**SRI VENKATESWARA UNIVERSITY, TIRUPATI**
**Department of Computer Science**
**ADOPTION OF CBCS SYSTEM FOR PG PROGRAMMES WITH EFFECT FROM 2016 – 2017**
**M.Sc. [Computer Science]**

| Semester | Course Code | Course | Core / Elective Or Minor Or Soft Skill Courses | L | T | P | University Exam Duration [ Hrs ] | IE / IA | EE / EA | Total Marks | No. Of Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I | MSCS -101C | Computer Organization | Core | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS -102C | Programming in Java & Data Structures | Core | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS -103C | Operating Systems | Core | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS - 104GE | 1.Mathematical Foundations For Computer Science<br>2. Computer Oriented Operational Research | Generic Elective | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS - 105CF | Environmental Studies | Compulsory Foundation | 2 | 0 | 0 | 1.5 | - | 50 | 50 | 2 |
| | MSCS - 106EF | PC Hardware Basics<br>Statistical Methods | Elective Foundation | 2 | 0 | 0 | 1.5 | - | 50 | 50 | 2 |
| | MSCS - 107P1 | | Practical I On Core | 0 | 0 | 4 | 3 | 20 | 80 | 100 | 4 |
| | MSCS - 108P2 | | Practical II On Core & Generic Elective | 0 | 0 | 4 | 3 | 20 | 80 | 100 | 4 |
| | | | | | | | | 80 | 620 | 700 | 28 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| II | MSCS -201C | Advanced Data Base Management System | Core | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS -202C | Computer Networks | Core | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS -203C | Computer Graphics | Core | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS - 204GE | 1. E- Commerce<br>2. Accounting And Financial Management | Generic Elective | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS - 205CF | Human Rights And Value Education | Compulsory Foundation | 2 | 0 | 0 | 1.5 | - | 50 | 50 | 2 |
| | MSCS - 206EF | 1)Principles Of Management<br>2)Internet Of Things | Elective Foundation | 2 | 0 | 0 | 1.5 | - | 50 | 50 | 2 |
| | MSCS - 207P1 | | Practical I on Core | 0 | 0 | 4 | 3 | 20 | 80 | 100 | 4 |
| | MSCS - 208P2 | | Practical II on Generic Elective | 0 | 0 | 4 | 3 | 20 | 80 | 100 | 4 |
| | | | | | | | | 120 | 580 | 700 | 28 |

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| Semester | Course Code | Course | Core / Elective Or Minor Or Soft Skill Courses | L | T | P | University Exam Duration [ Hrs ] | IE / IA | EE / EA | Total Marks | No. Of Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| III | MSCS -301C | Data Warehousing And Data Mining | Core | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS -302C | Web Technologies | Core | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS -303C | Software Engineering | Core | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS -304-GE-A | 1.Systems Programming<br>2. Computer Algorithms<br>3.UID Using .Net Technologies<br>4.IT in Forensic Science<br>5. Software Testing | Generic Elective | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS -305 GE-B | 1.Cloud Computing<br>2. Big Data Analytics<br>3. Artificial Neural Networks<br>4.Cyber Security<br>5.Mobile App Development | Generic Elective | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS -306OE | The courses offered by other departments<br>1. Programming in C<br>2. Office Automation<br>3. Internet Fundamentals and Web Designing | Open Elective | 3 | 1 | 0 | 3 | 20 | 80 | 100 | 4 |
| | MSCS -307P1 | | Practical I on Core | 0 | 0 | 4 | 3 | 20 | 80 | 100 | 4 |
| | MSCS -308P2 | | Minor Project work | 0 | 0 | 4 | 3 | 20 | 80 | 100 | 4 |
| | | | | 0 | 0 | 0 | -- | 160 | 640 | 800 | 32 |

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**M.Sc. [Computer Science]**

| Semester | Course Code | Course | Core / Elective Or Minor Or Soft Skill Courses | L | T | P | University Exam Duration [ Hrs ] | IE / IA | EE / EA | Total Marks | No. Of Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IV | MSCS - 401MP | Major Project Work | Core | 0 | 0 | 24 | 3 | 100 | 200 | 300 | 12 |
| All Semesters | Total | | | | | | | | | 2500 | 100 |

**SRI VENKATESWARA UNIVERSITY, TIRUPATI**

**Dept of Computer Science**

**ADOPTION OF CBCS SYSTEM FOR PG PROGRAMMES WITH EFFECT FROM 2016 – 2017**

**M.Sc [Computer Science]**

## MSCS 101C: COMPUTER ORGANIZATION

**UNIT I:**

Logic Circuits: Logic functions – synthesis of logic functions – Minimizations of logic - Synthesis with NAND and NOR gates Implementation of Logic gates - Flip-flops – Registers and shift registers – counters – decoders – Multiplexers – PLDs – sequential circuits. Basic Structure of Computers: Functional Units - Basic operational concepts – Bus structures – performance – Multi processors and Multi computers: Functional Units – Basic operational concepts – Bus structures – performance – Multiprocessors and Multi computers – Historical Perspective.

**UNIT II:**

Machine Instructions and programs: Numbers, Arithmetic operations and characters – Memory locations and address, operations – instructions and instruction, sequencing – addressing modes.

**UNIT III:**

Input / Output organization: accessing I/O Devices – Interrupts – direct memory access – buses 240-interface circuits – Standard I/O Interfaces.

**UNIT IV:**

Memory System, Concepts – semiconductor RAM memories - Read only memories – cache memories – performance considerations – virtual memories management requirements – secondary storage Arithmetic: Addition and subtraction of sign members – design of fast adders – multiplication of positive members – signed operand multiplication – fast multiplication – integer division – floating point numbers and operations.

**UNIT V:**

Basic Processing Unit: Concepts – execution of a complete instruction – Multiple – Bus organization – hardware control – micro programmed control. Pipelining: Concepts – Data hazards – instruction hazards – influence on Instruction sets - data path and control constructions – supers cal operation- ultra SPARC II – Performance considerations.

**Text Books:**


1. Hamacher C, Vranesic Z, and Zaky S. Computer Organization, 5th edition, Mc Graw – Hill, 2002


**Reference Books:**


1. Stallings W, Computer Organization and Architecture, 6th edition. Parson Education, 2003.
2. Mano M.M. Computer System Architecture, 3rd edition. PHI, 1993.
3. Yarbrough JM, Digital Logic – Applications and Design, Thomas Lernig, 1997.
4. Heuring VP, and Jordan HF, Computer Systems Design and Architecture, Pearson Education, 1997.


