

**University of Madras**  
**Department of Computer Science**  
**(For the batch admitted during the academic year 2017-2018)**

**Eligibility for Admission to Master of Computer Applications (M.C.A)**

Candidate who have passed the under-mentioned degree examinations of this University or an examination of other institution recognized by this University as equivalent thereto provided they have undergone the course under 10+2+3 or 11+1+3 or 11+2+2 pattern shall be eligible for admission to the M.C.A. Degree Course under CBCS.

(a) B.C.A/B.E.S/B.Sc. in Computer Science/Mathematics/Physics/ Statistics / Applied Sciences OR (b) B.Com / Bachelor of Bank Management/B.B.A/B.L.M/B.A Corporate Secretaryship / B.A. Economics/ any other Bachelor's Degree in any discipline with Business Mathematics and Statistics or Mathematics/Statistics in Main/Allied level OR (c) B.Sc., Chemistry with Mathematics and Physics as allied subjects OR (d) B.E/B.Tech/M.B.A OR (e) A Bachelor's Degree in any discipline with Mathematics as one of the subjects at the Higher Secondary level (i.e. in +2 level of the 10+2 pattern)

**Core Courses offered by the Department of Computer Science for M.C.A. Degree programme**

Course Code	Title of the Courses	Core/Elective	Credits L-T-P-C	Course Faculty
MSI C301	Digital Principles	C	3-1-0-4	S.Gopinathan(SG)
MSI C302	Object Oriented Programming with C++	C	3-1-0-4	PL.Chithra (PLC)
MSI C303	Programming in Java and Web Technology	C	3-1-0-4	M. Sornam
MSI C304	Programming in C++ Lab.	C	0-0-2-2	PL.Chithra (PLC)
MSI C305	Programming in Java and Web Technology Lab.	C	0-0-2-2	Guest Lecturer
	Elective	E	3-0-0-3	Faculty Concerned
	Elective	E	3-0-0-3	Faculty Concerned
	Soft Skill*	S	2-0-0-2	Faculty Concerned
MSI C306	Microprocessors and Applications	C	3-1-0-4	S.Gopinathan
MSI C307	Object Oriented Data Structures	C	3-1-0-4	B.Lavanya
MSI C308	Operating Systems	C	3-1-0-4	PL.Chithra
MSI C309	Microprocessors and Data Structures Lab.	C	0-0-2-2	S.Gopinathan & B.Lavanya
	Elective	E	3-0-0-3	Faculty Concerned
	Elective	E	3-0-0-3	Faculty Concerned
	Soft Skill*	S	2-0-0-2	Faculty Concerned

MSI C310	Design and Analysis of Algorithms	C	3-1-0-4	P. Thangavel
MSI C311	Database Management Systems	C	3-1-0-4	B. Lavanya
MSIC312	Computer Graphics	C	3-1-0-4	PL. Chithra
MSI C313	Database Systems and Computer Graphics Lab.	C	0-0-2-2	Guest Lecturer
	Elective	E	3-0-0-3	Faculty Concerned
	Elective	E	3-0-0-3	Faculty Concerned
	Soft Skill*	S	2-0-0-2	Faculty Concerned
UOMI 002	Internship-I	S	0-0-3-3	Faculty Concerned
MSI C314	Computer Networks	C	3-1-0-4	P.Thangavel
MSI C315	Theory of Computation	C	3-1-0-4	M.Sornam
MSI C316	Digital Image Processing	C	3-1-0-4	PL.Chitra
MSIC317	Data Mining and Data Warehousing	C	3-1-0-4	B.Lavanya
MSI C318	Digital Image processing Lab.	C	0-0-1-1	PL.Chithra
	Elective	E	3-0-0-3	Faculty Concerned
	Elective	E	3-0-0-3	Faculty Concerned
	Soft Skill*	S	2-0-0-2	Faculty Concerned
MSI C319	Mini Project and Group Discussion	C	0-0-2-2	All Faculty
MSIC320	Soft Computing	C	3-1-0-4	M.Sornam
MSI C321	Software Engineering	C	3-1-0-4	S.Gopinathan
MSIC322	Big Data and Analytics	C	3-1-0-4	B.Lavanya
	Elective	E	3-0-0-3	Faculty Concerned
	Elective	E	3-0-0-3	Faculty Concerned
	Elective	E	3-0-0-3	Faculty Concerned
	Soft Skill*	S	2-0-0-2	Faculty Concerned
	Soft Skill*	S	2-0-0-2	Faculty Concerned
MSI C323	Project Work	C	0-0-15-15	All Faculty

### List of elective Courses for M.C.A. and M.Sc. Computer Science

MSI E301	Financial Accounting and Analysis	E	3-0-0-3	Guest Faculty
MSI E302	Principles of Compiler Design	E	3-0-0-3	Guest Faculty
MSI E303	Advanced Java Programming	E	2-0-1-3	Guest Faculty
MSI E304	Programming in COBOL	E	2-0-1-3	M.Sornam
MSI E305	High Performance Computing	E	3-0-0-3	Guest Faculty
MSI E306	Multimedia Systems	E	2-0-1-3	B.Lavanya/GF
MSI E307	Artificial Intelligence & Expert Systems	E	3-0-0-3	M.Sornam/GF
MSIE308	Computer Oriented Statistical Methods	E	3-0-0-3	Guest Lecturer
MSIE309	Unix and Shell Programming	E	3-0-0-3	Guest Lecturer
MSIE310	Programming in Dot NET	E	3-0-0-3	M.Sornam/GF
MSI E311	Software Project Management & Testing	E	3-0-0-3	S. Gopinathan
MSI E312	Software Quality And Assurance	E	3-0-0-3	Guest Faculty
MSI E313	Computer Simulation & Modeling	E	3-0-0-3	Guest Faculty

MSI E314	Computer Aided Design	E	3-0-0-3	S.Gopinathan/ M.Sornam
MSI E315	Pattern Recognition	E	3-0-0-3	Guest Faculty
MSI E316	Object Oriented Analysis and Design	E	3-0-0-3	PL. Chithra
MSI E317	Project and Case Studies –I	E	0-0-3-3	All Faculty
MSI E318	Project and Case Studies –II	E	0-0-3-3	All Faculty
MSIE321	Introduction to Programming in PYTHON	E	2-0-1-3	M. Sornam
MSIE322	Functional Programming using Haskell	E	2-0-1-3	Guest Faculty
MSIE323	Cryptography	E	3-0-0-3	P.Thangavel/G.F.
MSIE324	Programming in C	E	3-0-0-3	Guest Lecturer

### List of elective Courses offered for other Department Students

MSI E319	Introduction to Information Technology and Programming in C	E	2-0-1-3	Guest Faculty
MSI E320	Internet and Java Programming	E	2-0-1-3	Guest Faculty

### Detailed Course Contents

MSI C301	Digital Principles	3	1	0	4	S.Gopinathan
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UNIT I: MINIMIZATION TECHNIQUES AND LOGIC GATES: Minimization techniques: Boolean postulates and laws – De-Morgan’s Theorem -Principle of Duality - Boolean expression - Minimization of Boolean expressions — Minterm – Maxterm – Sum of Products (SOP) – Product of Sums (POS) – Karnaugh map Minimization – Don’t care conditions – Quine-McCluskey method of minimization. Logic Gates: AND, OR, NOT, NAND, NOR, Exclusive–OR and Exclusive–NOR Implementations of Logic Functions using gates, NAND–NOR implementations – Multi level gate implementations- Multi output gate implementations– Tristate gates.

UNIT II: COMBINATIONAL CIRCUITS: Design procedure – Half adder – Full Adder – Half subtractor – Full subtractor – Parallel binary adder, parallel binary Subtractor – Fast Adder – Carry Look Ahead adder – Serial Adder/Subtractor - BCD adder - Multiplexer/ Demultiplexer – decoder - encoder – parity checker – parity generators .

UNIT III: SEQUENTIAL CIRCUITS: Latches, Flip-flops – SR, JK, D, T, and Master-Slave – Characteristic table and equation–Application table – Edge triggering - Realization of one flip flop using other flip flops – serial adder/subtractor- Asynchronous Ripple or serial counter – Asynchronous Up/Down counter - Synchronous counters – Synchronous Up/Down counters – Design of Synchronous counters: Circuit implementation – Modulo–n counter, Registers – shift registers – Universal shift registers – Shift register counters – Ring counter – Shift counters .

