

Vikram University, Ujjain –M.Sc. (Computer Science) Syllabus
(As per CBCS pattern)w.e.f. 2016-17 and onwards

Semester- I

Credits 25

Max. Mark 700

Sr N.	Course Type	Course Code	Course Title	Contact Hours			Credit	Examination Scheme				Total
				L	T	P		Internal		External		
							Internal Assessment M.M.(Min)	Assignment /Seminar/ Viva- Voce	Theory Semester Exam M.M. (Min)	Practical Semester Exam M.M.(Min)		
1	Core Subjects	MSCS 1.1	Discrete Mathematical Structure	3	1		4	25(10)		75(25)		100
2		MSCS 1.2	Operating System and System Software	3	1		4	25(10)		75(25)		100
3		MSCS 1.3	Practical Lab-I (based on MSCS 1.2)			8	4	25(10)			75(25)	100
4		MSCS 1.4	Minor Project/Practical Lab-II (based on elective)			8	4	25(10)			75(25)	100
5	Foundation Course	MSCS 1.5	Oral Communication (Skill based Activity)	2			1		100 (40)			100
Choose Any two From MSCS 1.6 E1, 1.6 E2, 1.6 E3 and 1.6 E4												
6	Elective Subjects	MSCS 1.6 E1	Computer Organization and Architecture	3	1		4	25(10)		75(25)		100
7		MSCS 1.6 E2	Object Oriented Programming using C++	3	1		4	25(10)		75(25)		100
8		MSCS 1.6 E3	Techniques of Operation Research	3	1		4	25(10)		75(25)		100
9		MSCS 1.6 E4	Data Communication And Computer Network	3	1		4	25(10)		75(25)		100
Total				14	4	16	25	150	100	300	150	700

Semester- II

Credits 25

Max. Mark 700

Sr N.	Course Type	Course Code	Course Title	Contact Hours			Credit	Examination Scheme				Total
				L	T	P		Internal		External		
							Internal Assessment M.M.(Min)	Assignment /Seminar/ Viva- Voce	Theory Semester Exam M.M. (Min)	Practical Semester Exam M.M.(Min)		
1	Core Subjects	MSCS 2.1	Data Structure using C++	3	1		4	25(10)		75(25)		100
2		MSCS 2.2	Database Management System	3	1		4	25(10)		75(25)		100
3		MSCS 2.3	Practical Lab-I (based on MSCS 2.1)			8	4	25(10)			75(25)	100
4		MSCS 2.4	Minor Project/Practical Lab-II (based on elective)			8	4	25(10)			75(25)	100
5	Foundation Course	MSCS 2.5	Written Communication (Skill based Activity)	2			1		100 (40)			100
Choose Any two From MSCS 2.6 E1, 2.6 E2, 2.6 E3 and 2.6 E4												
6	Elective Subjects	MSCS 2.6 E1	Theory of Computation	3	1		4	25(10)		75(25)		100
7		MSCS 2.6 E2	Programming with VB.Net	3	1		4	25(10)		75(25)		100
8		MSCS 2.6 E3	Internet Programming	3	1		4	25(10)		75(25)		100
9		MSCS 2.6 E4	Computer System Architecture and Parallel Processing	3	1		4	25(10)		75(25)		100
Total				14	4	16	25	150	100	300	150	700

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Semester- III

Credits 25

Max. Mark 700

Sr N.	Course Type	Course Code	Course Title	Contact Hours			Credit	Examination Scheme				
				L	T	P		Internal		External		Total
							Internal Assessment M.M.(Min)	Assignment /Seminar/ Viva-Voce	Theory Semester Exam M.M.(Min)	Practical Semester Exam M.M.(Min)		
1	Core Subjects	MSCS 3.1	Theory of Compiler Design	3	1		4	25(10)		75(25)		100
2		MSCS 3.2	Data Mining and Data warehousing	3	1		4	25(10)		75(25)		100
3		MSCS 3.3	Practical Lab-I (based on MSCS 3.2)			8	4	25(10)			75(25)	100
4		MSCS 3.4	Minor Project/Practical Lab-II (based on elective)			8	4	25(10)			75(25)	100
5	Foundation Course	MSCS 3.5	Seminar (Skill based Activity)	2			1		100 (40)			100
Choose Any two From MSCS 3.6 E1, 3.6 E2, 3.6 E3 and 3.6 E4												
6	Elective Subjects	MSCS 3.6 E1	Object Oriented Programming with java	3	1		4	25(10)		75(25)		100
7		MSCS 3.6 E2	Network Security	3	1		4	25(10)		75(25)		100
8		MSCS 3.6 E3	System Analysis and Design	3	1		4	25(10)		75(25)		100
9		MSCS 3.6 E4	Cloud Computing	3	1		4	25(10)		75(25)		100
Total				14	4	16	25	150	100	300	150	700