## MSCS 102C: PROGRAMMING IN JAVA AND DATA STRUCTURES

**UNIT – I:**

Object Oriented Programming Fundamentals & Java: Java Features, Object Oriented Programming Concepts –Abstraction, Encapsulation, Inheritance, and Polymorphism. Java Fundamentals: Data Types, variables, arrays, Inheritance to classes: class fundamentals, Objects, References, Constructors, Overloading of methods, Access control, Nested and Inner classes. Inheritance: Inheritance basics, Using super, multilevel hierarchy, method overriding, dynamic method dispatch, abstract classes, final with inheritance.

**UNIT-II:**

Packages, Exceptions and Threads: Packages and Interfaces: Packages, Access protection, Importing packages, interfaces, Exception Handling: fundamentals, exception types, uncaught exceptions, using try, nested try statements, throw, throws, Java built-in exceptions, user defined exceptions. Multithreading: Thread model, main thread, creating a thread, multiple threads, thread priorities, synchronization, Inter thread communication, String handling.

**UNIT-III:**

GUI Programming Features: Applets: Applet basics, Applet architecture, an applet skeleton, Applet display method, Repainting, Using Status window, HTML APPLET tag, passing parameters to applet, Audio Clip interface. Event Handling; two event handling mechanisms, Event model, Event classes, sources of events, Event Listener interfaces, Adapter classes.

**UNIT IV:**

Introduction: Concept of Data Structures - Overview of Data Structures Implementation of Data Structures. Arrays: Definition - Terminology - One dimensional array – Multidimensional. Arrays - Pointer arrays. Linked Lists : Single linked lists Circular linked list - Double linked lists -Circular Double linked lists - Applications of linked lists. Stacks: Definition - Representation of stack - Operations of stack Applications of stack. Queues: Definition - Representation of Queues - Various queue structures - Application of queues.

**UNIT - V:**

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

**Text Book**

1. Herbert Schildt: “The Complete Reference Java 2”(Fifth Edition),TMH.
2. CLASSIC DATA STRUCTURES; by D.Samanta -PHI, 2001

**Reference Books**

1. Dietel & Dietel : “Java2 How to Program”, Prentice Hall.
2. Thamus Wu: “An Introduction to Object Oriented Programming With Java.” TMH
3. Balagurusamy:”Programming With Java”: TMH.
4. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Addison Wesley Publishing
5. M.AWeiss, "Data Structures and Algorithm Analysis in C++", Benjamin Cummiys, 1994.
6. AS. Tanenbaum, Langram Y, Augestein MJ, Data Structures Using C ", PHI, 1992.

**MSCS 103C: OPERATING SYSTEMS**

**UNIT I:**

Introduction to Operating Systems, Types of Operating Systems, Computing Environments, Computer system operation, I/O structure, and Hierarchy, Hardware protection, Network structure, Operating system components and services – system calls, Systems programs, System Structure, Virtual machines, System design and Implantation.

**UNIT II:**

CPU Scheduling: Scheduling criteria, Scheduling Algorithms, Multiple processors Scheduling, Real-time scheduling. Process Synchronization:- The critical-section problem, Synchronization hardware, Semaphores, Classic problems of Synchronization, Critical regions, Monitors. Dead Locks: Deadlock characterization, Deadlock handling, Deadlock prevention, Deadlock avoidance, Deadlock detection, and Recovery.

**UNIT III:**

Memory Management: Swapping, Contiguous memory allocation, Paging, Segmentation with paring Concept of Virtual memory Demand paging Page replacement, Allocation of frames, Thrashing. File System Interface & Implementation: File concept, Access methods, Directory structure, File System Mounting File sharing Protection, File system structure, and implementation, Directory implementation, Allocation methods. Free space management, Efficiency and performance, Recovery.

**UNIT IV:**

I/O Systems: overview, I/O hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O to Hard ware operations, STREAMS, Performance of I/O. Mass Storage Structure:- Disk Structure Disk Scheduling, Disk management, Swap-space Management, RAID Structure, Disk Attachment, Stable – Storage implementation, Tertiary – storage structure. Protection: Goals, Domain of protection, Access matrix and implementation, Access rights, capability – based systems, Language – based protection.

**UNIT V:**

User authentication, program threats, system threats, security systems Facilities,. Linux system: History, Design principles, Kernel modules, process management, Scheduling Memory Management, File Systems, Input and output, IPC, Network structure, security.

**TEXT BOOKS:**

1. Silberschatz A, Galvin P.B, and Gaghe G. Operating System Concepts, 6th edition, John Wiley, 2002. 2. Tenenbaum A.S., Modern Operating Systems, 2nd edition, Pearson Education, 2001.

**REFERENCE BOOKS:**

1. Dhamdhere D.M., Operating Systems – A concept based Approach, Tata McGraw-Hill, 2002.
2. Flym I M, and Mc Hoes A.M., Understanding Operating Systems, 3rd edition, Thomson Brooks/Cole, 2001.
3. Bhatt P.C.P., An Introduction to Operating Systems – Concepts and Practice, PHI, 2003.
4. Harris J.A., Operating Systems, Tata McGraw-Hill (Schaum"s Outlines series), 2002.
5. Remy Card, Eric Dumas, Linux Kernal Book , Orielly

**MSCS 104GE-1: MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE**

**UNIT I**

Mathematical Logic : Connectives Negation, Conjunction, disjunction, Statement Formulas and TT, Conditional and Biconditional, Well formed formulas, tautologies, Equivalence of statement formulae, Duality law, Tautological implications, Functionally complete set of connectives; Normal Forms Disjunctive, Conjunctive, Principal disjunctive and principal conjunctive normal forms.

**UNIT II**

The theory of inference for statement calculus, Validity using TT, rules of inference, consistency of premises and indirect method of proof, Automatic Theorem proving- Predicate Calculus, Predicates, the statement function, variables and quantifiers.

**UNIT III**

Set Theory : Basic Concepts of Set theory, Notation, Inclusion and equality , Power set, Operations on sets, Set identities, Ordered pairs and n-tuples, Cartesian products - Relations and Ordering , Relations, Properties of binary relation- relation matrix and graph of a relation, partition and covering of a set, equivalence relations, composition of binary relations, partial ordering, partially ordered set - Functions, Definition, composition, Inverse, Binary and n-ary operations, characteristic function of a set, hashing function- Recursions, Functions, sets and predicates.