UNIT IV: SYNCHRONOUS AND AYNCHRONOUS SEQUENTIAL CIRCUITS:  
Synchronous Sequential Circuits: General Model – Classification – Design – Use of Algorithmic State Machine – Analysis of Synchronous Sequential Circuits Asynchronous Sequential Circuits:– Problems in Asynchronous Circuits Design of Combinational and

Sequential circuits. Classification of memories – ROM – ROM organization – PROM – EPROM – EEPROM – EAPROM, RAM – RAM organization

TEXT BOOKS: 1. M. Morris Mano, Digital Design, 3/e, Prentice Hall of India Pvt. Ltd., 2003 / Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.  
 2. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, 3/e, Vikas Publishing House Pvt. Ltd, New Delhi, 2006.  
 3. M. Morris Mano, 2011, Digital Logic and Computer Design, Thirteenth Impression, Pearson Education, Delhi

REFERENCES: 1. J. F. Wakerly, Digital Design, Fourth Edition, Pearson/PHI, 2006  
 2. John.M Yarbrough, Digital Logic Applications and Design, Thomson Learning, 2002.  
 3. Charles H.Roth. Fundamentals of Logic Design, Thomson Learning, 2003.  
 4. Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 6th Edition, TMH, 2003.  
 5. William H. Gothmann, Digital Electronics, 2nd Edition, PHI, 1982.  
 6. Thomas L. Floyd, Digital Fundamentals, 8th Edition, Pearson Education Inc, New Delhi, 2003  
 7. Donald D.Givone, Digital Principles and Design, TMH, 2003.

MSI C302	Object Oriented Programming with C++	3	1	0	4	PL.Chithra/GL
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UNIT-I: Introduction to OOP-Overview of C++-Classes-Structures-Union-Friend Functions-Friend Classes-Inline functions-Constructors-Destructors-Static Members-Scope Resolution Operator-Passing Objects to functions-Function returning objects.

UNIT-II: Arrays - Pointers-this pointer –References-Dynamic memory Allocation-Function Overloading-Default arguments-Overloading Constructors-Pointers to Functions-Ambiguity in function overloading.

UNIT-III: Operator Overloading-Member Operator Function-Friend Operator Function-Overloading some special operators like [], (), a and comma operator-Inheritance-Types of Inheritance-Protected members-Virtual Base Class-Polymorphism –Virtual Functions- Pure virtual functions.

UNIT-IV: Class templates and generic classes-Function templates and generic functions-Overloading a function template-power of templates-Exception Handling - Derived class Exception .

Text:

1. H. Schildt, C++-The Complete Reference, Third Edition-Tata McGraw Hill-1999.
2. J.P.Cohoon and J.W.Davidson.C++ Program Design - An Introduction to Programming and Object-Oriented Design, 2<sup>nd</sup> Edition-McGraw Hill-1999.

Reference Books

1. B. Stroustrup, C++ Programming Language, Addison-Wesley, 1997
2. R. Lafore, Object oriented Programming in C++, Fourth Edition, Pearson,2002
3. S. B. Lippman, J. Lajoie, B. E. Moo, C++ Primer, Fourth Edition, Pearson, 2005
4. M.P.Bhave, S.A.Patekar, Object-Oriented Programming with C++, Pearson, 2004.

MSIC303	Programming in Java and Web Technology	3	1	0	4	PL. Chithra/G.F.
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UNIT I : Introduction to java - Features of java - Object Oriented Concept - Lexical Issues - Data Types - Variables - Arrays – Operators - Control Statements. Classes – Objects – Constructors – Overloading method – Access Control – Static and fixed methods – Inner Classes – String Class – Inheritance – Overriding methods -Using super – Abstract class.

UNIT II: Packages – Access Protection – Importing Packages – Interfaces-Exception Handling-Throw and Throws-Thread-Synchronization-Messaging- Runnable Interface - Inter thread Communication – Deadlock - Suspending, Resuming and stopping threads - Multithreading.

UNIT-III: I/O Streams-Applets-String Objects-String Buffer-Char Array-Java Utilities-Code Documentation. Working using AWT Classes – Graphics - AWT Controls-Layout Managers and Menus –Events-Event Handling.

Unit IV: History of the Internet and World Wide Web – HTML 4 protocols – HTTP, SMTP, POP3, MIME, IMAP.- Web Pages - types and issues, tiers; web client and web server, HTML different tags, sections, image & pictures, listings, tables, frame, frameset, form. Dynamic HTML - DHTML, CSS, frames, navigator, Event Model –Form process – Creating Images – Adding shadows – Gradients – Creating Motion with Blur – Data Binding – Simple Data Binding – Moving with a record set – Sorting table data – Binding of an Image and table.- XML – Introduction – DTD- XML DOM – XSLT- Xpath- X forms-Xquery- databases - Java script - variables, operators, conditional statements, array object, date object, string object, front end validation, Event Handling - ASP - web hosting – web services- web server technologies- e-commerce- future of web technology – recent trends and products.

Text books:

1. P. Naughton and H. Schildt, Java2 (The Complete Reference), 3/e, TMH,1999.
2. K. Arnold and J. Gosling, D. Holmes, The Java Programming Language, 4/e, Addison Wesley Professional, 2005.
3. Dietel, Dietel Nieto, Internet and World Wide Web- how to program, Pearson publishers, 1<sup>st</sup> edition,2000.

Reference Books

1. J. Lewis, W. Loftus, Java Software Solutions, Addison-Wesley, 2007
2. P. Deitel and H. Deital, Java for programmers, Pearson, 2009
3. Horstmann, Core Java Vol. 1 Fundamentals, Eighth Edition, Pearson, 1999.
4. Godbole A. S. & Kahate A., Web Technologies, TMH, 2<sup>nd</sup> edition, 2008.

MSIC304	Programming in C++ Lab	0	0	2	2	PLC
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C++: Prime number generations- Recursive and non-recursive functions to find the factorial of a given integer, to find the GCD of two given integers-Class implementation with functions to swap two integers, to swap two characters, swap two real numbers - overloaded functions-Sorting-Matrix manipulation-Complex Number manipulation-String manipulation using overloading- Types of inheritance manipulations-Constructors and destructors implementation - Different types of exception handling implementation.

MSIC305	Programming in Java and Web	0	0	2	2	Guest Lecturer
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	Technology Lab					
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Java: To find all the possible roots of a quadratic equation -Fibonacci number generation using recursive and non-recursive functions – sorting names – matrix multiplication – Sum of integers with String Tokenizer class – File manipulation - multiple threads Using Thread class, using Runnable interface- Handling predefined exceptions - Handling user defined exceptions –display bio-data using awt controls- a frame to implement a simple arithmetic calculator using an event handling. Web technology - implementation of concepts and tags in HTML – DHTML – CSS – programs in javascript – programs in vb script and programs in ASP.

MSI C306	Microprocessors and Applications	3	1	0	4	S.Gopinathan
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UNIT – I: Introduction to Microcomputers and Microprocessor - Evolution of Microprocessor and types - 8086 Family Internal Architecture - Introduction to Programming - Writing Programming and Development tools.

UNIT-II: Simple programs - Addressing Modes — Program Structure-Jumps – Flags - Conditional Jumps – If – Then -If then Else and Multiple If then else programs – While – Do - Repeat Until-delay loops - String procedures - Macros.

UNIT – III: 8086 Interrupts - Interrupts responses - Interrupt Applications-8255 PPI - Analog to Digital converter, Digital to Analog Converter. 8275 Keyboard Controller - Serial I/O data Communication.

Unit – IV: 8254 Programmable interval timer - DMA Controller - Memories. Microprocessor based Different type of Applications. Study on Pentium, Itanium processor.

Text book:

1. D.V. Hall, Microprocessors and Interfacing: Programming and Hardware, 4/e, TMH, 2008.

Reference books:

1. Mathur ,Introduction to Microprocessors, 4/e, PHI, 2012.

2. K. Udaya kumar and B.S. Umashankar , Advanced Microprocessor and IBM PC Assembly Language Programming, TMH, 1998.

MSIC307	Object Oriented Data Structures	3	1	0	4	B. Lavanya
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UNIT I: Problem solving – Top-down Design – Implementation – Verification – Efficiency – Analysis – Sample algorithms – object oriented programming concepts - Arrays – operations – applications – recursion - sparse matrices – implementation – operations. - Abstract Data Type (ADT) – The Stack ADT – implementation-operations - applications-recursion- expression evaluation and conversion- The Queue ADT – priority queues – implementation – operations-applications.

UNIT II : Linked list Preliminaries – singly linked list- doubly linked lists – circular linked list- representation - implementation- operations- applications – complexity – Trees-general trees – conversion to Binary Trees – The Search Tree ADT – Binary Search Trees – Tree Traversals – representation- implementation – operations –applications – heap trees – applications-F-heaps–B-heaps.

