SEMESTER III

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE-31 BSC -MATHEMATICS-III

Objectives of the course:

- To develop logical understanding of the subject.
- To develop the knowledge, skills and attitudes necessary to solve problem pertaining to Civil Engineering.
- To make aware students about the importance and symbiosis between Mathematics and Engineering.

Total Hours: 60

Module 1 (08 Hours)

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

Module 2: (07 Hours)

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

Module 3 (08 Hours)

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

Module 4 (07 Hours)

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

Module 5 (08 Hours)

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

Statistics

Module 6 (08 Hours)

Basic Statistics: Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.

Module 7 (08 Hours)

Applied Statistics: Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

Module 8 (07 Hours)

Small samples: Test for single mean, difference of means and correlation coefficients, test for ratio of variances -Chi-square test for goodness of fit and independence of attributes.

Course outcomes

- Apply basic knowledge of maths to solve real-world problems.
- Able to generate solutions to unfamiliar problems

Textbooks/References:

1. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.

2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.

3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.

5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.

6. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.

7. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).

8. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002. 9. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE-32 BSC -BIOLOGY

Objectives of the course:

- To convey that Biology is as important a scientific discipline as Mathematics, Physics and Chemistry.
- To develop understanding about Biology and its different parts

Total Hours: 60

UNIT-I (07 Hours)
INTRODUCTION

Purpose: To convey that Biology is as important a scientific discipline as Mathematics, Physics and Chemistry

Bring out the fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Mention the most exciting aspect of biology as an independent scientific discipline. Why we need to study biology? Discuss how biological observations of 18^{th} Century that lead to major discoveries. Examples from Brownian motion and the origin of thermodynamics by referring to the original observation of Robert Brown and Julius Mayor. These examples will highlight the fundamental importance of observations in any scientific inquiry.

UNIT-II (07 Hours)
CLASSIFICATION

Purpose: To convey that classification *per se* is not what biology is all about. The underlying criterion, such as morphological, biochemical or ecological be highlighted.

Hierarchy of life forms at phenomenological level. A common thread weaves this hierarchy Classification. Discuss classification based on (a) cellularity- Unicellular or multicellular (b) ultrastructure- prokaryotes or eucaryotes. (c) energy and Carbon utilisation -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricoteliec, ureotelic (e) Habitata- acquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. A given organism can come under different category based on classification. Model organisms for the study of biology come from different groups. E.coli, S.cerevisiae, D. Melanogaster, C. elegance, A. Thaliana, M. musculus

UNIT-III (07 Hours)
GENETICS

Purpose: To convey that "Genetics is to biology what Newton's laws are to Physical Sciences" Mendel's laws, Concept of segregation and independent assortment. Concept of

allele. Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis be taught as a part of genetics. Emphasis to be give not to the mechanics of cell division nor the phases but how genetic material passes from parent to offspring. Concepts of recessiveness and dominance. Concept of mapping of phenotype to genes. Discuss about the single gene disorders in humans. Discuss the concept of complementation using human genetics.

UNIT-IV (07 Hours)
BIMOLECULAR

Purpose: To convey that all forms of life has the same building blocks and yet the manifestations are as diverse as one can imagine
Molecules of life. In this context discuss monomeric units and polymeric structures. Discuss about sugars, starch and cellulose. Amino acids and proteins. Nucleotides and DNA/RNA. Two carbon units and lipids.

UNIT-V (07 Hours)
ENZYMES

Purpose: To convey that without catalysis life would not have existed on earth Enzymologist: How to monitor enzyme catalyzed reactions. How does an enzyme catalyze reactions? Enzyme classification. Mechanism of enzyme action. Discuss at least two examples. Enzyme kinetics and kinetic parameters. Why should we know these parameters to understand biology? RNA catalysis.

UNIT-VI (07 Hours)
INFORMATION TRANSFER

Purpose: The molecular basis of coding and decoding genetic information is universal Molecular basis of information transfer. DNA as a genetic material. Hierarchy of DNA structure- from single stranded to double helix to nucleosomes. Concept of genetic code. Universality and degeneracy of genetic code. Define gene in terms of complementation and recombination.

UNIT-VII (06 Hours)
MACROMOLECULAR ANALYSIS

Purpose: How to analyse biological processes at the reductionist level Proteins- structure and function. Hierarch in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.

UNIT-VIII (06 Hours)
METABOLISM

Purpose: The fundamental principles of energy transactions are the same in physical and biological world.

Thermodynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergoinc reactions. Concept of K_{eq} and its relation to standard free energy. Spontaneity. ATP as an energy currency. This should include the breakdown of glucose to CO_2 + H_2O (Glycolysis and Krebs cycle) and synthesis of glucose from CO_2 and H_2O (Photosynthesis). Energy yielding and energy consuming reactions. Concept of Energy charge

UNIT-IX (06 Hours)

Microbiology

Concept of single celled organisms. Concept of species and strains. Identification and classification of microorganisms. Microscopy. Ecological aspects of single celled organisms. Sterilization and media compositions. Growth kinetics.

Course outcomes

- Ability has been developed to to describe how biological observations of 18th Century that lead to majordiscoveries.
- Understanding is develop about Biology and its different parts.

References:

1) Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd
2) Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H. John Wiley and Sons
3) Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
4) Molecular Genetics (Second edition), Stent, G. S.; and Calender, R. W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
5) Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS31 PCC-CS COMPUTER ORGANIZATION &ARCHITECTURE

Objectives of the course:

To expose the students to the following:

1. How Computer Systems work & the basic principles
2. Instruction Level Architecture and Instruction Execution
3. The current state of art in memory system design
4. How I/O devices are accessed and its principles.
5. To provide the knowledge on Instruction Level Parallelism
6. To impart the knowledge on micro programming
7. Concepts of advanced pipelining techniques.

Detailed contents:

Total Hours: 60

Module 1 (15 Hours)

Functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU–registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs.

Data representation: signed number representation, fixed and floating point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-and add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic.

Module 2: (15 Hours)

Introduction to x86 architecture.

CPU control unit design: hardwired and micro-programmed design approaches, Case study – design of a simple hypothetical CPU.

Memory system design: semiconductor memory technologies, memory organization.

Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers–program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes–role of interrupts in process state transitions, I/O device interfaces – SCII, USB

Module 3: (15 Hours)

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards.

Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.

Module 4: (15 Hours)

Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.

Suggested books:

1. "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by Carl Hamacher, McGraw Hill Higher Education.

Suggested reference books:

1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes, WCB/McGraw-Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

Course outcomes

1. Draw the functional block diagram of a single bus **architecture of a computer and describe the function of the** instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
2. **Write** assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
3. Write a flowchart for Concurrent access to memory and cache coherency in **Parallel Processors** and describe the process.
4. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
5. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS32 ESC DIGITAL ELECTRONICS

Objectives of the course:

1. To understand number representation and conversion between different representation in digital electronic circuits.
2. To analyze logic processes and implement logical operations using combinational logic circuits.
3. To understand characteristics of memory and their classification.

Total Hours: 60

Module 1: Fundamentals of Digital Systems and logic families (12 Hours)

Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital lCs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.

Module 2: Combinational Digital Circuits (12 Hours)

Standard representation for logic functions, K-map representation, simplification of logic functions using K-map, minimization of logical functions. Don't care conditions, Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serialadder,

ALU, elementary ALU design, popular MSI chips, digital comparator, paritychecker/generator, code converters, priority encoders, decoders/drivers for display devices, Q-M method of function realization.

Module 3: Sequential circuits and systems (12 Hours)

A 1-bit memory, the circuit properties of Bistable latch, the clocked SR flip flop, J- K-T and D types flipflops, applications of flipflops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple(Asynchronous)

counters, synchronous counters, counters design using flip flops, special counter IC's, asynchronous sequential counters, applications of counters.

Module 4: A/D and D/A Converters (12 Hours)

Digital to analog converters: weighted resistor/converter, R-2R Ladder D/A converter, specifications

for D/A converters, examples of D/A converter lCs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using voltagetofrequencyandvoltagetotimeconversion,specificationsofA/Dconverters, example of A/D converter ICs

Module 5: Semiconductor memories and Programmable logic devices (12Hours)

Memory organization and operation, expanding memory size, classification andcharacteristicsof memories, sequential memory, read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), charge de coupled device memory (CCD), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).

Text/References:

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.
3. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.

Digital Electronics Laboratory (0:0:2 – 1 credit)

Hands-on experiments related to the course contents of EE07.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand working of logic families and logic gates.
2. Design and implement Combinational and Sequential logic circuits.
3. Understand the process of Analog to Digital conversion and Digital to Analog conversion.
4. Be able to use PLDs to implement the given logical problem.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS33 PCC-CS DATA STRUCTURE & ALGORITHMS

Objectives of the course:

1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists, trees and graphs.
4. To enable them to write algorithms for solving problems with the help of fundamental data structures

Total Hours: 60

Module 1: (15 Hours)

Introduction: Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. **Searching:** Linear Search and Binary Search Techniques and their complexity analysis.

Module 2: (15 Hours)

Stacks and Queues: ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

Module 3: **(15 Hours)**

Linked Lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, Doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis.

Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis. Applications of Binary Trees. B Tree, B+ Tree: definitions, algorithms and analysis.

Module 4: (15 Hours)

Sorting and Hashing: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods, Hashing.

Graph: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

Suggested books:

1. "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.

Suggested reference books:

1. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
2. "How to Solve it by Computer", 2nd Impression by R.G. Dromey, Pearson Education.

Course outcomes

1. For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
2. For a given Search problem (Linear Search and Binary Search) student will able to implement it.
3. For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
4. Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
5. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE34 DLC PROGRAMMING LAB IN JAVA

Course Objectives:

1. Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
2. Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
3. Be aware of the important topics and principles of software development.
4. Have the ability to write a computer program to solve specified problems.
5. Be able to use the Java SDK environment to create, debug and run simple Java programs.

Total Hours: 60

UNIT-I (12 Hours)

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

UNIT–II (12 Hours)

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector.

Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un-modifiable Collections.

UNIT–III (12 Hours)

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

UNIT–IV (12 Hours)

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

UNIT–V (12 Hours)

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

References:

1. Deitel & Deitel, "JAVA, How to Program"; PHI, Pearson.
2. E. Balaguruswamy, "Programming In Java"; TMH Publications
3. The Complete Reference: Herbert Schildt, TMH
4. Peter Norton, "Peter Norton Guide To Java Programming", Techmedia.
5. Merlin Hughes, et al; Java Network Programming , Manning Publications/Prentice Hall
6. Cay Horstmann, Big JAVA, Wiely India.

Course outcomes

1. Knowledge of the structure and model of the Java programming language, (knowledge)
2. Use the Java programming language for various programming technologies (understanding)
3. Develop software in the Java programming language, (application)

List of Program to be perform (Expandable)

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

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CATEGORY: - PDFS

BE-35 PROFESSIONAL DEVELOPMENT FINISHING SCHOOL

LEVEL-I

TOTAL - 36 HOURS

OBJECTIVE

The students are to be groomed with respect to personality development. In this regard, an effort is made to improve the knowledge with respect to basic in English, mathematics, aptitude and reasoning.

UNIT-I

Conversational English:

Grammar mainly Tenses, 100 small sentences of daily use tense wise, Letter Writing, Standard Format for CV writing. [12 hrs]

UNIT-II

Basic Mathematics:

Arithmetic, Algebra, Unit Conversions.

Arithmetic

Number system, Decimals, Fractions, Simplification, HCF and LCM. Ratio and proportion, percentage, partnership, Average, profit and Losses, Simple Interest and Compound Interest, Mensuration, Time and work ,Time and Distance, Data Interpretation , Trigonometry Basics ,etc.

Algebra

Basics Algebraic Formulae, Linear Equations, quadratics Eqations,Logarithms,Functions, Permutation and Combination, Binomial Theorem , Series (AP,GP,HP).Unit conversion SI,FPS,MKS,CGS

(12 –HOURS)

UNIT-III

Aptitude / Reasoning

Quantitative Aptitude and Logical Reasoning- Level-1

Problem solving on.

Number System, problems on Ages, Number Theory, Algebra, Clocks and Calendars.

Alphabet Test, Series Completion, Coding- Decoding, Logical Sequence, Insert missing figures. (12 –HOURS)

OUTCOME

The students have gained confidence after improving their English, Math, and Aptitude and reasoning abilities.

SEMESTER IV

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE 41 HSMC ENGG. ECONOMICS AND ACCOUNTING

Course Objectives:

To enable students to understand and interpret the basic financial statements, to comprehend the basics in managing finance and to know pricing mechanism.

