization Methods for Ill-Posed Problems with Ill-Determined Numerical Rank, Matrix Splittings for Iterative Discrete-Time Methods for Solving Linear Equations.

Module - VI

Statistical Methods Using Neural Networks: Introduction, Principal-Component Analysis, Learning Algorithms for Neural Network Adaptive Estimation of Principal Components, Principal-Component Regression, Partial Least-Squares Regression, A Neural Network Approach for Partial Least-Squares Regression.

Module- VII

Identification, Control, And Estimation Using Neural Networks: Introduction, Linear System Representation, Autoregressive Moving Average Models , Identification of Linear Systems with ARMA Models, Parametric System Identification of Linear Systems Using PLSNET, Nonlinear System Representation, Identification and Control of Nonlinear Dynamical.

Text Book:

1. M. Ham & I. Kostanic – Principles of Neurocomputing for Science & Engineering, TMH, New Delhi , 2002.

COURSE INFORMATION SHEET

Course code IT 8053
Course title**: General knowledge of computer**
Pre-requisite(s):

Course Objectives:

1. To know definition and scope of e-Commerce.
2. To understand changing business strategies in electronics age.
2. 4.To understand intricacies of B2B e-Commerce.
3. 5.To understand intricacies of B2C e-Commerce.

Course Outcomes:

1. 1.To think of e-Commerce in right perspective.
2. 2.To be able to use e-Commerce for appreciate competitive advantage.
3. 3.To be able to use knowledge of changing business strategies in electronics age.
4. 4.To be able to develop and manage B2B e-Commerce.
5. 5.To be able to develop and manage B2C e-Commerce.

Syllabus:

Module - I

Introduction to Electronic Commerce: Electronic Commerce, Scope of Electronic Commerce, Definition of Electronic commerce, Electronic Commerce and Trade cycle, Electronic Market, Electronic Data Interchange, Internet Commerce, e-Commerce in perspective.

Module - II

Business Strategy in an Electronic Age: Value Chain, Supply Chains, Porter's Value Chain Model, Inter organizational Value chains, Competitive advantage, Competitive strategy, Porter's Model, First Mover advantage, Competitive advantage using e-commerce.

Module - III

Business strategy: Introduction to Business Strategy, Strategic implications of IT, Technology, Business Environment, Business Capability, Existing Business strategy, Strategy Formulation and Complementation Planning, e-commerce implementation, e-commerce & evaluation.

Module - IV

B2B e-Commerce Part1: Inter-organizational Transactions, The credit transaction trade cycle, Variety of transactions, Electronics Market, Advantage and disadvantage of electronics markets, Electronic Data Interchange, Benefits of EDI.

Module - V

B2B e-Commerce Part2: EDI technology, standards, communications, implementation, agreements, security, EDI and business, Organizations, Trading pattern, Transactions, Adoption and maturity, Inter-organizational e-Commerce, Purchasing online, After sales online.

Module – VI

B2C e-Commerce Part1: Consumer trade transactions, Internet e-Commerce, The e-Shop, Internet shopping and trade cycle, other e-Commerce technologies, Advantages and disadvantages of consumer e-Commerce

Module – VII

B2C e-Commerce Part2: The elements of e-Commerce, e-Visibility, Online payments, delivering the goods, After-sales service, Internet e-Commerce security.

E-Business: Introduction, Internet bookshop, Grocery Supplies, Software supplies and support, Electronics Newspaper, Internet Banking, Online share sealing, Gambling on the Net, e-diversity.

Text Book :

1. David Whiteley - E-COMMERCE: Strategy, Technologies and Applications, TMH, New Delhi,2000.

Reference Book :

1. Ravi Kalakota & Andre B. Whinston - Electronic Commerce A Manager’s Guide Pearson Education, 2005.
2. Efraim Turban, Dennis Viehland, David King, Jae Lee – Electronics Commerce: A Managerial Perspective, Pearson Education Asia