UNIT III: Preliminaries – Bubble sort - Insertion Sort — Heap sort– Quick sort – Radix sort - External Sorting - searching – linear – binary search.- Hashing

UNIT IV: Graphs - definitions – Topological Sort – Shortest-Path Algorithms – Unweighted Shortest Paths – representation – implementation - operations- Minimum Spanning Tree – Prim’s Algorithm – Applications of Depth-First Search – Undirected Graphs – AOV – AOE - Biconnectivity

TEXT BOOKS

1. E. Horowitz , S. Sahni, “Fundamentals of Data Structures”, Galgotia Book source, fourth edition,1994.
2. A.V. Aho, J. E. Hopcroft and J. D. Ullman, “Data Structures and Algorithms”, Pearson education Asia, 1<sup>st</sup> Edition,1983.

REFERENCES

- 1.Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, “Data Structures using C”, Pearson Education Asia, 2<sup>nd</sup> edition, 2004
2. Richard F. Gilberg, Behrouz A. Forouzan, “Data Structures – A Pseudocode Approach with C”, Thomson Brooks / COLE, 1<sup>st</sup> edition, 1998.
3. M. A. Weiss, “Data Structures and Algorithm Analysis in C”, 2nd ed, Pearson Education Asia, 2<sup>nd</sup> edition, 2002.

MSI C308	Operating Systems	3	1	0	4	PL.Chithra
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UNIT-I : Introduction-Multiprogramming-Time sharing-Distributed system-real-time systems-I/O structure-Dual-mode operation-Hardware protection-General system architecture-operating system services-System calls-System programs-System design and implementation.

UNIT-II : Process Management: Process concept-Concurrent process-Scheduling concepts-CPU scheduling-Scheduling algorithms, multiple processors Scheduling-Critical Section-Synchronization hardware-Semaphores, classical problem of synchronization, Interprocess communication. Deadlocks: Characterization, Prevention, Avoidance and Deletion.

UNIT-III : Storage management- swapping, single and multiple partition allocation-paging-segmentation, virtual memory-demand paging-page replacement and algorithms, thrashing. Secondary storage management-disk structure-free space management-allocation methods-disk scheduling-performance and reliability improvements-storage hierarchy.

UNIT-IV: Files and protection-file system organization-file operations-access methods-consistency semantics-directory structure organization-file protection-implementation issues-security-encryption. Case studies - MS-DOS and UNIX operating systems.

Text book:

1. A.Silberschatz and P.B.Galvin-Operating System Concepts - Addison-Welsey Publishing Company, 8<sup>th</sup> Edn, 2011
2. D.M.Dhamdere,Operating System: A Concept based approach , Second Edition, Tata McGraw Hill Education,1999.

3. A.S.Godbole-Operating Systems-Tata McGraw Hill-1999.

Reference Books

1. H.Deitel and P.Deital, Operating System, Third Edition, Pearson 2003
2. G.Nutt, Operating System, Third Edition, Pearson, 2003.

MSIC309	Microprocessors and Data structures Lab.	0	0	2	2	S. Gopinathan & B. Lavanya
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Microprocessors: Multibyte Addition/subtractions of signed and unsigned numbers, Computing Factorial, Computing Fibonacci Number, Matrix Addition, Matrix Multiplications, Selection Sort, Computing GCD of Number, Linear Search, Computing LCM. Data structures - Implementation of arrays -operations -applications- stacks – operations-applications -queues- operations-applications- types of linked lists- operations – applications- types of trees – operations-applications- graphs –operations-applications- Sorting and searching techniques.

MSI C310	Design and Analysis of Algorithms	3	1	0	4	M. Sornam
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UNIT I: Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.

UNIT II: Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components. Divide and conquer: General method , applications - Binary search, Quick sort, Merge sort, Strassen’s matrix multiplication.

UNIT III: Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem. Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

UNIT IV: Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles. Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution. NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook’s theorem.

**TEXT BOOK:**

1. Ellis Horowitz, Sartaj Sahni, S. Rajasekaran, “Fundamentals of Computer Algorithms”, Second Edition, University Press, 2008.

**REFERENCES:**

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, “Introduction to Algorithms”, Third Edition, PHI Learning Private Limited, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “Data Structures and Algorithms”, Pearson Education, Reprint 2006.



3. Donald E. Knuth, “The Art of Computer Programming”, Volumes 1 & 3 Pearson Education, 2009.
4. Steven S. Skiena, “The Algorithm Design Manual”, Second Edition, Springer, 2008.

MSIC311	Database Management Systems	3	1	0	4	B. Lavanya
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UNIT I: Introduction to File and Database systems- Database system structure – Data Models – Introduction to Network and Hierarchical Models – Relational Model – Relational Algebra and Calculus. E-R model – diagram, generalization, specialization- Data base design - Informal design guidelines for relational schemas; functional dependencies; normal forms based on primary keys, general definitions of 2nd and 3rd normal forms; Boyce-codd normalforms.,4NF,5NF

UNIT II: SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational Database design – Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - B+Tree .

UNIT III : Query processing- query optimization - Transaction Processing – Introduction- Need for Concurrency control- Desirable properties of Transaction- Schedule and Recoverability- Serializability and Schedules – Concurrency Control – Types of Locks- Two Phases locking- Deadlock- Time stamp based concurrency control .

UNIT IV: Recovery Techniques – Concepts- Immediate Update- Deferred Update - Shadow Paging- advanced recovery techniques - concepts of Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases- case studies and their analysis and design.

#### TEXT BOOKS

1.Abraham Silberschatz, Henry F. Korth and S. Sudarshan- “Database System Concepts”, Fourth Edition, McGraw-Hill, 2002.

#### REFERENCES

- 1.Ramez Elmasri and Shamkant B. Navathe, “Fundamental Database Systems”, Third Edition, Pearson Education, 2003.
- 2.Raghu Ramakrishnan, “Database Management System”, Tata McGraw-Hill Publishing Company, 2003.
- 3.Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- “Database System Implementation”- Pearson Education- 2000.
- 4.Peter Rob and Corlos Coronel- “Database System, Design, Implementation and Management”, Thompson Learning Course Technology- Fifth edition, 2003.

MSIC312	Computer Graphics	3	1	0	4	P.Thangavel
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UNIT – I: Overview of Computer Graphics system - Video Display Devices-Raster Scan and Random Scan Systems - Input device - Hard Copy devices - Graphics Software. Output Primitives : Line Drawing Algorithm - Circle Generation Algorithm - Character Generation Algorithm - Gray Scale Levels-Polygon filling.

UNIT – II: Two-Dimensional Transform - Basic Transformation - Composite Transformation – Translation – Rotation - Scaling-Reflections – Sheering - 2D Dimensional view : Window-to-View port Coordinate Transformation - Clipping Operations - Point-Line – Polygon – Text – Curve – GUI.

UNIT – III: 3-D Geometric Transformations – 3D – Viewing – Projection Animation - 3D-Object representations-Polygons, curved lines and surfaces, Quadric surfaces, super quadrics.

UNIT –IV:– Spline representations –Interpolation- cubic splines-Bezier curves- B-Spline curves – Blobby Objects -octrees –BSP trees- Visible surface detection methods- Basic illumination models.

Text Book:

1.D. Hearn and M.P. Baker, Computer Graphics, 4<sup>th</sup> edn., PH 2011.

Reference books:

1.W. Neuman and R.F. Sproull, “ Principles of Interactive Computer Graphics, TMH, 1979.

MSIC313	Database Systems and Computer Graphics Lab.	0	0	2	2	Guest Lecturer
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DBMS Lab: Design of scientific calculator with memory- student information system - employee payroll system - inventory control system - railway reservation/ cancellation system - airline ticket and its operations - hospital management system - library management system - bank loan operational system. Graphics Lab.: Different Fills Style and draw the different simple figures - Using different fonts and display different messages - Draw a line using DDA (digital differential analyzer algorithm) - Draw a line using Bresenham’s line drawing algorithm - Draw a circle and ellipse using bresenham’s algorithm - Generate a character using line drawing algorithm and bit map method - Using 2D technique Draw the following: Translation, Rotation, Scaling, Sheering, Reflection(mirring object) - Using clipping algorithm draw the following Line and Polygon-Using color techniques draw the following:HSV to RGB , RGB to HSV

MSIC314	Computer Networks	3	1	0	4	P.Thangavel
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Unit I: Introduction - Uses of networks - Network Architectures - OSI reference model and services – Example Networks - Physical layer - Transmission media - Guided and wireless – Digital Modulation and multiplexing – Public switched Telephone network.

Unit –II: Data link layer Design issues - error detection and correction - elementary data link protocols - sliding window protocols - Packet over SONET- ADSL. MAC sublayer protocols.

Unit-III: Network layer-design issues – Routing and congestion control algorithms, Quality of service, internetworking - Network layer in the INTERNET.

