

SRI VENKATESWARA UNIVERSITY::TIRUPATI

S.V.U.COLLEGE OF SCIENCES

DEPARTMENT OF COMPUTER SCIENCE

(Syllabus common for CBCS and NON- CBCS)

(Revised Scheme of Instruction and Examination, Syllabus etc., with effect from the Academic Years
2015-16 for I and II Semesters and 2016-17 for III and IV Semesters)

M.Sc. COMPUTER SCIENCE

SCHEME OF INSTRUCTION AND EXAMINATION

Sem	Course Code	Title of the course	Core/ elective	No.of Credits	Uni.Exams Duration (Hours)	IE	EE	Total Marks
I	MSCS-101	DISCRETE MATHEMATICS	Core	04	3	30	70	100
	MSCS-102	COMPUTER ORGANIZATION	Core	04	3	30	70	100
	MSCS-103	DATA STRUCTURES THROUGH JAVA	Core	04	3	30	70	100
	MSCS-104	ADVANCED DATABASE MANAGEMENT SYSTEMS	Core	04	3	30	70	100
	MSCS-105	OPERATING SYSTEMS	Core	04	3	30	70	100
	MSCS-106P	SOFTWARE LAB- I (O.S/D.S THROUGH JAVA)	Core	04		30	70	100
	MSCS-107P	ADBMS LAB	Core	04		30	70	100
II	MSCS-201	COMPUTER ORIENTED OPERATIONS RESEARCH	Core	04	3	30	70	100
	MSCS-202	COMPUTER GRAPHICS	Core	04	3	30	70	100
	MSCS-203	SYSTEM SOFTWARE	Core	04	3	30	70	100
	MSCS-204	DATA MINING	Core	04	3	30	70	100
	MSCS-205	COMPUTER NETWORKS	Core	04	3	30	70	100
	MSCS-206P	SOFTWARE LAB2 (CN/CG)		04		30	70	100
	MSCS-207P	DATA MINING LAB		04		30	70	100
	MSCS-208	Human Values and Professional Ethics – I	common	04	3	30	70	100
III	MSCS-301	COMPUTER ALGORITHMS	Core	04	3	30	70	100
	MSCS-302	SOFTWARE ENGINEERING	Core	04	3	30	70	100
	MSCS-303	IMAGE PROCESSING	Core	04	3	30	70	100
	MSCS-304	ELECTIVE-I A) CRYPTOGRAPHY AND NETWORK SECURITY B) ARTIFICIAL INTELLIGENCE C) NEURAL NETWORKS D) BOG DATA ANALYTICS E) CYBER SECURITY	IE	04	3	30	70	100
	MSCS-305	ELECTIVE-II A)SOFTWARE TESTING B) CLOUD COMPUTING C) MOBILE APPLICATIONS DEVELOPMENT D) NATURAL LANGUAGE PROCESSING WITH PYTHON E) FORMAL LANGUAGES & COMPILER DESIGN	IE	04	3	30	70	100

	MSCS-306P	SOFTWARE LAB3 (CA/SE/IM)	Core	04	3	--	100	100
	MSCS-307P	Mini Project Work	Core	04	3	50	50	100
IV	MSCS-401	Major Project Work				100	200	300
	MSCS-402	Human Values and Professional Ethics – II	Core	04	3	30	70	100

Note: MSCS: Master of Computer Science; IE: Internal Elective

IA: Internal Assessment for Non-CBCS Students 20 80 100

Major Project Work:

1. Project Seminar (Internal) : 50 marks
2. Project Report (Internal) : 50 marks
3. National/International Conference Publication Proceedings
(External) (paper based on project should be submitted to
conference and published in the form of proceedings.) : 50 marks
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

SEMESTER-I

MSCS 101 DISCRETE MATHEMATICS

Unit-I: Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions. Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

Unit-II: Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, and complemented lattices. Combinatorics: Basic Counting Technique, Pigeon-hole Principle, Recurrence Relation, Generating function, Polya's Counting Theorem Paths and Circuits : Isomorphism, Subgraphs, Walks, Paths and Circuits, Connected and disconnected graphs, Euler graphs, Operations on graphs, Hamiltonian graphs, Travelling salesman problem.

Unit-III: Introduction and Basic Concepts : Definition, Representation of graphs, Finite and infinite graphs, Directed graphs, Incidence and degree, Bipartite graph, Planar graphs, Matrix representation of graphs, Applications of graph in computer science. Graphs: Simple graph, multi graph, graph terminology, representation of graphs, Bipartite, Regular, Planar and connected graphs, connected components in a graph, Euler graphs, Hamiltonian path and circuits, Graph coloring, chromatic number, isomorphism and Homomorphism of graphs.

Trees and Fundamental Circuits : Definition, Properties of trees, Spanning trees, Fundamental circuits and cut-sets, Connectivity and separability, Minimal spanning tree and connected algorithms, Rooted and Binary trees, Applications of trees.