Total Hours: 60

UNIT I: INTRODUCTION (**12 Hours**)
Managerial Economics – Relationship with other disciplines – Firms: Types, objectives and goals – Managerial decisions – Decision analysis.

UNIT II DEMAND & SUPPLY ANALYSIS (**12 Hours**)
Demand – Types of demand – Determinants of demand – Demand function – Demand elasticity – Demand forecasting – Supply – Determinants of supply – Supply function – Supply elasticity.

UNIT III PRODUCTION AND COST ANALYSIS (**12 Hours**)
Production function – Returns to scale – Production optimization – Least cost input – Isoquants – Managerial uses of production function.Cost Concepts – Cost function – Types of Cost – Determinants of cost – Short run and Long run cost curves – Cost Output Decision – Estimation of Cost.

UNIT IV PRICING (**12 Hours**)
Determinants of Price – Pricing under different objectives and different market structures – Price discrimination – Pricing methods in practice – role of Government in pricing control.

UNIT V FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT) (**12 Hours**)
Balance sheet and related concepts – Profit & Loss Statement and related concepts – Financial Ratio Analysis – Cash flow analysis – Funds flow analysis – Comparative financial statements – Analysis & Interpretation of financial statements. Investments – Risks and return evaluation of investment decision – Average rate of return – Payback Period – Net Present Value – Internal rate of return.

Course outcomes

Upon successful completion of this course, students will get the ability to prepare and interpret financial statements, manage funds efficiently and fix and revise prices as warranted.

TEXT BOOKS:

1. McGuigan, Moyer and Harris, 'Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.
2. Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill Publishing Ltd., 4th edition, 2005.

REFERENCES:

1. Samuelson. Paul A and Nordhaus W.D., 'Economics', Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.
2. Paresh Shah, 'Basic Financial Accounting for Management', Oxford University Press, New Delhi, 2007.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS41PCC-CS DISCRETE MATHEMATICS

Objectives of the course

Throughout the course, students will be expected to demonstrate their understanding of Discrete Mathematics by being able to do each of the following:
1. Use mathematically correct terminology and notation.
2. Construct correct direct and indirect proofs.
3. Use division into cases in a proof.
4. Use counterexamples.
5. Apply logical reasoning to solve a variety of problems.

Total Hours: 60

Detailed contents:

Module 1: (12 Hours)
Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products,
Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem.
Principles of Mathematical Induction: The Well-Ordering Principle, Recursive
definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor:Euclidean Algorithm, The Fundamental Theorem of Arithmetic.

Module 2: (12 Hours)
Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination.

Module 3: (12 Hours)
Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. **Proof Techniques:** Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

Module 4: (12 Hours)
Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups,Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields.
Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form

Module 5: (12 Hours)

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle,Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph,definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortest distances.

Suggested books:

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill
2. Susanna S. Epp, Discrete Mathematics with Applications,4th edition, Wadsworth Publishing Co. Inc.
3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill.

Suggested reference books:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science", TMG Edition, TataMcgraw-Hill
2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum's Outlines Series, Seymour Lipschutz, Marc Lipson,
3. Discrete Mathematics, Tata McGraw - Hill

Course Outcomes

1. For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives
2. For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference For a given a mathematical problem, classify its algebraic structure
4. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra
5. Develop the given problem as graph networks and solve with techniques of graph theory.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS42 PCC-CS OBJECT ORIENTED PROGRAMMING

Objectives of the course

The course will introduce standard tools and techniques for software development, using object oriented approach, use of a version control system, an automated build process, an appropriate framework for automated unit and integration tests.

Total Hours: 60

Detailed contents

 Abstract data types and their specification.
 How to implement an ADT. Concrete state space, concrete invariant, abstraction function. Implementing operations, illustrated by the Text example.
 Features of object-oriented programming. Encapsulation, object identity, polymorphism – but not inheritance.
 Inheritance in OO design.
 Design patterns. Introduction and classification. The iterator pattern.
 Model-view-controller pattern.
 Commands as methods and as objects. *Implementing OO language features.*
 Memory management.
 Generic types and collections
 *GUIs. G*raphical programming with Scala and Swing *The software development process.*

The concepts should be practiced using C++ and Java. Pearl may also be introduced wherever possible.

Suggested books

1. Barbara Liskov, *Program Development in Java*, Addison-Wesley, 2001

Suggested reference books

1. Any book on Core Java
2. Any book on C++

Course Outcomes

After taking the course, students will be able to:
1. Specify simple abstract data types and design implementations, using abstraction functions to document them.
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Name and apply some common object-oriented design patterns and give examples of their use.
4. Design applications with an event-driven graphical user interface.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS43 PCC-CS DESIGN AND ANALYSIS OF ALGORITHMS

Pre-requisites ESC 201

Objectives of the course

- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations.

Total Hours: 60

Detailed contents:

Module 1: (12 Hours)

Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem.

Module 2: (12 Hours)

Fundamental Algorithmic Strategies: Brute-Force, Greedy,Dynamic Programming, Branchand-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving , Bin Packing, Knap Sack TSP. Heuristics – characteristics and their application domains.

Module 3: (14 Hours)

Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm.

Module 4: (10 Hours)

Tractable and Intractable Problems: Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques.

Module 5: (12 Hours)

Advanced Topics: Approximation algorithms, Randomized algorithms, Class of problems beyond NP – P SPACE

Suggested books:

1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivest and Clifford Stein, MIT Press/McGraw-Hill.
2. Fundamentals of Algorithms – E. Horowitz et al.

Suggested reference books

1. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.

2. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition,Michael T Goodrich and Roberto Tamassia, Wiley.
3. Algorithms—A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.

Course Outcomes

1. For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms .
2. Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedy algorithms.
3. Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and-conquer algorithms. Derive and solve recurrence relation.
4. Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. For a given problems of dynamic-programming and develop the dynamic programming algorithms, and analyze it to determine its computational complexity.
5. For a given model engineering problem model it using graph and write the corresponding algorithm to solve the problems.
6. Explain the ways to analyze randomized algorithms (expected running time, probability of error).
7. Explain what an approximation algorithm is. Compute the approximation factor of an approximation algorithm (PTAS and FPTAS).

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS44 PCC-CS OPERATING SYSTEMS

Objectives of the course

To learn the fundamentals of Operating Systems.
1. To learn the mechanisms of OS to handle processes and threads and their communication
2. To learn the mechanisms involved in memory management in contemporary OS
3. To gain knowledge on distributed operating system concepts that includes architecture,Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
4. To know the components and management aspects of concurrency management
5. To learn to implement simple OS mechanisms

Total Hours: 60

Detailed contents

Module 1: (10Hours)
Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS-Layered,Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.

Module 2: (12 Hours)
Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching
Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads,
Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.

Module 3: (08 Hours)
Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer\ Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems:Reader's & Writer Problem, Dinning Philosopher Problem etc.

Module 4: (08 Hours)
Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

Module 5: (12 Hours)
Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging.

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging,Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC),Not recently used (NRU) and Least Recently used (LRU).

Module 6: (10Hours)

I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software,Secondary-Storage Structure: Disk structure, Disk scheduling algorithms

File Management: Concept of File, Access methods, File types, File operation,Directory structure, File System structure, Allocation methods (contiguous, linked,indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks

Suggested books:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin,Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings,Prentice Hall of India.

Suggested reference books:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison- Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

Course Outcomes

1. Create processes and threads.
2. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
3. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement file management system.For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE42 DLC PROGRAMMING LAB (MATLAB)

Objectives of the course

On completion of this Subject/Course the student shall be able to

1. Familiarize the student in introducing and exploring MATLAB software.
2. Enable the student on how to approach for solving Engineering problems using simulation tools.
3. Prepare the students to use MATLAB in their project works.
4. Provide a foundation in use of this software for real time applications.

Total Hours: 60

Module - I (12 Hours)

MATLAB: An Overview, Brief history of MATLAB, About MATLAB, Installation of MATLAB, Help browser, Arranging the desktop, Basic functions of Matlab, Mostly used symbols in MATLAB, debugging in Matlab;

Module - II (14 Hours)

Building MATLAB expressions: MATLAB datatype, command handling, MATLAB basics.
MATLAB Vector and Matrix: Scalar and vector, elementary features in a vector array, matrices, eigen values and eigen vectors, matrix operations, matrix operators, creating matrix arrangement, indexing array value, other operations, mathematical operations on array, array types

Module - III (12 Hours)

Graphics in MATLAB: 2D plots, parametric plots, contour lines and implicit plots, field plots, multiple graphics display function, 3D plots, multivariate data, data analysis.

Module - IV (10 Hours)

MATLAB programming introduction to M-files,MATLAB editors, M files, scripts, functions, MATLAB error and correction, MATLAB debugger; Digital Image Processing with MATLAB (Image Processing).

Module - V (12 Hours)

MATLAB in neural networks: About neural networks, Human and artificial neuron, Architecture of neural networks (feed-forward, feedback, network layers), The McCuulloch- Pitts Model of Neuron, The Perceptron, Transfer function, neural network toolbox, Actual model, applications of neural network.

Course outcomes:

At the end of the course student will have ability to

1. Express programming & simulation for engineering problems.
2. Find importance of this software for Lab Experimentation.
3. Articulate importance of software's in research by simulation work.

REFERENCES:

1.S. Swapna Kumar, S V B Lenina: MATLAB – Esay way of learning, PHI Learning, 2016
2.Amos Gilat ," An Introduction with Applications ,4ed " , wiley India

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE42 DLC PROGRAMMING LAB (DOT NET)

Course Objectives:

This course is designed to provide the knowledge of Dot Net Frameworks along with C#.

Total Hours: 60

UNIT I (10 Hours)

Introduction .NET framework, features of .Net framework, architecture and component of .Net, elements of .Net.

UNIT II (12 Hours)

Basic Features of C# Fundamentals, Classes and Objects, Inheritance and Polymorphism, Operator Overloading, Structures. **Advanced Features of C#** Interfaces, Arrays, Indexers and Collections; Strings and Regular Expressions, Handling Exceptions, Delegates and Events.

UNIT III (14 Hours)

Installing ASP.NET framework, overview of the ASP .net framework, overview of CLR, class library, overview of ASP.net control, understanding HTML controls, study of standard controls, validations controls, rich controls. **Windows Forms:** All about windows form, MDI form, creating windows applications, adding controls to forms, handling Events, and using various Tolls

UNIT IV (12 Hours)

Understanding and handling controls events, **ADO.NET-** Component object model, ODBC, OLEDB, and SQL connected mode, disconnected mode, dataset, data-reader **Data base controls:** Overview of data access data control, using grid view controls, using details view and frame view controls, ado .net data readers, SQL data source control, object data source control, site map data source.

UNIT V (12 Hours)

XML: Introducing XML, Structure, and syntax of XML, document type definition (DTD), XML Schema, Document object model, Presenting and Handling XML. xml data source, using navigation controls, introduction of web parts, using java script, Web Services

Course outcomes:

After completion of the course the student will be able to use the features of Dot Net Framework along with the features of C#.

References:

1. C# for Programmers by Harvey Deitel, Paul Deitel, Pearson Education
2. Balagurusamy; Programming in C#; TMH
3. **Web** Commerce **Technology** Handbook by Daniel **Minoli**, Emma **Minoli** , TMH
4. Web Programming by Chris Bates, Wiley

5. XML Bible by Elliotte Rusty Harold ,
6. ASP .Net Complete Reference by McDonald, TMH.
7. ADO .Net Complete Reference by Odey, TMH

List of Experiment

1. Working with call backs and delegates in C#
2. Code access security with C#.
3. Creating a COM+ component with C#.
4. Creating a Windows Service with C#
5. Interacting with a Windows Service with C#
6. Using Reflection in C#
7. Sending Mail and SMTP Mail and C#
8. Perform String Manipulation with the String Builder and String Classes and C#:
9. Using the System .Net Web Client to Retrieve or Upload Data with C#
10. Reading and Writing XML Documents with the XML Text-Reader/-Writer Class and C#
11. Working with Page using ASP .Net.
12. Working with Forms using ASP .Net
13. Data Sources access through ADO.Net,
14. Working with Data readers , Transactions
15. Creating Web Application.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE-43 MC- ENVIRONMENT SCIENCE

We as human being are not an entity separate from the environment around us rather we are a constituent seamlessly integrated and co-exist with the environment around us. We are not an entity so separate from the environment that we can think of mastering and controlling it rather we must understand that each and every action of ours reflects on the environment and vice versa. Ancient wisdom drawn from Vedas about environment and its sustenance reflects these ethos. There is a direct application of this wisdom even in modern times. Idea of an activity based course on environment protection is to sensitize the students on the above issues through following two type of activities.

