# SREE VIDYANIKETHAN ENGINEERING COLLEGE
## (AUTONOMOUS)

### COURSE STRUCTURE (2011-2012)

### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### M.Tech. (COMPUTER SCIENCE)

**I SEMESTER**

| Subject Code | Subject | Periods per week | | Credits | Scheme of Examination Max. Marks | | |
|---|---|---|---|---|---|---|---|
| | | L | P | | Internal | External | Total |
| 10MT10501 | Computer Architecture | 4 | - | 4 | 40 | 60 | 100 |
| 10MT10502 | Discrete Structures and Automata Theory | 4 | - | 4 | 40 | 60 | 100 |
| 10MT10503 | Data Structures and Algorithms | 4 | - | 4 | 40 | 60 | 100 |
| 10MT10504 | Software Engineering | 4 | - | 4 | 40 | 60 | 100 |
| 10MT10505 | Database Management Systems | 4 | - | 4 | 40 | 60 | 100 |
| 10MT10506<br>10MT10507<br>10MT10508<br>10MT10509 | **Elective–I**<br>* Soft Computing<br>* Computer Vision and Graphics<br>* Digital Image Processing and Pattern Recognition<br>* Software Testing Methodologies | 4 | - | 4 | 40 | 60 | 100 |
| 10MT10510 | Data Structures and Database Management Systems Lab | | 4 | 2 | 25 | 50 | 75 |
| | **TOTAL** | **24** | **4** | **26** | **265** | **410** | **675** |

## II SEMESTER

| Subject Code | Subject | Periods per week | | Credits | Scheme of Examination Max. Marks | | |
|---|---|---|---|---|---|---|---|
| | | L | P | | Internal | External | Total |
| 10MT20501 | Computer Networks | 4 | - | 4 | 40 | 60 | 100 |
| 10MT20502 | Data Warehousing and Data mining | 4 | - | 4 | 40 | 60 | 100 |
| 10MT20503 | JAVA and Web Technologies | 4 | - | 4 | 40 | 60 | 100 |
| 10MT20504 | Object Oriented Analysis and Design | 4 | - | 4 | 40 | 60 | 100 |
| 10MT20505 | Operating Systems | 4 | - | 4 | 40 | 60 | 100 |
| 10MT20506<br>10MT20507<br>10MT20508<br>10MT20509 | **Elective–II**<br>* Cloud Computing<br>* Embedded Systems<br>* Service Oriented Architecture<br>* System Thinking | 4 | - | 4 | 40 | 60 | 100 |
| 10MT20510 | Industrial Visit / Seminar | - | - | 2 | 50 | - | 50 |
| 10MT20511 | Web Technologies and Object Oriented Analysis and Design Lab | | 4 | 2 | 25 | 50 | 75 |
| | **TOTAL** | **24** | **4** | **28** | **315** | **410** | **725** |

## III SEMESTER

| Subject Code | Subject | Periods per week | | Credits | Scheme of Examination Max. Marks | | |
|---|---|---|---|---|---|---|---|
| | | L | P | | Internal | External | Total |
| 10MT30501 | Project Work Phase – I | - | - | 4 | 50 | - | 50 |
| | **TOTAL** | | | **4** | **50** | **-** | **50** |

## IV SEMESTER

| Subject Code | Subject | Periods per week | | Credits | Scheme of Examination Max. Marks | | |
|---|---|---|---|---|---|---|---|
| | | L | P | | Internal | External | Total |
| 10MT40501 | Project Work Phase – II | - | - | 12 | 50 | 100 | 150 |
| | **Total** | | | **12** | **50** | **100** | **150** |

# SREE VIDYANIKETHAN ENGINEERING COLLEGE
# (AUTONOMOUS)

| M.Tech. (CS) | L | P | C |
|---|---|---|---|
| I Semester | 4 | 0 | 4 |

## (10MT10501) COMPUTER ARCHITECTURE

**Unit I**

**Digital Logic Circuits and Components:** Digital Computers - Logic gates - Boolean algebra - Map Simplifications Combinational Circuits: Half-Adder- Full-Adder- decoders- Encoders- Multiplexers Sequential Circuits: Flip flops- Registers- Shift Registers- Binary Counters - Memory Unit.

**Unit II**

**Basic structure of Computers:** Functional units - Basic operational concepts - Bus structures – Software- performance- multiprocessors and multi-computers. Data Types - Complements - Fixed Point Representation - Floating Point Representation - Error detection Codes.

**Unit III**

**Register Transfer Language and Micro operations:** Register Transfer language. Register Transfer Bus and memory transfers- Arithmetic Micro operations- logic micro operations- shift micro operations- Arithmetic logic shift unit. Instruction codes. Computer Registers Computer instructions – Instruction cycle. Memory – Reference Instructions. Input – Output and Interrupt. STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer.

**Unit IV**

**Data Path Design:** Fixed Point Arithmetic- Addition- Subtraction- Multiplication and Division- Combinational and Sequential ALUs- Carry look ahead adder- Robertson algorithm- booth's algorithm- non-restoring division algorithm- Floating Point Arithmetic- Coprocessor- Pipeline Processing- Pipeline Design- Modified booth's Algorithm

**Unit V**

**Control Design:** Hardwired Control-Micro programmed Control-Multiplier Control Unit- CPU Control Unit- Pipeline Control- Instruction Pipelines- Pipeline Performance-Superscalar Processing-Nano Programming.

**Unit VI**

**The Memory System:** Basic concepts- semiconductor RAM memories. Read-only memories Cache memories- performance- Considerations- Virtual memories- secondary storage. Introduction to RAID.

**Unit VII**

**Input-Output Organization: Peripheral Devices:** Input-Output Interface- Asynchronous data transfer Modes of Transfer- Priority Interrupt Direct memory Access- Input –Output Processor (IOP) Serial communication; Introduction to peripheral component- Interconnect (PCI) bus. Introduction to standard serial communication protocols like RS232- USB- and IEEE1394.

**Unit VIII**

**Multi Processors:** Characteristics or Multiprocessors- Interconnection Structures- Inter processor Arbitration. Inter Processor Communication and Synchronization Cache Coherence - Shared Memory Multiprocessors.

**TEXT BOOKS :**


1. Carl Hamacher, Zvonks Vranesic, SafeaZaky, Computer Organization, Vth Edition, McGraw Hill.
2. M. Moris Mano, Computer Systems Architecture, Pearson/PHI, IIIrd Edition
3. John P. Hayes, Computer architecture and Organisation, Tata McGraw-Hill, Third Edition, 1998.


**REFERENCES :**


1. William Stallings, Computer Organization and Architecture , Pearson/PHI, Sixth Edition
2. Andrew S. Tanenbaum, Structured Computer Organization , PHI/Pearson, 4th Edition.
3. Sivaraama Dandamudi, Fundamentals or Computer Organization and Design - Springer Int. Edition.
4. Anjaneyulu, Computer Organization, Himalaya Pub house.

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| M.Tech. (CS) | L | P | C |
|---|---|---|---|
| I Semester | 4 | 0 | 4 |

## (10MT10502) DISCRETE STRUCTURES AND AUTOMATA THEORY

**UNIT-I**

**Mathematical Logic:** Statements and notations – Connectives - Well formed formulas - Truth Tables - Tautology - equivalence implication - Normal forms.