Unit IV: Transport layer – transport service - Connection management - Addressing, Establishing & Releasing a connection, Timer based Connection Management, Multiplexing, Crash Recovery, Internet transport protocol TCP, Network security-cryptography.

Text book:

(i) A. S. Tanenbaum, and D.J. Wetherall, 2012, Computer Networks, 5<sup>th</sup>

Edition, - Pearson Education, Indian edition.

Reference Books

- (i) B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, New Delhi.
- (ii) F. Halsall, 1995, Data Communications, Computer Networks and Open Systems, Addison Wessley.
- (iii) D. Bertsekas and R. Gallager, 1992, Data Networks, Prentice hall of India, New Delhi.
- (iv) Lamarca, 2002, Communication Networks, Tata McGraw Hill, New Delhi.

MSIC315	Theory of Computation	3	1	0	4	M.Sornam
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UNIT I : Introduction to formal proof – Additional forms of proof – Inductive proofs –Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.

UNIT II : Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of Automata.

UNIT III : Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG– Deterministic Pushdown Automata.

UNIT IV : Normal forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines – Programming Techniques for TM. A language that is not Recursively Enumerable (RE) – An undecidable problem RE – Undecidable problems about Turing Machine – Post’s Correspondence Problem – The classes P and NP.

TEXT BOOK:

1.Peter Linz, “An Introduction to Formal Languages and Automata”, Third Edition ,Narosa, 2005

2. J.E. Hopcroft, R. Motwani and J.D. Ullman, “Introduction to Automata Theory, Languages and Computations”, second Edition, Pearson Education, 2007.

REFERENCES:

1. H.R. Lewis and C.H. Papadimitriou, “Elements of the theory of Computation”, Second Edition, Pearson Education, 2003.

2. Thomas A. Sudkamp,” An Introduction to the Theory of Computer Science, Languages and Machines”, Third Edition, Pearson Education, 2007.

3. Raymond Greenlaw an H.James Hoover, “ Fundamentals of Theory of Computation, Principles and Practice”, Morgan Kaufmann Publishers, 1998.

4. Micheal Sipser, “Introduction of the Theory and Computation”, Thomson Brokecole, 1997.

5. J. Martin, “Introduction to Languages and the Theory of computation” Third Edition, Tata Mc Graw Hill, 2007

MSIC316	Digital Image Processing	3	1	0	4	PL.Chithra
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Unit-I : Introduction – The origin - Fundamental steps components - Image Sampling and Quantization – Some basic relationship between pixels – Linear and nonlinear operations.

Image Enhancement in spatial domain – Some Basic Gray level transformation –

Histogram processing- Enhancement using Arithmetic Logic operations – Basics of spatial filtering – smoothing – sharpening – Image Enhancement in frequency domain

Unit-II: Color Image processing – color models – pseudo color Image processing – Smoothing – Sharpening – Color transformation - Color segmentation

Unit III: Wavelets – Multiresolution Processing – Image compression models – Lossy compression – Image Compression standards

Unit IV: Image segmentation – Edge Linking – Boundary Detection – Thresholding – Region Based segmentation by morphological watersheds

Text book:

1. R. C. Gonzalez and R. E. Woods , Digital image processing, 3/e , PH, 2007.

Reference:

2. Anil K.Jain, Fundamentals of Digital Image Processing, Pearson, 1989.

MSIC317	Data Mining and Warehousing	3	1	0	4	B. Lavanya
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UNIT I: Why preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Data Mining Primitives, Query Language, Graphical User Interfaces, Architectures, Concept Description, Data Generalization, Characterizations, Class Comparisons, Descriptive Statistical Measures.

UNIT II: Association Rule Mining, Single-Dimensional Boolean Association Rules from Transactional Databases, Multi-Level Association Rules from Transaction Databases-Classification and Prediction, Issues, Decision Tree Induction, Bayesian Classification, Association Rule Based

UNIT III: Other Classification Methods- neural network based, genetic algorithm- decision tree – CART-Prediction, Classifier Accuracy-Cluster Analysis-Types of data, Categorization of methods, Partitioning methods, Outlier Analysis- web mining - methods and algorithms- Applications and Trends in Data Mining – Introduction to data mining software and usage.

UNIT IV: Introduction, Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Implementation, Further Development, Data Warehousing to Data Mining – schemas- partition strategy – aggregations – process managers - physical layout – security-back up and recovery – SLA – capacity and tuning – testing the DW- future of DW – case study.

#### TEXT BOOK

1. J. Han, M. Kamber, “Data Mining: Concepts and Techniques”, Harcourt India / Morgan Kauffman, 2<sup>nd</sup> edition, 2001.
2. S. Anahory, D. Murry, “Data Warehousing in the real world”, Pearson Education, 2<sup>nd</sup> edition, 2003.

#### REFERENCES

1. M. H. Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education , 1<sup>st</sup> edition, 2004.

2. David Hand, Heikki Manila, Padhraic Symth, "Principles of Data Mining", PHI 2004.
3. W.H.Inmon, "Building the Data Warehouse", 3rd Edition, Wiley, 2003.
4. Alex Bezon, Stephen J.Smith, "Data Warehousing, Data Mining & OLAP", McGraw-Hill Edition, 1<sup>st</sup> edition, 2001.

MSIC318	Digital Image Processing Lab.	0	0	1	1	PL.Chithra
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Digital Image Processing: Basic image manipulation – reading, writing, quantization, sub sampling - Basic Intensity transformation - Histogram Processing-Filtering in spatial domain-2D FFT and smoothing filters-Image coding using transformations with SPIHT algorithm-Color image Enhancement with spatial sharpening.

MSIC319	Mini Project and Group Discussion	0	0	2	2	All Faculty
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Each student will take a specific problem for the Mini Project and solve it using any one of latest tool and submit a report. Further each student will participate in regular group discussion.

MSI C320	Soft Computing	3	1	0	4	M.Sornam
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UNIT I: FUZZY SET THEORY : Introduction to Neuro - Fuzzy and Soft Computing - Fuzzy Parameterization - Fuzzy Rules and Fuzzy Sets - Basic Definition and Terminology - Set-theoretic Operations - Member Function Formulation and Reasoning - Extension Principle and Fuzzy Relations - Fuzzy If-Then Rules - Fuzzy Reasoning - Fuzzy Inference Systems - Mamdani Fuzzy Models - Sugeno Fuzzy Models - Tsukamoto Fuzzy Models - Input Space Partitioning and Fuzzy Modeling.

UNIT II: OPTIMIZATION: Derivative-based Optimization - Descent Methods - The Method of Steepest Descent - Classical Newton Method - Step Size Determination - Derivative-free Optimization - Random Search - Downhill Simplex Search.

UNIT III: NEURAL NETWORKS: Supervised Learning Neural Networks - Perceptrons - Adaline - Backpropagation Mutilayer Perceptrons - Radial Basis Function Networks - Unsupervised Learning Neural Networks - Competitive Learning Networks - Kohonen Self-Organizing Networks - Learning Vector Quantization - Hebbian Learning.

UNIT IV: NEURO FUZZY MODELING and GENETIC ALGORITMS: Adaptive Neuro-Fuzzy Inference Systems - Architecture - Hybrid Learning Algorithm - Framework Neuron Functions for Adaptive Networks - Neuro Fuzzy Spectrum, Genetic algorithm, genetic algorithm applications, genetic-fuzzy model.

Text Books

1. Timothy J.Ross, -Fuzzy Logic with Engineering Applications McGraw-Hill, 1997.
2. S. Rajasekaran and G.A.V.Pai, -Neural Networks, Fuzzy Logic and Genetic Algorithms PHI, 2003.

Reference Books

1. Davis E.Goldberg, -Genetic Algorithms: Search, Optimization and Machine Learning Addison Wesley, N.Y., 1989.
- 2.R.Eberhart, P.Simpson and R.Dobbins, -Computational Intelligence - PC Tools AP Professional, Boston, 1996.
- 3.J.S.R.Jang, C.T.Sun and E.Mizutani, -Neuro-Fuzzy and Soft Computing PHI, 2004, Pearson Education 2004.
4. S.N.Sivanandam and S.N.Deepa, Principles of Soft Computing, Wiley, 2014

MSIC321	Software Engineering	3	1	0	4	S.Gopinathan
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UNIT – I: Introduction to Software Engineering - Layered technology-processing framework - Waterfall model - Incremental model-Spiral model – Requirement Engineering task - Initial Requirement Engineering process - Analysis model.

UNIT – II: Software Matrices – Estimations – Planning - Fundamentals of Requirement concepts - Structure Analysis (SADT)

UNIT – III: Object oriented Analysis and Data Modeling - Alternate Analysis techniques - Specification Techniques - Software Design and implementation.