(A) AWARENESS ACTIVITIES:

i) Small group meetings about water management, promotion of recycle use, generation of less waste, avoiding electricity waste
ii) Slogan making event
iii) Poster making event
iv) Cycle rally
v) Lectures from experts

(B) ACTUAL ACTIVITIES:

i) Plantation
ii) Gifting a tree to see its full growth
iii) Cleanliness drive
iv) Drive for segregation of waste
v) To live some big environmentalist for a week or so to understand his work
vi) To work in kitchen garden for mess
vii) To know about the different varieties of plants
viii) Shutting down the fans and ACs of the campus for an hour or so

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CATEGORY: - PDFS

BE-44 PROFESSIONAL DEVELOPMENT FINISHING SCHOOL

LEVEL-II

TOTAL - 36 HOURS

OBJECTIVE

The students are to be groomed with respect to personality development. Further improvement in English, Aptitude and reasoning ability is desirable.

UNIT-I

Conversational English:

Grammar mainly Prepositions (550 small sentences of daily use related to day to day life (18 – HOURS)

UNIT-II

Aptitude / Reasoning:

Quantitative Aptitude and Logical Reasoning – Level II

Problem solving on,

Partnerships, Profit Loss and Discounts, Time and Distance.

Logical sequence of Figures, Cubes, Blood Relations, Data Sufficiency, Arrangement Problems.(18 –HOURS)

OUTCOME

Further improvement in English, Aptitude and reasoning ability is achieved.

SEMESTER V

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS51 PCC-CS MICRO PROCESSOR AND INTERFACING

Course Objectives:

1. To introduce basic concepts of interfacing memory and peripheral devices to a microprocessor.
2. To introduce serial and parallel bus standards.
3. To introduce 8051 microcontroller

Total Hours: 60

Module 1: Fundamentals of Microprocessors: (10Hours)

Fundamentals of Microprocessor Architecture. 8-bitMicroprocessor and Microcontroller architecture, Comparison of 8-bit microcontrollers, 16-bit and 32-bit microcontrollers. Definition of embedded system and its characteristics, Role of microcontrollers in embedded Systems. Overview of the 8051 family.

Module 2: The 8051 Architecture (08 Hours)

Internal Block Diagram, CPU, ALU, address, data and control bus, Working registers,SFRs, Clock and RESET circuits, Stack and Stack Pointer, Program Counter, I/O ports, Memory Structures, Data and Program Memory, Timing diagrams and Execution Cycles.

Module 3: Instruction Set and Programming (12 Hours)

Addressing modes: Introduction, Instruction syntax, Data types, Subroutines Immediate addressing, Register addressing, Direct addressing, Indirect addressing, Relative addressing, Indexed addressing, Bit inherent addressing, bit direct addressing. 8051 Instruction set, Instruction timings. Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Subroutine instructions, Bit manipulation instruction. Assembly language programs, C language programs. Assemblers and compilers. Programming and debugging tools.

Module 4: Memory and I/O Interfacing (10 Hours)

Memory and I/O expansion buses, control signals, memory wait states. Interfacing of peripheral devices such as General Purpose I/O, ADC, DAC, timers, counters, memory devices.

Module 5: External Communication Interface (10 Hours)

Synchronous and Asynchronous Communication. RS232, SPI, I2C. Introduction and interfacing to protocols like Blue-tooth and Zig-bee.

Module 6: Applications (10 Hours)

LED, LCD and keyboard interfacing. Stepper motor interfacing, DC Motor interfacing, sensor interfacing.

Course outcomes:

1. Explain the concepts of memory and I/O interfacing with microprocessor.
2. Explain the concept of interrupts, buses and microprocessor based system architecture.
3. Describe an 8 bit microcontroller architecture- 8051.
4. Program assembly language programming of 8051.
5. perform experiments on assembly language programming.

Text / References:

1. M. A.Mazidi, J. G. Mazidi and R. D. McKinlay, "The8051Microcontroller and Embedded Systems: Using Assembly and C",Pearson Education, 2007.
2. K. J. Ayala, "8051 Microcontroller", Delmar Cengage Learning,2004.
3. R. Kamal, "Embedded System", McGraw Hill Education,2009.
4. R. S. Gaonkar, ", Microprocessor Architecture: Programming and Applications with the 8085", Penram International Publishing, 1996
5. D.A. Patterson and J.H. Hennessy, "Computer Organization and Design: The Hardware/Software interface", Morgan Kaufman Publishers, 2013.
6.D. V. Hall, "Microprocessors & Interfacing", McGraw Hill Higher Education, 1991.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS52(A) PEC-CS COMPUTER GRAPHICS & MULTIMEDIA

Course Objectives:

1. To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.

2. To learn the basic principles of 3- dimensional computer graphics.

3. Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.

4. Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.

5. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.

6. To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles, and applications.

Total Hours: 60

Unit-I (12 Hours)

Introduction to Raster Scan displays, Pixels, Frame buffer, Vector & Character generation, Random Scan systems, Display devices, Scan Conversion techniques, Line Drawing: simple DDA, Bresenham's Algorithm, Circle Drawing Algorithms: Midpoint Circle drawing and Bresenham's Algorithm, Polygon fill algorithm: Boundary-fill and Flood- fill algorithms

Unit-II (14 Hours)

2-D Transformation: Translation, Rotation, Scaling, Shearing, Reflection. Inverse Transformation, Homogenous coordinate system, Matrices Transformation, Composite Transformation. Windowing & Clipping: World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping & Polygon Clipping Algorithms.

Unit-III(14Hours)

3-D Transformations: Translation, Rotation and Scaling.

Parallel & Perspective Projection: Types of Parallel & Perspective Projection, Hidden Surface elimination: Depth comparison, Back face detection algorithm, Painter's Algorithm, Z-Buffer Algorithm. Curve generation, Bezier and B-spline methods. Basic Illumination Model: Diffuse reflection, Specular reflection, Phong Shading, Gouraud shading,Ray Tracing, Color models like RGB, YIQ, CMY, HSV.

Unit-IV (10Hours)

Multimedia : Characteristics of a multimedia presentation , Uses of Multimedia, Text –Types, Unicode Standard ,text Compression, Text file formats, Audio-Components of an audio system,

Digital Audio, Digital Audio processing, Sound cards, Audio file formats ,Audio Processing software ,Video-Video color spaces, Digital Video, Digital Video processing, Video file formats.

Unit –V (10 Hours)

Animation: Uses of Animation, Principles of Animation, Computer based animation, 3D Animation, Animation file formats, Animation softwares.
Compression: Lossless/Lossy Compression techniques, Image, Audio & Video Compressions, MPEG Standards ,Multimedia Architecture, Multimedia Databases

Course outcomes:

Students will able to:

1. To list the basic concepts used in computer graphics.
2. To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
3. To describe the importance of viewing and projections.
4. To define the fundamentals of animation, virtual reality and its related technologies.
5. To understand a typical graphics pipeline
6. To design an application with the principles of virtual reality.

Recommended Text:

1.Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill

2.Donald Hearn and M.P. Becker “Computer Graphics” Pearson Pub.

3.Parekh “Principles of Multimedia” Tata McGraw Hill

4.Maurya, “Computer Graphics with Virtual Reality System “ , Wiley India

5.Pakhira,”Computer Graphics ,Multimedia & Animation”,PHI learning

6.Andleigh, Thakral , “Multimedia System Design “ PHI Learning

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS52(B) PEC-CS OPTIMIZATION TECHNIQUES

Course Objectives:

- To introduce various optimization techniques i.e classical, linear programming, transportation problem, simplex algorithm, dynamic programming
- Constrained and unconstrained optimization techniques for solving and optimizing an electrical and electronic engineering circuits design problems in real world situations.
- To explain the concept of Dynamic programming and its applications to project implementation.

Total Hours: 60

UNIT – I **(12 Hours)**

Introduction and Classical Optimization Techniques: Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems.

UNIT – II **(12Hours)**

Classical Optimization Techniques: Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers – Multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.

UNIT – III **(12 Hours)**

Linear Programming: Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems – solution of a system of linear simultaneous equations – pivotal reduction of a general system of equations – motivation to the simplex method – simplex algorithm.

UNIT – IV **(12 Hours)**

Transportation Problem: Finding initial basic feasible solution by north – west corner rule, least cost method and Vogel's approximation method – testing for optimality of balanced transportation problems.

UNIT – V **(12 Hours)**

Unconstrained Nonlinear Programming: One dimensional minimization methods, Classification, Fibonacci method and Quadratic interpolation method Unconstrained Optimization Techniques: Univariant method, Powell's method and steepest descent method.

Course Outcomes:

After completion of this course, the student will be able to

- explain the need of optimization of engineering systems
- understand optimization of electrical and electronics engineering problems
- apply classical optimization techniques, linear programming, simplex algorithm, transportation problem
- apply unconstrained optimization and constrained non-linear programming and dynamic programming
- Formulate optimization problems.

TEXT BOOKS:

Singiresu S. Rao, Engineering Optimization: Theory and Practice by John Wiley and Sons, 4th edition, 2009.

H. S. Kasene & K. D. Kumar, Introductory Operations Research, Springer (India), Pvt. Ltd., 2004

REFERENCE BOOKS:

George Bernard Dantzig, Mukund Narain Thapa, "Linear programming", Springer series in operations research 3rd edition, 2003.

H.A. Taha, "Operations Research: An Introduction", 8th Edition, Pearson/Prentice Hall, 2007.

Kalyanmoy Deb, "Optimization for Engineering Design – Algorithms and Examples", PHI Learning Pvt. Ltd, New Delhi, 2005.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS52(C) PEC-CS INTERNET & WEB TECHNOLOGY

Course Objectives:

This course is intended to teach the basics involved in publishing content on the World Wide Web. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting. This will also expose students to the basic tools and applications used in Web publishing.

Total Hours: 60

UNIT 1: (12 Hours)
Introduction: Concept of WWW, Internet and WWW, HTTP Protocol : Request and Response, Web browser and Web servers, Features of Web 2.0 Web Design: Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Web site, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation.

UNIT 2: **(10 Hours)**
HTML :Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5

UNIT 3: **(14 Hours)**
Style sheets : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3 JavaScript : Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Advance JavaScript: Javascript and objects, JavaScript own objects, the DOM and web browser environments, Manipulation using DOM, forms and validations ,DHTML : Combining HTML, CSS and Javascript, Events and buttons

UNIT 4: **(12 Hours)**
XML : Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT PHP: Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files, Advance Features: Cookies and Sessions, Object Oriented Programming with PHP

UNIT 5: **(12 Hours)**
PHP and MySQL: Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting

data, altering tables, queries, deleting database, deleting data and tables, PHP my admin and database bugs.

Course Outcomes:

1. Describe the concepts of WWW including browser and HTTP protocol.
2. List the various HTML tags and use them to develop the user friendly web pages.
3. Define the CSS with its types and use them to provide the styles to the web pages at various levels.
4. Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications.
5. Use the JavaScript to develop the dynamic web pages.
6. Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.
7. Develop the modern Web applications using the client and server side technologies and the web design fundamentals

References:

1.Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India
2.Web Technologies, Black Book, dreamtech Press
3.HTML 5, Black Book, dreamtech Press
4.Web Design, Joel Sklar, Cengage Learning
5.Developing Web Applications in PHP and AJAX, Harwani, McGrawHill
6.Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel , Pearson

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS53 PCC-CS DATBASE MANAGEMENT SYSTEM

Objectives of the course

1. To understand the different issues involved in the design and implementation of a database system.
2. To study the physical and logical database designs, database modeling, relational, hierarchical, and network models
3. To understand and use data manipulation language to query, update, and manage a database To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
4. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

Total Hours: 60

Module 1 (12 Hours)
Database system architecture: Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML).
Data models: Entity-relationship model, network model, relational and object oriented data models, integrity constraints, data manipulation operations.

Module 2: (14 Hours)
Relational query languages: Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server.
Relational database design: Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design.
Query processing and optimization: Evaluation of relational algebra expressions,Query equivalence, Join strategies, Query optimization algorithms.
Storage strategies: Indices, B-trees, hashing.

Module 3: (12 Hours)
Transaction processing: Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.

Module 4: (10 Hours)
Database Security: Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.

Module 5: (12 Hours)
Advanced topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining.

Suggested books:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.

Suggested reference books

1 "Principles of Database and Knowledge – Base Systems", Vol 1 by J. D. Ullman,Computer Science Press.

2 "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe,Pearson Education

3 "Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley

Course Outcomes

1. For a given query write relational algebra expressions for that query and optimize the developed expressions
2. For a given specification of the requirement design the databases using ER method and normalization.
3. For a given specification construct the SQL queries for Open source and Commercial DBMS - MYSQL, ORACLE, and DB2.
4. For a given query optimize its execution using Query optimization algorithms
5. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.
6. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS54 PCC-CS UNIX AND SHELL PROGRAMMING

Course Objectives:

1 : To provide introduction to UNIX Operating System and its File System.
2 : To gain an understanding of important aspects related to the SHELL and the process.
3 : To provide a comprehensive introduction to SHELL programming, services and utilities.