**Predicates:** Predicative logic - Free & Bound variables - Rules of inference – Consistency - proof of contradiction - Automatic Theorem Proving.

**UNIT-II**

**Set Theory:** Properties of binary Relations – equivalence - compatibility and partial ordering relations - Hasse diagram.

**Functions:** Inverse Function – Composite of functions - recursive Functions - Lattice and its Properties - Pigeon hole principles and its application.

**Algebraic structures:** Algebraic systems - Examples and general properties - Semi groups and monads - groups and sub groups - homomorphism - isomorphism.

**UNIT-III**

**Elementary Combinatorics:** Basis of counting - Combinations & Permutations with repetitions - Constrained repetitions - Binomial Coefficients - Binomial and Multinomial theorems - the principles of Inclusion – Exclusion.

**Recurrence Relation:** Generating Functions - Function of Sequences - Calculating Coefficient of generating function - Recurrence relations - Solving recurrence relation by substitution and Generating functions - Characteristics roots solution of In homogeneous Recurrence Relation.

**UNIT-IV**

**Graph Theory:** Representation of Graph – DFS – BFS - Spanning Trees-planar Graphs - Graph Theory and Applications - Basic Concepts Isomorphism and subgraphs - Multi graphs and Euler circuits - Hamiltonian graphs - Chromatic Numbers.

**UNIT-V**

**Fundamentals:** Strings–Alphabet–Language – Operations - Finite state machine–definitions-finite automaton model - acceptance of strings and languages-deterministic finite automaton and non deterministic finite automaton - transition diagrams and Language recognizers.

**Finite Automata:** NFA with Î transitions – Significance - acceptance of languages. **Conversions and Equivalence:** Equivalence between NFA with and without Î transitions - NFA to DFA conversion - minimization of FSM - equivalence between two FSM's - Finite Automata with output-Moore and Melay machines.

**UNIT -VI**

**Regular Languages:** Regular sets - regular expressions - identity rules - Constructing finite Automata for a given regular expressions - Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets - closure properties of regular sets.

Grammar Formalism: Regular grammars-right linear and left linear grammars - equivalence between regular linear grammar and FA - inter conversion - Context free grammar - derivation trees - sentential forms. Right most and leftmost derivation of strings.

**UNIT -VII**

**Context Free Grammars:** Ambiguity in context free grammars - Minimization of Context Free Grammars - Chomsky normal form - Greiback normal form - Pumping Lemma for Context Free Languages - Enumeration of properties of CFL.

**Push Down Automata:** Push down automata–definition – model-acceptance of CFL - Acceptance by final state and acceptance by empty state and its equivalence - Equivalence of CFL and PDA - interconversion. (Proofs not required) - Introduction to DCFL and DPDA.

**UNIT -VIII**

**Turing Machine:** Turing Machine – definition – model - design of TM - Computable functions - recursively enumerable languages - Church's hypothesis - counter machine - types of Turing machines.

**Computability Theory:** Chomsky hierarchy of languages - linear bounded automata and context sensitive language - LR(0) grammar - decidability of problems - Universal Turing Machine - undecidability of posts - Correspondence problem - Turing reducibility- Definition of P and NP problems - NP complete and NP hard problems.

**TEXT BOOKS:**

1. Trembly J.P. & Manohar .P, Discrete Mathematical Structures with applications to computer science, TMH
2. John C Martin, Theory of Computation, TMH.

**REFERENCES :**

1. Ralph. P.Grimaldi, Discrete and Combinational Mathematics- An Applied Introduction-5th Edition, Pearson Education
2. Kenneth H. Rosen, Discrete Mathematics and its Applications, Fifth Edition, TMH.
3. Introduction to Theory of Computation –Sipser 2nd edition Thomson
4. Trembly J.P. & Manohar .P, Discrete Mathematical Structures with applications to computer science, TMH
5. Daniel I.A. Cohen, John Wiley, Introduction to Computer Theory.

# SREE VIDYANIKETHAN ENGINEERING COLLEGE
# (AUTONOMOUS)

| M.Tech. (CS) | L | P | C |
|---|---|---|---|
| I Semester | 4 | 0 | 4 |

## (10MT10503) DATA STRUCTURES AND ALGORITHMS

**UNIT I : Overview of Data Structures**

Review of Arrays- Stacks- Queues- linked lists- Linked stacks and Linked queues- Applications

**UNIT II: Algorithm Analysis**

Efficiency of algorithms- Apriori Analysis- Asymptotic Notations- Time complexity of an algorithm using O notation- Polynomial Vs Exponential Algorithms- Average- Best- and Worst Case Complexities- Analyzing Recursive Programs.

**UNIT III: Trees and Graphs**

Introduction- Definition and Basic terminologies of trees and binary trees- Representation of trees and Binary trees- Binary tree Traversals- Threaded binary trees- Graphs-basic concepts- representation and traversals.

**UNIT IV: Binary Search Trees, AVL Trees and B Trees**

Introduction, Binary Search Trees: Definition- Operations and applications. AVL Trees: Definition- Operations and applications. B Trees: Definition- Operations and applications.

**UNIT V: Red – Black Trees, Splay Trees and Hash Tables**

Red – Black Trees- Splay Trees and its applications. Hash Tables: Introduction- Hash Tables- Hash Functions and its applications.

**UNIT VI: Divide – and – Conquer & Greedy Method**

General Method- Binary Search- Finding Maximum and Minimum- Quick Sort- Merge sort- Strassen's Matrix Multiplication- Greedy Method- General Method- Minimum Cost Spanning Trees- Single Source Shortest Path.

**UNIT VII: Dynamic Programming**

General Method- All Pairs Shortest Path- Single Source Shortest Path- 0/1 Knapsack problem- Reliability Design- Traveling Sales Person's Problem.

**UNIT VIII: Back Tracking and Branch – and – Bound**

General Method- 8 – Queen's Problem- Graph Coloring. Branch – and – Bound: The Method- LC Search- Control Abstraction- Bounding- 0 / 1 Knapsack Problem.

**Text books:**


1. G.A.V. Pai, Data Structures and Algorithms, TMH, 2009.
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, 2nd edition, University Press.


**Reference books:**


1. D. Samanta, Classic Data Structures, PHI, 2005.
2. Aho, Hopcraft, Ullman, Design and Analysis of Computer Algorithms PEA, 1998.
3. Goodman, Hedetniemi, Introduction to the Design and Analysis of Algorithms, TMG.
4. E. Horowitz, S. Sahani, Design and Analysis of Algorithms 3rd Edition, Galgotia.
5. Drozdek, Data Structures and Algorithms in C++, 2nd Edition, Thomson.

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| M.Tech. (CS) | L | P | C |
|---|---|---|---|
| I Semester | 4 | 0 | 4 |

## (10MT10504) SOFTWARE ENGINEERING

**UNIT-I:**

**Software, Software Engineering, and Process**: The nature of Software- The unique nature of WebApps- Software engineering- A layered technology- The essence and principles of software engineering practice- Generic process model (framework)- Process patterns- Process assessment and improvement- CMMI- Software myths.