**UNIT IV**

Lattices and Boolean Algebra: Lattices as partially ordered sets, properties of lattices, Lattices as Algebraic systems, Some special lattices - Boolean algebra, functions, representation and minimization.

**UNIT V**

Graph theory: Definition, Examples, Paths and Cycles, Planarity, coloring graphs

**TEXT BOOKS**

1. J.P. Tremblay and R.Manohar, Discrete Mathematical structures with applications to Computer Science, Tata McGraw Hill publishers, 2008.
2. Robin. J.Wilson, Introduction to Graph theory. (Fourth edition)

## MSCS 104GE-2: COMPUTER ORIENTED OPERATIONS RESEARCH

**UNIT-I:**

Introduction to Operations Research: Origin and Development of OR, Definition of OR, Applications of OR, Models and their classifications, Advantages and Limitations of OR

**UNIT-II:**

Linear programming problem (LPP): Formulation of LPP, Solution of LPP using graphical method and simplex method (≤ inequality only).

**UNIT-III:**

Transportation problem: Mathematical formulation, IBFS of transportation problem using north-west corner rule, least-cost rule and Vogels approximation method, Simple problems.

**UNIT-IV:**

Assignment problem: definition, mathematical formulation of assignment problem, solution of transportation problem using Hungarian Algorithm, simple problems

**UNIT-V:**

Job Sequencing Problem: Introduction – Definition – Terminology and Notations Principal Assumptions,

Problems with n Jobs through Two Machines

Problems with n Jobs through Three Machines

**Text Book:**

1. Operations Research (2nd Edition) by S.Kalavathi, Vikas Publications Towers Pvt. Ltd.

**Reference books:**

1. Operations Research by Kanthi swaroop, P.K.Gupta, Manmohan by Sultan Chand & Sons
2. Operations Research by Paneerselvam by Prentice Hall of India
3. Operations Research by S.D.Sarma
4. Operations Research by Taha, H.A., Ninth Edition

## MSCS 105CF: ENVIRONMENTAL STUDIES

**Unit I**

Definition -Scope and importance.-Need for public awareness

**Unit II**

Natural Resources, Ecosystems

**Unit III**

Environmental pollution

**Unit IV**

Social issues and the environment

**Unit V**

Human population and the environment

**Text Books:**

1. Environmental Studies - S.N. Chary
2. A text book on Ecology and Environmental Science – M. Prasanthrajan

## MSCS 106EF-1: PC HARDWARE BASICS

**UNIT I**

Basic concepts and architecture, Microprocessor, System, Memory, Control unit, Arithmetic & Logic Unit. Interrupts, Operating system, Virtual memory, Cache memory. Peripheral Devices: Keyboard, CRT, Display, Monitor, Printer. Magnetic Storage Devices: Floppy disk drive, Hard disk drive. PC Hardware overview: Hardware, BIOS-DOS Interaction, PC Hardware, Motherboard logic, I/O Data transfer, PC Hardware components & ICs, Computer memories.

**UNIT II**

Mother Board: Introduction to mother boards & its types, Ports, Slots, Connectors, Add on cards, Power supply units, Cabinet types, Mother boards Problem Diagnosis. Bus Standards and Networking: ISA, PCI, SCSI, IDE, USB – comparative study and characteristics, Network Interface Cards, Cables and connectors.

**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, Symptoms observation & analysis, Fault diagnosis, Rectification, 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, FDD, CD-Rom drive, Key board and Mouse, Modem, Power supply, I/O ports, Printer interface problems, Printer problems, Attaching Add-on cards. PC Assembling, up gradation and integration, Basic data recovery & disaster recovery.

**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.

## MSCS 106EF-2: STATISTICAL METHODS

**UNIT-I**

Introduction - scope and limitations of statistical methods - classification of data - Tabulation of data - Diagrammatic and Graphical representation of data - Graphical determination of percentiles and quartiles.

**UNIT-II**

Measures of location: Arithmetic mean, median, mode, geometric mean and Harmonic mean and their properties.

**UNIT-III**

Measures of dispersion: Range, Quartile deviation, mean deviation, Standard deviation, combined standard deviation, co-efficient of variation.

**UNIT-IV**

Measures of Skewness Karl Pearson's, Bowley's, kelly's and co-efficient of Skew ness and kurtosis based on moments.

**UNIT-V**

Correlation - Karl Pearson - spearman's rank correlation - concurrent deviation methods. Regression Analysis: Simple Regression Equations.

**Text Books**

1. Fundamental of Mathematical Statistics - S.C. Gupta & V.K. Kapoor - Sultan Chand

**Reference Books**

1. Statistical Methods - Snedecor G.W. & Cochran W.G. oxford & +DII
2. Elements of Statistics - Mode . E.B. - Prentice Hall
3. Statistical Methods - Dr. S.P. Gupta - Sultan Chand & Sons

## II SEMESTER

## MSCS 201C: ADVANCED DATABASE MANAGEMENT SYSTEMS

**UNIT-I**

File System Vs. DBMS - Database System Applications - View of Data-Database language – Database design – ER Model _ Relational Model – Network Data Model – Hierarchical Data Model – Data Storage & Querying – Data Architecture.

**UNIT-II**

Relational Model – Structure of Relational Databases – Relational Algebra and Calculus – SQL – Basic Structure – Set Operations – Aggregate Functions – Null Values – Nested Queries – Complex Queries – Views – Modification of the Database - Advanced SQL – Triggers.

**UNIT-III**

Functional Dependencies - Features of Relational designs – Decomposition and Normalization using Functional Dependencies and Multivalued Dependencies – Join dependencies- Domain key Normal form.

**UNIT-IV**

Overview of Physical Storage Media – Magnetic disks – RAID – Territory Storage - File Organization – Organization of records in Files – Indexing and Hashing – Ordered Indices – B+ -Tree Index Files – B-Tree Index Files – multiple Key Access – Static and Dynamic Hashing – Query Processing – Transaction Management – Transactions – Concurrency.

**UNIT-V**

Distributed Databases – Homogeneous and Heterogeneous Databases – Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control. Case Study : Oracle – Introduction – Basics elements of SQL – Operators – Expression Functions – SQL Statements – PL/SQL- Triggers – Cursor.

**Text Books:**

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan- “Database System Concepts”, Fifth Edition, McGraw-Hill, 2006.