Total Hours: 60

Unit-I (12 Hours)

General Overview of the System: System structure, user perspective, O/S services assumption about Hardware The Kernel and buffer cache architecture of Unix O/S, System concepts, Kernel data Structure, System administration, Buffer headers, Structure of the buffer pool, Scenarios for retrieval of the buffer, Reading and writing disk block, Advantage and disadvantage of buffer cache.

Unit-II (12 Hours)

Internal Representation of Files: INODES, Structure of regular, Directories conversions of a path name to an inode, Super block, Inode assignment to a new file, Allocation of disk blocks. System Calls for the System: Open read write file and record close, File creation, Operation of special files change directory and change root, change owner and change mode, STAT and FSTAT, PIPES Mounting and unmounting files system, Link Unlink.

Unit-III (12 Hours)

Structures of Processes and process control: Process states and transitions layout of system memory, the context of a process, manipulation of process address space, Sleep process creation/termination. The user Id of a process, changing the size of a process. The SHELL Interprocess Communication and multiprocessor system: Process tracing system V IPO network communication sockets problem of multiprocessors systems, solution with master and hare process, and solution with semaphores.

Unit-IV (12 Hours)

Introduction to shell scripts: shell Bourne shell, C shell, Unix commands, permissions, editors, filters sed, grep family, shell variables, scripts, metacharacters and environment, if and case statements, for while and until loops. Shell programming.

Unit-V (12 Hours)

Awk and perl Programming: Awk pattern scanning and processing language, BEGIN and END patterns, Awk arithmetic and variables, Awk built in variable names and operators, arrays, strings, functions, perl; the chop() function, variable and operators, $_ and $. , Lists, arrays, regular expression and substitution, file handling, subroutines, formatted printing. Linux: History & Features of Linux, Linux structure, various flavours of linux.

Course Outcomes

1. Describe the architecture and features of UNIX Operating System and distinguish it from other Operating System Understanding.
2. Demonstrate UNIX commands for file handling and process control.
3. Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem.

Books

1. M.J. Bach “Design of UNIX O.S. “, Prentice Hall of India.
2. Y.Kanetkar “Unix shell programming”, BPB Pub.
3. Linux complete, BPB Publications
4. Sumitabha Das “ Unix concepts and Applications.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS55 PCC-CS FORMAL LANGUAGE & AUTOMATA THEORY

Course Objectives:

1. To learn fundamentals of Regular and Context Free Grammars and Languages
2. To understand the relation between Regular Language and Finite Automata and machines.
3. To learn how to design Automata's and machines as Acceptors, Verifiers and Translators.
4. To understand the relation between Contexts free Languages, PDA and TM.
5. To learn how to design PDA as acceptor and TM as Calculators.

Total Hours: 60

UNIT 1: (14 Hours)

Automata: Basic machine, FSM , Transition graph, Transition matrix, Deterministic and nondeterministic FSM'S, Equivalence of DFA and NDFA, Mealy & Moore machines, minimization of finite automata, Two-way finite automata.

Regular Sets and Regular Grammars: Alphabet, words, Operations, Regular sets, Finite automata and regular expression, Myhill- Nerode theorem Pumping lemma and regular sets, Application of pumping lemma, closure properties of regular sets.

UNIT 2: (10 Hours)

Context –Free Grammars: Introduction to CFG, Regular Grammars, Derivation trees and Ambiguity, Simplification of Context free grammars, Normal Forms (Chomsky Normal Form and Greibach Normal forms).

UNIT 3: (12 Hours)

Pushdown Automata: Definition of PDA, Deterministic Pushdown Automata, PDA corresponding to given CFG, CFG corresponding to a given PDA.

Context Free Languages: The pumping lemma for CFL's, Closure properties of CFL's, Decision problems involving CFL's.

UNIT 4: (12 Hours)

Turing Machines: Introduction, TM model, representation and languages acceptability of TM Design of TM, Universal TM & Other modification, Church's hypothesis, composite & iterated TM. Turing machine as enumerators. Properties of recursive & recursively enumerable languages, Universal Turing machine

UNIT 5: (12 Hours)

Tractable and Untractable Problems:P, NP, NP complete and NP hard problems, examples of these problems like satisfy ability problems, vertex cover problem, Hamiltonian path problem, traveling sales man problem, Partition problem etc.

Course Outcomes:

Students will able to:

1. Understand, design, construct, analyze and interpret Regular languages, Expression and Grammars.
2. Design different types of Finite Automata and Machines as Acceptor, Verifier and Translator.
3. Understand, design, analyze and interpret Context Free languages, Expression and Grammars.
4. Design different types of Push down Automata as Simple Parser.
5. Design different types of Turing Machines as Acceptor, Verifier, Translator and Basic computing machine. .
6. Compare, understand and analyze different languages, grammars, Automata and Machines.

Suggested Reading:

1.John E. Hopcroft, Jeffery Ullman,"Introduction to Automata theory, Langauges & computation" , Narosa Publishers.
2. K.L.P Mishra & N.Chandrasekaran,"Theory of Computer Science", PHI Learning
3. Michael Sipsev,"Theory of Computation",Cenage Learning
4. John C Martin, "Introdution to languages and theory of computation", McGraw Hill
5.Daniel I.A. Cohen,"Introduction to Computer Theory",Wiley India.
5. Kohavi,"Switching & Finite Automata Theory",TMH

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE-52 MC - ESSENCE OF INDIAN KNOWLEDGE TRADITION

COURSE OBJECTIVE

The course aims at imparting basic principles of thought process, reasoning and inferencing. Sustainability is at the core of Indian Traditional knowledge Systems connecting society and nature. Holistic life style of yogic science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions. Part-I focuses on introduction to Indian Knowledge Systems, Indian perspective of modern scientific world-view, and basic principles of Yoga and holistic health care system.

COURSE CONTENTS (60 Hours)

- Basic structure of Indian Knowledge System:
- Modern Science and Indian Knowledge System
- Yoga and Holistic Health care
- Case studies

COURSE OUTCOME

Ability to understand, connect up and explain basics of Indian traditional knowledge in modern scientific perspective.

REFERENCES

- Knowledge traditions and practices of India, CBSE Publication V. Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, Bharatiya
- Vidya Bhavan, Mumbai. 5th Edition, 2014 Swami Jitatmanand, Modern Physics and Vedantharatiya Vidya Bhavan
- Swami Jitatmanand, Holistic Science and Vedantharatiya VidyaBhavan
- Fritzof Capra, Tao of Physics
- Fritzof Capra, The Wave of life
- VN Jha (Eng. Trans.), Tarkasangraha of Annam Bhatta, International Chinmay
- Foundation, Velliarnad, Arnakulam Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkata
- GN Jha (Eng. Trans.), Ed. RN Jha, Yoga-darshanam with Vyasa Bhashya,
- Vidyanidhi Prakashan, Delhi 2016 RN Jha, Science of Consciousness Psychotherapyand Yoga Practices, Vidyanidhi
- Prakashan, Delhi 2016 P B Sharma (English translation), Shodashang Hridayan

PEDAGOGY:

Problem based learning, group discussions, collaborative mini projects.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CATEGORY: - PDFS

BE-53 PROFESSIONAL DEVELOPMENT FINISHING SCHOOL

LEVEL-III

TOTAL - 36 HOURS

OBJECTIVE

The students are to be groomed with respect to personality development. Further improvement in English, Aptitude and reasoning ability is desirable.

UNIT-I

Conversational English:

Grammar mainly Active and Passive Voice, 250 sentences of daily use irrespective of any specific tenses. (12 HOURS)

UNIT-II

Conversational English:

100 sentences of daily use related to professional and formal environment Report Writing with necessary punctuations and with editor′s eye, Thematic Apperception, Expression of Feelings 2-minutes Talk by the students, Smart Etiquettes and Tidiness . (12 HOURS)

UNIT-III

Aptitude/Reasoning

Quantitative Aptitude and Logical Reasoning – Level III

Problem solving on,

Average, Time work, percentage, Probability, Permutation and Combination.

Question- Statements, Theme Detection, Statement Assumptions, Statement Argument. (12 HOURS)

OUTCOME

Further improvement in reading, writing and vocal English is achieved. Aptitude and reasoning aspect shows improvement.

SEMESTER VI

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS61(A) OEC-CS CYBER LAW AND ETHICS

Course Objectives:
The Objectives Of This Course Is To Enable Learner To Understand, Explore, And Acquire A Critical Understanding Cyber Law. Develop Competencies For Dealing With Frauds And Deceptions (Confidence Tricks, Scams) And Other Cyber Crimes For Example, Child Pornography Etc. That Are Taking Place Via The Internet.

Total Hours: 60

Unit-1(14 Hours)
Introduction Computers and its Impact in Society, Overview of Computer and Web Technology, Need for Cyber Law, Cyber Jurisprudence at International and Indian Level, Cyber Law - International Perspectives UN & International Telecommunication Union (ITU) Initiatives Council of Europe - Budapest Convention on Cybercrime, Asia-Pacific Economic Cooperation (APEC), Organization for Economic Co-operation and Development (OECD), World Bank, Commonwealth of Nations.

Unit-2(12 Hours)
Constitutional & Human Rights Issues in Cyberspace Freedom of Speech and Expression in Cyberspace, Right to Access Cyberspace – Access to Internet, Right to Privacy, Right to Data Protection, Cyber Crimes & Legal Framework Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft & Fraud Cyber terrorism, Cyber Defamation.

Unit-3(10 Hours)
Cyber Torts Cyber Defamation, Different Types of Civil Wrongs under the IT Act 2000, Intellectual Property Issues in Cyber Space Interface with Copyright Law, Interface with Patent Law, Trademarks & Domain Names Related issues

Unit-4 (12 Hours)
E-Commerce Concept, E-commerce-Salient Features, Online approaches like B2B, B2C & C2C Online contracts, Click Wrap Contracts, Applicability of Indian Contract Act, 1872,

Unit-5(12 Hours)
Dispute Resolution in Cyberspace, Concept of Jurisdiction, Indian Context of Jurisdiction and IT Act, 2000. International Law and Jurisdictional Issues in Cyberspace, Dispute Resolutions .

Course Outcomes:

1. Make Learner Conversant With The Social And Intellectual Property Issues Emerging From 'Cyberspace.
2. Explore The Legal And Policy Developments In Various Countries To Regulate Cyberspace;
3. Develop The Understanding Of Relationship Between Commerce And Cyberspace;

4. Give Learners In Depth Knowledge Of Information Technology Act And Legal Frame Work Of Right To Privacy, Data Security And Data Protection.
5. Make Study On Various Case Studies On Real Time Crimes.

References Books

1. Chris Reed & John Angel, Computer Law, OUP, New York.
2. Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi.
3. Verma S, K, Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute.
4. Jonthan Rosenoer, Cyber Law, Springer, New York.
5. Sudhir Naib, The Information Technology Act, 2005: A Handbook, OUP, New York.
6. S. R. Bhansali, Information Technology Act, 2000, University Book House Pvt. Ltd.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS62(A) PEC-CS ADVANCE COMPUTER ARCHITECTURE

Course Objectives:

- An understanding of the fundamental computer architectural issues and the inherent limitations of the traditional approaches.
- Familiarity with the principles and the terminologies involved in computer architecture, organization and design.
- Introduction to methods of specification, description, measurement and evaluation of processors and systems.
- An appreciation of the historical developments in computer architecture and an acquaintance with many of the current innovative designs, providing a basis for understanding the new computer architectures that are on the horizon.

Total Hours: 60

Unit-I (12 Hours)

Flynn's Classification, System Attributes to Performance, Parallel computer models - Multiprocessors and multicomputers, Multivector and SIMD Computers. Data and resource dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain size and latency, Control flow, data flow and Demand driven mechanisms. Static interconnection networks, Dynamic interconnection Networks: Bus Systems, Crossbar Switch, Multiport Memory, Multistage and Combining Networks

Unit- II (12 Hours)

Instruction set architecture, CISC Scalar Processors , RISC Scalar Processors, VLIW architecture, Memory Hierarchy, Inclusion, Coherence and Locality, Memory capacity planning. Interleaved memory organization- memory interleaving, pipelined memory access, Bandwidth and Fault Tolerance. Backplane Bus System :Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt.

Unit-III (12 Hours)

Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, pipeline hazards, Dynamic instruction scheduling - score boarding and Tomosulo's algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic pipeline, Multifunctional arithmetic pipelines. Superscaler pipeline design, Super pipeline processor design.