**UNIT-II:**

**Process Models:** Prescriptive process models: The waterfall model- Incremental process models- Evolutionary process models.
The Unified process- Aspect oriented software development- Agile development: Agile process- Extreme programming.

**UNIT-III:**

**Software Requirements :** Introduction to functional and non-functional requirements- Requirements engineering activities- Eliciting requirements- *Requirements modeling*- Requirements validation- Software requirements specification(SRS)- Requirements management.

**Requirements modeling:** Structured view: Data modeling (ERD)- Functional modeling(DFD)- Behavioral modeling. Object oriented view: Use cases- CRC Modeling- Analysis classes- Collaborations- Responsibilities- Object relationship model- Object behavior model.
**Software Project Estimation:** Empirical estimation models.

**UNIT-IV:**

**Design Concepts:** Software design quality guidelines and attributes- Design concepts.

**Software Architecture:** Architecture and its importance- Architectural Styles- Data design- Architectural design.

**Design:** Structured view (Traditional view): Architectural mapping using data flow (Call and return architecture), Interface design, Function based component design.
**Object oriented view:** OO Architecture, Class hierarchies- Message design- Class based component design.

**UNIT-V:**
**Performing User Interface Design:** Golden rules- User interface analysis and design-interface analysis- interface design steps.

**Pattern Based Design:** Design patterns- Pattern based software design- Architectural patterns- Component level design patterns- User interface design patterns.

**UNIT-VI:**
**Testing :** Software testing strategies: A strategic approach to software testing- Test strategies (Unit testing and integration testing) for conventional and object oriented software- Validation testing- System testing- The art of debugging.

**UNIT-VII:**
**Testing Conventional Applications:** Software testing fundamentals- White-Box testing: basis path testing- condition (predicate) testing- data flow testing- loop testing- Black box testing: Equivalence partitioning- Boundary value analysis- Graph based testing methods.

**Testing Object Oriented Applications:** OO testing methods- Testing methods applicable at class level- Interclass test case design.

**UNIT-VIII:**
**Umbrella Activities:**
Risk management- Software quality assurance- Software configuration management- Measurement and metrics: Size oriented metrics- Function oriented metrics- Metrics for software quality- Product metrics: Metrics for the requirements model- Metrics for the design model- Metrics for source code- Metrics for testing- Metrics for maintenance.

**Software Reengineering:** A software reengineering process model- Software reengineering activities.

**TEXT BOOKS:**

1. Roger S. Pressman, Software Engineering, A practitioner's Approach, 7th edition, McGraw Hill International Edition.
2. Sommerville, Software Engineering, 7th edition, Pearson education.

**REFERENCE BOOKS:**

1. K.K. Agarwal & Yogesh Singh, Software Engineering, New Age International Publishers
2. James F. Peters, Witold Pedrycz, John Wiely, Software Engineering, an Engineering approach.
3. Shely Cashman Rosenblatt, Systems Analysis and Design, Thomson Publications.
4. Waman S Jawadekar, Software Engineering principles and practice, The TATA McGraw- Hill Companies.

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| M.Tech. (CS) | L | P | C |
|---|---|---|---|
| I Semester | 4 | 0 | 4 |

## (10MT10505) DATABASE MANAGEMENT SYSTEMS

**UNIT I**

Databases and Database Users – Database System Concepts and Architecture – Data Modeling Using the Entity- Relationship Model – The Enhanced Entity-Relationship Model.(Text Book 1: Chapters 1, 2, 3 & 4.1,4.2,4.3,4.4)

**UNIT II**

Database Design Theory and Methodology – Functional Dependencies and Normalization for Relational Databases - Relational Database Design and Algorithms and Further Dependencies. (Text Book 1: Chapters 10 & 11)

**UNIT III**

The Relational Data Model and Relational Database Constraints – Relational Algebra and Relational Calculus: Tuple Relational Calculus – Domain Relational Calculus- SQL-99-schema-definitons-constraints (Text Book 1: Chapters 5, 6 & 8)

**UNIT IV**

Introduction to SQL programming Techniques – Introduction to PL/SQL – More on PL/SQL – Database Objects: Stored Procedures and Functions – Advantages of Using a Procedure or Function – Procedure Versus Functions – Syntax for Creating, Deleting Stored Procedure and Functions (Text Book 1: Chapter 9; Text Book 2: Chapters 6, 7 & 9)

**UNIT V**

Disk Storage - Basic File Structures and Hashing – Indexing Structures for Files – Algorithms for Query Processing and Optimization. (Text Book 1: Chapters 13, 14 & 15).

**UNIT VI**

Introduction to Transaction Processing Concepts and Theory - Concurrent Control Techniques – Database recovery Techniques (Text Book 1: Chapters 17, 18 & 19).

**UNIT VII**

Distributed Database: An Overview – Levels of Distribution Transparency – Distributed Database Design – Translation of Global Queries to Fragment Queries (Text Book 3: Chapters 1, 3, 4 & 5)

**UNIT VIII**

Database Security – Concepts for Object Databases – Enhanced Data Models for Advanced Applications – Web Database Programming – Emerging Database Technologies and Applications. (Text Book 1: Chapter 23, 20, 24.1,24.4,24.3, 26 & 30)

**Text Books:**


1. Ramez Elmasri & Shamkant B. Navathe, Fundamentals of Database Systems, Fifth Edition, Pearson Education, 2008.
2. Ivan Bayross – SQL, PL/SQL Programming – 3rd revised edition, BPB publications.
3. Stefano Ceri, Giuseppe Pelagatti, Distributed Databases Principles and Systems, McGraw-Hill International Editions, 1985.


**Reference books:**


1. Thomas M. Connolly, Carolyn E. Begg, Database Systems – A Practical Approach to Design, Implementation and Management, Third edition, Pearson Education, 2003.
2. Jefrey D. Ullman, Jenifer Widom, A First Course in Database Systems, Pearson Education Asia, 2001.
3. Rajesh Narang, “Object Oriented Interfaces and Databases”, Prentice Hall of India, 2002.
4. Abraham Silberchatz, Henry F. Korth, S.Sudarsan, Database System Concepts, Fifth Edition, McGraw-Hill, 2006.

# SREE VIDYANIKETHAN ENGINEERING COLLEGE
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| M.Tech. (CS) | L | P | C |
|---|---|---|---|
| I Semester | 4 | 0 | 4 |

## (10MT10506) SOFT COMPUTING

**Unit I:**

**NEURAL NETWORKS:** Basic concepts-Supervised Learning Neural Networks – Perceptions - Adaline – Back propagation Multilayer Perceptrons – Radial Basis Function Networks

**Unit II**

**ARTIFICIAL NEURALS:** Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian Learning.

**Unit III**

**FUZZY SET THEORY:** Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems- Fuzzy decision making- Applications

**Unit IV**

**FUZZY MODELS:** Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

**Unit V**

**OPTIMIZATION :** Derivative-based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative-free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

**Unit VI**

**NEURO FUZZY MODELING:** Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

**Unit VII**

**GENETIC ALGORITHM:** Survival of the fittest-cross over mutation-reproduction-rank method-rank space method- Application.