UNIT – IV: Software Testing Techniques and Strategies - Software quality assurance - Software Maintenance - Different type of ISO-Computer Aided Software Engineering Integrated Environments(CASE).

Text Books:

- 1.R. S.Pressman “Software Engineering “ A Practitioner’s Approach . 5<sup>th</sup> Edition, TMH, 2011

Reference Books:

1. I. Sommerville, ”Software Engineering “ 5<sup>th</sup> Edition, Addison Wesley, 2004
2. R. Failrely , “ Software Engineering Concepts “ , 4/e, TMH, 2008.

MSIC322	Big Data and Analytics	3	1	0	4	B.Lavanya
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Unit – I : Basic nomenclature - Analytics process model - Analytics model requirements - Types of data sources – Sampling - types of data elements - Visual Data Exploration and Exploratory Statistical Analysis - Missing Values - Outlier Detection and Treatment - Standardizing Data – Categorization - weights of evidence coding - Variable selection - Segmentation.

Unit –II : Predictive Analytics: Target Definition - Linear Regression - Logistic Regression - Decision Trees - Neural Networks - Support Vector machines - Ensemble Methods - Multiclass Classification Techniques - Evaluating Predictive Models.

Unit – III :Descriptive Analytics: Association Rules - Sequence Rules - Segmentation. Survival Analysis: Survival Analysis Measurements - Parametric Survival Analysis.

Unit – IV : Social Network Analytics: Social Network Definitions - Social Network Metrics - Social Network Learning -Relational Neighbor Classifier - Probabilistic Relational Neighbor Classifier -Relational logistic Regression - Collective Inference. Benchmarking - Data Quality - Software – Privacy - Model Design and Documentation - Corporate Governance. Example applications: Credit Risk Modeling - Fraud Detection - Recommender Systems - Web Analytics.

Text book:

Bart Baesens, 2014, Analytics in a Big Data World: The Essential Guide to Data Science and Its applications, Wiley India Private Limited

References:

1. Michael Minelli, Michele Chambers, 2013, Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses, Wiley CIO
2. Stephan Kudyba, 2014, Big Data, Mining and Analytics: Components of Strategic Decision Making, CRC Press.
3. Frank J. Ohlhorst, 2013, Big data Analytics: Turning Big Data into Big Money, Wiley and SAS Business Series.
4. Foster Provost, Tom Fawcett, 2013, Data Science for Business, SPD.

MSIC323	Project Work	0	0	15	15	All Faculty
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Each student will do a project work and submit report of their work done.

MSIE301	Financial Accounting and Analysis	3	0	0	3	Guest Faculty
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Unit I: Principles of Accounting: Principles of double entry -Assets and Liabilities - Accounting records and systems - Trial balance and preparation of financial statements - Trading, Manufacturing, Profit and Loss accounts, Balance Sheet including adjustments (Simple problems only). Analysis and Interpreting Accounts and Financial Statements: Ratio analysis - Use of ratios in interpreting the final accounts (trading accounts and loss a/c and balance sheet) - final accounts to ratios as well as ratios to final accounts.

Unit II: Break-even analysis and Marginal Costing: Meaning of variable cost and fixed cost - Cost-Volume-Profit analysis – calculation of breakeven point, Profit planning, sales planning and other decision – making analysis involving break - even analysis - Computer Accounting and algorithm.(differential cost analysis to be omitted)

Unit III: Budget/Forecasting: preparation of and Characteristics of functional budgets, Production, sales, Purchases, cash and flexible budgets. Project Appraisal: Method of capital investment decision making: Payback method, ARR method - Discounted cash flows - Net Present values - Internal rate of return - Sensitivity analysis - Cost of capital.

Reference Books

- (i) Shukla M.C. & T.S. Grewal, 1991, Advanced Accounts, S.Chand & Co. New Delhi.
- (ii) Gupta R.L. & M. Radhaswamy, 1991, Advanced Accounts Vol. II, Sultan Chand & Sons, New Delhi.
- (iii) Man Mohan & S.N. Goyal, 1987, Principles of Management Accounting, Arya Sahithya Bhawan.
- (iv) Kuchhal, S.C., 1980, Financial Management, Chaitanya, Allahabad.
- (v) Hingorani, N.L. & Ramanathan, A.R, 1992, Management Accounting, 5<sup>th</sup> edition, Sultan Chand, New Delhi.

MSIE302	Principles of Compiler Design	3	0	0	3	P. Thangavel
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UNIT I BASICS OF COMPILATION: Compilers – Analysis of source program – Phases of a compiler – Grouping of phases – Compiler Construction tools – Lexical Analyzer: Token specification -Token Recognition- A language for Specifying lexical analyzer– Top down parser : Table implementation of Predictive Parser - Bottom-up Parser : SLR(1) Parser - Parser generators.

UNIT II TYPE CHECKING AND RUNTIME ENVIRONMENTS : Syntax directed definitions – Construction of syntax trees – Type systems – Specification of a simple type checker - Equivalence of type expressions – Type conversions – Attribute grammar for a simple type checking system – Runtime Environments: Source language issues – Storage organization – Storage allocation strategies – Parameter passing.

UNIT III INTERMEDIATE CODE GENERATION: Intermediate languages – Declarations – Assignment statements – Boolean expressions – Case statements – Backpatching – Procedure calls. Issues in the design of a code generator – The target machine – Runtime storage management – Basic blocks and flow graphs – Next-use information – A simple code generator – Register allocation and assignment – The DAG representation of basic blocks – Generating code from DAG – Dynamic programming code generation algorithm – Code-generator generators.

#### TEXT BOOK

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman. “Compilers Principles, Techniques and Tools”. Pearson Education, 2008.

#### REFERENCES

1. Steven S. Muchnick, “Advanced Compiler Design Implementation”, Morgan Koffman, 1997.
2. Charles N. Fischer, Richard J. Leblanc, “Crafting a Compiler with C”, Benjamin Cummings, 1991.
3. Allen Holub, “Compiler Design in C”, Prentice Hall of India, 1990.

MSIE303	Advanced Java Programming	2	0	1	3	Guest Faculty
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Unit I: Servlet Overview, Java Webserver, Servlet Chaining, Session Management, Using JDBC in Servlets, Applet to Servlet Communication, Java Beans  
Unit II: EJB Architecture, Design and Implementation, EJB Session Beans, EJB Entity Beans, Implementation and Entity Direction of EJB, JSP,J2EE  
Unit III: Laboratory exercises on the above topics.

Text Books:



1. H. Schildt, Java2: The Complete Reference, 5/e, TMH 2002.
2. E. Jendrock, J. Ball, D. Carson, The Java EE 5 Tutorial, Pearson Education, 3/e, 2003.

Reference sites:

1. <http://java.sun.com>; <http://www.roseindia.net>; <http://docs.oracle.com>
2. [www.tutorialspoint.com](http://www.tutorialspoint.com); [www.easywayserver.com](http://www.easywayserver.com); [www.download.oracle.com](http://www.download.oracle.com)
3. [www.java2s.com](http://www.java2s.com); [www.coreservlets.com](http://www.coreservlets.com)

MSIE304	Programming in COBOL	2	0	1	3	M. Sornam
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UNIT I: INTRODUCTION: Structure of a COBOL Program- Coding Format for COBOL Programs- Character Set, COBOL words- Data Names and Identifiers- Literal, Figurative Constants- Continuation of lines and notations-divisions and its sections - IDENTIFICATION, ENVIRONMENT, DATA, PROCEDURE.

UNIT II: USING I/O FACILITIES : Basic verbs- Conditional and sequential verbs- writing complete programs-Introduction- Sample program- program testing and style- Types of Clause- Elementary and Group Moves- CORRESPONDING Options.

UNIT III: IMPROVING THE PROGRAMS: Table Handling- PERFORM - indexed Table and Indexing-SET Verb- SEARCH Verb- OCCURS DEPENDING Clause- Structured programming - Current Trends -Objectives - methodologies-basic structures-combinations-Weakness of COBOL in Structured Programming. Sequential Files-file description-fixed length records- variable length records- Statements for Sequential Files- I-O CONTROLS- Sorting and Merging.

TEXT BOOK :

1. Roy M.K., and Dastidar Ghosh D., COBOL Programming, Tata McGraw Hill, 1989.

REFERENCES:

1. E. Balagurusamy, COBOL Programming –A Self Study Text, MACMILLAN 1999

MSIE305	High Performance Computing	2	1	0	3	B.Lavanya
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UNIT I (Distributed and Parallel computing) : Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture. Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism .

UNIT II ( Mobile computing ) : Network Technologies and Cellular Communications: HIPERLAN: Protocol architecture, physical layer, Channel access control sub-layer, MAC sub-layer, Information bases and networking WLAN: Infrared vs. radio transmission, Infrastructure and ad hoc networks, IEEE 802.11. Bluetooth.: User scenarios, Physical layer, MAC layer, Networking, Security, Link management GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services - architecture. Wireless Medium Access Control: specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

Mobile Network Layer - Mobile IP , Dynamic Host Configuration Protocol (DHCP).  
 Mobile Transport Layer - various TCP, Mobile Ad hoc Networks (MANETs)- Overview,  
 routing and various routing algorithms, security in MANETs. Protocols and Tools: Wireless  
 Application Protocol –WAP -Bluetooth .

UNIT – III (Cloud and Pervasive computing): Cloud Computing – Cloud Architecture –  
 Cloud Storage – Why Cloud Computing Matters – Advantages and disadvantages of Cloud  
 Computing – Companies in the Cloud Today – Cloud Services - 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 – Cloud Computing for the Community – Collaborating on Group Projects and  
 Events – Cloud Computing for the Corporation - Pervasive Computing- Principles,  
 Characteristics- interaction transparency, context aware, automated experience capture.  
 Architecture for pervasive computing- Pervasive devices.

**Text books**

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, Fifth Edition, McGraw Hill, 2006.
2. J. Schiller, Mobile Communications, 2/e, Pearson, 2/e, 2003.
3. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
4. Seng Loke, Context-Aware Computing Pervasive Systems, Auerbach Pub., New York, 2007.
5. Uwe Hansmann etl , Pervasive Computing, Springer, New York,2001.

**References**

1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education/Addison Wesley, 2007.
2. I. Stojmenovic and Cacute, Handbook of Wireless Networks and Mobile Computing, Wiley, 2002.
3. Reza Behravanfar, “Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML”, ISBN: 0521817331, Cambridge University Press
4. Ivan Stojmenovic , Handbook of Wireless Networks and Mobile Computing, John Wiley & sons Inc, Canada, 2002.
5. Asoke K Taukder, Roopa R Yavagal, Mobile Computing, Tata McGraw Hill Pub Co. , New Delhi, 2005.
6. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Lreo Pty Limited, July 2008.

MSI E306	Multimedia Systems	2	1	0	3	B. Lavanya
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Unit I : Introduction- Evolution of Multimedia – Components Its Applications-Multimedia Project- Multimedia team-Storyboard-Multimedia Systems-Hardware-Software- Storage models and Access Techniques-Image and Video Database.

Unit II: Image: Formats, Image Color Scheme, Image Enhancement; Text: Types of Text, Ways to Present Text, Aspects of Text Design, Audio: Basic Sound Concepts, Types of Sound, Digitizing Sound, Computer Representation of Sound (Sampling Rate, Sampling Size, Quantization), Audio Formats, Audio tools, MIDI ,Video: Analogue and Digital Video, Recording Formats and Standards (JPEG, MPEG, H.261) Transmission of Video Signals, Video Capture, and Computer based Animation.

Unit III: Laboratory exercises on the above concepts.

#### Text Book

1. T. Vaughan, Multimedia: Making it Work, 7<sup>th</sup> Edition, 2008 Tata McGraw-Hill Publications

#### References :

1. J. E. Shuman, Multimedia in Action, Course Technology, 1997
2. P. K. Andleigh, K. Thakrar, Multimedia System Design, Prentice Hall, 2006
3. N. K. Sharda, Multimedia Information System, Prentice Hall, 2009

MSIE307	Artificial Intelligence & Expert Systems	3	0	0	3	Guest Faculty
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Unit I: Introduction, Search strategies: Evolution of Artificial Intelligence production systems- Applications of A.I -AI Problems – Task Domain6 Problem Characterization. Hill climbing, backtracking graph search - algorithm A and A \*, monotone restriction specialized production systems - AO\* algorithm - Searching game trees Minimax Procedure alpha beta pruning

Unit II: Predicate calculus & Knowledge Representation: Predicate calculus - Answer extraction - knowledge based systems - knowledge processing, inference techniques. Natural language processing and understanding - perception - Learning using Neural nets.

Unit III: Expert System: Expert system Definition - stages in development - knowledge representation and acquisition techniques - building expert systems - Forward and Backward Chaining - Tools - Explanation facilities - Meta Knowledge - fuzzy reasoning.

Case study: Mycin.

#### Text Book:

1. N. J. Nilsson, Artificial Intelligence – A New Synthesis, Morgan Kaufmann, 1998.

#### References

1. E. Rich, K. Knight, S.B. Nair, Artificial Intelligence, 3/e, TMH, 2008.
2. S.J. Russel, P. Norvig Artificial Intelligence: A Modern Approach, 3/e, Prentice Hall, 2009.

MSIE308	Computer Oriented Statistical Methods	3	0	0	3	Guest Faculty
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Unit I : Sample spaces - events - Axiomatic approach to probability - conditional probability - Independent events – Bayes’ formula - Random Variables - Continuous and Discrete - distribution function - Expectation, variance, coefficient of variation, moment generation function - Chebyshev's inequality.

Unit II: Bivariate distribution - conditional and marginal distributions – Binomial, Poison and geometric Distributions - Uniform, Normal, Exponential and Gamma distributions.

Unit III: Correlation - Rank correlation - Linear Regression - Method of Least squares - Fitting of the curve of the form  $ax + b$ ,  $ax^2 + bx + c$ ,  $abx$  and  $axb$  - multiple and partial correlation( 3 -variables only). sampling - simple random sampling - Systematic sampling and stratified random sampling - concepts of sampling distributions and standard error - point estimation - Interval Estimation of mean and proportion.

Unit IV: Tests of Hypotheses - Critical Region - Errors - Level of significance - power of the test - Large sample tests for mean and proportion - Exact tests based on Normal, t, F and Chi-square distributions. Basic principles of experimentation - Analysis of variance - one way and two way classifications - computing randomized design - Randomized Block design

1. Text books:

- (i) Miller, I., and Miller M., Mathematical Statistics with applications, 7/e, Pearson, 2004.
- (ii) Mood, A.M., Graybill, F.A., and Boes D.C, Introduction to Theory of Statistics, 3<sup>rd</sup> Edn., Tata McGraw-Hill,2001
- (iii) Trivedi, K.S, Probability and Statistics with Reliability, Queuing and Computer Science Applications. Prentice Hall India, New Delhi,1994

2. Reference Books

- (i) Allen,A.O., Probability, Statistics and Queuing Theory with Computer Science Application, 2<sup>nd</sup> Edition, Academic Press,1990.
- (ii) Bajpai, A.C. Calus, I.M. Fairley, J.A., Statistical Methods for Engineers and Scientists. John Wiley & Sons,1979

MSIE309	Unix and Shell Programming	3	0	0	3	Guest Lecturer
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Unit I : Unix Operating system-History, Structure, General Purpose Utilities-File System -Handling ordinary files. The shell, vi editor, the environment basic files attributes -simple filters.

Unit II: Regular Expression and the grep family-The process-Communication and Electronic mail-SHELL programming.

Unit III: System Administration-Managing Disk space -Backups-CPIO-task, Operating System concepts Programming implementations. Advanced shell programming-sh command –Export command.expr, shell function-eval: Evaluating twice-Exec strut

Text Books:

1. S. DAS, UNIX: Concepts and application, TMH

2. Kochan, Unix and Shell Programming, Third Edition, Pearson.

MSI E310	Programming in Dot NET	2	1	0	3	GF / M.Sornam
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Unit I :An overview of the .NET framework-Understanding .NET- ADO.NET architecture- An introduction to Visual Studio .NET.

Unit II: Introducing to C#-Literals, variables, data types, operators, expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations, Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exception.

Unit III: Introduction to ASP.NET, ASP.NET architecture – ASP.NET lifecycle- Web forms and Controls: Standard, Navigation, Login, HTML-State Management-Master pages, Themes, Skins, CSS- File I/O and Streams- Working with database using ADO.NET-User Controls.

