**PVKN Govt. College (A), Chittoor**

(Affiliated to S.V. University, Tirupati)

**Department of Computer Science**

**22-PG-CSC-101 : COMPUTER ORGANIZATION**

**Course Outcomes**

1. Demonstrate knowledge on:

• Computer Arithmetic units

• Register Transfer and Computer Instructions.

1. Analyze the functional units of a digital computer.
2. Design the functional modules in a digital computer - Arithmetic Units, Memory and I/O.

4. Investigate the performance of memory, I/O, and pipelined processors.

5. Select appropriate techniques of I/O, Pipelining and Multiprocessing to solve computing problems.

**UNIT-I:**

**REGISTER TRANSFER & MICROOPERATIONS AND COMPUTER ARITHMETIC**

**Register Transfer And Micro operations:** Register transfer, Bus and memory transfers, Arithmetic micro operations, Logic micro operations, Shift micro operations, Arithmetic logic shift unit.

**Computer Arithmetic:** Fixed point representation, Floating point representation, Addition and subtraction.

**UNIT-II:**

**BASIC COMPUTER ORGANIZATION & DESIGN AND MICRO PROGRAMMED CONTROL**

**Basic Computer Organization and Design:** Instruction codes, Computer registers, Computer instructions, Instruction formats, Addressing modes, Memory reference instructions, Input - Output and Interrupt.

**Micro Programmed Control:** Control memory, Address sequencing, Design of control unit, Hardwired control, Micro programmed control.

**UNIT-III:**

**INPUT-OUTPUT ORGANIZATION**

Peripheral devices, Input-Output interface, Modes of transfer, Priority interrupt, Direct Memory Access, Input-Output Processor (IOP).

**UNIT-IV:**

**THE MEMORY SYSTEM**

Semiconductor RAM memories – Internal organization, Static memories, Synchronous and Asynchronous DRAMs, Structure of larger memories; Read-Only memories, Cache memories – Mapping functions; Secondary Storage – Magnetic Disks, Optical Disks.

**UNIT-V: PIPELINE & VECTOR PROCESSING**

**Pipeline and Vector Processing:** Parallel processing, Pipelining, Arithmetic pipeline, Instruction pipeline, Vector processing, Array processors.

**TEXT BOOKS:**

1. Morris Mano, Computer System Architecture, Pearson Education, Third Edition, 2007.

2. Carl V. Hamacher, Zvonko G. Vranesic and Safwat G. Zaky, Computer Organization, McGraw-Hill, Fifth Edition, 2002.

**TEXT BOOKS:**

1. Morris Mano, Computer System Architecture, Pearson Education, Third Edition, 2007.

2. Carl V. Hamacher, Zvonko G. Vranesic and Safwat G. Zaky, Computer Organization, McGraw-Hill, Fifth Edition, 2002.

**REFERENCE BOOKS:**

1. William Stallings, Compu ter Organization and Architecture: Designing For Performance, Pearson Education, Seventh Edition, 2007.

2. John P. Hayes, Computer Architecture and Organization, McGraw-Hill. Third Edition.

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**Department of Computer Science**

**22-PG-CSC-102 : DATA STRUCTURES THROUGH JAVA**

**Course Outcomes**

1. Understand the concept and underlying principles of Object-Oriented Programming
2. Develop problem-solving and programming skills using OOP concept
3. Develop the ability to solve real-world problems through multi-threaded programming using Java
4. Describe how arrays, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
5. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs

**UNIT-I:**

**Introduction:** Concept of Data Structures – Arrays, Linked Lists – Types of Linked Lists, Applications of linked lists. Stacks – Implementation of stacks, Operations of stacks, Applications of stacks. Queues: Definition - Representation of Queues - Various queue structures - Application of queues.

**UNIT-II:**

**Trees:** Definition and concepts - Representation of Binary tree - Operations on Binary tree - Types of binary trees - Trees and forests - B Trees - B+ Tree Indexing.

**Graphs:** Terminology - Representation of graphs - Operations and graphs Application of graph structures.

**Searching and Sorting:** Linear Search, Binary Search, Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort.

**UNIT-III:**

**INTRODUCTION**

Data types, Variables, Arrays, Operators, Control statements.

**Classes and Objects:** Concepts of Classes, Objects, Constructors, Methods, this keyword, Garbage collection, Overloading Methods and Constructors, Parameter passing, Access control, Recursion, String Class.

**UNIT IV:**

**INHERITANCE, PACKAGES AND INTERFACES**

**Inheritance:** Inheritance basics, Super keyword, Multi-level hierarchy, Abstract classes, Final keyword with inheritance.

**Packages:** Definition, Creating and accessing a package, Understanding CLASSPATH, Importing packages.

**Interfaces:** Definition, Implementing interfaces, Nested interfaces, Applying interfaces, Variables in interface and Extending interfaces.

**UNIT - V:**

**EXCEPTION HANDLING**

Exception Handling: Concepts of exception handling, Exception types, Usage of Try, Catch, Throw, Throws and Finally, Built in exceptions, Creating own exception sub classes.