**References Books:**

1. Raghu Ramakrishnan and Johannes Gehrke, “Database Management Systems”, Tata McGraw-Hill Publishing Company, 2003.
2. Ramez Elmasri and Shamkant B. Navathe, “Fundamental Database Systems”, Third Edition, Pearson Education, 2003.
3. Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- “Database System Implementation”- Pearson Education- 2000.
4. Narang,”Database management systems”,2nd ed.,PHI

## MSCS 202C: COMPUTER NETWORKS

**UNIT – I:**

Introduction, Network models – Internet model, OSI model Physical Layer: Signails – Analog, Digital, Digital Transmission – Coding, Sampling, Analog Transmission – Modulation of digital and analog signal, Multiplexing – FDM, WDM, TDM, Transmission Media – cable, wireless, Circuit switching and Telephone network, DSL Technology, Cable modern, SONET.

**UNIT – II:**

Data Link Layer: Error detection and correction, Data link control and Protocols – Stop and wait, Go-back-n, Selective repeat, HDLC, Point to point access, Channelization, LANS – Traditional Ethernet, Fast Ethernet, Gigabit Ethernet, Wireless LAN"s – IEEE 802.11, Blue tooth, Connecting LANs – Connecting devices, Backbone networks, Virtual LANS, Cellular telephony, Satellite networks, Virtual circuit switching, Frame relay, ATM.

**UNIT – III:**

Network Layer: Inter-networks, Addressing, Routing, Network layer Protocols – ARP, IP, JCMP. IPV6, Routing – Introduction, Unicast routing, Protocols – RIP, OSPF, BGP, Multicast Routing, Protocols – DVMRP, MOSPF, CBT, PIM.

**UNIT – IV:**

Transport Layer: Process-to-Process Delivery, UDP, TCP, Data traffic, Congestion and Control, Quality of service (QOS) and techniques to improve QOS, Integrated services, QOS in Switched networks. Security: Introduction. Symmetric-key cryptography, Public key cryptography, Message security, Digital signature, User authentication, Key management, Kerberos. Communication Security, Authentications Protocols, E-mail Security, Web security, Social Issues.

**UNIT – V:**

Application Layer: Design issues, file transfer, access and management. Client-Server model, Socket interface Introduction to DNS, Distribution of name space, . DNS in the Internet. Electronic mail, SMTP, File Transfer, FTP, HTTP, World Wide web.

**Text Books:**

1. Forouzan B A, Data Communications and Networking, 4th edition, Tata McGraw-Hill, 2007.
2. Tanenbaum A S, Computer Networks, 4th edition, Pearson Education, 2003.

**Reference Books:**

1. Stallings W, Data and Computer Communications, 7th edition, Pearson Education, 2004.
2. Gallo M A, and Hancock W M, Computer Communications and Networking Technologies, Thomson Brooks/Cole, 2002.
3. Comer D E, Computer Networks – and Internets with Internet Applications, 4th edition, Pearson Education, 2004.
4. Kutose J F, and Ross K W, Computer Networking – A Top-down Approach Fealuring the Internet, Pearson Education, 2001.
5. Tomasi W, Introduction to Data Communications and Networking, Pearson Education, 2004.

## MSCS 203C: COMPUTER GRAPHICS

**UNIT I**

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, Raster-scan systems, random scan systems, graphics monitors and work stations and input devices Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

**UNIT II**

2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. 2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm.

**UNIT III**

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces. Basic illumination models, polygon rendering methods.

**UNIT IV**

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

**UNIT V**

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods Computer animation: Design of animation sequence, general computer animation functions, raster animatio, computer animation languages, key frame systems, motion specifications

**TEXT BOOKS:**

1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.
2. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

**REFERENCE BOOKS:**

1. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc Graw Hill edition.
2. "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
5. "Computer Graphics", Steven Harrington, TMH.
6. Computer Graphics, F.S.Hill, S.M.Kelley, PHI.
7. Computer Graphics, P.Shirley, Steve Marschner & Others, Cengage Learning.
8. Computer Graphics & Animation, M.C.Trivedi, Jaico Publishing House.
9. An Integrated Introduction to Computer Graphics and Geometric Modelling, R.Goldman, CRC Press, Taylor & Francis Group.
10. Computer Graphics, Rajesh K.Maurya, Wiley India.

## MSCS 204 GE-1: E-COMMERCE

**UNIT – I:**

Electronic Commerce: Electronic Commerce Framework; Electronic Commerce and Media Convergence; The Anatomy of E-Commerce Application; Electronic Commerce Organization Applications- The Network Infrastructure for Electronic Commerce: Market Forces Influencing the I-Way; Components of the I Way; Network Access Equipment; the Last Mlle: Local Roads and Access Ramps; Global Information Distribution: Networks: Public Policy Issues Shaping the I-Way. Case study: B2B ecommerce

**UNIT – II:**

The Internet as a Network Infrastructure: The Internet Terminology; Chronological History of the Internet NSFNET: Architecture and Components: Globalization of the Academic Internet; Internet Governance: The Internet Society –An Overview of Internet Applications –Electronic Commerce; World Wide Web(WWW) as the Architecture: Web Background: Hypertext Publishing; Technology behind the Web: Security and the Web- Consumer-Oriented Electronic Commerce: Oriented Applications; Mercantile Process Models Mercantile Models from the Consumer‟s Perspective; Mercantile Models from the Merchant‟s Perspective. Case study: E-Commerce/High Security (PCI)

**UNIT – III:**

Electronic Payment Systems: Types of Electronic Payment Systems; Smart Cards and Electronic Payment Systems; Credit Card-Based Electronic Payment systems: Risk and Electronic Payment Systems Designing Electronic Payment systems – Inter organizational Commerce and EDI: Legal, security, and Privacy Issues: EDI and Electronic Commerce – EDI Implementation, MIME, and Value- Added Networks : Standardization and EDI;EDI Software Implementation: EDI Envelope for Message Transport: Value- Added Networks (VANs); Internet – Based EDI. Case study: Social Media Marketing

**UNIT – IV:**

Intra organization Electronic Commerce: Internal Information System: Macro forces and Internal Commerce; Work-Flow Automation and Coordination; Customization and Internal Commerce; Supply Chain Management (SCM) – The Corporate Digital Library: Dimensions of Internal Electronic Commerce Systems; Making a Business Case for a Document Library; Types of Digital Document Library; Types of Digital Documents; Issues behind Document Infrastructure; Corporate Data Warehouses. Case study: Email Marketing, Email Personalization