Unit-IV: Tree: Definition, Rooted tree, properties of trees, binary search tree, tree traversal. Shortest Path Problems : Shortest path algorithms, Generalized shortest path algorithms, Applications of shortest path problems.

Network Flow Problems : Flows in network, formulation, Max-flow min-cut theorem, Minimum cost flow problems, Ford-Fulkerson algorithm for maximum flow.

Unit-V:

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers.

Formal language & Automata: Grammars, Languages, regular expression, regular languages, phrase structure grammars, types of grammars, Chomsky's hierarchy, finite state automata, finite state machine, deterministic finite automata, non-deterministic finite automata, conversions.

Text books :

1. Discrete Mathematics and Its Applications, By Kenneth H Rosen, McGraw Hill, Sept.2002.
2. Discrete Mathematical Structures with Applications to Computer Science, By J. P.Tremblay, R.Manohar, McGraw Hill Pub, 1975.
3. "Graph Theory With Applications to Engineering and Computer Science" Prentice Hall, Englewood Cliffs, 1974
4. Combinatorics: Theory and Applications, By V. Krishnamurthy, East-West Press Pvt. Ltd., New Delhi, 1986.

MSCS 102: 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 - assembly language – basic input/output operations – subroutines – encoding of Machine instructions. Instructions – Assembly language –O/I operations – Registers and addressing – Instructions language – program flow control – I/O operations logic instructions of 6300 and Intel Pentium.

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:

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 103: DATA STRUCTURES THROUGH JAVA

UNIT I:

Fundamentals of object oriented programming – classes and objects, data abstraction and encapsulation, inheritance, polymorphism, static binding and dynamic binding, message communication, function overloading and operator overloading. Introduction to JAVA – data types, operators, control structures, input and output, arrays, strings, vectors, classes, objects, methods, abstract classes, interfaces, multiple inheritance, packages, wrapper classes, java collections, exception handling.

UNIT II:

Linear Lists – Array Representation: Data Objects and Structures –The Linear List Data Structure – Array Representations – Vector Representation Linked Lists and Chains – Circular Lists and Header Nodes – Doubly Linked Lists.

Arrays and Matrices: Arrays – Operations on Arrays – Sparse Matrices

Stacks: Definition and Applications – The Abstract Data Type – Array Representations, Linked Representation – Applications

UNIT III:

Queues: Definition and Applications – The Abstract Data Type – Array Representations, Linked Representation – Applications

Binary and other Trees: Trees Binary Trees – properties of Binary Trees – Representation of Binary Trees – Common Binary Tree operations – Binary Tree Traversal – The ADT Binary Tree - The Class Linked Binary Tree – Applications

Priority Queues: Definition and Applications – The Abstract Data Type- Linear Lists – Heaps – Applications

UNIT IV:

Binary Search Trees: Definitions – Abstract Data Types – Binary Search Tree Operations and Implementation - Binary Search Trees with Duplicates – Indexed Binary Search Trees – Applications.

Balanced Search Trees: AVL Trees – Red – Black Trees – Splay Trees – B- Trees

UNIT V:

Graphs: Definitions – Applications and more Definitions – Propoerties - The ADT Graph-Representation of Un-weighted Graphs-Representation of Weighted Graphs-Class Implementations-Graph search methods-Applications revisited.

TEXT BOOKS:-

1. Sahni S, Data Structures, Algorithms and Applications in JAVA, McGraw-Hill, 2000. (Chapters 5,6,7,8,9,10,12,13, and 15: Sections 16.1., 16.2. and 16.3).
2. Core java Dr. R. Nageswara Rao.

REFERENCES BOOKS:

1. Heilman G.L., Data Structures, Algorithms and Object – Oriented Programming, Tata McGraw – Hill, 2002. (Chapters 1 and 14).
3. Tremblay J. P., and Sorenson P.G., Introduction to Data Structures and Applications, Tata McGraw-Hill, 1995 (Sections 6-1, 6-2.1, and 6-22).
4. Drzdek A, Data Structures and Algorithms in C++, 2nd edition, Vikas Publishing House, 2002.
5. Samantha D. Classic Data Structures, Prentice-Hall of India, 2001.
6. Sahni S, Data Structures, Algorithms and Applications in C++, McGraw-hill, 2002.
7. Kanetkar Y.P., Data Structures through C++, BPB Publications, 2003.
8. D.S. Malik, Data Structures Using C++, Thomson, India Edition 2006

MSCS 104: ADVANCED DATABASE MANAGEMENT SYSTEMS

UNIT-I

Relational Model: Introduction - Structure of Relational Data Base - Relational Algebra - Relational Calculus. Relational Query Languages - Introduction - Codd's Rules - Structured Query Language - Embedded Structured Query Language. ER Model - Basic Concepts - Conversion of ER Model into Relations - ER Diagram Symbols.

UNIT-II

Data Base Design: Introduction - Software Development Life Cycle - Database Development Life Cycle - Automated Design Tools. Functional Dependency and Decomposition - Functional Dependency - Decomposition. Normalization - Introduction - Normalization - Normal Forms - BCNF - 4 NF - 5 NF.