Unit-IV (12 Hours)

Cache coherence, Snoopy protocols, Directory based protocols. Message routing schemes in multicomputer network, deadlock and virtual channel. Vector Processing Principles, Vector instruction types, Vector-access memory schemes. Vector supercomputer architecture, SIMD organization: distributed memory model and shared memory model. Principles of Multithreading: Multithreading Issues and Solutions, Multiple-Context Processors

Unit-V (12 Hours)

Parallel Programming Models, Shared-Variable Model, Message-Passing Model, Data-Parallel Model, Object-Oriented Model, Functional and Logic Models, Parallel Languages and Compilers, Language Features for Parallelism, Parallel Programming Environment, Software Tools and Environments.

Course Outcomes:

At the end of this course student will

1. Understand the Concept of Parallel Processing and its applications.
2. Implement the Hardware for Arithmetic Operations.
3. Analyze the performance of different scalar Computers.
4. Develop the Pipelining Concept for a given set of Instructions.
5. Distinguish the performance of pipelining and non pipelining environment in a processor.

Suggested Reading:

1. Kai Hwang, "Advanced computer architecture", TMH.
2. J.P.Hayes, "computer Architecture and organization"; MGH.
3. V.Rajaranam & C.S.R.Murthy, "Parallel computer"; PHI Learning.
4. Kain,"Advance Computer Architecture: - A System Design Approach", PHI Learning
5. M.J Flynn, "Computer Architecture, Pipelined and Parallel Processor Design"; Narosa Publishing.
6. Hwang and Briggs, "Computer Architecture and Parallel Processing"; MGH.
7. David E. Callav & Jaswinder Pal Singh Marge Kaufmann"Advance Computer Architecture", EIS India.
8. Sajjan G. Shiva, Taylar & Francis, "Advance Computer Architecture

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS62(B) PEC-CS EMBEDDED SYSTEMS

Course Objectives:

1. Develop an understanding of the technologies behind the embedded computing systems.
2. To introduce students to the design issues of embedded systems.
3. Enable students to analyze and develop software programs for embedded systems

Total Hours: 60

The concept of embedded systems design, Embedded microcontroller cores, embedded memories.
Examples of embedded systems, Technological aspects of embedded systems: interfacing between analog and digital blocks, signal conditioning, digital signal processing. sub-system interfacing ,interfacing with external systems, user interfacing. Design tradeoffs due to process compatibility, thermal considerations, etc., Software aspects of embedded systems: real time programming languages and operating systems for embedded systems.

Course Outcomes:
After successful completion of this course, student will be able to

- Understand hardware and software design requirements of embedded systems.
- Analyze the embedded systems' specification and develop software programs.
- Evaluate the requirements of programming Embedded Systems, related software architectures and tool chain for Embedded Systems.

Text/Reference Books:

1. J.W. Valvano, "Embedded Microcomputer System: Real Time Interfacing", Brooks/Cole,
2000.
2. Jack Ganssle, "The Art of Designing Embedded Systems", Newness, 1999.
3. V.K. Madisetti, "VLSI Digital Signal Processing", IEEE Press (NY, USA), 1995.
4. David Simon, "An Embedded Software Primer", Addison Wesley, 2000.
5. K.J. Ayala, "The 8051 Microcontroller: Architecture, Programming, and Applications",
Penram Intl, 1996.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS62(C) PEC-CS INTERNET OF THINGS

Course Objectives:
Students will understand the concepts of Internet of Things and can able to build IoT applications.

Total Hours: 60

Unit I: (12 Hours)
Introduction to IoT Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs

Unit II: (12 Hours)
IoT & M2M Machine to Machine, Difference between IoT and M2M, Software define Network

Unit III: (12 Hours)
Network & Communication aspects Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination

Unit IV: (12 Hours)
Challenges in IoT Design challenges, Development challenges, Security challenges, Other challenges.

Domain specific applications of IoT Home automation, Industry applications, Surveillance applications, Other IoT applications

Unit V: (12 Hours)
Developing IoTs Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python.

COURSE OUTCOMES:

On successful completion of the course, the student will: Understand the concepts of Internet of Things

- Analyze basic protocols in wireless sensor network
- Design IoT applications in different domain and be able to analyze their performance
- Implement basic IoT applications on embedded platform

Reference Books:
1. Vijay Madisetti, Arshdeep Bahga, “Internet of Things: A Hands-On Approach”
2. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS63(A) PEC-CS SOFTWARE ENGINEERING & PROJECT MANAGEMENT

COURSE OBJECTIVES:

This course introduces the concepts and methods required for the construction of large software intensive systems.

The course aims is to develop a broad understanding of the discipline of software engineering and management of software systems.

This course provides an understanding of both theoretical and methodological issues involve in modern software engineering project management and focuses strongly on Practical techniques.

Total Hours: 60

Unit I: (12 Hours)

The Software Product and Software Process: Software Product and Process Characteristics, Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model, Evolutionary Process Models like Incremental Model, Spiral Model, Component Assembly Model, RUP and Agile processes. Software Process customization and improvement, CMM, Product and Process Metrics

Unit II: (10 Hours)

Requirement Elicitation, Analysis, and Specification: Functional and Non-functional requirements, Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented software development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability

Unit III: (12 Hours)

Software Design : The Software Design Process, Design Concepts and Principles, Software Modeling and UML, Architectural Design, Architectural Views and Styles, User Interface Design, Function-oriented Design, SA/SD Component Based Design, Design Metrics

Unit IV: (14 Hours)

Software Analysis and Testing : Software Static and Dynamic analysis, Code inspections, Software Testing Fundamentals, Software Test Process, Testing Levels, Test Criteria, Test Case Design, Test Oracles, Test Techniques, Black-Box Testing, White-Box Unit Testing and Unit Testing Frameworks, Integration Testing, System Testing and other Specialized Testing, Test Plan, Test Metrics, Testing Tools. , Introduction to Object-oriented analysis, design and comparison with structured software engg.

Unit V: (12 Hours)

Software Maintenance & Software Project Measurement : Need and Types of Maintenance, Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support.

Project Management Concepts, Feasibility Analysis, Project and Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance (SQA). Project Plan, Project Metrics.

Practical and Lab work

Lab work should include a running case study problem for which different deliverables at the end of each phase of a software development life cycle are to be developed. This will include modeling the requirements, architecture and detailed design. Subsequently the design models will be coded and tested. For modeling, tools like Rational Rose products. For coding and testing, IDE like Eclipse, NetBeans, and Visual Studio can be used.

COURSE OUTCOMES:

Upon the completion of the course students will be able to:-

1. Apply the process to be followed in the software development life-cycle models.
2. Implement communication, modeling, construction & deployment practices in software development.
3. Analyze & design the software models using unified modeling language (UML).
4. Explain the concepts of various software testing methods & be able to apply appropriate testing approaches for development of software.
5. Explain the quality management & different types of metrics used in software development.
6. Apply the concepts of project management & planning.

Suggested Reading:

1. Pankaj Jalote ,"An Integrated Approach to Software Engineering", Narosa Pub, 2005

2. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning

3. R S. Pressman ,"Software Engineering: A Practitioner's Approach", Sixth edition 2006, McGraw-Hill.

4. Sommerville,"Software Enginerring",Pearson Education.

5. Richard H.Thayer,"Software Enginerring & Project Managements",Willey India

6. Waman S.Jawadekar,"Software Enginerring", TMH

7. Schwalbe,"IT Project Managements",Cengage Learning.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS63(B) PEC-CS AD HOC AND SENSOR NETWORKS

COURSE OBJECTIVES:

The student should be made to

1. Understand the design issues in ad hoc and sensor networks.
2. Learn the different types of MAC protocols.
3. Be familiar with different types of adhoc routing protocols.
4. Be expose to the TCP issues in adhoc networks.
5. Learn the architecture and protocols of wireless sensor networks.

Total Hours: 60

UNIT I (12 Hours)
INTRODUCTION
Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio propagation Mechanisms – Characteristics of the Wireless Channel -mobile ad hoc networks (MANETs) and wireless sensor networks (WSNs) :concepts and architectures. Applications of Ad Hoc and Sensor networks. Design Challenges in Ad hoc and Sensor Networks.

UNIT II (12 Hours)
MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS
Issues in designing a MAC Protocol- Classification of MAC Protocols- Contention based protocols-Contention based protocols with Reservation Mechanisms- Contention based protocols with Scheduling Mechanisms – Multi channel MAC-IEEE 802.11

UNIT III (12 Hours)
ROUTING PROTOCOLS AND TRANSPORT LAYER IN AD HOC WIRELESS NETWORKS
Issues in designing a routing and Transport Layer protocol for Ad hoc networks- proactive routing, reactive routing (on-demand), hybrid routing- Classification of Transport Layer solutions-TCP over Ad hoc wireless Networks.

UNIT IV (12 Hours)
WIRELESS SENSOR NETWORKS (WSNS) AND MAC PROTOCOLS
Single node architecture: hardware and software components of a sensor node – WSN Network architecture: typical network architectures-data relaying and aggregation strategies - MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.

UNIT V (12 Hours)
WSN ROUTING, LOCALIZATION& QOS
Issues in WSN routing – OLSR- Localization – Indoor and Sensor Network Localization-absolute and relative localization, triangulation-QOS in WSN-Energy Efficient Design-Synchronization-Transport Layer issues.

COURSE OUTCOMES:
Upon completion of the course, the student should be able to:

- Explain the concepts, network architectures and applications of ad hoc and wireless sensor networks.
- Analyze the protocol design issues of ad hoc and sensor networks.
- Design routing protocols for ad hoc and wireless sensor networks with respect to some protocol design issues.
- Evaluate the QoS related performance measurements of ad hoc and sensor networks.

TEXT BOOK:
1. C. Siva Ram Murthy, and B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols ", Prentice Hall Professional Technical Reference, 2008.

REFERENCES:
1. Carlos De Morais Cordeiro, Dharma Prakash Agrawal "Ad Hoc & Sensor Networks: Theory and Applications", World Scientific Publishing Company, 2006.
2. Feng Zhao and Leonides Guibas, "Wireless Sensor Networks", Elsevier Publication – 2002.
3. Holger Karl and Andreas Willig "Protocols and Architectures for Wireless Sensor Networks", Wiley, 2005
4. Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor Networks- Technology, Protocols, and Applications", John Wiley, 2007.
5. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS63(C) PEC-CS FAULT TOLERANT COMPUTING

Course Objectives:

Dependability is now a major requirement for all computing systems and applications. Computer hardware, software, data, networks and systems are always subject to faults. The faults cannot be eliminated, however their impact can be limited and a suitably designed fault-tolerant system can function even in the presence of faults. This course introduces the widely applicable concepts in reliable and fault-tolerant computing. Topics to be covered include basic testing concepts, hardware and software faults, reliability evaluation, design and evaluation of redundant systems, relationship between testing and reliability, software reliability growth, security vulnerabilities and emerging issues.

The course will provide the students a background so that they can: understand techniques to model faults and know how to generate tests and evaluate effectiveness; evaluate reliability of systems with permanent and temporary faults; determine applicability of these forms of redundancy to enhance reliability: spatial, temporal, procedural; assess the relation between software testing and residual defects and security vulnerabilities, devise and analyse potential solutions for emerging issues.

Total Hours: 60

Basic Concepts of Reliability Faults in Digital Circuits Test Generation **(10 Hours)**

Introduction to Fault Tolerant Design of Digital Systems: Fault Tolerance, Static redundancy, Dynamic redundancy, Fault tolerant design of Memory systems. **(10 Hours)**

Practical Fault Tolerant Systems: FTMP, ESS, COMTRAC**. (15 Hours)**

Introduction to Self-Checking Logic: The two rail Checker, Design for Testability: Testability, Controllability and Observability. **(15 Hours)**

Design of testable Combinational Logic Circuits, Testable design of Sequential Circuits, The scan path technique, Designing testability into logic boards **(10 Hours)**

Text Books:

Fault Tolerant and Fault Testable Hardware Design, Parag K. Lala, PHI, 1985

Reference:

1. Fault Tolerant Computing Theory and Techniques-Volume I, D.K. Pradhan, PHI, 1986

2. Testing of Digital Systems, Niraj jha and Sandeep Gupta, Cambridge University Press, 2003

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS64 PCC-CS COMPILER DESIGN

Course Objectives:

The Objectives of this course is to explore the principles, algorithms, and data structures involved in the design and construction of compilers. Topics include context-free grammars, lexical analysis, parsing techniques, symbol tables, error recovery, code generation, and code optimization.