**UNIT-V:**

M-Commerce: Introduction to Mobile Commerce, Limitations, history, applications, architecture, transaction models, payment methods, advantages, disadvantages Case study: Mobile app marketing case study: O2 Priority Moments gets small businesses on side

**TEXT BOOK:**

1. Kalakota and Andrew B.Whinston.Frontiers of Electronic Commerce, Pearson Education.

**REFERENCE BOOKS:**

1. Henry Chan, Raymond Lee. Tharan Dillan and E.Chany,E-Commerce, Wiley,2003. 2. Danjel Minoli and Emuna Mimoli, Web Commrece Technology, Tata MicGraw Hill, 1999. 3. Marilyn Greenstein and Todd M Feinman, aElectronic Commerce, TaraMcGraw Hill Edition. 4. Craig Patridge, Gigaibit Networking, Addison – Wesley, 1994 5. PaulM-Commerce: Book Your Business with the Power of Mobile Commerce

## MSCS 204GE-2: ACCOUNTING AND FINANCIAL MANAGEMENT

**UNIT I**

1. Introduction; 2. Accounting System; 3. Inventory Control System; 4. Payroll System

**UNIT II**

1. Starting with Tally 7.2; 2.Creating Accounts Masters; 3. Creating Inventory Masters; 4. Entering Accounts Vouchers;

**UNIT III**

5. Entering Inventory Vouchers; 6. Introduction to VAT (Value Added Tax); 7. Ledgers and VAT; 8. More on VAT;

**UNIT IV**

9. VAT Documents and Reports; 10. Introduction to TDS; 11. Display/Reports in Tally; 12. The Collaborative Tally;

**UNIT V**

13. The Administrative Tally A. Fundamentals of Accounting; B. Fundamentals of Inventory

**TEXT BOOKS :**

1. Computer Accounting With Tally 7.2 ,Firewall, Firewall Media, , Laxmi Publications
2. Comdex Tally 9 Course Kit by Namrata Agrawal, Dream Tech Press

**REFERENCE BOOKS :**

3. Tally 9 by Dinesh Maidarsani By Firewall Media
4. Tally 9.0 English Edition Google EBook By Computer World

## MSCS 205CF: HUMAN RIGHTS AND VALUE EDUCATION

**UNIT I**

Value Education- Definition – relevance to present day - Concept of Human Values – Self introspection – Self esteem. Family values - Components, structure and responsibilities of family Neutralization of anger – Adjustability – Threats of family life – Status of women in family and society – Caring for needy and elderly – Time allotment for sharing ideas and concerns.

**UNIT II**

Medical ethics- Views of Charaka, Sushruta and Hippocratus on moral responsibility of medical practitioners. Code of ethics for medical and healthcare professionals. Euthanasia, Ethical obligation to animals, Ethical issues in relation to health care professionals and patients. Social justice in health care, human cloning, problems of abortion. Ethical issues in genetic engineering and Ethical issues raised by new biological technology or knowledge.

**UNIT III**

Business ethics- Ethical standards of business-Immoral and illegal practices and their solutions. Characterics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.

**UNIT IV**

Environmental ethics- Ethical theory, man and nature – Ecological crisis, Pest control, Pollution and waste, Climate change, Energy and population, Justice and environmental health.

**UNIT V**

Social ethics- Organ trade, Human trafficking, Human rights violation and social disparities Feminist ethics, surrogacy/pregnancy. Ethics of media- Impact of Newspapers, Television Movies and Internet.

**Books for study:**

1. John S Mackenjie: A manual of ethics.
2. "The Ethics of Management" by Larue Tone Hosmer, Richard D. Irwin Inc.
3. "Management Ethics – integrity at work' by Joseph A. Petrick and John F. Quinn, Response Books: New Delhi.
4. "Ethics in management" by S.A. Sherlekar, Himalaya Publishing House.
5. Harold H. Titus: Ethics for Today
6. Maitra, S.K: Hindu Ethics
7. William Lilly: Introduction to Ethics
8. Sinha: A Manual of Ethics
9. Manu: Manu Dharma Sastra or the Institute of Manu: Comprising the Indian system of Duties: Religious and Civil(ed.) G.C. Haughton.
10. Susruta Samhita: Tr. Kaviraj Kunjanlal, Kunjalal Brishagratha, Chowkamba Sanskrit series, Vol. I, II and III, Varnasi, Vol I OO, 16-20, 21-32 and 74-77 only.
11. Caraka Samhita: Tr. Dr. Ram Kraran Sarma and Vaidya Bhagavan Dash, Chowkambha Sanskrit Series office, Varanasi I,II,III Vol I PP 183-191.
12. Ethics, Theory and Contemporary Issues, Barbara Mackinnon, Wadsworth/Thomson Learning, 2001.
13. Analyzing Moral Issues, Judith A. Boss, Mayfield Publishing Company, 1999.
14. An Introduction to A pplied Ethics (Ed.) John H. Piet and Ayodhya Prasad, Cosmo Publications.
15. Text book for Intermediate logic, Ethics and Human Values, board of Intermediate Education & Telugu Academic Hyderabad.
16. I.C. Sharma Ethical Philosophy of India. Nagin & co Julundhar.

## MSCS 206EF-1: PRINCIPLES OF MANAGEMENT

**Unit-I**: **Introduction to Management**

Management - meaning - significance - management vs administration –
functions of management – Leadership – Leader Vs Manager - Fayol's principles of management.

**Unit-II**: **Planning**

Planning - meaning - significance – Steps in Panning - Decision making – Steps in decision making process.

**Unit-III**: **Organization**

Organizing - meaning – Principles of organization– Line and Staff Organisation - Organisation chart.

**Unit-IV**: **Delegation of Authority**

Delegation - meaning - elements - principles - difficulties in delegation - guidelines for making delegation effective - Centralization vs decentralization

**Unit-V**: **Staffing and Controlling**

Staffing – selection procedure – Coordination - Control – meaning – Qualities of Good Control

**Text Books**

1. R.K.Sharma and Shashi K Gupata Business Organization and Management - Kalayani Publications.

**Reference Books:**

1. Dr.C.D.Balaji and G.Prasad, Business Organization and Management - Margham Publications, Chennai-17.
2. C.B.Guptha Industrial Organization and Management, Sulthan Chand.
3. Y.K.Bushan Business organization and Management, Sulthan Chand.
4. Sherlekar Business Organization and Management, Himalaya Publications.