**Multithreading:** Creating threads, Life cycle of a thread, Thread priority, Synchronizing threads,

**TEXT BOOK:**

1. Herbert Schildt, Java the Complete Reference, Oracle Press, Ninth Edition.

2. CLASSIC DATA STRUCTURES; by D.Samanta -PHI,2001

**Reference Books**

1. Dietel & Dietel : “Java2 How to Program”, PrenticeHall.
2. Thamus Wu: “An Introduction to Object Oriented Programming With Java.”TMH
3. Balagurusamy:”Programming With Java”:TMH.

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**Department of Computer Science**

**22-PG-CSC-103: OPERATING SYSTEMS**

**Course Outcomes**

1. Demonstrate knowledge on Operating system operations, services, file management, disk management, I/O management and protection.
2. Identify the functionality involved in process management concepts scheduling and synchronization.
3. Design models for handling deadlock and perform memory management.
4. Synthesize and apply programming API’s to perform Process management.
5. Use appropriate protection tools to provide access control to Operating system users.

**UNIT-I:**

**OPERATING SYSTEMS OVERVIEW AND PROCESS MANAGEMENT**

Operating system Definition, Types of Operating Systems, Functions of Operating Systems, Distributed systems, Special purpose systems.

**Process Management:** Process states, Process Control Block, Inter process communication, Multithreading models, Scheduling algorithms.

**UNIT-II:**

**SYNCHRONIZATION AND DEADLOCKS**

**Synchronization:** The critical-section problem, Peterson’s Solution, Semaphores, Classic problems of synchronization, Monitors.

**Deadlocks**: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock detection, Deadlock avoidance, Deadlock recovery.

**UNIT-III:**

**MEMORY MANAGEMENT**

**Memory Management Strategies:** Swapping, Contiguous memory allocation, Paging, Structure of the page table, Segmentation.

**Virtual Memory Management:** Demand paging, Copy-on-Write, Page replacement Algorithms, Thrashing.

**UNIT-IV:**

**STORAGE MANAGEMENT**

**File System:** File Concept, Access methods, File system structure, File system implementation, Allocation methods.

**Secondary Storage Structure:** Disk structure, Disk scheduling, Swap-space management, Tertiary storage.

**UNIT-V:**

**I/O SYSTEMS AND PROTECTION**

**I/O Systems:** I/O Hardware, Application I/O interface, Kernel I/O subsystem.

**Protection:** Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights.

**TEXT BOOK:**

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Principles, Wiley India Edition, 7th edition, 2011.

**REFERENCE BOOKS:**

1. William Stallings, Operating Systems, Internals and Design Principles, Pearson Education, 7th edition, 2013.

2. Andrew S. Tanenbaum, Modern Operating Systems, PHI, 3rd edition, 2009.

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**Department of Computer Science**

**22-PG-CSC-104A: MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE**

**Course Outcomes**

1. Apply mathematical logic to solve problems
2. Understand permutations and combinations
3. Use set theory and its applications.
4. Use recursive functions to solve problems
5. Understand graph theory.

**UNIT-1**

**Mathematical Logic**: Statements and Notations, Connectives, Well Formed Formulas, Truth Tables, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications, Normal Forms.

**UNIT-2**

**Set Theory**: Operations on Sets, Principle of Inclusion-Exclusion.

**Relations:** Binary relation, Representation of relations, Composition of relations, Types of relations, Closure properties of relations, Equivalence relations, Partial Ordering relations.

**UNIT-3**

**Functions:** Types of functions, Identity function, Composition of functions, Mathematical functions.

**Algebraic Structures:** Algebraic Systems, Semi Groups and Monoids, Group, Subgroup and Abelian Group.

**UNIT-4**

**Combinatorics**: Basic Counting Principles, Permutations, Permutations with Repetitions, Circular and Restricted Permutations, Combinations, Restricted Combinations, Pigeonhole principle.

**UNIT-5**

**Graph Theory**: Basic Concepts, Sub graphs, Graph Representations: Adjacency and Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, BFS, DFS, Spanning Trees, Minimal Spanning Trees, Prim’s and Kruskal’s Algorithms.

**TEXT BOOK**

1. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill.

**REFERENCES**

1. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rd Edition, Tata McGraw Hill.

2. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel and T. P. Baker, 2nd Edition, Prentice Hall of India.

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**Department of Computer Science**

**22-PG-PCH-101: PC HARDWARE**

**Course Outcomes**

1. Understand the real time working of virtual memory and cache memory

2. Identify various ports, connectors and interface cards

3. Get Practical knowledge on installation of software and troubleshooting PCs

4. Connect different types of hardware devices and installing required drivers

5. Understand the concept of data recovery and disaster recovery

**UNIT I**

Basic concepts and architecture: System, Memory, Control unit, Arithmetic & Logic Unit. Interrupts, Operating system, Virtual memory, Cache memory. Peripheral Devices: Keyboard, CRT, Display, Monitor, Printer.

**UNIT II**

Mother Board: Introduction to mother boards & its types, Ports, Slots, Connectors, Add on cards,

Power supply units, Cabinet types.

Bus Standards and Networking: ISA, PCI, SCSI, IDE, USB – comparative study and characteristics,

Network Interface Cards.

**UNIT III**

Maintenance & Troubleshooting: System configuration, Pre-Installation planning, Installation practice, Preventive maintenance tools, Procedures, Plan/schedule.