**Unit VIII**

**SOFT COMPUTING AND CONVENTIONAL AI :** AI Search algorithm-Predicate calculus rules of interface - Semantic networks-frames-objects-Hybrid models- applications

**TEXT BOOK**

1. J.S.R.Jang, C.T.Sun and E.Mizutani, Neuro-Fuzzy and Soft Computing, PHI, 2004, Pearson Education 2004.

**REFERENCES**

1. Timothy J.Ross, Fuzzy Logic with Engineering Applications, McGraw-Hill, 1997.
2. Davis E.Goldberg, Genetic Algorithms: Search, Optimization and Machine Learning, Addison Wesley, N.Y., 1989.
3. S. Rajasekaran and G.A.V.Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI,
4. R.Eberhart, P.Simpson and R.Dobbins, Computational Intelligence - PC Tools, AP Professional, Boston, 1996.
5. Nih.J.Ndssen Artificial Intelligence, Harcourt Asia Ltd., Singapore, 1998.

# SREE VIDYANIKETHAN ENGINEERING COLLEGE
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| M.Tech. (CS) | L | P | C |
|---|---|---|---|
| I Semester | 4 | 0 | 4 |

## (10MT10507) COMPUTER VISION AND GRAPHICS

**UNIT-I**

**Cameras:** Pinhole Cameras- Camera with Lenses- the Human Eye- Sensing. Radiometry-Measuring Light: Light in Space- Light at Surfaces- Important Special Cases.

**UNIT-II**

Sources- Shadows- and Shading: Qualitative Radiometry- Sources and Their Effects- Local Shading Models- Application: Photometric Stereo- Inter reflections: Global Shading Models.

**UNIT-III**

**Linear Filters:** Linear Filters and Convolution- Shift Invariant Linear Systems- Spatial Frequency and Fourier Transforms- Sampling and Aliasing- Filters as Templates- Technique: Normalized Correlation and Finding Patterns- Technique: Scale and Image Pyramids.

**UNIT-IV**

**Edge Detection:** Noise- Estimating Derivatives- Detecting Edges. Texture: Representing Texture- Analysis using Oriented Pyramids- and Application: Synthesizing Textures for Rendering- Shape for Texture for Planes.

**UNIT-V**

Basic raster graphics algorithms for drawing 2 D Primitives liner- circles- ellipses- arcs- clipping- clipping circles- ellipses & polygon.

**UNIT-VI**

Polygon Meshes in 3D- curves- cubic & surfaces- Solid modeling. Geometric Transformation: 2D- 3D transformations- window to viewport transformations- aromatic and color models.

**UNIT-VII**

**Shading Tech:** Transparency- Shadows- Object reflection- Gouraud & Phong shading techniques. Visible surface determination techniques for visible line determination- Z-buffer algorithm- scanline algorithm- algorithm for oct-tres- algorithm for curve surfaces- visible surfaces ray-tracing - recursive ray tracing- radio-city methods.

**UNIT-VIII**

Elementary filtering tech- elementary Image Processing techniques- Geometric & multi-pass transformation mechanisms for image storage & retrieval.

**Text Books:**


1. David A. Forsyth, Jean Ponce, Computer Vision-A Modern Approach, PHI, 2003.
2. Foley et. al., “Computer Graphics Principles & practice”, AWL.
3. D. Hearn and P. Baker, “Computer Graphics”, Prentice Hall, 1986.


**References:**


1. Geometric Computing With Clifford Algebras: Theoretical Foundations and Applications in Computer Vision and Robotics, Springer; 1 edition, 2001 by Sommer.
2. Sonka, Digital Image Processing and Computer Vision, 1/e.
3. Jack, Computer Vision and Applications: Concise Edition(With CD), Academy Press, 2000.
4. W. Newman and R. Sproul, “Principles of Interactive Computer Graphics, McGraw-Hill, 1973.
5. David F. Rogers, Procedural Elements for Computer Graphics, McGraw Hill Book Company, 1985.

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| M.Tech. (CS) | L | P | C |
|---|---|---|---|
| I Semester | 4 | 0 | 4 |

## (10MT10508) DIGITAL IMAGE PROCESSING AND PATTERN RECOGNITION

**UNIT I**

Digital image fundamentals - Digital Image through scanner- digital camera - Concept of gray levels Gray level to binary image conversion - Sampling and quantization - Relation ship between pixels - Imaging Geometry.

**UNIT II**

Image Transforms 2-D FFT- Properties. Walsh transform - Hadamard Transform- Discrete cosine Transform - Haar transform - Slant transform - Hotelling transform.

**UNIT III**

Image enhancement Point processing - Histogram processing - Spatial filtering - Enhancement in frequency domain - Image smoothing - Image sharpening.

**UNIT IV**

Image Restoration Degradation model- Algebraic approach to restoration- Inverse filtering- Least mean square filters- Constrained Least Squares Restoration- Interactive Restoration.

**UNIT V**

Image segmentation Detection of discontinuities. Edge linking and boundary detection- Thresholding- Region oriented segmentation.

**UNIT VI**

Image compression Redundancies and their removal methods- Fidelity criteria- Image compression models- Source encoder and decoder- Error free compression- Lossy compression.

**UNIT VII**

Basics of pattern recognition- Bayesian decision theory- Classifiers- Discriminant functions- Decision surfaces- Normal density and discriminant functions- Discrete features

**Unit VIII**

Parameter estimation methods- Maximum-Likelihood estimation- Gaussian mixture models- Expectation-maximization method- Bayesian estimation

**TEXT BOOK :**


1. R.C. Gonzalez & R.E. Woods, Digital Image processing, Addison Wesley/ Pearson education, 2nd Education, 2002.
2. S. Theodoridis and K.Koutroumbas, Pattern Recognition, 4th Ed., Academic Press, 2009


**REFERENCES :**


1. A.K.Jain, Fundamentals of Digital Image processing – PHI.
2. Rafael C. Gonzalez, Richard E Woods and Steven L., Digital Image processing using MAT LAB, PEA, 2004.
3. William K. Pratt, John Wilely, Digital Image Processing, 3rd Edition, 2004.
4. Weeks Jr., SPIC/IEEE Series, Fundamentals of Electronic Image Processing – PHI.
5. R.O.Duda, P.E.Hart and D.G.Stork, Pattern Classification, John Wiley, 2001

# SREE VIDYANIKETHAN ENGINEERING COLLEGE
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| M.Tech. (CS) | L | P | C |
|---|---|---|---|
| I Semester | 4 | 0 | 4 |

## (10MT10509) SOFTWARE TESTING METHODOLOGIES

**UNIT - I**

Introduction: Purpose of testing- Dichotomies- model for testing- consequences of bugs- taxonomy of bugs

**UNIT - II**

Flow graphs and Path testing: Basics concepts of path testing- predicates- path predicates and achievable paths- path sensitizing- path instrumentation- application of path testing.

**UNIT - III**

Transaction Flow Testing : Transaction flows- transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing- strategies in dataflow testing- application of dataflow testing.

**UNIT - IV**

Domain Testing:-domains and paths- Nice & ugly domains- domain testing- domains and interfaces testing- domain and interface testing- domains and testability.

**UNIT - V**

Paths- Path products and Regular expressions: Path products & path expression- reduction procedure- applications- regular expressions & flow anomaly detection. Logic Based Testing: Overview- decision tables- path expressions- kv charts- specifications.