## MSCS 206EF-2: INTERNET OF THINGS

**UNIT I**

FUNDAMENTALS OF IOT

Introduction-Characteristics-Physical design - Protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs – IoT vs M2M.

**UNIT II**

IOT DESIGN METHODOLOGY

IoT systems management – IoT Design Methodology – Specifications Integration and Application Development.

**UNIT III**

BUILDING IOT WITH RASPBERRY PI

Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services –

**UNIT IV**

BUILDING IOT WITH GALILEO/ARDUINO

Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks

**UNIT V**

CASE STUDIES and ADVANCED TOPICS

Various Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for Iot – Data Analytics for IoT – Software & Management Tools for IoT

**REFERENCES:**

1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A hands-on approach", Universities Press, 2015. 2. Manoel Carlos Ramon, "Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers", Apress, 2014.
3. Marco Schwartz, "Internet of Things with the Arduino Yun", Packt Publishing, 2014.

## III SEMESTER

### MSCS 301C: DATA WAREHOUSING AND DATAMINING

**Unit – I:**

Chapter – I: Data Warehousing & OLAP Technologies [Kambler –chapter 3 (3.1,3.2,3.3)] Chapter –II: Basic Data Mining Tasks: Classification-Regression-Time series Analysis Prediction-Clustering-Summarization-Association rules-Sequence discovery-Data mining Versus Knowledge discovery in databases-the development of Data Mining-Data Mining issues-Data mining Metrics-Social Implications of Data Mining-The future. [M.H.Dunhum – chapter 1(1.1 to 1.7)] Chapter- III: Data Preprocessing [Kambler –chapter 2(2.1 to 2.6)]

**UNIT II:**

Chapter –I: Basic Data mining Tasks [M.H.Dunhum –chapter 1(1.1 to 1.7)] Chapter –II: Principles of dimensional modeling-design decisions, Dimensional Modeling basics-R Modeling versus Dimensional modeling-use of case tools-The star schema-Review of a simple STAR schema, inside a Dimension table, inside the fact table, the fact less fact table, Data Granularity. Star Schema keys-primary keys, surrogate keys, foreign keys. Advantages of star schema. Chapter –III: Dimensional Modeling: Updates to the dimensional tables-Miscellaneous Dimensions-The Snowflake schema-Aggregate fact tables-Families of stars

**UNIT-III:**

Chapter –I : Classification: Introduction-Issues in classification-Statistical Based Algorithm Regression-Bayesian Classification-Distance based algorithm-Simple approach-K nearest approach-Decision tree based algorithms-ID3-C4.5 & C5.0-CART-Scalable DT Techniques Neural network based algorithms-Propagation-NN Supervised Learning-Radial basis function works-Perceptrons-Rule based algorithms [M.H.Dunhum –chapter 4(4.1 to 4.6)]

**UNIT – IV:**

Chapter –I: Clustering: Introduction-Similarity & distance measures-outliers-Hierarchical algorithms agglomerative algorithms-Divisive clustering-Partitional algorithms-Minimum spanning tree Squared error clustering algorithm-K-means clustering-nearest neighbor algorithm-PAM algorithm-Bond energy algorithm-Clustering with Genetic algorithms-Clustering with neural networks-Clustering large databases-BIRCH- DBSCAN-CURE algorithm-Clustering with categorical attributes. [M.H.Dunhum –chapter 5(5.1 to 5.7)]

**UNIT-V:**

Chapter –I: Associate Rules:- Introduction-Large Item sets-Basic Algorithms-Apriori Algorithm-Sampling algorithm-Partitioning- Parallel and Distributed algorithms-Data Parallelism-Task parallelism-Comparing Approaches- Incremental Rules- Advanced Association Rule Technique-Generalized association rules-Multiple level association rules-Multiple –level Association rules-Quantitative association rules-Using multiple minimum supports Measuring the Quality of a Rules. [M.H.Dunhum chapter 6(6.1 to 6.8)] Chapter –II: Mining objects-spatial, multimedia & text mining, www mining [Kambler chapter10 (10.1 to 10.5)]

**Text Books:**

1. Data Mining – Introductory & Advanced topics by Margaret H. Dunham. Pearson Education publishers. 2. Data mining concepts & techniques-Jiawei Han & Micheline Kamber
3. Fundamentals of Data warehousing –Paul Raj Ponniah

**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

## MSCS 302C: WEB TECHNOLOGIES

**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, Webservers IIS, TomcatHosting Website in a Webservers

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

## MSCS 303C: SOFTWARE ENGINEERING

**UNIT – I:**

Software Engineering – Introduction, Generic view of process, models, an agile view of process. Software Engineering practice – Software Engineering, communication, planning, modeling, construction practices and deployment.

**UNIT-II:**

System Engineering – Computer-based systems, the system engineering Hierarchy, business process engineering, product engineering and system modeling. Building The Analysis Model – Requirement Analysis, Modeling Approaches, Data Modeling. Behavioral Model. The web engineering process, analysis models for web apps.

**UNIT –III:**

Design Engineering-Design process and quality, design concepts the design model, and pattern-used software design. Architectural design – Software architecture, data design, architectural styles and patterns, architectural design mapping data flow into a software architecture. Component-based software engineering, Critical systems development, Software reuse, User interface design, web apps design issues and architecture design.

**UNIT –IV:**

Testing strategies – Strategies and issues, testing strategies for and object-oriented software. Validation testing and system testing. Software testing tactics – Fundamentals, black-box and white-box testing white-box testing basis path testing. Control structure testing, black box testing, object-oriented testing methods. Testing methods applicable at the class level inter class testing case design. Testing for specialized environments, architectures and applications, web application testing – concepts, testing process, component level testing.

**UNIT – V:**

Product metrics – Software quality, framework, metrics for analysis model design model, source case and testing. Managing software projects – The management spectrum, the W5 HH principle, metrics in process, software measurement, and metrics for software quality integrating metrics within the software process. Estimation – observations, decomposition techniques, empirical models, estimation for object-oriented projects other estimation techniques, project scheduling, risk management, reengineering, Security engineering, Service-oriented software engineering, Aspect-oriented software development.