Semester- IV

Credits 25

Max. Mark 700

Sr N.	Course Type	Course Code	Course Title	Contact Hours			Credit	Examination Scheme				
				L	T	P		Internal		External		Total
							Internal Assessment M.M.(Min)	Assignment /Seminar/ Viva-Voce	Theory Semester Exam M.M.(Min)	Practical Semester Exam M.M.(Min)		
1	Core Subjects	MSCS 4.1	Computer Graphics and Multimedia	3	1		4	25(10)		75(25)		100
2		MSCS 4.2	Artificial Intelligence	3	1		4	25(10)		75(25)		100
3		MSCS 4.3	Practical Lab-I (based on MSCS 4.1)			8	4	25(10)			75(25)	100
4		MSCS 4.4	Major Project			8	4	25(10)			75(25)	100
5	Foundation Course	MSCS 4.5	Seminar (Skill based Activity)	2			1		100 (40)			100
Choose Any two From MSCS 4.6 E1, 4.6 E2, 4.6 E3 and 4.6 E4												
6	Elective Subjects	MSCS 4.6 E1	Software Engineering	3	1		4	25(10)		75(25)		100
7		MSCS 4.6 E2	Internetwork Application	3	1		4	25(10)		75(25)		100
8		MSCS 4.6 E3	Analysis and Design of Algorithm	3	1		4	25(10)		75(25)		100
9		MSCS 4.6 E4	Mobile Computing	3	1		4	25(10)		75(25)		100
Total				14	4	16	25	150	100	300	150	700

Total Credits = First Sem 25 + Second Sem 25 + Third Sem 25 + Fourth Sem 25 = 100 Credits

1. Credit Based Grading System

- 1.1 Each student, registered for a course, shall be awarded grade. The grades awarded to a student shall depend upon his continuous evaluation through performance in various examinations, assignments, quizzes, laboratory work, class work, mid semester test and regularity. The grades to be used and their numerical equivalence are as under:

Grade	% Marks Range (based on absolute marks system)	Grade Point	Description of Performance
A ⁺	91-100	10	Outstanding
A	81-90	9	Excellent
B ⁺	71-80	8	Very Good
B	61-70	7	Good
C ⁺	51-60	6	Average
C	41-50	5	Satisfactory
D	33-40	4	Marginal
F	Below 33	0	Fail

- 1.2 The Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA) shall be calculated as under:

$$SGPA = \frac{\sum_{i=1}^n c_i p_i}{\sum_{i=1}^n c_i}$$

- 1.3 Where c_i is the number of credits offered in the i^{th} subject of a semester for which SGPA is to be calculated, p_i is the corresponding grade point earned in the i^{th} subject, where $i= 1,2,3,\dots,n$, are the number of subjects in that semester.

 

$$CGPA = \frac{\sum_{j=1}^m SG_j NC_j}{\sum_{j=1}^m NC_j}$$

Here NC_j is the number of total credits offered in the j^{th} semester, SG_j is the SGPA earned in the j^{th} semester, where $j= 1,2,3,\dots,m$, are the number of semesters in that Programme.

- 1.4 The grade sheet at end of each semester examination for students shall also show CGPA till end of that semester the final examination grade at the end of final semester examination of the course shall also indicate CGPA, equivalent percentage marks and the division awarded, according to the rule as given in the next paragraph.

2. Award of Division

- 2.1 Division shall be awarded only after final semester examination based on integrated performance of the candidate for all the two years as per following details

CGPA SCORE	DIVISION
$7.5 \leq CGPA$	First Division With Honours
$6.0 \leq CGPA < 7.5$	First Division
$4.5 \leq CGPA < 6.0$	Second Division
$4.0 \leq CGPA < 4.5$	Third Division

 

- 2.2 The conversion from grade to an equivalent percentage in a given academic programme shall be according to the following formula applicable.

Percentage Marks Scored= CGPA obtained x10

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MSCS 1.1: Discrete Mathematical Structures

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 1.1	M.Sc.	Core	4	4	25	75	-	-	-	100

UNIT 1

Set Theory: Introduction, Sets and Elements, Universal Set and Empty Set, Subsets, Venn Diagrams. Relations: Introduction, Product Sets, Relations, Pictorial Representation of Relations, Composition of Relations, Types of Relations, Partial Ordering Relations.

UNIT 2

Functions: Introduction, One-to-One, Onto, and Invertible Functions, Cardinality. Logic and Propositional Calculus: Introduction, Propositions and Compound Propositions, Basic Logical Operations, Propositions and Truth Tables, Tautologies and Contradictions.