UNIT-III

Query Processing and Optimization: Introduction - Query Processing - Syntax Analyzer - Query Decomposition - Query Optimization. Transaction Processing and Concurrency Control: Transaction Concepts - Concurrency Control - Locking Methods - Timestamp Methods - Optimistic Methods.

UNIT-IV

Data Base Recovery Systems: Introduction - Recovery Concepts - Types of Failures - Types of Recovery - Recovery Techniques - Buffer Management. Data Base Security: Goals - Firewalls - Data Encryption.

UNIT-V

Distributed Data Base Systems: Introduction - Distributed Data Bases - Architecture of Distributed Data Bases - Distributed Data Base System Design - Distributed Query Processing. Emerging Data Base Technologies: Internet Data Bases - Digital Libraries - Multimedia Data Bases - Mobile Data Bases - Spatial Data Bases.

Text Books

1. S.K. Singh, "Database Systems Concepts, Design and Applications", Pearson Education Pte. Ltd., New Delhi: 2006.
2. C.J. Date and others, "An Introduction to Database Systems", Eighth Edition, Pearson Education Pte. Ltd., New Delhi: 2006.

Reference

1. Abraham Silberschatz, "Database Systems", McGraw Hill International, 1997.
2. Paneerselvam R, "Database management systems", PHI, 2005.
3. Narang Rajesh, "Database management systems", PHI, 2005.
4. ISRD Group, "Introduction to database management systems", TMG, 2006.
5. Ramakrishnan, Gehrke, "Database management systems", 3/E, TMG, 2003.

MSCS 105: OPERATING SYSTEMS

UNIT-I

Introduction: Definition of OS - early History - history of DOS and UNIX operating system
Process: Definition of process - process states - process state transition - interrupt processing
- interrupt classes - context switching - semaphores - deadlock and definite postponement.

UNIT-II

Storage management: Real storage management strategies - contiguous versus non-contiguous storage allocation - single user contiguous storage allocation - fixed partition multiprogramming - variable partition multiprogramming - multiprogramming with storage swapping. Virtual storage: Virtual storage management strategies - page replacement strategies - working sets - demand paging - paging sets.

UNIT-III

Processor management: Preemptive versus non-preemptive scheduling - priorities -deadline scheduling - FIFO - RR - Quantum size - SJF - SRT - SHN. Distributed computing: Classification of sequential and parallel processing-array processors - dataflow computers - multiprocessing - fault tolerance.

UNIT-IV

Device and information management: Operation of moving head disk storage - need for disk scheduling - seek optimization - FCFS - SSTF - SCAN - RAM disks - optical disks. Files and database systems: File system - function - organization - allocating and freeing space - file descriptor - access control matrix.M.Sc. Computer Science

UNIT-V

Case studies: DOS - memory management - overlaying - extended and expanded memory - memory allocation - file system and allocation method - internal and external command memory management functions - file management functions. UNIX: Process in UNIX - memory management - I/O systems - file systems and allocation method - semaphores - command systems.

Text Book

1. Deital, "An introduction to operating systems", Addison wisely, second edition, 1998.

References

1. Willam Stallings, "Operating Systems", 5/e PHI/Pearson Education, 1997. 2. Silberschatz, Peterson, Galvin, "Operating System Concepts", Addison Wessely, Fifth Edition, 1998. 3. Charles Crowley, "Operating systems - A Design Oriented Approach", Tata McGraw Hill, 1998. 4. Andrew S. Tannenbaum, "Operating Systems: Design and Implementation", 3/e, PHI, 2006. 5. Mukesh singhal, Niranjana G shivaratri, "Advanced concepts in operating systems", TMG, 2007.

SEMESTER -II

MSCS 201: COMPUTER ORIENTED OPERATIONS RESEARCH

UNIT-I :

Origin and Development of Operations Research - Nature and Scope of Operations Research- Models and Modeling in Operations Research- Computer Software for Operations Research- Applications of Operations Research-Linear Programming-Model formulation, Graphical Method, Simplex Method, Duality, Revised Simplex Method-Integer Programming Problem using Excel solver.

UNIT-II:

Transportation Problem–Transshipment Model–Assignment Problem–Goal Programming - Network Techniques: Shortest-Path Model, Minimum Spanning Tree Problem, Maximum Flow Problem.

UNIT-III:

Non-Linear Programming-Unconstrained Optimization, Constrained Optimization with and without inequalities-Kuhn-Tucker Conditions-Graphical Solution of Non-Linear Programming Problem-Quadratic Programming-Separable Programming-Convex and Non-Convex Programming.

UNIT-IV:

Queuing Theory-Basic structure of Queuing System-Classification of Queuing Models-Single-Server Queuing Models-Multi-Server Queuing Models-Applications of Queuing Theory-Simulation-Monte-Carlo Simulation-Role of Computers in Simulation-Applications of Simulation.