Text Books:

1. E. Balagurusamy, Programming in C#, Tata McGraw Hill, 2004
2. J. Liberty, Programming C# , 2<sup>nd</sup> Edition, O-Reily, 2002
3. Kogent Learning Solutions Inc.: ASP.NET 4.0 Black Book, Dreamtech Press, 2012

Reference Book

1. H. Schildt, The Complete Reference : C#, Tata McGraw Hill, 2004
2. S. Robinson et. al., Professional C# , 2<sup>nd</sup> Edition, Wrox Press, 2001.
3. A. Troelson, C# and the .NET Platform, A! Press, 2003
4. S.Thamaraiselvi, R. Murugesan- A Textbook on C#, Pearson Education,2003

MSIE311	Software Project Management & Testing	3	0	0	3	Guest Faculty
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Unit-I: Introduction to Software Project Management- Software project versus other types of project- problems- management control- Stakeholders- Requirement Specification – Information and control in organizations Introduction to step wise project planning

Unit: II: Select-identify scope and objectives- waterfall model- v-process model-spiral model- software prototyping- ways of categorizing prototypes- tools- incremental delivery-selecting process model - Software effort estimation- introduction- where-problems with over and under estimates- basis for software estimating- software effort estimation technique- expert judgment-COCOMO -Activity Planning- Objectives

Unit III: Project schedules- projects and activities- sequencing and scheduling activities-sequencing and scheduling problem-job sequencing-n jobs through two machines, two jobs through m-machines and n-jobs through m-machines, PERT and CPM techniques-critical path-Normal path and crash time-Resource allocation-Resource leveling and smoothing.

1. Recommended Texts

- (i) B. Hughes and M. Cotterell, 2005, Software Project Management, 4<sup>th</sup> Edition, Tata McGraw Hill, New Delhi.
- (ii) W. Royce, 1998, Software Project Management: A Unified Frame Work, Addison Wesley, Boston
- (iii) G.Reynolds, 2003, Ethics in Information Technology, Thomson Learning, Singapore.

2. Reference Books

- (i) K. Heldman, 2005, Project Management Professionals, 3<sup>rd</sup> Edition, Wiley Dreamtech
- (ii) Bhforooz & Hudson, 2004, Software Engineering, Oxford Press.

MSIE312	Software Quality And Assurance	3	0	0	3	Guest Faculty
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Unit –I : Introduction - Quality and the quality system - standards and procedures technical activities. Software tasks - management responsibility - quality system - contract review - design control - document control - purchasing - product identification and traceability.

Unit II: Process control - checking - identification of testing tools - control of nonconforming product - Corrective action. Handling, storage, packing and delivery - Quality records - Internal quality audits - Training - Servicing - statistical techniques.

Unit III: QA and new technologies - QA and Human - Computer interface - process modeling - standards and procedures. ISO-9001 - Elements of ISO 9001 - Improving quality system - Case study.

References:

- 1. D. Galin, Software quality assurance – from theory to implementation , Pearson education, 2009.
- 2. A. Mathur, Foundations of software testing, Pearson Education, 2008
- 3. S. Desikan and G. Ramesh, Software testing – principles and practices , Pearson education, 2006
- 4. R. Patton, Software testing , second edition, Pearson education, 2007
- 5. A. C. Gillies, Software Quality Theory and Management, Cengage Learning, Second edition, 2003

MSIE313	Computer Simulation & Modeling	3	0	0	3	P.Thangavel
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Unit I: Introduction to Simulation: types of system - Discrete and Continuous Systems - Model of a System - Types of Models - Discrete-Event System Simulation - Steps in a Simulation Study; Simulation Examples.

Unit II: Simulation of Queuing Systems - Random-Number Generation- Tests for Random Numbers. Random Variate Generation: Inverse Transformation Technique:- Uniform

Distribution - Exponential Distribution - Weibull Distribution - Triangular Distribution - Empirical Continuous Distribution - Discrete Distribution - Direct Transformation for the Normal Distribution - Convolution Method for Erlang Distribution - Acceptance - Rejection Technique: Poisson Distribution - Gamma Distribution.

Unit III: Input Data Analysis: Data Collection - Identifying the Distribution with Data - Parameter Estimation - Goodness-of-Fit Tests:- Chi-Square Test - Kolmogorov-Smirnov Test; Selecting Input Models without Data - Multivariate and Time-Series Input Models. Verification and Validation of Simulation Models - Calibration and Validation of Models - Output Data Analysis - Alternative System Designs

#### 1. Recommended Texts

(i) J. Banks, J. S. Carson II and B. L. Nelson, 1995, Discrete-Event System Simulation, 2nd Edition, Prentice Hall of India, New Delhi.

#### 2. Reference Books

- (i) Averill M. Law and W. David Kelton, 1991, Simulation Modeling & Analysis, 2nd Edn., Tata McGraw Hill.
- (ii) Geoffrey Gardon, 1992, System Simulation, 2nd Edn., Prentice Hall of India.
- (iii) Narsingh Deo, 1979, System Simulation with Digital Computers, Prentice Hall of India.
- (iv) C. Dennis Pegden, Robert E. Shannon and Randall P. Sadowski, 1995, Introduction to Simulation using SIMAN, 2nd Edn., Tata McGraw-Hill.

MSIE314	Computer Aided Design	3	0	0	3	S.Gopinathan/M.Sornam
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Unit I: Introduction to CAD; Role of Computers in the design process. Hardware - Input devices, Display devices, Output devices, Computation devices. Computer Graphics Software and Data Base - Software configuration of a Graphics System - Data Base Structure and content - Wire Frame Modeling, Surface Modeling, Solid Modeling. Numerical Control. The beginning of CAM : Conventional Numerical Control - Components of an NC system - NC procedure - Coordinate systems - Applications. NC Part Programming - Manual Part Programming. NC Programming with Interactive Graphics. Computer Controls in NC - Computer and Direct Numerical Control - Adaptive Control Machining system.

Unit II: Applications: CAD for LSI/VLSI applications: Device circuit and process modeling for IC technology: optimization techniques in IC design: Design automation, Design for testability: Specific examples. Mechanical Drafting: Basic CAD Two-dimensional drafting, mechanical CAD software, developing a mechanical database, solid modeling. Electrical applications: Advantages of computer graphics systems for electrical design and drafting, CAD as an aid to electrical designers and drafters, production of an electrical schematic or wiring diagram, production of a printed-circuited board design, designing integrated circuits. Piping and Instrumentation diagrams: Setting up the system, applying P and ID, creating the drawing, drawing revisions, text drawing annotation, text revisions, drawing formats, report generation, documentation: Plotters.

Unit III: Solid Modeling: Converging technologies of CAD, CAM and CAE, interacting with SM systems, display requirements. Cartography: Mapping applications - uses and users, map production, automated cartography. Case Studies: LPKF, Unigraphics CAD/CAM Software, NISA Finite Element Analysis Software, GOS CAD Package.

Text Book: M.P. Groover and E.W. Zimmers Jr., CAD/CAM: Computer-Aided Design and Manufacturing, Pearson, 1984.

References:1. I. Zeid, CAD/CAM Theory and Practice, Mcgraw-Hill 1991.

2. K. Lee, Principles of CAD/CAM/CAE Systems, Addison-Wesley, 1999.

MSIE315	Pattern Recognition	3	0	0	3	Guest Faculty
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UNIT I: Introduction and mathematical preliminaries - What is pattern recognition? Clustering vs. Classification; Applications; Linear Algebra, vector spaces, probability theory, estimation techniques. Overview of pattern recognition - Discriminant functions - Supervised learning - Parametric estimation - Maximum likelihood estimation - Bayesian parameter estimation - Perceptron algorithm - LMSE algorithm - Problems with Bayes approach - Pattern classification by distance functions - Minimum distance pattern classifier.

UNIT II: Clustering for unsupervised learning and classification - Clustering concept - C-means algorithm - Hierarchical clustering procedures - Graph theoretic approach to pattern clustering - Validity of clustering solutions. Elements of formal grammars - String generation as pattern description - Recognition of syntactic description - Parsing - Stochastic grammars and applications - Graph based structural representation. Entropy minimization - Karhunen - Loeve transformation - Feature selection through functions approximation - Binary feature selection.

UNIT III: Neural network structures for Pattern Recognition - Neural network based Pattern associators - Unsupervised learning in neural Pattern Recognition - Self organizing networks - Fuzzy logic - Fuzzy pattern classifiers - Pattern classification using Genetic Algorithms.

Text Book:

1. R. J.Schalkoff, Pattern Recognition : Statistical, Structural and Neural Approaches, John Wiley & Sons Inc., New York, 1992.

References:

1. Tou and Gonzales, Pattern Recognition Principles, Wesley Publication Company, London, 1974.

2. Duda R.O., and Hart.P.E., Pattern Classification and Scene Analysis, Wiley, New York, 1973.

3. Morton Nadier and Eric Smith P., Pattern Recognition Engineering, John Wiley & Sons, New York, 1993.

MSIE316	Object Oriented Analysis & Design	3	0	0	3	Guest Faculty
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UNIT-I: Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT-II: Basic Structural Modeling: Classes, Relationships, Common Mechanisms, and Diagrams, Advanced Structural Modeling: Advanced classes, Advanced relationships, Interfaces, Types and Roles, Packages.