Total Hours: 60

Unit-I (12 Hours)

Introduction to compiling & Lexical Analysis: Introduction of Compiler, Major data Structure in compiler, BOOT Strapping & Porting, Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, Lexical analysis: Input buffering , Specification & Recognition of Tokens, LEX.

Unit-II (14 Hours)

Syntax Analysis & Syntax Directed Translation: Syntax analysis: CFGs, Top down parsing, Brute force approach, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence parsing, LR parsers (SLR,LALR, LR),Parser generation. Syntax directed definitions: Construction of Syntax trees, Bottom up evaluation of S-attributed definition, L-attribute definition, Top down translation, Bottom Up evaluation of inherited attributes Recursive Evaluation, Analysis of Syntax directed definition.

Unit-III (10 Hours)

Type Checking & Run Time Environment: Type checking: type system, specification of simple type checker, equivalence of expression, types, type conversion, overloading of functions and operations, polymorphic functions. Run time Environment: storage organization, Storage allocation strategies, parameter passing, dynamic storage allocation , Symbol table

Unit –IV (12 Hours)

Code Generation: Intermediate code generation: Declarations, Assignment statements, Boolean expressions, Case statements, Back patching, Procedure calls Code Generation: Issues in the design of code generator, Basic block and flow graphs, Register allocation and assignment, DAG representation of basic blocks, peephole optimization, generating code from DAG.

Unit –V (12 Hours)

Code Optimization: Introduction to Code optimization: sources of optimization of basic blocks, loops in flow graphs, dead code elimination, loop optimization, Introduction to global data flow analysis, Code Improving transformations ,Data flow analysis of structure flow graph Symbolic debugging of optimized code.

List of Experiments:

1. Develop a lexical analyzer to recognize a few patterns.
2. Write a programme to parse using Brute force technique of Topdown parsing.
3. Develop LL (1) parser (Construct parse table also).

4. Develop an operator precedence parser (Construct parse table also)
5. Develop a recursive descent parser
6. Write a program for generating for various intermediate code forms
7. Three address code ii) Polish notation
8. Write a program to simulate Heap storage allocation strategy
9. Generate Lexical analyzer using LEX
10. Generate YACC specification for a few syntactic categories.
11. Given any intermediate code form implement code optimization techniques
12. Study of an Object Oriented Compiler.

Course Outcomes:

1. Understand the major phases of compilation and to understand the knowledge of Lex tool & YAAC tool
2. Develop the parsers and experiment the knowledge of different parsers design without automated tools
3. Construct the intermediate code representations and generation
4. Convert source code for a novel language into machine code for a novel computer
5. Apply for various optimization techniques for dataflow analysis

References:

1. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques and Tools , Pearson Education
2. Raghavan, Compiler Design, TMH Pub.
3. Louden. Compiler Construction: Principles and Practice, Cengage Learning
4. C. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.
5. Mak, writing compiler & Interpreters, Willey Pub.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS65 PCC-CS COMPUTER NETWORKING

Course Objectives:

1. Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
2. Acquire knowledge of Application layer and Presentation layer paradigms and protocols.
3. Study Session layer design issues, Transport layer services, and protocols.
4. Gain core knowledge of Network layer routing protocols and IP addressing.
5. Study data link layer concepts, design issues, and protocols.
6. Read the fundamentals and basics of Physical layer, and will apply them in real time applications.

Total Hours: 60

Unit –I (12 Hours)

Computer Network: Definitions, goals, components, Architecture, Classifications & Types. Layered Architecture: Protocol hierarchy, Design Issues , Interfaces and Services, Connection Oriented & Connectionless Services, Service primitives, Design issues & its functionality. ISO-OSI Reference Model: Principle, Model, Descriptions of various layers and its comparison with TCP/IP. Network standardization.

Unit-II (12 Hours)

Data Link Layer: Need, Services Provided, Framing , Flow Control, Error control. Data Link Layer Protocol: Elementary & Sliding Window protocol: 1-bit, Go-Back-N, Selective Repeat, Hybrid ARQ. Bit oriented protocols: SDLC, HDLC, BISYNC, LAP and LAPB. Protocol verification: Finite State Machine Models & Petri net models.

Unit-III (12 Hours)

MAC Sublayer: MAC Addressing, Binary Exponential Back-off (BEB) Algorithm, Distributed Random Access Schemes/Contention Schemes: for Data Services (ALOHA and Slotted-ALOHA), for Local-Area Networks (CSMA, CSMA/CD, CSMA/CA), Collision Free Protocols: Basic Bit Map, BRAP, Binary Count Down, MLMA Limited Contention Protocols: Adaptive Tree Walk, URN Protocol, High Speed LAN: Fast Ethernet, Gigabit Ethernet, FDDI, Performance Measuring Metrics. IEEE Standards 802 series & their variant.

Unit-IV(12 Hours)

Network Layer: Need, Services Provided , Design issues, Routing algorithms: Least Cost Routing algorithm, Dijkstra's algorithm, Bellman-ford algorithm, Hierarchical Routing, Broadcast Routing, Multicast Routing, Congestion Control Algorithms: General Principles of Congestion control, Prevention Policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram subnets. IP protocol, IP Addresses, Comparative study of IPv4 & IPv6, Mobile IP.

Unit-V(12 Hours)

Transport Layer: Design Issues, UDP: Header Format, Per-Segment Checksum, Carrying Unicast/Multicast Real-Time Traffic, TCP: Connection Management, Reliability of Data

Transfers, TCP Flow Control, TCP Congestion Control, TCP Header Format, TCP Timer Management.Session layer: Authentication, Authorisation, Session layer protocol (PAP, SCP, H.245). Presentation layer: Data conversion, Character code translation, Compresion, Encryption and Decryption, Presentation layer protocol (LPP, Telnet, X.25 packet Assembler/Disassembler).Application Layer: WWW and HTTP, FTP, SSH, Email (SMTP, MIME, IMAP), DNS, Network Management (SNMP).

Course Outcomes:

Students will able to:

1. Describe the functions of each layer in OSI and TCP/IP model.
2. Explain the functions of Application layer and Presentation layer paradigms and Protocols.
3. Describe the Session layer design issues and Transport layer services.
4. Classify the routing protocols and analyze how to assign the IP addresses for the given network.
5. Describe the functions of data link layer and explain the protocols. 6. Explain the types of transmission media with real time applications.

References:

1. Andrew S. Tanenbaum, David J. Wetherall, “Computer Networks” Pearson Education.
2. Dimitri Bertsekas, Robert Gallager, “Data Networks”, PHI Publication, Second Edition.
3. Kaveh Pahlavan, Prashant Krishnamurthy, “Networking Fundamentals”, Wiley Publication.
4. Uyless Black, “Computer Networks”, PHI Publication, Second Edition.
5. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, “Computer Networks: An Open Source Approach”, McGraw Hill.

List of Experiments:

- Study of Different Type of LAN& Network Equipments.
- Study and Verification of standard Network topologies i.e. Star, Bus, Ring etc.
- LAN installations and Configurations.
- Write a program to implement various types of error correcting techniques.
- Write a program to implement various types of framing methods.
- Study of Tool Command Language (TCL).
- Study and Installation of Standard Network Simulator: N.S-2, N.S-3.OpNet,QualNet etc .
- Study & Installation of ONE (Opportunistic Network Environment) Simulator for High Mobility Networks.
- Configure 802.11 WLAN.
- Implement & simulate various types of routing algorithm.
- Study & Simulation of MAC Protocols like Aloha, CSMA, CSMA/CD and CSMA/CA using Standard Network Simulators.
- Study of Application layer protocols- DNS, HTTP, HTTPS, FTP and TelNet.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CATEGORY: - PDFS

BE- 61 PROFESSIONAL DEVELOPMENT FINISHING SCHOOL

(LEVEL-IV)

TOTAL - 36 HOURS

OBJECTIVE

The students are to be groomed with respect to personality development. Emphasis to be made in reading, writing and vocal English, quantitative aptitude and logical reasoning to be stressed.

UNIT-I

Final Finishing:

Final Preparation of CV. Final Compilation of Database of Students with Necessary Mapping, Mock Interviews, Group Discussions. (18 HOURS)

UNIT-II

Aptitude / Reasoning:

Quantitative Aptitude and Logical Reasoning- Level IV

Problem solving on.

Ratio and Proportions, Solutions and Mixtures, Sets, Simple Interest and Compound Interest, Simple and Quadratic Equations. (18 HOURS)

OUTCOME

Attainment of confidence the students to be able to face interviews, group discussion and presentation ability. Knowledge on basic mathematical ability attained. Hence forth a student become competent to face the challenges of the world after attainments of knowledge at college level.

SEMESTER VII

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS71 OEC-CS HUMAN RESOURCE DEVELOPMENT AND ORGANIZATIONAL BEHAVIOR

The course shall be conducted in an interactive manner since students learn best by active participation. Lecture and discussion method will be followed to familiarize students with the theories, concepts, techniques, etc. The instructor would also employ tools like case discussions, exercises, games, psychometric testing, etc. to aid students' understanding of theoretical concepts. Collaborative learning would be emphasized in the form of group exercises, group projects, role plays, etc. Thrust would be given to analysis and application of each topic from the perspective of development organizations. Students will require attending classes with in-advance readings of the topic(s) with reading material available in text/reference books and library resource centre as per the course outline.

Course Objectives:

1. To enable the students to understand the HR Management and system at various levels in general and in certain specific industries or organizations.
2. To help the students focus on and analyse the issues and strategies required to select and develop manpower resources.
3. To help the students to develop cognizance of the importance of human behaviour.
4. To enable students to describe how people behave under different conditions and understand why people behave as they do.
5. To provide the students to analyse specific strategic human resources demands for future action.

Total Hours: 60

Unit - 1 (12 Hours)

What is Organizational Behaviour (OB) and Human Resource Management (HRM) Difference between corporates and development organizations OB and HRM and Sustainable development OB and HRM: contribution and linkages with sustainability Importance of OB and HRM for sustainable development practitioners

Unit - II (12 Hours)

Knowing and Managing Yourself Individual Behaviour: MARS model of individual behaviour Values: Values across cultures (Hofstede's framework); Personality: Big five model; MBTI; Use of personality tests; Personality attributes influencing OB Emotions: Understanding emotions; Emotional labour; Emotional Intelligence Attitudes: Attitudes v/s values; Job Satisfaction; Organizational Commitment Perception: Factors influencing perception; Perceptual errors; Self-fulfilling prophecy; Know yourself: Johari window

Unit - III (12 Hours)

Motivation in the workplace What is motivation; Early theories of motivation; Contemporary theories of motivation; Designing motivating jobs: JCM model; motivation of social workers.
Work Teams Teams v/s groups; Why teams; A model of Team effectiveness: Context, Composition, Work design, Process; Virtual teams; Turning individuals into team players

Communication What is communication; Organizational communication: Formal networks and Grapevine; Electronic communications; Barriers to effective communication; non- verbal communication; Improving Interpersonal communication: Empathy and Active listening.

Unit - IV (12 Hours)
Leadership Difference between managers and leaders; Perspectives of leadership: Trait, Behavioural, Contingency; Inspirational leadership: Transactional, Transformational, Charismatic; NGO leadership.

Unit - V (12 Hours)
Job Analysis Job description; Job Specification; Job Evaluation.Recruitment, Selection, Orientation Sources of recruitment: Internal and external; Steps in selection process; Socialization and Induction; NGO recruitment.

Course Outcomes:

1. To develop the understanding of the concept of human resource management and to understand its relevance in organizations.
2. To integrate the knowledge of HR concepts to take correct business decisions.
3. Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.
4. Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.

Suggested Readings:

• McShane, S.L. and Von Glinow, M.A., Organizational Behaviour, New Delhi, Tata McGrawHill Publishing company ltd.
• P. Jyothi, P. and Venkatesh, D.N., Human Resource Management, New Delhi, Oxford University Press. • Denhardt, R.B., Denhardt, J.V., and Aristigueta, M.P. (2009), Managing Human Behaviour in Public and Non-Profit Organizations, Second edition. California, Sage Publications.
• Pynes, J.E. (2004). Human Resources Management for Public and Nonprofit Organizations, Second Edition. San Francisco, CA: Jossey- Bass Publishers.
• Drucker, Peter F. Managing the Non-profit Organization: Principles and Practices. Harper Business, 1990.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS-72 PCC-CS DISTRIBUTED SYSTEM

Course Objectives:
This course provides an introduction to the fundamentals of distributed computer systems.

Total Hours: 60

UNIT-I **(12 Hours)**
Introduction to Distributed Systems: Goals of Distributed Systems, Hardware and Software concepts, The client server model, Remote procedure call, remote object invocation, message and stream oriented Communications.