**TEXT BOOK:**

1. Roger, S, Pressman, Software Engineering, A Practitioner"s Approach, Six Edition, McGraw-Hill, International Edition, 2005.
2. Ian Sommerville, Software Engineering, Pearson Education, 8th Edition.

**REFERENCE BOOKS:**

1. James F Peters, Software Engineering, John Wiley
2. Waruan S Jawadekar, Software Engineering, Tata McGraw Hill, 2004.
3. Carlo Ghezzi, Mehdi Jazayeri, Dino Manrioli, Fundamentals of Software Engineering, PHI, 2001 Pankaj Jalote, An Integrated approach to Software Engineering Narosa

## MSCS 304-GE-A-1: SYSTEMS PROGRAMMING

**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 conceptsShell 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. 3. Jhon J. Donovan, System Programming Tata Mc Graw Hill 2005.

## MSCS 304GE-A-2: COMPUTER ALGORITHMS

**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

## MSCS 304-GE-A-3: USER INTERFACE DESIGN USING .NET TECHNOLOGIES

**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.

## MSCS 304-GE-A-4: IT IN FORENSIC SCIENCE

**UNIT I**

Overview of Biometrics, Biometric Identification, Biometric Verification, Biometric Enrollment, Biometric System Security. Authentication and Biometrics: Secure Authentication Protocols, Access Control Security Services, Matching Biometric Samples, Verification by humans. Common biometrics: Finger Print Recognition, Face Recognition, Speaker Recognition, Iris Recognition, Hand Geometry, Signature Verification

**UNIT II**

Introduction to Information Hiding: Technical Steganography, Linguistic Steganography, Copy Right Enforcement, Wisdom from Cryptography Principles of Steganography: Framework for Secret Communication, Security of Steganography System, Information Hiding in Noisy Data , Adaptive versus non-Adaptive Algorithms, Active and Malicious Attackers, Information hiding in Written Text.

**UNIT III**

A Survey of Steganographic Techniques: Substitution systems and Bit Plane Tools, Transform Domain Techniques: - Spread Spectrum and Information hiding, Statistical Steganography, Distortion Techniques, Cover Generation Techniques. Steganalysis: Looking for Signatures: - Extracting hidden Information, Disabling Hidden Information.

**UNIT IV**

Watermarking and Copyright Protection: Basic Watermarking, Watermarking Applications, Requirements and Algorithmic Design Issues, Evaluation and Benchmarking of Watermarking system. Transform Methods: Fourier Transformation, Fast Fourier Transformation, Discrete Cosine Transformation, Mellin-Fourier Transformation, Wavelets, Split Images in Perceptual Bands. Applications of Transformation in Steganography.

**UNIT V**

Computer Forensics, Rules of evidence, Evidence dynamics, Evidence collection, Data recovery, Preservation of digital evidence, surveillance tools for future warfare,

**References:**

1. Katzendbisser, Petitcolas, " Information Hiding Techniques for Steganography and Digital Watermarking", Artech House.
2. Peter Wayner, "Disappearing Cryptography: Information Hiding, Steganography and Watermarking 2/e", Elsevier
3. Bolle, Connell et. al., "Guide to Biometrics", Springer
4. John Vecca, “Computer Forensics: Crime scene Investigation”, Firewall Media
5. Christopher L.T. Brown, “Computer Evidence: Collection and Preservation”, Firewall Media

## MSCS 304-GE-A-5: 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,

## MSCS 305-GE-B-1: 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.

## MSCS 305-GE-B-2: BIG DATA ANALYTICS

**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

## MSCS 305-GE-B-3: 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

## MSCS 305-GE-B-4: CYBER SECURITY

**UNIT I**

FUNDAMENTALS OF CYBER SECURITY Introduction-Cyber Security and its problem-Intervention Strategies: Redundancy, Diversity and Autarchy.

**UNIT II**

ISSUES IN CYBER SECURITY Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Rightsource of risks, Pirates, Internet Infringement, Fair Use, postings, criminal liability, First Amendments, Data Loss.

**UNIT III**

INTELLECTUAL PROPERTY RIGHTS Copy Right-Source of risks, Pirates, Internet Infringement, Fair Use, postings, Criminal Liability, First Amendments, Losing Data, Trademarks, Defamation, Privacy-Common Law Privacy, Constitutional law, Federal Statutes, Anonymity, Technology expanding privacy rights.

**UNIT IV**

PROCEDURAL ISSUES Duty of Care, Criminal Liability, Procedural issues, Electronic Contracts & Digital Signatures, Misappropriation of information, Civil Rights, Tax, Evidence.

**UNIT V**

LEGAL ASPECTS OF CYBER SECURITY Ethics, Legal Developments, Late 1990 to 2000,Cyber security in Society, Security in cyber laws case. Studies, General Law and Cyber Law-a Swift Analysis.

**Text Books:**

1. Jonathan Rosenoer,"Cyber Law: The law of the Internet", Springer-Verlag, 1997.
2. Mark F Grady, Fransesco Parisi, "The Law and Economics of Cyber Security", Cambridge University Press, 2006.

## MSCS 305-GE-B-5: MOBILE APP DEVELOPMENT

**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.

**REFERENCES:**

1. http://developer.android.com/develop/index.html
2. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
3. Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, DreamTech, 2012
4. James Dovey and Ash Furrow, “Beginning Objective C”, Apress, 2012
5. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS 6 Development: Exploring the iOS SDK”, Apress, 2013.

## MSCS -306 OPEN ELECTIVE

The following are the open elective courses offered by the Department Of Computer Science to other departments

1. Programming in C
2. Office Automation
3. Internet Fundamentals and Web Designing

## Open Electives offered by Department of Computer Science (IIIrd Semester)

### Programming in C

UNIT - I introduction to c language: Overview of 'C'language - Constants, Variables and Data Types - Operators, Expressions and Assignment statements - Managing Input/Output Operations - Formatted I/O - Decision Making - Branching - IF, Nested IF - Switch - goto - Looping- While, do, for statements.

UNIT - II ARRAYS AND FUNCTIONS - Arrays - dynamic and multi-dimensional arrays - Character arrays and Strings - String handling Functions - User defined Functions - Categories of Functions - Recursion.

UNIT - III STRUCTURES AND UNIONS: Basics of Structures-Declaring a Structure - Array of Structures - Passing Structures elements to Functions- Passing entire Structure to Function - Structures within Structures - Union - Union of Structures - Enumerated Data Types - typedef Statement.