**UNIT IV**

Troubleshooting: Computer faults, Types of faults, Diagnostic programming & tools,

Systematic troubleshooting, Troubleshooting levels, Different troubleshooting techniques - Functional area approach, Split half method,Divergent, Convergent and feedback path Method.

**UNIT V**

Installation and Troubleshooting: Hard drives, Operating system and software, Sound card, Video card, HDD, CD-Rom drive, Key board and Mouse, Modem, Power supply, I/O ports, Printer interface problems.

**Text Books:**

1. B. Govindarajalu, “IBM PC Clones Hardware, Troubleshooting and Maintenance”, Tata McGraw-Hill.

2. Craig Zacker, John Rourke, “The Complete Reference: PC Hardware”, Tata McGraw-Hill, New

Delhi.

**Reference Books:**

1. Scott Mueller “Upgrading and Repairing PCs”, 20th Edition, Pearson Education, New Delhi, 2012.

2. Ron Gilster, “PC Hardware – a beginner’s Guide”, Tata McGraw-Hill.

3. Mike Meyers, “Introduction to PC Hardware and Troubleshooting”, Tata McGraw-Hill, New Delhi.

4. Dan Gookin, “Troubleshooting Your PCs for Dummies”, 3rd Edition, Willey Publishing Inc.

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**Department of Computer Science**

**22-PG-CSC-301:**

**DATA WAREHOUSING AND DATAMINING**

**COURSE DESCRIPTION:**

Data Mining Fundamentals; Data Preprocessing; Operational Database Systems and Data Warehouses; Mining Frequent Patterns; Classification and Prediction; Clustering; New Trends and Research Frontiers.

**COURSE OUTCOMES:**

On successful completion of the course, students will be able to:

CO1. Demonstrate knowledge on Concepts of data warehousing and data mining.

CO2. Analyze using data mining techniques to find useful and potential Knowledge.

CO3. Design of Data Warehouse for OLAP applications and deployment.

CO4. Evaluate the usage of association mining techniques on complex data objects.

CO5. Select appropriate techniques to measure the interesting patterns from heterogeneous databases.

CO6. Apply appropriate evolutionary data mining algorithms to find solutions of Real time Applications.

### UNIT-I: DATA WAREHOUSING AND ONLINE ANALYTICAL PROCESSING

### Data Warehouse, Operational Database Systems versus Data Warehouses, A Multi tired Architecture, A Multidimensional Data Model, Stars, Snowflakes and Fact Constellations: Schemas, Role of Concept hierarchies, Measures, OLAP Operations, From online Analytical processing to Multidimensional Data Mining, Indexing OLAP Data.

### UNIT-II: DATA MINING AND DATA PREPROCESSING

### Introduction to Data Mining, kinds of data, kinds of patterns, major issues in Data Mining, Data Pre-processing, Data Cleaning, Data Integration , Data Reduction, Data Transformation and Discretization.

### UNIT-III: ASSOCIATIONS AND CLASSIFICATION

### Basic Concepts , Frequent itemset Mining Methods, pattern evaluation methods- From Association Mining to Correlation Analysis ,Classification, Decision Tree Introduction, Bayesian Classification Methods, Rule Based Classification, Prediction: Linear Regression.

### UNIT-IV: CLUSTER ANALYSIS

### Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods -k-Means and K-Medoids, Hierarchical methods-Agglomerative and divisive method, Density-Based Method-DBSCAN, Grid-Based Method-STING, Outlier Analysis.

### UNIT-V: DATA MINING TRENDS

### Mining Complex Data Types: Mining sequence data, Mining other kinds of data: Spatial, Text, Multimedia and Web data, Data Mining Trends.

### Text Books:

1. Jiawei Han, Micheline Kamber and Jian Pei, Data Mining: Concepts and Techniques, Elsevier, 3rd edition, 2013.

### Reference Books:

1. Data Mining – Concepts and Techniques by Han and Kamber, 2001, Morgan Kaufmann Publishers
2. Oracle 8i – Data Warehousing by Cohen, Abbey, Taub, Tata McGraw Hill

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**Department of Computer Science**

### 22-PG-CSC-302: WEB TECHNOLOGIES

### COURSE DESCRIPTION:

### Hyper Text Markup Language (HTML); Features of HTML5; Cascading Style Sheets (CSS); JavaScript; JQuery; AJAX, Hypertext Preprocessor (PHP); Java Servlets, JSP.

### COURSE OUTCOMES:

### On successful completion of the course, students will be able to:

### CO1. Demonstrate knowledge on web page design elements, dynamic content and database interaction.

### CO2. Analyze user requirements to develop web applications.

### CO3. Design client-server applications using web technologies.

### CO4. Demonstrate problem solving skills to develop enterprise web applications.

### CO5. Use HTML, CSS, JavaScript, JQuery, JSP and PHP technologies for device independent web application development.

### CO6. Apply Web Technologies to develop interactive, dynamic and scalable web applications for societal needs.

**UNIT-I**

Introduction to Internet-Browser Architecture-IE, Chrome-Search Engines-Introduction to HTML-5- HTML-5 Tags-Audio, Video Tags – HTML-5 Forms-Controls-CSS Styling-CSS Tags Attributes.