UNIT-V:

Decision Theory-Steps in Decision Theory Approach-Decision-Making Environments-Decision Making under Certainty, Uncertainty and Risk-Decision Tree Analysis-Game Theory.

Reference Books:

1. Taha H.A., Operations Research: An Introduction, Printice-Hall of India
2. S.D.Sharma., Operations Research, Kedar Nath Ram Nath, Delhi
3. R.Pannerselvam., Operations Research, Prentice-Hall of India
4. J.K.Sharma., Operations Research -Theory and Applications, Macmillian India Ltd
Kanti Swarup., P.K.Gupta and Mam Mohan, Sultan chand & Sons

MSCS 202: 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 – 203: SYSTEM SOFTWARE

UNIT I

BASICS OF SYSTEM SOFTWARE AND ASSEMBLER 9 Introduction – System software and SIC/XE machine architecture - Basic assembler functions – Assembler algorithms and data structures – Machine dependent assembler features, Instruction formats and addressing modes – Program relocation – Machine independent assembler features – Literals – Symbol-defining statements – Expressions – Program Blocks – Control Sections and Program Linking-Implementation examples MASM assembler.

UNIT II

COMPILER- LEXICAL ANALYSIS, SYNTAX ANALYSIS 9 Phases of compiler-Lexical Analysis: Role of a Lexical analyzer, input buffering, specification and recognition of tokens, Finite Automata, Designing a lexical analyzer generator, Pattern matching based on NFA's. Syntax Analysis: Role of Parser, Top-down parsing, recursive descent and predictive parsers (LL), Bottom-Up parsing, Operator precedence parsing, LR, SLR and LALR parsers.

UNIT III

COMPILER- CODE GENERATION, OPTIMIZATION 9 Intermediate languages: graphical representations, DAGs, Three address code, types of three address statements, syntax directed translation into three address code, implementation of three address statements-Code Optimization: Machine dependent and machine independent code generation: Sources of optimization-Code Generation-Semantic stacks, evaluation of expressions, control structures, and procedure calls.

UNIT IV

LOADERS AND LINKERS 9 Basic loader functions: Design of an Absolute Loader – A Simple Bootstrap Loader Machine dependent loader features Relocation – Program Linking – Algorithm and Data Structures for Linking Loader. Machine-independent loader features – Automatic Library Search – Loader Options Loader design options – Linkage Editors – Dynamic Linking – Bootstrap Loaders. Implementation examples: MSDOS linker.

UNIT V

MACRO PROCESSORS & OTHER SYSTEM SOFTWARE 9 Basic macro processor functions – Macro Definition and Expansion – Macro Processor Algorithm and data structures – Implementation examples: MASM Macro Processor- Text editors – Overview of Editing Process - User Interface – Editor Structure – Interactive Debugging Systems – Debugging functions and capabilities –Relationships with Other parts of the system – User Interface Criteria. - Virtual Machines

REFERENCES:

1. Leland Beck - "System Software – An Introduction to Systems Programming", Third Edition, Pearson Education, Inc., 2008
2. A.V. Aho, R. Shethi and Ulman; Compilers - Principles, Techniques and Tools, Second Edition, Pearson Education, 2002.
3. D. M. Dhamdhere, "Systems Programming and Operating Systems", Tata McGraw Hill Company, Second Edition, 2009.
4. John J. Donovan, "Systems Programming", Tata McGraw Hill Company, Second Edition, 2000.
5. V. Raghavan, "Principles of Compiler Design", Tata McGrawHill Education Publishers, 2010.
6. Srimanta Pal, " Systems Programming " , Oxford University Press, 2011.

MSCS -204: DATA MINING

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 discpvery-Datamining 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,E-R Modeling versus Dimensional modeling-use of case tools-The star shema-Review of a simple STAR schema,inside a Dimension table,inside the fact table,the factless fact table,Dat Granularity.Star Scheam keys-primary keys,surrogate keys,foreign keys.Advantages of star schema.
Chapter –III: Dimensional Modeling: Updates to the dimensional tables-Miscellaneous Dimensions-The Snowflake shema-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-Nueral network based algorithms-Propogation-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-Hierarchial algorithms-agglomerative algorithms-Divisive clustering-Partitional algorithms-Minimum spanning tree-Squared error clustering algorithm-K-means clustering-nearest neighbour 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 Itemsets-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.Dunham chapter 6(6.1 to 6.8)]
Chapter -II: Mining objects-spatial ,multimedia & trxt 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 - 205: COMPUTER NETWORKS

UNIT I

Overview of the Internet: Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model Data Link Layer – design issues, CRC Codes, Elementary Data link Layer protocols, sliding window protocol

UNIT II

Multiple Access Protocols –ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT III

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

UNIT IV

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, Ipv6 Protocol, IP addresses, CIDR, ICMP, ARP, RARP, DHCP. Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Connection Release, Crash Recovery.