UNIT - IV POINTERS: Pointers - Declaration, Accessing a variable, dynamic memory allocation, Pointers versus Arrays, Array of pointers, Pointers to functions and structure Pointers.

UNIT - V : File Management in C - Data hierarchy- Files and Streams - Sequential access file- Random access file - Preprocessors

### Text Books:

1 E.Balagurusamy " Programming in ANSI C " , Tata McGraw Hill, 2004

**Reference Books:**

2 Yashavant P. Kanetkar "Understanding Pointers In C" , BPB Publications, NewDelhi, 2002

3 Byron C Gottried, Programming with C, Schuams' outline series, 2nd edition, Tata McGraw Hill, 2006.

## Open Electives offered by Department of Computer Science (IIIrd Semester)

### Office Automation

**Unit I:** introduction to Computers basics, fundamentals, input and output devices, dos, internal and external commands, windows operating system and components, working functionalities of computers, hardware, software.

**Unit II:** MS WORD: Creating and Formatting a simple document using bulleted and Numbered list, adding Headers, Footers and Page numbers Navigating Long document with the Document Map Working with Tables create tables, editing tables, formatting tables, converting tables, sorting table contents, etc., Mail Merge, Creating a Birthday Card

**Unit III:** MS EXCEL : introduction to excel its features, Formatting the worksheets, Formatting the cell, rows and columns, Working with functions and formulae. Presenting Data with Charts, Performing What-If analysis with data table, Summarize the data using pivot table

**Unit IV:** POWER POINT: Presentation using Text with animation, Presentation using images, media file Creating a graph in a PowerPoint slides, Creating self running presentations, Hiding and showing the slides

**Unit – V:** MS ACCESS Creating a database create a table, setting field properties and setting the key Entering and editing data using forms Retrieving data from more than one related table using queries using Query Wizard, Generating Report using Report Wizards.

**Text Books:**

1. **Computer Basics with Office Automation Paperback – Import, 1 Jan 2011,** by **Archana Kumar**
2. **Office Automation Concepts and Tools Editors:** Tsichritzis**, D. (Ed.)**

**SRI VENKATESWARA UNIVERSITY, TIRUPATI**
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## Open Electives offered by Department of Computer Science (IIIrd Semester)

### Internet Fundamentals and Web Designing

Unit I: Fundamentals of Electronic Mail, Jump Start: Browsing and Publishing
Unit II: The Internet, The World Wide Web, Searching the World Wide Web
Unit III: Telnet and FTP, Basic HTML, Web Graphics
Unit IV: Advanced HTML, Newsgroups and Mailing Lists, Chat Rooms, and MUDs
Unit V: Electronic Publishing, Web Programming Material

Text book

1. **Fundamentals Of The Internet & The World Wide Web by Raymond Greenlaw**

### Web Design Concepts

**Unit I**: Introduction to HTML 4.01 and XHTML 1.1, What is Markup Language, Basic Structure of HTML, Difference Between HTML and XHTML , Head Section and Elements of Head Section, Meta Tags , Css Tags, Script Tag, Table Tag, Div Tag, Header Tags, Paragraph, Span, Pre Tags, Anchor Links and Named Anchors, Image Tag, Object Tag, Iframe Tag, Forms, Form Tag, Attributes of Form, POST and GET Method, Fieldset and Legend, Text input, Text area, Checkbox and Radio Button, Dropdown, List and Optgroup, File Upload and Hidden Fields, Submit, Image, Normal, Reset Button, Creating a Live Website Form, HTML Validators.
**Unit II**: Introduction to Cascading Style, Sheets, Types of CSS, CSS Selectors, Universal Selector, ID Selector, Tag Selector, Class Selector, Sub Selector, Child Combinatory Selector, Adjacent Sibling Selector, Attribute Selector, Group selector, First-line and First-letter selector, Before and After Selector, CSS Properties, Type Properties, Background Properties, Block Properties, Box Properties, List Properties, Border Properties, Positioning Propeties, Realtime Implementation, Converstion of Table to CSS Layout, CSS Menu Design (Horizontal, Vertical), Form Designing.
**Unit III**: Introduction to HTML5, Features of HTML5, HTML5 DocType, New Structure Tags, Section, Nav, Article, Aside, Header, Footer, Designing a HTML Structure of Page, New Media Tags, Audio Tag, Video Tag, Canvas and Svg Tag, Introduction to HTML5 Forms, New Attributes, Placeholder Attribute, Require Attribute, Pattern Attribute, Autofocus Attribute, email , tel, url types, number type, date type, range type, voice search, Examples of Form.
**Unit IV:** Java Script, Introduction to Client Side Scripting, Introduction to Java Script, Javascript, Types, Variables in JS, Operators in JS, Conditions Statements, Java Script Loops, JS Popup Box, JS Events, JS Arrays, Working with Arrays, JS Objects, JS Functions, Using Java Script in Realtime, Validation of Forms, Related Examples.
**Unit V:** jQuery and jQuery UI: Introduction to jQuery, jQuery Features, Installing jQuery, jQuery Syntax, jQuery Ready Function, jQuery Selectors, jQuery Actions, jQuery plugins, jQuery Validation plugin, jQuery Slideshow, jQuery Dropdown, jQuery UI, Working with jQueryUI, jQuery Accordions, jQuery Tabs, jQuery Tooltips, jQuery Autocomplete. Web Hosting: Web Hosting Basics, Types of Hosting Packages, Registering domains, Defining Name Servers, Using Control Panel, Creating Emails in Cpanel, Using FTP Client, Maintaining a Website.

**Text Books:**

1. HTML & CSS Design and build Websites, Published by John Wiley & Sons, Inc. ©2011 by John Wiley & Sons, Inc., Indianapolis, Indiana

## MSCS 401 MP: MAJOR PROJECT WORK

The project will be one semester duration. The student will be advised to approach different organizations involved in science communication activities as per interest and specialization of students, mostly located in the place of the study. They will have to carry out a project work related to the area of interest and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.

1. Project Seminar (Internal) : 50 Marks
2. Project Report (Internal) : 50 Marks
3. National / International Conference Publication Proceedings (External) : 50 Marks

   (Paper based on project should be submitted to conference and published in the form of proceedings)
4. National / International Journal Publication (External) : 50 Marks

   (Paper based on project should be submitted to the journal and should be published)
5. Viva Voce (External) : 50 Marks
6. Project Execution (External) : 50 Marks

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