### UNIT-II

Java Script - JQuery- JavaScript Programming Scripts- Control structures- Functions Document, Browser, Date, Math, String objects-Events- JQuery Libraries-JQuery Objects, Functions – JQuery Events-Animations.

**UNIT-III**

AJAX Concepts- Simple AJAX objects-Ajax Libraries-Examples, Web servers IIS, Tomcat Hosting Website in a Web server.

### UNIT-IV

Introduction to PHP-Control Structures-Arrays-Functions-Database connectivity Introduction to ZEND Framework and applications

### UNIT-V

Introduction to Java Servlets, Servlets classes and interfaces - Java Database Connectivity Introduction to JSP-Java Server Page scriplets -JSP Objects-JSP Web applications.

### TEXT BOOK:

1. Deitel, Deitel and Goldberg Internet & World Wide Wide how to program ”by End. Pearson Education
2. Ivan Bayross, Web enavled commercial Application Development in Java 2.0 BPB.
3. Nicholas C. Zakas.,Jeremy McPeak,Joe Fawcett, Professional AJAX,2nd Edition, Willey publishing
4. HTML 5 Black book, Kogent Learning Solutions Inc.

### REFERENCE BOOKS:

1. Raj Kamal Internet and web Technologies, Tata Mc Graw Hill, 2002. 2.Chirs Bates, Web Programming, John Wiley, 2nd Edition

1. E.V.Kumar and S.V.Subramanyam, Web Services. Tata Mc Graw Hill, 2004.

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### 22-PG-CSC-303: SOFTWARE ENGINEERING

**Course Objectives**

The Objective of the course is to assist the student in understanding the basic theory of software engineering, and to apply these basic theoretical principles to a group software development project.

**Course Outcomes:**

Upon successful completion of the course, a student will be able to:

CO1. Gather and specify requirements of the software projects.

CO2. Analyze software requirements with existing tools

CO3. Differentiate testing methodologies

CO4. Understand and apply the basic project management practices in real life projects

CO5. Work in a team as well as independently on software projects

**UNIT I**

**INTRODUCTION:** Defining Software, Software Application Domains, Software Engineering definition, The Software Process.

**SOFTWARE PROCESS MODELS**: The Waterfall Model, Incremental Process Models, The Prototyping Model, The RAD Model, Spiral Model.

**UNIT II**

**Requirements Analysis:** Functional and Non Functional Requirements, Requirements specification – Requirements Engineering Process – Requirements Elicitation Techniques – Requirements Analysis – Requirements Documentation: SRS, Characteristics of Good SRS.

**UNIT III**

**DESIGN CONCEPTS**:

Introduction to Software Design, Software Design Levels – Modularization, Advantages of Modularization, Concurrency – Cohesion, Types of Cohesion – Coupling, Types of Coupling – Strategy of Design: Function Oriented Design and Object Oriented Design – Object modelling using UML: Use case diagrams and Class diagrams.

**UNIT IV**

**USER INTERFACE DESIGN:** The Golden Rules, User Interface Design Process, User Interface Analysis and Design Models.

**QUALITY MANAGEMENT:** Software Quality – Quality Control – Software Project Management – Software Quality Assurance (SQA), SQA Activities, Benefits of SQA.

**UNIT V**

**SOFTWARE TESTING:** Testing Objectives and Principles, Basis Path Testing, Control Structure Testing, Black Box Testing**.**

**SOFTWARE TESTING STRATAGIES**: Unit Testing, Integration Testing, Validation Testing and System Testing, Reverse Engineering, Reengineering.

**Text Books:**

1. Roger Pressman S., “Software Engineering: A Practitioner's Approach”, 7th Edition, McGraw Hill, 2010.

**REFERENCE BOOKS:**

1. Sommerville, “Software Engineering”, Eighth Edition, Pearson Education, 2007 .

2. K.K. Aggarwal and Yogesh Singh,” Software Engineering”, New Age International, 01 Jan-2005.

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**Department of Computer Science**

### 22-PG-CSC-304A: SYSTEMS PROGRAMMING

**COURSE OBJECTIVES:**

To introduce student the fundamental model of the processing of high level language programs for execution on computer system, the basic operations that are performed from the time a computer is turned on until a user is able to execute programs.

**COURSE OUTCOMES:**

CO1. Understand different components of system software.

CO2. Understand intermediate code generation in context of language designing.

CO3. Recognize operating system functions such as memory management as pertaining to run time storage management.

CO4. To understand how linker and loader create an executable program from an object module created by assembler and compiler.

CO5. To know various editors and debugging techniques.

**UNIT I:**

Background introduction, system software and machine architecture, SIC, RISC, and CISC architecture. Assembler: basic assembler functions, machine dependent and independent assembler features, assembler design options, and implementation examples.

### UNIT II:

Loading and linkers basic loader junction, machine dependent and independent loader features, loader design options and implementation examples. Macro processors, basic macro processor functions machines – independent macro processor features, macro processor design options, implementation examples.

### UNIT III:

Compilers: basic compiler functions, machine dependent and independent compiler features, compiler design options and implementation examples. Other system software: text editors and interactive debugging systems

### UNIT-IV

Introduction to Device Drivers, Design issues-Types of Drivers, Character driver-1 and Design issues, Character Driver-2- A/D converter and its design issues, Block driver-1 and its design issues- RAM DISK driver-Anatomy-Prologue of drivers and programming Considerations.