**UNIT - VI**

State- State Graphs and Transition testing: State graphs- good & bad state graphs- state testing- Testability tips.

**UNIT - VII**

Graph Matrices and Application: Motivational overview- matrix of graph- relations- power of a matrix- node reduction algorithm- building tools. ( Student should be given an exposure to a tool like JMeter or Win-runner).

**UNIT - VIII**

Software Testing Tools Taxonomy of Testing tools- Methodology to evaluate automated testing tools- Load Runner- Win runner and Rational Testing Tools- Java Testing Tools- JMetra- JUNIT and Cactus.

**TEXT BOOKS :**


1. Boris Beizer, Software Testing techniques, second edition, Dreamtech.
2. Dr. K.V.K.K. Prasad, Software Testing Tools, Dreamtech.


**REFERENCES :**


1. Brian Marick, The craft of software testing, Pearson Education.
2. Software Testing Techniques – SPD (Oreille)
3. Edward Kit, Software Testing in the Real World, Pearson.
4. Perry, Effective methods of Software Testing, John Wiley.
5. Meyers, Art of Software Testing, John Wiley.

# SREE VIDYANIKETHAN ENGINEERING COLLEGE
# (AUTONOMOUS)

| M.Tech. (CS) | L | P | C |
|---|---|---|---|
| I Semester | 0 | 4 | 2 |

## (10MT10510) DATA STRUCTURES AND DATABASE MANAGEMENT SYSTEMS LAB

**Data Structures Lab Experiments:**

1. Implementation of Stacks and Queues used linked list.
2. Perform the following operations using binary search tree:
   a) Insertion
   b) Deletion
   c) Searching
3. Perform the following operations on AVL-tree:
   a) Insertion
   b) Deletion
4. Implementing Knuth-Morris- Pratt pattern matching algorithm.
5. Implement the following using recursive and non-recursive traversals:
   a) Preorder
   b) Inorder
   c) Postorder.
6. Implement all the functions of a dictionary using hashing.
7. Implement a shortest path algorithm to find shortest path in a graph.
8. Implement 8-queen's problem.

**Database Management Systems Lab Experiments:**

1. Implement a student-college relationship using DDL commands and practice all possible DML commands.
2. Implement queries to demonstrate aggregate functions, GROUP BY, HAVING and creation / dropping of views.
3. a. Practice various JOIN operations on relations.
   b. Implement various normalizations on relations.
4. Implement the various trigger operations on relations.
5. Perform the following operations of procedures on relations
   a. Creation of stored procedure
   b. Execution of procedure
   c. Modification of procedure
6. Implement Database Objects and creation of object structures for complex relations.

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## (10MT20501) COMPUTER NETWORKS

**UNIT I**

**Foundation of Networking Protocols:** 5-layer TCP/IP Model- 7-Layer OSI Model- Internet Protocols and Addressing- Equal-Sized Packets Model: ATM .**Review of Computer Networks and the Internet:** What is the Internet- The Network edge- The Network core- Access Networks and Physical media- ISPs and Internet Backbones- Delay and Loss in Packet-Switched Networks- History of Computer Networking and the Internet .

**UNIT II**

**Networking Devices:** Multiplexers- Modems and Internet Access Devices- Switching and Routing Devices- Router Structure. **The Link Layer and Local Area Networks:** Link Layer: Introduction and Services- Error-Detection and Error-Correction techniques- Multiple Access Protocols- Link Layer Addressing- Ethernet- Interconnections: Hubs and Switches- PPP: The Point-to-Point Protocol- Link Virtualization

**UNIT III**

**Routing and Internetworking:** Network–Layer Routing- Least-Cost-Path algorithms- Non-Least-Cost-Path algorithms- Intradomain Routing Protocols- Interdomain Routing Protocols- Congestion Control at Network Layer. **Logical Addressing:** IPv4 Addresses- IPv6 Addresses - **Internet Protocol:** Internetworking- IPv4- IPv6- Transition from IPv4 to IPv6 – **Multicasting Techniques and Protocols:** Basic Definitions and Techniques- Intradomain Multicast Protocols- Interdomain Multicast Protocols- Node-Level Multicast algorithms

**UNIT IV**

**Transport and End-to-End Protocols:** Transport Layer- Transport Services- Connection management- Transmission Control Protocol (TCP)- User Datagram Protocol (UDP)- Mobile Transport Protocols- TCP Congestion Control.

**UNIT V**

**Application Layer:** Principles of Network Applications- The Web and HTTP- File Transfer: FTP- Electronic Mail in the Internet- Domain Name System (DNS)- P2P File Sharing- Socket Programming with TCP and UDP- Building a Simple Web Server

**UNIT VI**

**Wireless Networks and Mobile IP**: Infrastructure of Wireless Networks- Wireless LAN Technologies- IEEE 802.11 Wireless Standard- Cellular Networks- Mobile IP- Wireless Mesh Networks (WMNs)

**UNIT VII**

**Optical Networks and WDM Systems:** Overview of Optical Networks- Basic Optical Networking Devices- Large-Scale Optical Switches- Optical Routers- Wavelength Allocation in Networks- Case Study: An All-Optical Switch

**UNIT VIII**

**VPNs- Tunneling and Overlay Networks**: Virtual Private Networks (VPNs)- Multiprotocol Label Switching (MPLS)- Overlay Networks – **VoIP and Multimedia Networking:** Overview of IP Telephony- VoIP Signaling Protocols- Real-Time Media Transport Protocols- Distributed Multimedia Networking- Stream Control Transmission Protocol

**TEXT BOOKS:**


1. James F. Kurose, Keith W.Ross, Computer Networking: A Top-Down Approach Featuring the Internet, Third Edition, Pearson Education, 2007
2. Nader F. Mir, Computer and Communication Networks, Pearson Education, 2007


**REFERENCE BOOKS:**


1. Behrouz A. Forouzan, Data Communications and Networking, Fourth Edition, Tata McGraw Hill, 2007
2. Greg Tomsho,Ed Tittel, David Johnson, Guide to Networking Essentials, Fifth Edition, Thomson.
3. S.Keshav, An Engineering Approach to Computer Networking, Pearson Education.
4. Diane Teare, Catherine Paquet, Campus Network Design Fundamentals, Pearson Education (CISCO Press)
5. Andrew S. Tanenbaum, Computer Networks, Fourth Edition, Prentice Hall.
6. A.Farrel, The Internet and Its Protocols, Elsevier.

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| II Semester | 4 | 0 | 4 |

## (10MT20502) DATA WAREHOUSING AND DATA MINING

**UNIT-I:**

**Introduction :**Data Mining- Kinds of Data- Data Mining Functionalities- Classification of Data Mining Systems- Primitives- Major Issues in Data Mining.

**UNIT-II:**

**Data Preprocessing**: Descriptive Data Summarization- Data Cleaning- Data Integration and Transformation- Data Reduction- Data Discretization and Concept Hierarchy Generation.

**UNIT-III:**

**Data Warehouse and OLAP Technology**: What is Data Warehouse- A Multidimensional Data Model- Data Warehouse Architecture- Data Warehouse Implementation- From Data Warehouse to Data Mining.