UNIT V

The Internet Transport Protocols UDP-RPC, Real Time Transport Protocols,The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP. Application Layer-Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH

TEXT BOOKS:

- 1) Computer Networks, Andrew S. Tanenbaum, David J Wetherall, Pearson Education, 5th Edition.
- 2) Computer Networks A Top-Down Approach, Behrouz A Forouzan, Firouz Mosharraf, TMH.

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning.
3. Computer Networks, L.L.Peterson and B.S.Davie, 4th edition, ELSEVIER.
4. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose,K.W.Ross, 3 rd Edition, Pearson Education.

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

S.V.U. COLLEGE OF SCIENCES

COMMON SYLLABUS FOR ALL P.G. COURSES (CBCS & NON-CBCS)

SEMESTER – II

HUMAN VALUES AND PROFESSIONAL ETHICS – I

Syllabus

(With effect from 2014-15)

(effective from the batch of students admitted from the academic year 2014-15)

- I. Definition and Nature of Ethics- Its relation to Religion, Politics, Business, Law, Medicine and Environment. Need and Importance of Professional Ethics- Goals – Ethical Values in various Professions.
- II. Nature of Values- Good and Bad, Ends and Means, Actual and potential Values, Objective and Subjective Values, Analysis of basic moral concepts- right, ought, duty, obligation, justice, responsibility and freedom, Good behavior and respect for elders, Character and Conduct.
- III. Individual and society:
Ahimsa (Non-Violence), Satya (Truth), Brahmacharya (Celibacy), Asteya (Non possession) and Aparigraha (Non-stealing). Purusharthas (Cardinal virtues)- Dharma (Righteousness), Artha (Wealth), Kama (Fulfillment Bodily Desires), Moksha (Liberation).
- IV. Bhagavad Gita – (a) Niskama karma. (b) Buddhism – The Four Noble Truths – Arya astanga marga, (c) Jainism – mahavratas and anuvratas. Values Embedded in Various Religions, Religious Tolerance, Gandhian Ethics.
- V. Crime and Theories of punishment – (a) Reformative, Retributive and Deterrent. (b) Views on manu and Yajnavalkya.

Books for study:

1. John S Mackenzie: 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 Karan 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 Applied 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.

SEMESTER-III

MSCS -301: COMPUTER ALGORITHMS

UNIT-I

Introduction - Algorithm - Specification - Performance Analysis - Divide - And Conquer - General Method - Binary Search - Finding the Maximum and Minimum - Merge Sort - Quick Sort.

UNIT-II

The Greedy Method - General Method - Knapsack Problem - Tree Vertex Splitting Dynamic Programming - General Method - Multistage Graphs - All pairs shortest paths - Single - Source Shortest paths - The traveling salesperson problem - Flow shop scheduling.

UNIT-III

Basic Traversal and Search Techniques - Binary Trees - Graphs - Connected Components and Spanning Trees - Biconnected Components.

UNIT-IV

Backtracking - General Method - 8 Queens Problem - Graph Coloring - Branch and Bound - Method - 0/1 Knapsack Problem

UNIT-V

NP-Hard and NP-Complete Problem - Basic Concepts - Cooke's Theorem - NP-Hard Problems - Clique Decision Problem - Job Shop Scheduling - Code generation with Common Sub expressions - Approximation Algorithms - Introduction - Absolute Approximations - E-Approximations

Text Book :

Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Computer Algorithms", Galgotia Publications Pvt. Ltd., 2002

Reference :

1. Sara Baase and Allen Van Gelde, "Computer Algorithms, Introduction to Design and Analysis", 3rd Edition, Pearson Education, Delhi, 2002.
2. Aho, Hopcroft and Ullman, "The Design and Analysis of Computer Algorithm", Pearson Education, Delhi, 2001.
3. Basu S.K., "Design Methods and Analysis of Algorithms", PHI, 2006.
4. Brassard and Bratley, "Fundamentals of Algorithms", PHI, 1995.
5. Sanjoy Dasgupta, Christos Papadimitriou, Umesh vazirani, "Algorithms", TMG, 2007.

MSCS 302: SOFTWARE ENGINEERING

UNIT I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, legacy software, Software myths. A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models. Process models: The waterfall model, Incremental process models, Evolutionary process models, specialized process models, The Unified process.

UNIT II

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document. Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. System models: Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT III

Design Engineering: Design process and Design quality, Design concepts, the design model, pattern based software design. Creating an architectural design: software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture. Modeling component-level design: Designing class-based components, conducting component-level design, Object constraint language, designing conventional components. Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging. Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance. Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT V

Risk management: Reactive Vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan. Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition , 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach Publications, 2008.
8. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley & Sons Ltd.
9. Software Engineering 3: Domains, Requirements, and Software Design, D.Bjorner, Springer International Edition.
10. Introduction to Software Engineering, R.J.Leach, CRC Press

MSCS 303: IMAGE PROCESSING

UNIT-I:

What is Digital image Processing-The Origins of Digital Image Processing-Example Fields that use digital image processing- Fundamental Steps in Digital Image Process Components of an image processing system summary-Elements of Visual Perception- I and the Electromagnetic Spectrum-image Sensing and Acquisition-Image Sampling Quantization-Some Basic Relationships between Pixels-Linear and Nonlinear Operation.