### UNIT-V

Introduction to Linux- Linux Architecture- X-windows- Linux administration tools - Commands to use Linux OS- Executing Linux Shell scripts – Shell Programming concepts Shell scripts.

### Text Books:

1. Leland .Beck, System Software: An Introduction to systems Programming: 3/e, Pearson Educations Asia, 2003.
2. George pajari, Writing Unix Drivers, Addison – Wesley,1991.
3. Richard Petersen, Linux complete Reference, McGraw Hill Education (India) Private Limited; 6 edition (21 November 2007

### Reference Books:

1. Dhamdhere, System programming and operation Systems Book 2/E, Tata Mc Graw, Hill, 1999

2. A.V. Aho, Ravi Sethi and J D Ullman , “compilers, Techniques and Tools”, Addison Wesley, 1986.

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### 22-PG-CSC-304B: THEORY OF COMPUTATION

### COURSE DESCRIPTION:

### Fundamentals of Computation; Finite State Automaton; Regular Expressions; Grammars; Push Down Automaton; Turing Machine.

### COURSE OUTCOMES:

### On successful completion of the course, students will be able to:

### CO1. Demonstrate knowledge on Formal languages and automata.

### CO2. Analyze the classification of languages, automata’s and their computing power.

### CO3. Design grammars and automata (recognizers) for regular expressions and formal languages.

### CO4. Solve computational problems using automata.

### CO5. Apply theorems to translate automata’s and identify the class of languages.

### UNIT-I: FINITE AUTOMATA

### Introduction to Finite automata, Deterministic finite automata, Nondeterministic Finite automata, the equivalence of DFA and NFA, Finite automata with epsilon-transitions, Conversion of epsilon-NFA to NFA and DFA, Mealy and Moore models.

### UNIT-II: REGULAR EXPRESSIONS AND LANGUAGES

### Regular expressions, Identity rules and Arden’s theorem, Conversion of FA to RE, Conversion of RE to FA, Pumping lemma for regular languages, Applications of the pumping lemma, Closure properties of regular languages, Equivalence of two finite automata and minimization of automata.

### UNIT-III: CONTEXT-FREE GRAMMARS

### Context-free grammars – Definition, Derivations using a Grammar, Left most and Right most derivations, Parse trees, Ambiguity in CFG, Simplification of CFG, Chomsky’s Normal form, Greibach Normal form, The pumping lemma for context-free languages.

### UNIT-IV: PUSH DOWN AUTOMATA

### Definition of the Pushdown Automaton, the languages of a PDA, Construction of PDA from CFG, Deterministic Pushdown Automaton, Chomsky hierarchy of languages.

### UNIT-V: TURING MACHINES

### Turing machine model, Representation of Turing machines; Language acceptability by Turing machine, Design of Turing machines, Turing machines with semi-infinite tapes, Universal Turing machines.

**TEXT BOOKS:**

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D Ullman, Introduction to Automata Theory, Languages and Computation, Pearson Education, Third Edition, 2011.

2. K.L.P. Mishra and N.Chandrasekaran, Theory of Computer Science: Automata Languages and Computation, PHI Learning, Third Edition, 2009.

**REFERENCE BOOK:**

1. John C Martin, Introduction to Languages and the Theory of Computation, TMH, Third Edition, 2009.

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### 22-PG-CSC-304C: COMPUTER ALGORITHMS

**COURSE OBJECTIVES:**

To learn how to analyze an algorithm theoretically and to study basic methods of problem solving and algorithms in modern computing.

**COURSE OUTCOMES:**

CO1. Analyze any algorithms and able to calculate their theoretical complexity.

CO2. Understand the problem solving methods such as recurrences, dynamic programming and greedy method.

CO3. Able to explain important algorithmic design paradigms and apply when an algorithmic design situation calls for it.

CO4. Understand Np-Hard and Np-complete concepts

CO5. Argue the correctness of algorithms using inductive proofs and loop invariants.

**UNIT I:**

Divide – and-Conquer and Greedy Methods.

### UNIT II:

Dynamic Programming; Basic Traversal and Search Technique.

### UNIT III:

Backtracking; and Branch-and Bound Technique.

### UNIT IV:

Lower bound Theory; NP-Hard and NP-Complete Problems

### UNIT V:

Mesh and Hypercube Algorithms, the Fast Fourier Transform and its Applications.

### TEXT BOOKS:

1. Eills Horowliz, Sartaj sahni and Sanguthevar Rajasekaran. Computer Algorithms Galgotia Publications, 1999.

### REFERENCE BOOKS:

* 1. RCT Lec, SS Teang, RC Change and YT Tsai, Introduction to the Design and Analysis of Algorithms, McGraw-Hill 2005.
  2. R. Jhonsonbaugh and Mschaefer, Algorithms, Pearson education 2004.
  3. A. Levitin, Introduction to the Design and Analysis of Algorithms, Pearson Education 2005.
  4. TH Coremen, CE Leiserson and RL Rivest, Introduction to Algorithms, PHI 5. G. Brassed and P. Bratley, Fundamentals of Algorithms, PHI

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### 22-PG-CSC-304D: USER INTERFACE DESIGN USING .NET TECHNOLOGIES

**COURSE OBJECTIVES:**

Learners are exposed to describe the web user Interface to the structure of user Interface and design process and Organize the web systems and control.