**UNIT-IV:**

**Mining Frequent Patterns and Associations:** Basic Concepts- Efficient and Scalable Frequent Itemset Mining Methods- Mining Various Kinds of Association Rules.

**UNIT-V:**

**Classification and Prediction:** Issues regarding classification and prediction- classification by decision tree induction- Bayesian classification- Rule based classification- Prediction- Accuracy and Error Measures.

**UNIT-VI:**

**Cluster Analysis:** Types of Data in Cluster Analysis- A Categorization of Major Clustering Methods- Partitioning Methods- Hierarchical Methods- Density based Methods- Grid based methods- model based clustering methods- Clustering high dimensional data- Outlier analysis.

**UNIT-VII:**

**Mining Stream- Time-Series- and Sequence Data:** Mining Data Streams- Mining Time-Series Data- Mining Sequence Patterns in Biological Data.

**UNIT-VIII:**

**Mining Object- Spatial- Multimedia- Text and Web data:** Multidimensional analysis and descriptive mining of complex data objects- Spatial Data Mining- Multimedia Data Mining- Text Mining- Mining the World Wide Web.

**TEXT BOOKS:**

1. Jiawei Han and Micheline Kamber, Data Mining, Concepts and Techniques, Elsevier, II Edition, 2008.

**REFERENCE BOOKS:**

1. Margaret H Dunham, Data Mining Introductory and Advanced Topics, Pearson Education, 2e, 2006.
2. Amitesh Sinha, Data Warehousing, Thomson Learning, 2007.

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## (10MT20503) JAVA AND WEB TECHNOLOGIES

**Unit I**

**Object-Oriented concepts:**

Classes and Objects – Methods - Constructors - Overloading Methods and constructors - Encapsulation - Inheritance - Data Abstraction - polymorphism –Abstract classes - Method Overloading - Method Overriding – Interfaces – Packages - Exception handling – try – catch - throw - throws and Finally - Multi Threading-Thread Life cycle - creating Threads.

**Unit II**

Applets - Event Handling - AWT Programming - Introduction to Swing – JApplet - Handling Swing Controls like Icons - Labels – Buttons – Text Boxes – Combo – Boxes – Tabbed Pane – Scroll Pane – Trees – Tables Differences between AWT Controls & Swing Controls Developing a Home page using Applet & Swing.

**Unit III**

**HTML Common tags**- List – Tables – Images – Forms – Frames - Cascading Style sheets - Introduction to Java Scripts - Objects in Java Script - Dynamic HTML with Java Script.

**Unit IV**

**XML**: Document Type Definition - XML Schemas - Document Object model - Presenting XML - Using XML Processors - DOM and SAX

**Unit V**

**Java Beans**: Introduction to Java Beans- Advantages of Java Beans- BDK Introspection- Using Bound properties- Bean Info Interface- Constrained properties Persistence- Customizes- Java Beans API.

**Unit VI**

Web servers- Tomcat Server Installation and Testing-Introduction to Servlets - Lifecycle of a Servlet – JSDK - The Servlet API-The javax.servlet Package-Reading Servlet parameters-Reading initialization parameters - The javax.servlet HTTP package-Handling Http Request & Responses-Using Cookies-Session Tracking-Security Issues.

**Unit VII**

**Introduction to JSP**: The Problem with Servlet - The Anatomy of a JSP Page - JSP Processing - JSP Application Design with MVC architecture - AJAX.

**JSP Application Development**: Generating Dynamic Content - Using Scripting Elements

Implicit JSP Objects - Conditional Processing – Displaying Values Using an Expression to Set an Attribute - Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages-Requests - and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

**Unit VIII**

**Database Access:** Database Access - Database Programming using JDBC Studying Javax.sql.* package - Accessing a Database from a JSP Page Application – Specific Database Actions - Deploying JAVA Beans in a JSP Page.

**TEXT BOOKS:**

1. Patrick Naughton and Herbert Schildt, The complete Reference Java 2 Fifth Edition , TMH.
2. Chris Bates, Web Programming, Building Internet Applications, 2nd Edition, WILEY Dreamtech
3. Dietel,Dietel and Nieto, Internet and World Wide Web-How To Program, PHI/Pearson Education.
4. Hans Bergsten, SPD O'Reilly, Java Server Pages

**REFERENCE BOOKS**:

1. John Duckett, Begining Web Programming, WROX.
2. Marty Hall and Larry Brown, Programming world wide web-Sebesta, Pearson Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES, Pearson.
3. Programming World Wide Web-Sebesta, Pearson.

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## (10MT20504) OBJECT ORIENTED ANALYSIS AND DESIGN

**UNIT I**

**Object Oriented concepts**: The meaning of Object Orientation- object identity- Encapsulation- information hiding- polymorphism.

**Introduction to UML**: importance of modeling- principles of modeling- object oriented modeling- conceptual model of the UML- Architecture.

**UNIT II**

**Basic Structural Modeling:** Classes- Relationships- common Mechanisms- and diagrams.

**Class & Object Diagrams:** Terms- concepts- modeling techniques for Class & Object Diagrams.

**UNIT III**

**Interaction Diagrams: Sequence Diagrams:** Terms- Concepts and Common modeling techniques

**Collaboration Diagrams:** Terms- Concepts and Common modeling techniques

**UNIT IV**

**Basic Behavioral Modeling:** Use cases- Use case Diagrams- Activity Diagrams.

**Advanced Behavioral Modeling:** Events and signals- state machines- processes and Threads- time and space- state chart diagrams.

**UNIT V**

**Architectural Modeling**: Component- Deployment- Component diagrams and Deployment diagrams.

**Case Studies:** Automation of a Library- Software Simulator application (2-floor elevator simulator)

**UNIT VI**

**The Unified process**: use case driven- architecture centric- iterative- and incremental

**The Four Ps:** people- project- product- and process

**Use case driven process:** why use case- capturing use cases- analysis- design- and implementation to realize the use cases- testing the use cases

**Architecture-centric process:** architecture in brief- why we need architecture- use cases and architecture- the steps to architecture- an architecture description.

**Iterative incremental process:** iterative incremental in brief- why iterative incremental development? The iterative approach is risk driven- the generic iteration.

**UNIT VII**

**Inception phase:** early in the inception phase- the archetypal inception iteration workflow- execute the core workflows- requirements to test.

**Elaboration Phase:** elaboration phase in brief- early in the elaboration phase- the architectural elaboration iteration workflow- execute the core workflows-Requirements to test.

**UNIT VIII**

**Construction phase:** early in the construction phase- the archetypal construction iteration workflow- execute the core workflow.

**Transition phase:** early in the transition phase- activities in transition phase

**TEXT BOOKS :**

1. Grady Booch, James Rumbaugh, Ivar Jacobson, The Unified Modeling Language User Guide 2nd Edition, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, UML 2 Toolkit, David Fado WILEY-Dreamtech India Pvt. Ltd.
3. Ivar Jacobson, Grady Booch, James Rumbaugh, The Unified Software Development Process By, Pearson Education

**REFERENCE BOOKS :**

1. Meilir Page-Jones, Fundamentals of Object Oriented Design in UML, Pearson Education
2. Object Oriented Analysis & Design By Atul Kahate, The McGraw-Hill.
3. Mark Priestley, Practical Object-Oriented Design with UML, TATA McGrawHill
4. Brett D McLaughlin, Gary Pollice and David West, Object Oriented Analysis & Design, O'REILY .
5. Simon Bennet, Steve McRobb and Ray Farmer, Object-Oriented Analysis and Design using UML, 2nd Edition, TATA McGrawHill.
6. John W. Satzinger, Robert B Jackson and Stephen D Burd, Object-Oriented Analysis and Design with the Unified Process, THOMSON Course Technology.
7. R.C.Lee, and W.M.Tepfenhart, UML and C++, PHI.