UNIT-II:

Background-Some Basic Gray level Transformations-Histogram Processing- Enhancer Using Arithmetic/ Logical Operations- Basis of spatial filters – smoothing spatial Filters – smoothing spatial filter sharpening spatial filters-Combining spatial Enhancement Methods. Color Fundamental color Models-pseudo color image processing – Basis of full-color image processing- Transformations smoothing and sharpening – color segmentation – noise in color image color image compression.

UNIT – III:

Fundamentals – image compression Models – Elements of information theory – Error-Compression – image Compression Standards.

UNIT-IV:

Detection of Discontinuities – Edge Linking and Boundary Detection – Threshold- Regarding based Segmentation- Segmentation by morphological watersheds-the Use of Motion Segmentation.

UNIT – V:

Representation – Boundary Descriptors – Regional Descriptors – Use of Principal – Common for Description – Relational Descriptors – Scope and relevance Handwriting – Finger Print – 1 Other state – of the art Technologies.

TEXT BOOK:

1.Gonzalez and Woods, Digital Image Processing, Second Edition, Pearson Education.

REFERENCE BOOKS:

1. Introductory Computer Vision & Image Processing, Mc Graw Hill.
2. Ramesh Jani et al, Machine Vision, McGraw Hill.
3. B.Chandra, D.Dutta Majmlar, Digital Image Processing PHL
4. G.W.Awlock & R.Thomas, Applied Degital Image Processing, McGraw Hill.
5. Picks, Digital Image Processing, John Wiley.
6. M.Sonka, Image Processing Analysis & Machine Design, Thomson Learning.
7. Anil K Jain, Fundamentals of Digital Image Processing, Pearson Education, 2004.

MSCS 304A: CRYPTOGRAPHY AND NETWORK SECURITY

UNIT I

Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT II

Symmetric key Ciphers: Block Cipher principles & Algorithms(DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4,Location and placement of encryption function, Key distribution Asymmetric key Ciphers: Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman,ECC), Key Distribution

UNIT III

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm Authentication Applications: Kerberos, X.509 Authentication Service, Public – Key Infrastructure, Biometric Authentication

UNIT IV

E-Mail Security: Pretty Good Privacy, S/MIME IP Security: IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management

UNIT V

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls Case Studies on Cryptography and security: Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections

TEXT BOOKS:

1. Cryptography and Network Security : William Stallings, Pearson Education,4th Edition
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2nd Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1 st Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2nd Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

MSCS 304B: ARTIFICIAL INTELLIGENCE

UNIT I:

INTRODUCTION 1 : The AI problem - The underlying Assumption - The level of the model - Criteria for success – Defining the problem as a static O.s.pace search - Production systems - Problem Characteristics - Production system Characteristics - Issues in the Design of search problems. Heuristic Search Techniques - Generate and Test - Hill climbing -Best first search - Problem reduction - Means ends Analysis.

UNIT II:

KNOWLEDGE REPRESENTATION 1 : Representations and mappings - Approaches to Knowledge representation - issue in Knowledge representation - the frame problem – Representing simple facts in logic - representing Instances and its relationships - computable functions and predicates - Resolutions - Natural deduction. Procedural versus Declarative Knowledge - Logic programming -Forward versus Backward reasoning - Matching - control Knowledge.

UNIT III:

PARALLEL AND DISTRIBUTED AI : Psychological modeling - Parallelism in Reasoning system - Distributed Reasoning system.

LEARNING: What is Learning ? - Rote Learning - Learning by taking Advice - Learning in problem solving - Learning from examples; Induction - Explanation Based Learning - Discovery - Analogy - Formal Learning theorem - Neuralnet learning and Genetic Learning.

UNIT IV:

CONNECTIONIST MODELS: Introduction: Hopfield Networks -

Learning in Neural Networks - Application of Neural networks - Recurrent Networks - Distributed representations - Connectionist AI and symbolic AI. Expert systems: Representation and using Domain Knowledge expert system - shells - explanations - Knowledge Acquisition.

UNIT V

Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing.

TEXT BOOK:

Scope and standard as in Chapters 1 to 6, 16,17,18,20 of Artificial Intelligence, by Elaine Rich and Kevin Knight, Tata MacGraw Hill publishing Company Ltd.,New Delhi, 1991. (Second edition)

REFERENCE BOOKS:

1. E.Charnic and D.McDermott, "Introduction to Artificial Intelligence", Addison - Wesley.
2. P. Winston "Artificial Intelligence", Addison - Wesley.
3. Stuart Russell and Peter Narving, "Artificial Intelligence", Prentice Hall International , 1995.