**COURSE OUTCOMES:**

CO1. Describe the Characteristics of Graphics Interface and its Principles.

CO2. Design the standards and structures for Human computer interaction.

CO3. Understand the components of web systems and text boxes.

CO4. Demonstrate the Guidance of multimedia systems and its accessibility.

CO5. Summarize the concepts of windows layout and visualization.

**Unit – I:**

Human factors of interactive software goals of system engineering and user-interface design, motivations, accommodation of human diversity goal for out profession. Theories, principles, and guidelines – High-level theories, object-action interface model, Principle 1.2 and 3, guide links for data display and data entry, balance of automation and human control. Managing design processes

* Usability, design pillars, development methodologies, ethnographic observation, usability testing, surveys, and continuing assessments – expert reviews, usability testing and laboratories, surveys acceptance tests, evaluation during active use, and controlled psychologically oriented experiments.

**Unit – II:**

Software tolls – Specification methods, interface- building tools and evaluation and critiquing tools. Direct manipulation and virtual environments – examples, explanations, programming, visual, thinking and icons Home automation, remote direct manipulation, visual environments. Menu selection, form filling, and dialog boxes – Task – related organizations item presentation sequence, response time and display rate, fact movement through menus, menu layout, form fill in, and dialog boxes. Command and natural languages – Functionality to support users tasks, command – organization strategies, the benefits of structure, naming and abbreviations, command menus, natural language in computing.

### Unit – III:

Interaction Devices – Keyboards and function keys, pointing devices, speech recognition digitization and generation. Image and video displays, printers. Response time and display rate-Theoretical foundations, expectations and attitudes, user productivity, variability. Presentation styles: Balancing function and fashion – error messages, No anthropomorphic design, display design, color, Printed manuals, Online Help and tutorials – Reading from paper versus form displays, preparation of printed manuals, and preparation of online facilities.

### Unit – IV:

Multiple – Window strategies – Individual – Window design, multiple-window design, Coordinator by tightly – coupled windows. Image browsing and tightly –coupled windows, personal role management and elastic windows. Computer-supported cooperative work-goals of cooperation, Asynchronous Interaction: Different time and place, Synchronous Distributed: Different place, same time, face to face: same place, same time, Applying CSCW to Edition, Information search and visualization – Database Query and phrase search in textual documents, multimedia document searches, information visualization. Advanced filtering. Hypermedia and the world wide web (www).

### Unit – V:

Introduction to Dot Net technology c#.Net Language – Control structures – GUI controls – Database GUI Controls and its connectivity to databases – ASP.Net Fundamentals and Web pages Interface designing.

### TEXT BOOK:

1. Ben Shriderman, Designing the user Interface, strategies for effective human- Computer introduction Third Edition, Pearson Education, 2004, (For units I, II, III and IV).
2. Beginning .NET 2.0 by wrox publications (For Unit V).

### Reference Books:

1. Hix, Deborah and Hartgon, H.RR X; Developing use Interfaces, John Wiley, 1993.
2. Galitz, Wilbert O., It‟s Time to Clear Your Windows: Designing GUIs that Work, John Wiley and Sons, New York(1994) 3. ASP.NET 2.0 Black Book , Dreamtech publications. 4. VB.NET

2.0 Black Book, Dreamtech publications.

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### 22-PG-CSC-304E : SOFTWARE TESTING

**COURSE OBJECTIVES:**

Study fundamental concepts of software testing and its application in various scenarios with the help different testing strategies, methods and tools.

**COURSE OUTCOMES:**

CO1. TO Understand importance of testing techniques in software quality management and assurance.

C02. Identify various types of software risks and its impact on different software application.

CO3. Create test case scenarios for different application softwares using various testing techniques.

CO4. Apply different testing methodologies used in industries for software testing.

**UNIT I**

Software Engineering Evaluation

* Software Development Process Models
* Requirements Management
* Software Design
* Coding and Unit Testing
* Integration Testing
* System testing
* Installation and Acceptance
* Customer Support / Maintenance

### UNIT II

System Testing Process

* System testing Process
* System Test Commencement
* System Test Planning
* Test Design
* Test Execution
* Test Reporting and Defect Tracking

### UNIT III

WinRunner 8.0

* Introduction to WinRunner
* checkpoints in WinRunner
* Data Driven and Batch Testing
* Improve Test Automation in WinRunner
* GUI Mapping
* Web test Option in WinRunner

### UNIT IV

QTP 8.2

* QuickTestPro Introduction
* Edit Test Scripts
* Improving Test Automation in QTP
* Data Driven and Batch Testing
* Web Test Options in QTP

### UNIT V

Load Runner 8.0

* Introduction to Performance Testing
* VuserScript Creation Using LoadRunner
* VuserScript Execution and Results Analysis TestDirector 8.0
* Site Administrator
* Understanding Test Director

**TEXT BOOK:**

1. Software Testing Concepts And Tools By Nageshwar Rao Pusuluri, Dreamtech Press,

### References:

### 1. Roger S.Pressman, Software engineering- A practitioner’s Approach, McGraw-Hill International Editions

### 2. Ian Sommerville, Software engineering, Pearson education Asia

### 3. Software Testing Techniques, 2nd edition, Boris Beizer, 1990

### 4. Software Testing: Principles and Practices by Srinivasan Desikan

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### 22-PG-CSC-305A: CLOUD COMPUTING

**COURSE OBJECTIVES:**

This course gives students an insight into the basics of cloud computing along with virtualization, cloud computing is one of the fastest growing domain from a while now. It will provide the students basic understanding about cloud and virtualization along with it how one can migrate over it.