UNIT-III: Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams, Basic Behavioral Modeling-I: Interactions, Interaction diagrams, Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams. Case Study: The Unified Library application

**TEXT BOOKS:**

1. G. Booch, J. Rumbaugh, I. Jacobson : The Unified Modeling Language User Guide, 2/e Addison-Wesley Professional, 2005.
2. H-E. Eriksson, M. Penker, B. Lyons, D. Fado, UML 2 Toolkit, John Wiley, 2004.

**REFERENCE BOOKS:**

1. M. Page-Jones, Fundamentals of Object Oriented Design in UML, Addison-Wesley Professional, 1999.
2. P. Roques, Modeling Software Systems Using UML2, John Wiley, 2004.
3. A. Kahate, Object Oriented Analysis & Design, TMH, 2004
4. M. Priestley, Practical Object-Oriented Design with UML, 2/e, TMH, 2003
5. C. Larman, Applying UML and Patterns: An introduction to Object Oriented Analysis and Design and Unified Process, 3/e, Prentice Hall, 2004.

MSIE317	Project and Case Studies-I	0	0	3	3	All Faculty
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Each student will do a project work and submit report of work carried out with sufficient case studies.

MSIE318	Project and Case Studies-II	0	0	3	3	All Faculty
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Each student will do a project work and submit report of work carried out with sufficient case studies.

MSIE321	Introduction to Programming in PYTHON	2	0	1	3	Guest Faculty
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Unit I: Expressions, variables, functions, conditionals - Event-driven programming, local and global variables, buttons and input fields - The canvas, static drawing, timers, interactive drawing.

Unit II: Lists, keyboard input, motion, positional/velocity control - Mouse input, more lists, dictionaries, images.

Unit III: Classes, tiled images - Acceleration and friction, spaceship class, sprite class, sound - Sets, groups of sprites, collisions, sprite animation

Text books:

1. W. Chun, Core Python Programming, 2/e, PH 2006.
2. M. Lutz, Learning Python, 4/e, O'Reilley Media, 2009.

Reference Books.

1. D. M. Beazley Python Essential Reference, 4/e, Addison-Wesley Professional, 2009
2. J. M. Zelle, Python Programming: An Introduction to Computer Science, Franklin Beedle & Associates, 2003.

MSIE322	Functional Programming using Haskell	2	0	1	3	Guest Faculty
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Unit I: The principles and techniques of programming with functions - Purely functional programming languages; recursion.

Unit II: Higher-order functions; reduction models - strictness; type systems.

Unit III: List operations; infinite data structures; Program synthesis and transformation.

Textbook:

1. B. O'Sullivan, J. Goerzen, and D. Stewart, Real World Haskell, O'Reilly Media, 2009.
2. A free online version, licensed under a Creative Commons Attribution-Noncommercial 3.0 License, is available at <http://book.realworldhaskell.org/>.
3. R. Bird, Introduction to Functional Programming using Haskell, 2/e, Prentice-Hall International, 1998.

References:

1. G. Hutton, Programming in Haskell, Cambridge University Press, 2007
2. S. Thompson, Haskell: The Craft of Functional Programming, Addison-Wesley, 1996.
3. P. Hudak, The Haskell School of Expression, Cambridge University Press, 2000.

MSI E323	Cryptography	3	0	0	3	P.Thangavel/G.F.
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Unit I: Conventional Encryption: Conventional encryption model – DES –RC 5 – Introduction to AES - Random number generation. Number Theory: Modular arithmetic – Euler’s theorem – Euclid’s algorithm – Chinese remainder theorem – Primality and factorization

Unit II: Discrete logarithms – RSA algorithm - Public key Cryptography: Principles – RSA algorithm – key management- Diff – Hellman key exchange - Message Authorization and Hash functions: Hash functions-Authentication requirements –Authentication function.

Unit III: Message authentication codes –Secure Hash algorithms - Digital Signature and Authentication Protocols : Digital Signature-Authentication Protocols –Digital signature standard.

Text books:

1. Stallings, W., Cryptography and Network Security Principles and Practice, Pearson Education, 2005.

Reference Books:

1. C. Kaufman, R. Perlman, M. Speciner, Network Security- Private Communication in a public world, 2/e, Prentice Hall, 2002.
2. M. Welschenbach, Cryptography in C & C++, John Wiley, 2005.
3. B. Schneier, Applied Cryptography, 2/e, Wiley, 1996.
4. K. N. Gupta , K. N. Agarwala, P. Agarwala, Digital Signature: Network security practices, PHI, 2005.

MSIE324	Programming in C	3	0	0	3	Guest Lecturer
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UNIT – I: Getting started with C- Constants and Variables - Data types and sizes - Storage classes – Operators – Expressions - C instructions – Input / Output functions - Decision Control structures - Case control structure - Loop control structure—Arrays - Strings.

UNIT – II: Functions - Passing values between functions - Function declaration - Structures and Unions - Bit wise operations –Pointers - Pointers and Arrays

Unit III: Pointers and function - Pointers and Structures - Dynamic memory allocation- File management - Creating , Processing , Opening and Closing a File , Command line Arguments.

Text books:

1. E. Balaguruswamy, Programming in ANSI C , 5<sup>th</sup> Edn., TMH 2011.
2. S. Das, UNIX: Concepts and applications, 4<sup>th</sup> edition, TMH, 2006.

Reference books

1. B.W. Kerninghan and D.M. Ritchie, The C Programming Language, 2/e, PHI,1988.
2. H.Schildt, C The complete reference, 4/e, TMH, 2004.
3. Gottfried B.S , Programming with C ,2/e, TMH, 1996
4. Y.P. Kanetkar, Let us C , BPB Pub, New Delhi, 1999.
5. Kochan, Unix and Shell Programming, 3/e , Pearson,2003
6. N. B. Venkateswarulu, Advanced Unix Programming, BS Publications,2008

7. B.A.Forouzan and R.F.Gilberg, Unix and Shell Programming, Cengage Learning, 2005.

### Elective Courses offered for other Departments/Schools

MSI E319	Introduction to Information Technology and Programming in C	2	0	1	3	Guest Faculty
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Unit I: Introduction to Computer – Classification of Digital Computer System – Computer Architecture – Number System – Memory Unit – Input–Output Device – Logic Gates – Truth Table. Introduction to Computer Software.

Unit II: Introduction to MS-WORD, MS-ACCESS, MS-EXCEL – Creating Recruitment Database and Create Application Table - Creating Tables Using EXCEL - Creating Graphs – MS-ACCESS – Planning and Creating Tables and Using the feature of Chart, Bar Chart, Pie Chart etc. Introduction to Internet – Creating an E-Mail Account using E-mail Service.

Unit III: Programming Language C– Identifiers – Keywords – Data Types – Access Modifiers – Data Type Conversions – Operators – Conditional Controls – Loop Control – Input/Output Operations – Function Prototypes – Function Arguments – Arrays – Structures- Implementing some Problems Using ‘C’ Language.

Text Book:

- 1.E. Balagurusamy, “Programming in ANSI-C”, TMH, 5/e, 2012
2. Sinha P., Sinha P., “Foundation of Computing”, BPB Publication, 1st Edition, 2003 ISBN-81-7656-663-2.

Reference Books:

2. Rajaraman V., “Computer Fundamentals” – ISBN 0B- 87692-387-2, 5/e, 2010

MSI E320	Internet and Java Programming	2	0	1	3	Guest Faculty
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UNIT I: INTERNETWORKING WITH TCP / IP: Review of network technologies, Internet addressing, Internet applications - E-mail, Telnet, FTP.

UNIT II: WORLD WIDE WEB: HTTP protocol, Web browsers - Netscape, Internet explorer, Web site and Web page design, HTML, Dynamic HTML, CGI, Java script.

UNIT III: INTRODUCTION TO JAVA: The java programming environment, Fundamental Programming structures, Objects and Classes, Inheritance.

#### TEXT BOOKS

1. Harvey Deitel and Abbey Deitel, ” Internet & World Wide Web How to Program “ , Pearson 5/e Edn 2011.
- 2 . Robert W.Sebesta, “Programming the worldwide web”, 3/e, Pearson Education. (Unit-I & II), 2007.
3. Steven Holzner et. al, “Java 2 Programming” , Black Book, Dreamtech Press, 2006. (Unit –III)

## REFERENCES

1. Cay S.Hortsmann, Gary Cornwell, “Core Java 2”, Vol I, Pearson Education, 7/e, 2005.
2. B. A. Farouzon , “TCP/IP Protocol Suite, 3rd edition , Tata McGraw Hill, 2007
3. C. Bates, “ Web Programming Building Internet Applications”, Wiley Publications, 3<sup>rd</sup> Edn., 2007