UNIT-II**(12 Hours)**
Process and synchronization in Distributed Systems: Threads, clients, servers, code migration, clock Synchronization, mutual exclusion, Bully and Ring Algorithm, Distributed transactions.

UNIT-III **(12 Hours)**
Consistency, Replication, fault tolerance and security: Object replication, Data centric consistency Model, client-centric consistency models, Introduction to fault tolerance, process resilience, recovery, Distributed security architecture, security management, KERBEROS, secure socket layer, cryptography.

UNIT-IV**(12 Hours)**
Distributed Object Based and File Systems: CORBA, Distributed COM, Goals and Design Issues of Distributed file system, types of distributed file system, sun network file system.

UNIT-V **(12 Hours)**
Distributed shared memory, DSM servers, shared memory consistency model, distributed document Based systems: the world wide web, distributed co-ordination based systems: JINI Implementation: JAVA RMI, OLE, ActiveX, Orbix, Visbrokes, Object oriented programming with SOM.

Course Outcomes

In Distributed Systems this course, you will learn a range of fundamental and applied techniques in distributed systems. The learning objectives for Distributed Systems are:

1. Apply knowledge of distributed systems techniques and methodologies.
2. Explain the design and development of distributed systems and distributed systems applications.
3. Use the application of fundamental Computer Science methods and algorithms in the development of distributed systems and distributed systems applications.

BOOKS

1. Andrew S. Tanenbaum, Maarten Van Steen “Distributed Systems Principles and Paradigms” Pearson Education Inc. 2002.

2. Lui “Distributed Computing Principles and Applications”.

3. George Coulios, “Distribute System: Design and Concepts”, Pearson Education

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SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS-73(A) PEC-CS – DATA MINING

Course Objectives:

1. To identify the scope and essentiality of Data Warehousing and Mining.
2. To analyze data, choose relevant models and algorithms for respective applications.
3. To study spatial and web data mining.
4. To develop research interest towards advances in data mining.

Total Hours: 60

Unit-I (12 Hours)

Introduction, to Data warehousing, needs for developing data Warehouse, Data warehouse systems and its Components, Design of Data Warehouse, Dimension and Measures, Data Marts:- Dependent Data Marts, Independents Data Marts & Distributed Data Marts, Conceptual Modeling of Data Warehouses:-Star Schema, Snowflake Schema, Fact Constellations. Multidimensional Data Model & Aggregates.

Unit-II (12 Hours)

OLAP, Characteristics of OLAP System, Motivation for using OLAP, Multidimensional View and Data Cube, Data Cube Implementations, Data Cube Operations, Guidelines for OLAP Implementation, Difference between OLAP & OLTP, OLAP Servers:-ROLAP, MOLAP, HOLAP Queries.

UNIT-III (12 Hours)

Introduction to Data Mining, Knowledge Discovery, Data Mining Functionalities, Data Mining System categorization and its Issues. Data Processing :- Data Cleaning, Data Integration and Transformation. Data Reduction, Data Mining Statistics. Guidelines for Successful Data Mining.

Unit-IV (12 Hours)

Association Rule Mining:-Introduction, Basic, The Task and a Naïve Algorithm, Apriori Algorithms, Improving the efficiency of the Apriori Algorithm, Apriori-Tid, Direct Hasing and Pruning(DHP),Dynamic Itemset Counting (DIC), Mining Frequent Patterns without Candidate Generation(FP-Growth),Performance Evaluation of Algorithms,.

Unit-V (12 Hours)

Classification:-Introduction, Decision Tree, The Tree Induction Algorithm, Split Algorithms Based on Information Theory, Split Algorithm Based on the Gini Index, Overfitting and Pruning, Decision Trees Rules, Naïve Bayes Method.

Cluster Analysis:- Introduction, Desired Features of Cluster Analysis, Types of Cluster Analysis Methods: - Partitional Methods, Hierarchical Methods, Density- Based Methods, Dealing with Large Databases. Quality and Validity of Cluster Analysis Methods.

Course Outcomes:

Students will be able to:

1. Understand Data Warehouse fundamentals, Data Mining Principles
2. Design data warehouse with dimensional modelling and apply OLAP operations.

3. Identify appropriate data mining algorithms to solve real world problems.

4. Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining.

5. Describe complex data types with respect to spatial and web mining. 6. Benefit the user experiences towards research and innovation, integration.

References:

1. Berson: Data Warehousing & Data Mining &OLAP , TMH
2. Jiawei Han and Micheline Kamber, Data Mining Concepts & Techniques, Elsevier Pub.
3. Arun.K.Pujari, Data Mining Techniques, University Press.
4. N.P Gopalan: Data Mining Technique & Trend, PHI
5. Hand, Mannila & Smith: Principle of Data Mining, PHI
6. Tan, Introduction to Data Mining, Pearson Pub.

List of Experiments:

1. Evolution of data management technologies, introduction to data warehousing concepts.
2. Develop an application to implement defining subject area, design of fact dimension table, data mart.
3. Develop an application to implement OLAP, roll up, drill down, slice and dice operation
4. Develop an application to construct a multidimensional data.
5. Develop an application to implement data generalization and summarization technique.
6. Develop an application to extract association rule of data mining.
7. Develop an application for classification of data.
8. Develop an application for one clustering technique
9. Develop an application for Naïve Bayes classifier.
10. Develop an application for decision tree.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS-73(B) PEC-CS – SOFT COMPUTING

Course Objectives:

1. To familiarize with soft computing concepts.
2. To introduce the fuzzy logic concepts, fuzzy principles and relations.
3. To Basics of ANN and Learning Algorithms.
4. Ann as function approximation.
5. Genetic Algorithm and its applications to soft computing.
6. Hybrid system usage, application and optimization.

Total Hours: 60

Unit – I (12 Hours)

Soft Computing: Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, applications of soft computing.

Artificial Intelligence : Introduction, Various types of production systems, characteristics of production systems, breadth first search, depth first search techniques, other Search Techniques like hill Climbing, Best first Search, A* algorithm, AO* Algorithms and various types of control strategies. Knowledge representation issues, Prepositional and predicate logic, monotonic and non monotonic reasoning, forward Reasoning, backward reasoning, Weak & Strong Slot & filler structures, NLP.

Unit – II (12 Hours)

Neural Network : Structure and Function of a single neuron: Biological neuron, artificial neuron, definition of ANN, Taxonomy of neural net, Difference between ANN and human brain, characteristics and applications of ANN, single layer network, Perceptron training algorithm, Linear separability, Widrow & Hebb;s learning rule/Delta rule, ADALINE, MADALINE, AI v/s ANN. Introduction of MLP, different activation functions, Error back propagation algorithm, derivation of BBPA, momentum, limitation, characteristics and application of EBPA,

Unit – III (12 Hours)

Counter propagation network, architecture, functioning & characteristics of counter Propagation network, Hopfield/ Recurrent network, configuration, stability constraints, associative memory, and characteristics, limitations and applications. Hopfield v/s Boltzman machine. Adaptive Resonance Theory: Architecture, classifications, Implementation and training. Associative Memory.

Unit – IV (12 Hours)

Fuzzy Logic: Fuzzy set theory, Fuzzy set versus crisp set, Crisp relation & fuzzy relations, Fuzzy systems: crisp logic, fuzzy logic, introduction & features of membership functions, Fuzzy rule base system : fuzzy propositions, formation, decomposition & aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making & Applications of fuzzy logic.

Unit – V (12 Hours)

Genetic algorithm : Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modeling: Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, Generational Cycle, Convergence of GA, Applications & advances in GA, Differences & similarities between GA & other traditional methods.

Course Outcomes:

1. List the facts and outline the different process carried out in fuzzy logic, ANN and Genetic Algorithms.
2. Explain the concepts and meta-cognitive of soft computing.
3. Apply Soft computing techniques the solve character recognition, pattern classification, regression and similar problems.
4. Outline facts to identify process/procedures to handle real world problems using soft computing.
5. Evaluate various techniques of soft computing to defend the best working solutions.
6. Design hybrid system to revise the principles of soft computing in various applications.

References :

1. S, Rajasekaran & G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & applications, PHI Publication.
2. S.N. Sivanandam & S.N. Deepa, Principles of Soft Computing, Wiley Publications •Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.
3. Bose, Neural Network fundamental with Graph , Algo.& Appl, TMH •Kosko: Neural Network & Fuzzy System, PHI Publication
4. Klir & Yuan ,Fuzzy sets & Fuzzy Logic: Theory & Appli.,PHI Pub. •Hagen, Neural Network Design, Cengage Learning

Practical list:

1. To perform Union,Intersection and Complement operations.
2. To implement De-Morgan's Law.
3. To plot various membership functions.
4. To implement FIS Editor. Use Fuzzy toolbox to model tip value that is given after a dinner based on quality ans service.
5. To implement FIS Editor.
6. Generate ANDNOT function using McCulloch-Pitts neural net.
7. Generate XOR function using McCulloch-Pitts neural net.
8. Hebb Net to classify two dimensional input patterns in bipolar with given targets.
9.Perceptron net for an AND function with bipolar inputs and targets.
10.To calculate the weights for given patterns using heteroassociative neural net.
11.To store vector in an auto-associative net.Find weight matrix & test the net with input
12.To store the vector ,find the weight matrix with no self connection.Test this using a discrete Hopfield net.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS-73(C) PEC-CS ARTIFICIAL INTELLIGENCE

Course Objectives:

1. To create appreciation and understanding of both the achievements of AI and the theory underlying those achievements.
2. To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems.
3. To review the different stages of development of the AI field from human like behavior to Rational Agents.
4. To impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.
5. To create an understanding of the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as minimal, resolution, etc. that play an important role in AI programs.
6. To introduce advanced topics of AI such as planning, Bayes networks, natural language processing and Cognitive Computing.

Total Hours: 60

Unit-I **(12 Hours)**

General Issues and Overview of AI The AI problems, what is an AI technique, Characteristics of AI applications. Introduction to LISP Programming: Syntax and numeric functions, Basic list manipulation functions, predicates and Conditionals, input output and local variables, iteraction and recursion, property lists and arrays

Unit-II **(12 Hours)**

Problem Solving, Search and Control Strategies General problem solving, production systems, control strategies forward and backward chaining, Exhausive searches depth first breadth first search. Heuristic Search Techniques Hill climbing, branch and bound technique, best first search & A* algorithm, AND / OR graphs, problem Reduction & AO* algorithm, constraint satisfaction problems.

Unit-III**(12 Hours)**

Knowledge Representations First order predicate calculus, skolemization, resolution principle & unification, interface mechanisms, Horn's clauses, semantic networks, frame systems and value inheritance, scripts, conceptual dependency.

Unit-IV`**(12 Hours)**

Natural Language processing: Parsing techniques, context free grammar, recursive transitions nets (RNT),augmented transition nets (ATN), case and logic grammars, symantic analysis. Game playing Minimax search procedure, alpha-beta cutoffs, additional refinments. Planning Overview

an example domain the block word, component of planning systems, goal stack planning, non linear planning.

Unit-V **(12 Hours)**

Probabilistic Reasoning and Uncertainty: Probability theory, bayes theorem and bayesian networks, Certainty factor. Expert Systems Introduction to expert system and application of expert systems, various expert system shells, vidwan frame work, knowledge acquisition, case studies, MYCIN. Learning Rote learning, learning by induction, explanation based learning.

Course Outcomes:

Students will able to:

1. Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
2. Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.
3. Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing.
4. Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning.
5. Formulate and solve problems with uncertain information using Bayesian approaches.
6. Apply concept Natural Language processing to problems leading to understanding of cognitive computing.

Books

1. Elaine Rich and Kevin Knight “Artifical Intelligence” - Tata McGraw Hill.

2. Dan W. Patterson “Introduction to Artifical Intelligence and Expert Systems”, Prentice India.

3. Nils J. Nilson “Principles of Artifical Intelligence”, Narosa Publishing House

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS-74(A) PEC-CS CLOUD COMPUTING

Course Objectives:

1. Basics of cloud computing.
2. Key concepts of virtualization.
3. Different Cloud Computing services.
4. Cloud Implementation, Programming and Mobile cloud computing.
5. Key components of Amazon Web Services 6. Cloud Backup and solutions.

Total Hours: 60

Unit-I (12 Hours)

Introduction: Historical development ,Vision of Cloud Computing, Characteristics of cloud computing as per NIST , Cloud computing reference model ,Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments. Overview of cloud applications: ECG Analysis in the cloud, Protein structure prediction, Gene Expression Data Analysis ,Satellite Image Processing ,CRM and ERP ,Social networking .

Unit-II(12 Hours)

Cloud Computing Architecture: Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance,

Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management.

Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure.

Unit –III (12 Hours)

Cloud Management & Virtualization Technology: Resiliency, Provisioning, Asset management, Conceps of Map reduce , Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization .Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits .