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## (10MT20505) OPERATING SYSTEMS

**Unit I**

**Operating Systems Introduction:** What operating system do- structure- operations process management- memory management- storage management- distributed systems- special purpose systems. Operating system services- system calls- virtual machines- system design and implementation.

**Unit II**

**Process and CPU Scheduling:** Process concepts and scheduling- operations on processes- threads- and inter process communication- scheduling criteria- scheduling algorithms- multiple processor scheduling- thread scheduling.

**Unit III**

**Memory Management and Virtual Memory:** Logical versus physical address space- swapping- contiguous allocation- paging- segmentation- demand paging- performance of demanding paging- page replacement- page replacement algorithms- allocation of frames- thrashing.

**Unit IV**

**File System Interface and Implementation:** Access methods- directory structure- protection- file system structure- allocation methods- free-space management- directory management- directory implementation- efficiency and performance.

**Deadlocks-** System Model- dead locks characterization- methods for handling dead locks deadlock prevention- deadlock avoidance- deadlock detection- and recovery from deadlock.

**Unit V**

**Process Management and Synchronization:** The critical section problem- synchronization hardware- semaphores- and classical problems of synchronization- critical regions- monitors.

**Unit VI**

**Case Study:** The LINUX system: Design principles- kernel modules- process management- scheduling- memory management- file systems- inter process communication.

**Unit VII**

**Introduction to Distributed systems:** Goals of distributed system- hardware and software concepts- design issues.

**Communication in Distributed systems:** Layered protocols- ATM networks- the client server model- remote procedure call and group communication.

**Unit VIII**

**Synchronization in distributed systems:** Clock synchronization- mutual exclusion- Election algorithms- the Bully algorithm- a ring algorithm- atomic transactions.

**Dead locks:** Deadlock in distributed systems- distributed deadlock prevention- and distributed dead lock detection.

**Text Books:**


1. Abraham silberchatz, Peter B. Galvin, Greg Gagne, Operating system principles, 7th Edition, John Wiley.
2. Andrew. S. Tanenbaum, Distributed Operating System, PHI


**Reference Books:**


1. Crowley, Operating System A Design Approach, TMH.
2. Operating Systems – Internals and Design Principles, Stallings, Fifth Ediction, Pearson Education /PHI, 2005.
3. Andrew S Tanenbaum, Modern Operating Systems, 2nd edition, Pearson/PHI.
4. Dhamdhere, Operating Systems, TMH.

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## (10MT20506) CLOUD COMPUTING

**Unit I**

**UNDERSTANDING CLOUD COMPUTING:**

**Virtualization**: Definition, objectives, benefits of virtualized technology, The virtual service desk, How virtualization take place, Related forms of computing - Cloud Computing - Software As A Service – Grid Computing – Utility Computing – Virtualization processes, History of Cloud Computing, Cloud Architecture, Cloud Storage, Why Cloud Computing Matters, Advantages of Cloud Computing, Disadvantages of Cloud Computing, Companies in the Cloud Today, Cloud Services.

**Unit II**

**DEVELOPING CLOUD SERVICES:** Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service - Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds

**Unit III**

**BUILDING CLOUD NETWORKS:** The Evolution from the MSP Model to Cloud - Computing and Software-as-a-Service -The Cloud Data Center - Collaboration - Service-Oriented Architectures as a Step -Toward Cloud Computing -Basic Approach to a Data Center-Based SOA - The Role of Open Source Software in Data Centers.

**Unit IV**

**COMMON STANDARDS IN CLOUD COMPUTING:** The Open Cloud Consortium - The Distributed Management Task Force - Open Virtualization Format - Standards for Application Developers - Browsers (Ajax) - Data (XML- JSON) - Solution Stacks (LAMP and LAPP) - Standards for Messaging - Standards for Security

**Unit V**

**SECURITY IN THE CLOUD:** Cloud Security Challenges - Software-as-a-Service Security - Security Management (People) - Security Governance - Risk Management - Risk Assessment - Security Portfolio Management - Security Awareness - Life Cycle (SecSDLC) - Security Monitoring and Incident - Forensics - Security Architecture Design - Application Security Virtual Machine Security.

**Unit VI**

**CLOUD COMPUTING FOR EVERYONE:** Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

**Unit VII**

**USING CLOUD SERVICES:** Collaborating on Calendars- Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files

**Unit VII**

**OTHER WAYS TO COLLABORATE ONLINE:** Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis.

**Text Books:**


1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, Pearson, August 2011.

2. Cloud Computing Specialist Certification Kit – Virtualization, The Art of Service, http://www.theartofservice.com

**References:**

1. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

2. Tim Mather, Subra Kumaraswamy, Shahed Latif, Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance (Theory in Practice), en | O'Reilly Media, Inc., 2009-09-12 18:32

3. Roger Jennings, Cloud Computing with the Windows Azure Platform (Wrox Programmer to Programmer), Wrox.

4. Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach, en | McGraw-Hill Osborne Media, 2009-11-20 19:08

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## (10MT20507) EMBEDDED SYSTEMS

**UNIT I**

**Introduction to Embedded Systems:** Embedded Systems- Processor Embedded into a System- Embedded Hardware Units and Devices in a System- Embedded Software- Complex System Design- Design Process in Embedded System- Formalization of System Design- Classification of Embedded Systems

**UNIT II**

**8051 and Advanced Processor Architecture:** 8051 Architecture- 8051 Micro controller Hardware- Input/Output Ports and Circuits- External Memory- Counter and Timers- Serial data Input/Output- Interrupts- Introduction to Advanced Architectures- Real World Interfacing- Processor and Memory Organization.

**UNIT-III**

**Program Modeling Concepts**: Program models- DFG models- State Machine program models- Modeling of multi processor system- UML modeling.

**UNIT-IV**

**Embedded Programming Concepts:** Software programming in Assembly language and High Level Language- Data types- Structures- Modifiers- Loops and Pointers- Macros and Functions- object oriented Programming- Embedded Programming in C++ & JAVA

**UNIT-V**

**Device Drivers and Interrupt Service Mechanism**: Programmed-I/O Busy-wait Approach without Interrupt Service Mechanism-ISR Concept-Interrupt sources-Interrupt Servicing mechanisms-Multiple interrupts-Context switching-periods-latency-DMA-Device driver programming.

**UNIT VI**

**Introduction to IPC in Embedded Systems:** Tasks-Task states-Task and data-Shared data-Inter process communication -Signal Function-Semaphore- Message Queues-Mail box-Pipe-Sockets-RPC.