**COURSE OUTCOMES:**

CO1. Analyze the trade-offs between deploying applications in the cloud and over the local infrastructure.

CO2. Compare the advantages and disadvantages of various cloud computing platforms.

CO3. Deploy applications over commercial cloud computing infrastructures such as Amazon Web Services, Windows Azure, and Google App Engine.

CO4. Analyze the performance, scalability, and availability of the underlying cloud technologies and software.

CO5. Identify security and privacy issues in cloud computing.

**UNIT I**

UNDERSTANDING CLOUD COMPUTING : Cloud Computing – 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

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 IV**

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 V

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

### REFERENCES:

* 1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
  2. Kumar Saurabh, “Cloud Computing – Insights into New Era Infrastructure”, Wiley Indian Edition, 2011.
  3. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for Ondemand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

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### 22-PG-CSC-305B: BIG DATA ANALYTICS

**COURSE OBJECTIVES:**

Understand the Big Data Platform and its Use cases and Provide an overview of Apache Hadoop, HDFS Concepts and Interfacing with HDFS, Map Reduce Jobs Provide hands on Hodoop Eco System to apply analytics on Structured, Unstructured Data. Exposure to Data Analytics with R.

**COURSE OUTCOMES:**

CO1. To understand big data analytics as the next wave for businesses looking for competitive

CO2. To understand the financial value of big data analytics

CO3. To explore tools and practices for working with big data

CO4. To understand how big data analytics can leverage into a key component

CO5. To know about the research that requires the integration of large amounts of data

**UNIT-I**

What is Big Data - Varieties of Data - Unstructured data – Trends in Data Storage- Industry Examples of Big Data

### UNIT-II

Big data Technology – New and older approaches- Data Discovery – Open source technologies for Big Data Analytics- Cloud and Big Data –Big Data Foundation-Computation-Limitations Big Data Emerging Technologies

### UNIT-III

Business Analytics- Consumption of Analytics- Creation to Consumption of Analytics-Data visualization by Organizations – 90/10 rule of critical thinking – Decision sciences and analytics- Learning over knowledge-Agility-Scale and convergence-Privacy and security in Big Data.

### UNIT-IV

Predictive Analytics –Linear Regression – Decision trees-Neural networks-Classification trees Ensemble methods-Association Rules-Segmentation, Sequence Rules, Social Network analytics.

### UNIT-V

Hadoop – Components of Hadoop – Hadoop File System –Hadoop Technology Stack-Dataware housing Hadoop Concepts-Applications of Hadoop using PIG,YARN, HIVE.

### Text Books

1. Micheal Minnelli,Ambiga Dhiraj,Chambers, Big Data and Big Analytics, Willey and Sons Inc,.
2. Bart Beasens, Analytics in Big Data World, Willey and Sons Inc

3 Sameer Wadker,Madhu Sidhalingaiah and Jason Winner,Apache Hadoop, APress

### Reference Books

### Michael Berthold, David J. Hand, "Intelligent Data Analysis”, Springer, 2007.

### Jay Liebowitz, “Big Data and Business Analytics” Auerbach Publications, CRC press (2013)

### Tom Plunkett, Mark Hornick, “Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop”, McGraw-Hill/Osborne Media (2013), Oracle press.

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### 22-PG-CSC-305C: ARTIFICIAL NEURAL NETWORKS

**COURSE OBJECTIVES:**

To understand the biological neural network and to model equivalent neuron models, the architecture, learning algorithm and issues of various feed forward and feedback neural networks.

**COURSE OUTCOMES:**

CO1. Create different neural networks of various architectures both feed forward and feed backward.

CO2. Perform the training of neural networks using various learning rules.

CO3. Perform the testing of neural networks and do the perform analysis of these networks for various pattern recognition applications.

CO4. To know some application of artificial neural networks.

CO5. To identify the different structures of artificial neural networks.

**UNIT I**

INTRODUCTION - what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks (p. no’s 1 –49) LEARNING PROCESS 1 – Error Correction learning, Memory based learning, Hebbian learing, (50-55)

### UNIT II

LEARNING PROCESS 2: Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process, (p. no’s 50 –116) SINGLE LAYER PERCEPTRONS – Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception –convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment (p. no’s 117 –155)

### UNIT III

MULTILAYER PERCEPTRON – Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection, (p. no’s 156 –201) BACK PROPAGATION - back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning. (p. no’s 202 –234)

### UNIT IV

SELF ORGANIZATION MAPS – Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification, Hierarchal Vector quantilizer, contexmel Maps (p. no’s 443 –469, 9.1 –9.8 )