Unit-IV (12 Hours)

Cloud Security: Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Secutity Architecture.

Unit-V (12 Hours)

Market Based Management of Clouds, Federated Clouds/Inter Cloud: Characterization & Definition ,Cloud Federation Stack , Third Party Cloud Services .

Case study: Google App Engine, Microsoft Azure, Hadoop , Amazon , Aneka

Course Outcomes:

Students will able to:

1. Define Cloud Computing and memorize the different Cloud service and deployment models.
2. Describe importance of virtualization along with their technologies.
3. Use and Examine different cloud computing services.
4. Analyze the components of open stack & Google Cloud platform and understand Mobile Cloud Computing.
5. Describe the key components of Amazon web Service 6. Design & develop backup strategies for cloud data based on features.

List of Experiments:

1. Installation and configuration of Hadoop/Euceliptus etc.
2. Service deployment & Usage over cloud.
3. Management of cloud resources.
4. Using existing cloud characteristics & Service models.
5. Cloud Security Management.
6. Performance evaluation of services over cloud.

Recommended Text:

1. Buyya, Selvi ," Mastering Cloud Computing ",TMH Pub
2. Kumar Saurabh, "Cloud Computing" , Wiley Pub
3. Krutz , Vines, "Cloud Security " , Wiley Pub
4. Velte, "Cloud Computing- A Practical Approach" ,TMH Pub
5. Sosinsky, " Cloud Computing" , Wiley Pub

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS-74(B) PEC-CS CRYTOGRAPHY AND NETWORK SECURITY

Course Objectives:

1. To understand basics of Cryptography and Network Security.
2. To be able to secure a message over insecure channel by various means.
3. To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
4. To understand various protocols for network security to protect against the threats in the networks.

Total Hours: 60

UNIT I (12 Hours)

Introduction to Network Security, Computer Securit y and Cyber Security. Security Terminologies and Principle, Security Threats, Types of attacks (Operating System, application level, Shrink Wrap code, Misconfiguration attacks etc.). Introduction to Intrusion, Terminologies, Intrusion Detection System (IDS), Types of Intrusion Detection Systems, System Integrity Verifiers (SIVS).Indication of Intrusion: System Indications, File System Indications Network Indications. Intrusion Detection Tools ,Post attack IDS Measures & Evading IDS Systems. Penetration Testing, Categories of security assessments, Vulnerability Assessment, Types of Penetration Testing. Risk Management.

UNIT II (12 Hours)

Cryptography, Classical Cryptographic Techniques, Encryption, Decryption, Code Breaking: Methodologies, Cryptanalysis, Cryptography Attacks, Brute-Force Attack, Use of Cryptography. Public key cryptography, Principles of Public key Cryptosystems, Cryptographic Algorithms RSA, Data Encryption Standard (DES), RC4, RC5, RC6, Blowfish, Key Management, Diffie-Hellman key exchange, elliptic curve cryptography.

UNIT III (12 Hours)

Hash Functions, One-way Hash Functions, SHA (Secure Hash Algorithm), Authentication Requirements, Authentication Functions, Kerberos. Message Authentication codes ,Message Digest Functions, MD5, SSL (Secure Sockets Layer), SSH (Secure Shell), Algorithms and Security, Disk Encryption, Government Access to Keys (GAK) **Digital Signature:** Analysis, Components, Method, Applications, Standard, Algorithm: Signature Generation/Verification, ECDSA, EIgamal Signature Scheme, Digital Certificates.

UNIT IV (12 Hours)

Trojans and Backdoors: Overt and Covert Channels, Working, Types (Remote Access Trojans, Data-Sending Trojans, Destructive Trojans, Trojans, Proxy Trojans, FTP Trojans, Security Software Disablers).

Viruses and Worms: Characteristics, Working, Infection Phase, Attack Phase. Sniffers: Definition, spoofing, Sniffing, Vulnerable Protocols, Types.

Phishing: Methods, Process, Attacks Types (Man-in-the-Middle Attacks, URL Obfuscation Attacks, Hidden Attacks, Client-side Vulnerabilities, Deceptive Phishing, Malware-Based Phishing, DNSBased Phishing, Content-Injection Phishing, Search Engine Phishing).

Web Application Security- Secured authentication mechanism, secured session management, Cross-site Scripting, SQL Injection and other vulnerabilities

Denial-of Service Attacks: Types of Attacks (Smurf Attack, Buffer Overflow Attack, Ping of Death Attack, Teardrop Attack, SYN Attack, SYN Flooding), DDoS Attack(Distributed DoS Attack.), Session Hijacking, Spoofing v Hijacking, TCP/IP hijacking, CAPTCHA Protection

UNIT V (12 Hours)

IP Security, Web Security, Firewalls: Types, Operation, Design Principles, Trusted Systems. Computer Forensics, Need, Objectives,Stages & Steps of Forensic Investigation in Tracking Cyber Criminals, Incident Handling. Hacking, Classes of Hacker (Black hats, grey hats, white hats, suicide hackers), Footprinting, Scanning (Types-Port, Network, Vulnerability), E-Mail Spiders, Overview of System Hacking Cycle.

Course Outcomes:

After successful completion of the course, the learners would be able to

1. Provide security of the data over the network.
2. Do research in the emerging areas of cryptography and network security.
3. Implement various networking protocols.
4. Protect any network from the threats in the world.

Suggested Reading:

1. William Stallings, "Cryptography and Network Security: Principles and Practice" Pearson
2. Charlie Kaufman, Radia Perlman, Mike Speciner, Michael Speciner, " Network Security -
   Private communication in a public world" TMH
3. Fourozon, "Cryptography & Network Security" TMH
4. Joseph Migga Kizza, Computer Network Security, , Springer International Edition
5. Atul Kahate,"Cryptography and Network Security" Mc Graw Hill
6. Carl Endorf, Eugene Schultz, Jim Mellander **"**INTRUSION DETECTION & PREVENSION**"** TMH
   7.Neal, Krawetz, Introduction to Network Security,Cengage Learning.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS-74(C) PEC-CS DIGITAL IMAGE PROCESSING

Course Objectives:

1. Fundamental concepts of a digital image processing system.
2. Concepts of image enhancement techniques.
3. Various Image Transforms.
4. Compression techniques and Morphological concepts.
5. Various segmentation techniques, and object descriptors.
6. Color models and various applications of image processing.

Total Hours: 60

Unit-I **(12 Hours)**
Digital Image fundamentals, A simple image model, Sampling and Quantization. Relationship between pixels. Imaging geometry. Image acquisition systems, Different types of digital images

Unit-II**(12 Hours)**

Image transformations, Introduction to Fourier transforms, Discrete Fourier transforms, Fast Fourier transform, Walsh transformation, Hadmord transformation, Discrete Cosine Transformation.

Unit-III **(12 Hours)**

Image enhancement, Filters in spatial and frequency domains, Histogram based processing. Image subtraction, Averaging, Image smoothing, Nedion filtering, Low pass filtering, Image sharpening by High pass filtering.

Unit-IV **(12 Hours)**

Image encoding and segmentation, Encoding: Mapping, Quantizer, Coder. Error free compression, Lossy Compression schemes. JPEG Compression standard. Detection of discontinuation by point detection, Line detection, edge detection, Edge linking and boundary detection, Local analysis, Global processing via Hough transforms and graph theoretic techniques

Unit-V **(12 Hours)**

Mathematical morphology- Binary, Dilation, crosses, Opening and closing, Simple methods of representation, Signatures, Boundary segments, Skeleton of a region, Polynomial approximation.

Course Outcomes:

Students will able to:
1. Remember the fundamental concepts of image processing.
2. Explain different Image enhancement techniques
3. Understand and review image transforms

4. Analyze the basic algorithms used for image processing &image compression with morphological image processing.
5. Contrast Image Segmentation and Representation
6. Design & Synthesize Color image processing and its real world applications.

References:

1. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing Pearson.
2. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing using Matlab – TMH.
3. Sonka, Digital Image Processing & Computer Vision , Cengage Learning.
4. Jayaraman, Digital Image Processing, TMH.
5. Pratt, Digital Image Processing, Wiley India
6. Annadurai, Fundamentals of Digital Image Processing ,Pearson Education .

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

CS-75 PCC-CS WEB ENGINEERING

Course Objectives:

The objectives of this course are to make the students to:

1. Be familiar with web application development software tools and environments currently available on the market.
2. Teach the concepts, principles and methods of web engineering.
3. Build web applications that are scalable, flexible to modify and easy to manage.

Total Hours: 60

UNIT-1 (12 Hours)

Web Engineering: Introduction, History, Evolution and Need, Time line, Motivation, Categories & Characteristics of Web Applications, Web Engineering Models, Software Engineering v/s Web Engineering. World Wide Web: Introduction to TCP/IP and WAP, DNS, Email, TelNet, HTTP and FTP. Browser and search engines: Introduction, Search fundamentals, Search strategies, Directories search engines and Meta search engines, Working of the search engines. Web Servers: Introduction, Features, caching, case study-IIS, Apache.

UNIT- 2(12 Hours)

Information Architecture: Role, Collaboration and Communication, Organizing Information, Organizational Challenges, Organizing Web sites parameters and Intranets Website Design: Development, Development phases, Design issues, Conceptual Design, High-Level Design, Indexing the Right Stuff, Grouping Content. Architectural Page Mockups, Design Sketches, Navigation Systems. Searching Systems, Good & bad web design, Process of Web Publishing. Web-site enhancement, submission of website to search engines.

Web security: issues, security audit. Web effort estimation, Productivity Measurement, Quality usability and reliability. Requirements Engineering for Web Applications: Introduction, Fundamentals, Requirement Source, Type, ,Notations Tools. Principles Requirements Engineering Activities, Adapting RE Methods to Web Application.

UNIT- 3 (12 Hours)

Technologies for Web Applications I: HTML and DHTML: Introduction, Structure of documents, Elements, Linking, Anchor Attributes, Image Maps, Meta Information, Image Preliminaries, Layouts, Backgrounds, Colors and Text, Fonts, Tables, Frames and layers, Audio and Video Support with HTML Database integration, CSS, Positioning with Style sheets, Forms Control, Form Elements.

Introduction to CGI, PERL, JAVA SCRIPT, JSP, PHP, ASP & AJAX. Cookies: Creating and Reading

UNIT-4 (12 Hours)

Technologies for Web Applications II: XML: Introduction, HTML Vs XML, Validation of documents, DTD, Ways to use, XML for data files, Embedding XML into HTML documents, Converting XML to HTML for Display, Displaying XML using CSS and XSL, Rewriting

HTML as XML, Relationship between HTML, SGML and XML, web personalization , Semantic web, Semantic Web Services, Ontology.

UNIT- 5 (12 Hours)

E- Commerce: Business Models, Infrastructure, Creating an E-commerce Web Site, Environment and Opportunities. Modes & Approaches, Marketing & Advertising Concepts. Electronic Publishing issues, approaches, legalities and technologies, Secure Web document, Digital Signatures and Firewalls, Cyber crime and laws, IT Act. Electronic Cash, Electronic Payment Systems: RTGS, NEFT, Internet Banking, Credit/Debit Card. Security: Digital Certificates & Signatures, SSL, SET, 3D Secure Protocol. .

Course Outcomes:

At the end of the course, students shall be able to, along with many others following are fundamentals learning outcomes for students that are expected through this course.

1. Be able to understand the concepts, principles and methods of Web engineering.
2. Be able to apply the concepts, principles, and methods of Web engineering to Web applic ations development.
3. Be familiar with current Web technologies.

Suggested Experiments:

1.HTML/ DHTML

2.PHP

3.XML

4.Java Script, CGI, PERL

5.ASP

6.Configuration of Web Servers.

Recommended Books:

1. Roger S.Pressman, David Lowe, “Web Engineering”, Tata Mc Graw Hill Publication, 2007
2. Achyut S Godbole and Atul Kahate, “Web Technologies”, Tata McGraw Hill
3. Gopalan N P , Akilandeswari, “Web Technology: A Developer s Perspective” , PHI
4. Neil Gray, “Web server Programming” Wiley
5. Chris Bates, “Web Programming: Building Internet applications” Wiley
6. Moller, “An Introduction to XML and Web Technologies”, Pearson Education New Delhi, 2009
7. “Web Technologies: Black Book”, Kogent, Dreamtech
8. Internet & World Wide Web How to Program, Pearson education, 3rd edition, by: H.M. Deitel, P.J. Deitel, A.B.
9. C. Xavier, “Web Technology & Design ”, Tata McGraw Hill. 10 Ivan Bay Ross, “HTML,DHTML,Java script,Perl CGI” , BPB