MSCS 304C: 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 learning, (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 pattern classification, Hierarchical Vector quantizer, contextmel Maps (p. no's 443 -469, 9.1 -9.8)

UNIT V

NEURO DYNAMICS – Dynamical systems, stability 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 Hall 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 304D: BIG DATA ANALYTICS

UNIT I

INTRODUCTION TO BIG DATA 8 Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

UNIT II

MINING DATA STREAMS 9 Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT III

HADOOP 10 History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS- Java interfaces to HDFS- Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features

UNIT IV

HADOOP ENVIRONMENT 9 Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop benchmarks- Hadoop in the cloud

UNIT V

FRAMEWORKS 9 Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphere BigInsights and Streams. Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications

REFERENCES

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2. Tom White “ Hadoop: The Definitive Guide” Third Edition, O’reilly Media, 2012.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, McGrawHill Publishing, 2012
4. Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
5. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.
6. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007
7. Pete Warden, “Big Data Glossary”, O’Reilly, 2011.
8. Jiawei Han, Micheline Kamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008.

9. Da Ruan, Guoqing Chen, Etienne E. Kerre, Geert Wets, Intelligent Data Mining, Springer, 2007
10. Paul Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corrigan, Harness the Power of Big Data The IBM Big Data Platform, Tata McGraw Hill Publications, 2012
11. Michael Minelli (Author), Michele Chambers (Author), Ambiga Dhiraj (Author), Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses, Wiley Publications, 2013
12. Zikopoulos, Paul, Chris Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, Tata McGraw Hill Publications, 2011

MSCS 304E: 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 Right-source 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.

REFERENCES:

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 305A: SOFTWARE TESTING

UNIT I

Introduction: - Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs. Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT II

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

UNIT III

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability. Paths, Path products and Regular expressions: - path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

UNIT IV

Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications. State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips.

UNIT V

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing,3rd edition, P.C.Jorgensen, Aurbach Publications(Dist. by SPD).
3. Software Testing in the Real World – Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley, 2nd Edition, 1999.
5. Art of Software Testing – Meyers, John Wiley.
6. Software Testing, N.Chauhan, Oxford University Press.
7. Software Testing, M.G.Limaye, TMH.
8. Software Testing, S.Desikan, G.Ramesh, Pearson.
9. Foundations of Software Testing, D.Graham & Others, Cengage Learning.
10. Foundations of Software Testing, A.P.Mathur, Pearson.
11. Software Testing, S.Desikan, G.Ramesh, Pearson

MSCS 305B Cloud Computing

UNIT I

CLOUD ARCHITECTURE AND MODEL 9 Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT II

VIRTUALIZATION 9 Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

UNIT III

CLOUD INFRASTRUCTURE 9 Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT IV

PROGRAMMING MODEL 9 Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments - Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

UNIT V

SECURITY IN THE CLOUD 9 Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

REFERENCES:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
2. John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A Practical Approach”, TMH, 2009.
4. Kumar Saurabh, “Cloud Computing – insights into New-Era Infrastructure”, Wiley India,2011.
5. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud” O'Reilly
6. James E. Smith, Ravi Nair, “Virtual Machines: Versatile Platforms for Systems and Processes”, Elsevier/Morgan Kaufmann, 2005.

MSCS 305C: Mobile App Development

UNIT I

INTRODUCTION 5 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 8 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 8 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 12 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 12 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 305D Natural Language Processing with Python

UNIT I

Introduction and Overview What is Natural Language Processing, hands-on demonstrations. Ambiguity and uncertainty in language. The Turing test. Regular Expressions Chomsky hierarchy, regular languages, and their limitations. Finite-state automata. Practical regular expressions for finding and counting language phenomena. A little morphology. Exploring a large corpus with regex tools. Programming in Python An introduction to programming in Python. Variables, numbers, strings, arrays, dictionaries, conditionals, iteration. The NLTK (Natural Language Toolkit) String Edit Distance and Alignment Key algorithmic tool: dynamic programming, a simple example, use in optimal alignment of sequences. String edit operations, edit distance, and examples of use in spelling correction, and machine translation.

UNIT II

Context Free Grammars Constituency, CFG definition, use and limitations. Chomsky Normal Form. Top-down parsing, bottom-up parsing, and the problems with each. The desirability of combining evidence from both directions Non-probabilistic Parsing Efficient CFG parsing with CYK, another dynamic programming algorithms. Earley parser. Designing a little grammar, and parsing with it on some test data. Probability Introduction to probability theory Joint and conditional probability, marginals, independence, Bayes rule, combining evidence. Examples of applications in natural language. Information Theory The "Shannon game"--motivated by language! Entropy, cross-entropy, information gain. Its application to some language phenomena.

UNIT III

Language modeling and Naive Bayes Probabilistic language modeling and its applications. Markov models. N-grams. Estimating the probability of a word, and smoothing. Generative models of language. Part of Speech Tagging and Hidden Markov Models , Viterbi Algorithm for Finding Most Likely HMM Path , Dynamic programming with Hidden Markov Models, and its use for part-of-speech tagging, Chinese word segmentation, prosody, information extraction, etc.