**UNIT VII**

**Real– Time Operating Systems:** Real – Time Operating Systems-Basic Design Using an RTOS- Task Scheduling Models- Interrupt Latency- Response of Task as Performance Metrics - **RTOS Programming:** Basic functions and Types of RTOSES- RTOS VxWorks-Windows CE

**UNIT V III**

**Embedded Software Development Process and Tools:** Introduction to Embedded Software Development Process and Tools, Host and Target Machines, Linking and Locating Software, Getting Embedded Software into the Target System, Issues in Hardware-Software Design and Co-Design – **Testing - Simulation and Debugging Techniques and Tools:** Testing on Host Machine - Simulators - Laboratory Tools

**Text Books**

1. Rajkamal, Embedded Systems Architecture, Programming and Design, Tata McGraw Hill, First reprint, 2003.

**REFERENCE**

1. David E. Simon. An Embedded Software Primer, Pearson Education
2. John Catsoulis, Designing Embedded Hardware, O'reilly
3. Frank Vahid, Tony Givargis, Embedded System Design, John Wiley & Sons, Inc
4. Karim Yaghmour, Building Embedded Linux Systems, O'reilly

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## (10MT20508) SERVICE ORIENTED ARCHITECTURE

### UNIT I

**SOA:** Introducing SOA- Fundamental SOA- Why companies need SOA? Dimensions of SOA- Common tangible benefits of SOA- Common pitfalls of adopting SOA. The Evolution of SOA. A Preview of the Service-Oriented Architecture Compass.

### UNIT II

Explaining the Business Value of SOA- Enterprise Reconstruction- Industry Deconstruction- Rethinking Components for Business and Applications. SOA Value roadmap. The Nine Business Rules of Thumb for SOAs.

### UNIT III

Architectural Elements of SOA- Refining SOA Characteristics- Introduction to Strategy: Business Process Management (BPM) Enterprise Architecture- SOA and Web Services- Strategy of an SOA. Example of SOA as a Tactical Solution. Example of SOA as a Strategic Solution. Governance of Information Technology with an SOA Strategy. Program Management Methodology.

### UNIT IV

Service-Oriented Architecture (SOA) Methodology: Introduction to Program Management Methodology- Framework of Governance- Communications- Product Realization- Project Management- Architecture- Data Management- Service Management- Human Resource Management- Post Implementation.

### UNIT V

Deployment of Services- Integration of Process and Services: Architecture- and Restructuring of Organizations and Staff- Case Study: Broadband Communications Firm- Program Management Methodology: Overview- Methodology Frameworks and Key Factor Highlights on

Project- Governance- Communications- Product Realization- Project Management- Architecture- Data Management- Service Management- Human Resource Management- Post Implementation.

**UNIT VI**

Principles of Service-Orientation Service – Orientation and the enterprise-Anatomy of SOA-Common Principles of Service – Orientation-interrelation between Principles of Service-Orientation-Service Orientation and Object Orientation-Native Web Services support for Principles of Service-Orientation.

**UNIT VII**

Service Layers: Service-Orientation and Contemporary SOA - Service Layer abstraction - Application Service Layer - Business Service Layer-Orchestration Service Layer-Agnostic Services-Service Layer Configuration Scenarios.

**UNIT VIII**

Building SOA(Technology and Design)

Service Oriented Design(Part I-Introduction)-Introduction to Service-Oriented design-WSDL related XML Schema language basics-WSDL language basics-Service interface design tools. Service Oriented Design(Part II-SOA Composition Guidelines)-SOA Composing steps-Considerations for choosing service layers-Considerations for positioning core SOA standards-Considerations for choosing SOA extensions.

**Text Books:**


1. Norbert Bieberstein, Sanjay Bose,, Marc Fiammante, Keith Jones, Rawn Shah, Service-Oriented Architecture Compass: Business Value, Planning, and Enterprise Roadmap, IBM Press, © 2005.
2. James P Lawler, H. Howell-Barber, Service Oriented Architecture: SOA Strategy, Methodology and Technology, Auerbach Publications, Taylor & Francis Group, (C) 2008.
3. Thomas Erl, Service-Oriented Architecture-Concepts, Technology, and Design, Pearson Education.
4. Eric Newcomer, Greg Lomow, Understanding SOA with Web Services, Pearson Education.

**Reference Books:**

1. Jeff Davies & others, The Definitive guide to SOA, Apress, Dreamtech.
2. E.Hewitt, Java SOA Cook book, SPD.
3. N.M. Josuttis, SOA in Practice, SPD.
4. Applied SOA, Wiley India Pvt. Ltd.
5. J. Mc Govern, and others, Java Web Services Architecture, Morgan Kaufmann Publishers, Elsevier.
6. Shankar.K, SOA for Enterprise Applications, Wiley India Edition.
7. W.Roshen, SOA-Based Enterprise Integration, TMH.
8. K.Rama Rao, C.Prasad, SOA Security, dreamtech press.

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## (10MT20509) SYSTEM THINKING

**UNIT I**
**Complexity in Real World**
Complexity – Characteristics of complex problems

**UNIT II**
**Learning**
Learning in and about complex systems – Structure and Behavior of dynamic systems.

**UNIT III**
**Systems thinking mindset**
Holistic Thinking – Multi-levels of reasoning: Event-Pattern-Structure – Learning Organization

**UNIT IV**
**Multi modeling approach**
Multi-perspective: Stakeholder Needs, Alterables and Constraints

**UNIT V**
**Problem solving approach**
Problem Understanding: Discovery and Diagnosis.

**UNIT VI**
**Tools for Systems Thinking**
Causal Loop Diagram – Stocks and Flows – Dynamics of Simple Structures

**UNIT VII**
**System Archetypes -1**
Limits to Growth – Escalation – Drifting Goals

**UNIT VIII**
**System Archetypes -2**
Success to the Successful – Fixes that Fail– Shifting the Burden

**Text Books**

1. Senge, P.M. “The Fifth Discipline: The Art and Practice of Learning Organization”, Doubleday, 1990.
2. Joseph O’Connor and Ian McDermott, “The Art of Systems Thinking”, Thorsons, 1997.

**References Books**

1. John D. Sterman, “Business Dynamics: Systems Thinking and Modeling from Complex World”, McGraw-Hill/Irwin, 2000.
2. Dennis Sherwood, “Seeing the Forest for the Trees: A Manager’s Guide to Applying Systems Thinking”, Nicholas Brealey, 2002.
3. MIT System Dynamics Group: http://sysdyn.clexchange.org/sd-intro/home.html

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## (10MT20511) WEB TECHNOLOGIES AND OBJECT ORIENTED ANALYSIS AND DESIGN LAB

**Object Oriented Analysis and Design Lab Experiments:**

Draw the UML diagrams for the following case studies:

1. ATM application
2. University course information system
3. Online ticket reservation system
4. Online shopping
5. Hospital Management System
6. Unified Library Application
7. Two-floor elevator simulator

**Web Technologies Lab Experiments:**

1. Design static web pages for an online book store website.
2. Write Java script to validate the fields of the registration page.
3. Design a web page using CSS.
4. Write a DTD (Document Type Definition) to validate an XML file.
5. Develop an application using Java Beans.
6. Develop a client-server application using servlets.
7. Develop JSP to connect to the database and experiment with various SQL queries.
8. Create an application using cookies and sessions.