### UNIT V

NEURO DYNAMICS – Dynamical systems, stavility of equilibrium states, attractors, neurodynamical models, manipulation of attractors’ as a recurrent network paradigm (p. no’s 664 –680, 14.1 –14.6) HOPFIELD MODELS – Hopfield models, computer experiment I (p. no’s 680-701, 14.7 –14.8)

### TEXT BOOK:

1. Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2nd Edition 2004

### REFERENCE BOOKS:

1. Artificial neural networks - B.Vegnanarayana Prentice Halll of India P Ltd 2005
2. Neural networks in Computer intelligence, Li Min Fu TMH 2003
3. Neural networks James A Freeman David M S kapura Pearson Education 2004

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### 22-PG-CSC-305D: CYBER SECURITY

### COURSE DESCRIPTION:

The Cyber security Course will provide the students with foundational Cyber Security principles, Security architecture, risk management, attacks, incidents, and emerging IT and IS technologies.

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### COURSE OUTCOMES:

On successful completion of the course, students will be able to:

CO1. Cyber Security architecture principles.

CO2. Identifying System and application security threats and vulnerabilities.

CO3. Cyber Security incidents to apply appropriate response.

CO4. Describing risk management processes and practices.

CO5. Evaluation of decision making outcomes of Cyber Security scenarios.

### UNIT-I: Introduction to Cyber Crime

Introduction to Cybercrime: Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security ,Who are Cybercriminals?, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.

### UNIT-II: Cyber Offenses

Cyber offenses: How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.

### UNIT-III: Cyber Crime Mobile and Wireless Devices

Cybercrime Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era.

### UNIT-IV: Tools and Methods used in Cyber Crime

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Attacks on Wireless Networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

### UNIT-V: Cyber Crimes and Cyber Security

Cybercrimes and Cyber security: Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Information Security Planning and Governance, Information Security Policy Standards, Practices, Training and awareness program.

**TEXT BOOKS:**

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, SunitBelapure, Wiley.

2. Principles of Information Security, MichealE.Whitman and Herbert J.Mattord, Cengage Learning.

.

**REFERENCE BOOK:**

1. Information Security, Mark Rhodes, Ousley, MGH.

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### 22-PG-CSC-305E: MOBILE APP DEVELOPMENT

**COURSE OBJECTIVES:**

To facilitate students to understand android SDK and to help students to gain a basic understanding of Android application development, inculcate working knowledge of Android Studio development tool.

**COURSE OUTCOMES:**

CO1. Identify various concepts of mobile programming that make it unique from programming for other platforms.

CO2. Critique mobile applications on their design pros and cons,

CO3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,

CO4. Program mobile applications for the Android operating system that use basic and advanced phone features, and

CO5. Deploy applications to the Android marketplace for distribution.

**UNIT I**

Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications

### UNIT II

BASIC DESIGN : Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.

### UNIT III

ADVANCED DESIGN: Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.

### UNIT IV

TECHNOLOGY I - ANDROID : Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

### UNIT V

TECHNOLOGY II - IOS : Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and address book with social media application – Using Wifi - iPhone marketplace.

### TEXT BOOKS:

### 1. T1. Lauren Darcey and Shane Conder, “Android Wireless Application Development”, Pearson Education, 2nd ed. (2011)

### REFERENCES:

1. <http://developer.android.com/develop/index.html>
2. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012

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**22-PG-OE-301: Office Automation**

## Corse Objectives:

This course aims at acquainting the students with basic computer fundamentals and MS Office tools MS Word, MS PowerPoint, and MS Excel which help them in their day to day life as well as in office and research.

## Course Outcomes:

After successful completion of the course, student will be able to:

1. Demonstrate basic understanding of computer hardware and software.
2. Apply skills and concepts for basic use of a computer.
3. Identify appropriate tool of MS office to prepare basic documents, charts, spreadsheets and presentations.
4. Create personal, academic and business documents using MS office.
5. Create spreadsheets, charts and presentations.
6. Analyze data using charts and spread sheets.

**Unit-I**

**Basics of Computers:** Definition of a Computer - Characteristics and Applications of Computers, Limitations of Computer – Block Diagram of a Digital Computer – I/O Devices.

**MS-Word**: Features of MS-Word – MS-Word Window Components – Creating, Editing, Formatting and Printing of Documents – Headers and Footers – Insert/Draw Tables – Mail Merge.

**Unit-II**

**MS-PowerPoint:** Features of PowerPoint – Creating a Blank Presentation - Creating a Presentation using a Template – Auto content wizard – Inserting and Deleting Slides in a Presentation – Adding Clip Art/Pictures -Inserting Other Objects, Audio, Video – Slide Transition – Custom Animation.

**Unit-III**

**MS-Excel:** Overview of Excel features – Creating a new worksheet, Selecting cells, Entering and editing Text, Numbers, Formulae, Referencing cells – Inserting Rows/Columns –Changing column widths and row heights, auto format, changing font sizes, colors, shading, Charts and its Types.

**Reference Books:**

1. Fundamentals of Computers by ReemaThareja, Publishers : Oxford University Press, India.
2. Fundamentals of Computers by V.Raja Raman, Publishers : PHI.
3. Microsoft Office 2010 Bible by John Walkenbach, Herb Tyson, Michael R.Groh and FaitheWempen, Publishers : Wiley.