UNIT IV

Probabilistic Context Free Grammars Weighted context free grammars. Weighted CYK. Pruning and beam search. Parsing with PCFGs A tree bank and what it takes to create one. The probabilistic version of CYK. Also: How do humans parse? Experiments with eye-tracking. Modern parsers. Maximum Entropy Classifiers The maximum entropy principle, and its relation to maximum likelihood. Maximum entropy classifiers and their application to document classification, sentence segmentation, and other language tasks

UNIT V

Maximum Entropy Markov Models & Conditional Random Fields Part-of-speech tagging, noun-phrase segmentation and information extraction models that combine maximum entropy and finite-state machines. State-of-the-art models for NLP.

Lexical Semantics Mathematics of Multinomial and Dirichlet distributions, Dirichlet as a smoothing for multinomial's. Information Extraction & Reference Resolution- Various methods, including HMMs. Models of anaphora resolution. Machine learning methods for co reference.

TEXT BOOKS:

1. "Speech and Language Processing": Jurafsky and Martin, Prentice Hall
2. "Statistical Natural Language Processing"- Manning and Schutze, MIT Press
3. "Natural Language Understanding". James Allen. The Benajmins/Cummings Publishing Company

REFERENCES BOOKS:

1. Cover, T. M. and J. A. Thomas: Elements of Information Theory. Wiley.
2. Charniak, E.: Statistical Language Learning. The MIT Press.
3. Jelinek, F.: Statistical Methods for Speech Recognition. The MIT Press.
4. Lutz and Ascher - "Learning Python", O'Reilly.

MSCS 305E FORMAL LANGUAGES & COMPILER DESIGN

UNIT - I:

Context Free Languages: Context Free Grammars - Example of Context Free Languages Left most and Right most Derivations, Derivations Trees, Relation Between Sentential Forms and Derivation Tress.

Parsing and Ambiguity - Parsing and membership, Ambiguity in Grammars and Languages. Context - free Grammars and programming Languages. Simplification of Context Free Grammars: Methods for Transporting Grammars A Useful Substitution Rule, Removing Useless Productions - Removing Productions, Removing Unit - Productions, Two Important Normal Forms Chomsky Normal form - Greibach Normal form.

UNIT - II:

Pushdown Automata: Non-deterministic Pushdown Automata Definition of a pushdown Automata - A Language Accepted by a Pushdown Automata . Pushdown Automata and Context - Free Languages - Pushdown Automata for Context Free Languages Context - Free Grammars for Pushdown Automata. Properties of Context - Free Languages : Two Pumping Lemmas - a Pumping for Context - Free Languages - A Pumping Lemma for Linear Languages. Turing Machine: The Standard Turing Machine - Definition of a Turing Machine as Language Accepters - Turing

UNIT - III:

What is a Compiler ? The need of Machine Translation, The structure of a Compiler, A Demonstration Compiler. Target Languages: Types of Target Machine, Implementation Methods. Formal Grammars : Defining the Structure of a Language, Properties of Grammars, Syntax - directed Translation. Intermediate Representations : Types of Intermediate Representations, Abstract Machines. Lexical Analysis : Why have a Separate Lexical Analyzer? , Adhoc Lexical Analyser, Lexical Analysis with Finite state Machines. Syntax Analysis Methods: Approaches to Parsing, Top-down Parsing Methods. Bottom - up Parsing.

UNIT - IV:

Error handling: Compile - Time error Handling, Run - time Errors. Parser Generators: YACC. YACC and Ambiguous Grammars. Type Consistency in YACC. Error Handling. Other Parser Generators and Related Tools. Semantic Checking: Type Checking, Other Semantic Checks.

UNIT - V

Code Generation : Declarations and Storage Allocation, Expressions and Assignment, Flow of Control, Code Generator, Generators. Simple Code Optimization: Basic Blocks and Local Optimization, Register Optimization, Machine - Dependent Optimizations, Peephole Optimization.

Text Books:

- 1.An Introduction to Formal Languages and Automata - Peter Linz - Narosa Publishing House - 3rd Edition – 2001.
- 2.Introduction to Compiling Techniques by I.P.Bennett - Tata MC.Graw Hill Second Edition (chapters 1 to 11) - 2002 Ed.

SEMESTER-IV

MSCS-401 MAJOR PROJECT WORK

MSCS-402 HUMAN VALUES AND PROFESSIONAL ETHICS – II

COMMON SYLLABUS FOR ALL P.G. COURSES (CBCS & NON-CBCS)

Syllabus

(With effect from 2015-16)

(effective from the batch of students admitted from the academic year 2014-15)

- 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.
- II. Medical ethics- Views of Charaka, Sushruta and Hippocrates 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.
- III. Business ethics- Ethical standards of business-Immoral and illegal practices and their solutions. Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.
- IV. Environmental ethics- Ethical theory, man and nature – Ecological crisis, Pest control, Pollution and waste, Climate change, Energy and population, Justice and environmental health.
- 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 Mackenzie: 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 Applied 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.