UNIT 3

Counting: Introduction, Basic Counting Principles, Factorial Notation, Binomial Coefficients, Permutations and Combinations. Pigeon hole Principle.

UNIT 4

Graph Theory: Introduction, Graphs and Multigraphs, Subgraphs, Paths, Connectivity, Weighted Graphs, Complete, Regular and Bipartite Graphs. Directed Graphs: Introduction, Rooted Trees, Graph Algorithms: Depth first and Breadth-First Searches.

UNIT 5

TREES AND CUT - SETS : Paths and Circuits, Shortest Paths, Eulerian Paths and Circuits, Hamiltonian Paths and Circuits. Rooted Trees, Path Lengths in Rooted Trees, Binary Search Trees. Spanning Trees, Minimum Spanning Trees.

Reference Books:

1. Elements of Discrete Mathematics, C.L.Liu, Second Edition, TMH
2. Discrete Mathematics and its applications, Kenneth H. Rosen, (Fifth Edition), Tata McGraw Hill Publishing Company.
3. Theory and Problems of Discrete Mathematics, Semmour Lipschutz, Marc Lipson, Second Edition, Schaum's Outline, T.M.H.

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MSCS 1.2: Operating System and System Software

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 1.2	M.Sc.	Core	4	4	25	75	-	-	-	100
MSCS 1.3	M.Sc.	Core	8	4	25	-	75	-	-	100

UNIT 1

Overview of Operating System: Batch Processing, Multiprogrammed, Time-Sharing, Multiprocessor, Real-Time Systems. Operating System Structures: System Components, Operating System Services, System Calls, File Systems Interface: File Concept, Access Methods, Directory Structure.

UNIT 2

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms. Deadlocks: Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Avoidance and Detection, Recovery from Deadlock.

UNIT 3

Memory Management: Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with Paging, Virtual Memory: Background, Demand Paging, Page Replacement, Allocation of Frames.

UNIT 4

Mass Storage Structure: Disk Structure, Disk Scheduling- FCFS, SSTF, SCAN Scheduling, Disk Management, Swap-Space Management.

UNIT 5

System software and application software, layered organization of system software. Assemblers, Macros, Compilers, Cross compilers, Linking and loading, Relocation.

Reference Books:

1. Operating Systems Concepts, A. Silberschatz, P.Galvin, G.Gagne, John Wiley & Sons, Inc.
2. Systems Programming and Operating Systems (Part II - Operating Systems), Dhamdhare, 2nd Edition, TMH
3. Donovan, J.J. : System programming, Mcgraw Hill,1972.
4. Dhamdhare. D.M.: Introduction to system software, Tata Mcgraw Hill Publ.comp. 1986

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MSCS 1.3: Practical Lab-I (based on MSCS 1.2)

MSCS 1.2: Operating System and System Software

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 1.2	M.Sc.	Core	4	4	25	75	-	-	-	100
MSCS 1.3	M.Sc.	Core	8	4	25	-	75	-	-	100

MSCS 1.4: Minor Project / Practical Lab-II (based on Elective)

MSCS 1.6 E2: Object Oriented Programming Using C++

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 1.6 E2	M.Sc.	Elective	4	4	25	75	-	-	-	100
MSCS 1.4	M.Sc.	Core	8	4	25	-	75	-	-	100

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MSCS 1.5: Oral Communication

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 1.5	M.Sc.	Core	4	4	100	-	-	-	-	100

UNIT 1

Definition of Language, nature of language, Characteristics of Human Language. Varieties of English Language: British, American, Indian, Australian etc., English for specific and special purposes.

UNIT 2

Meaning and process of communication, importance of effective communication, communication skills, barriers to communication, Animal and human communication, Methods of communication (Verbal & Non-Verbal).

UNIT 3

Objectives of communication, types of communication, principles of communication, essentials of effective communication. Media of communication: written, oral, face-to-face, visual, audio-visual, merits and demerits of written and oral communication, preparing for oral presentation.

UNIT 4

Basic skills of communication, listening to and Understanding, Extended natural speech in business situations (Both face to face and on the telephone), Understanding standard American, British and Indian accents, speaking with correct, Pronunciation, English Consonants, English Vowels, Speaking with right accent.

UNIT 5

Developing communication skills, interview- how to face and how to conduct. Planning and preparing to speak, Strategies for making powerful openings in presentations and conducting presentations, Body Language, Voice Modulations.

Reference Books:

1. Essentials of Business Communication by Rajendra Pal and J.S.Korilahalli, Sultan Chand & Sons Publishers, New Delhi.
2. Business Communications by U.S. Rai & S.M.Rai, Himalaya Publishing House.
3. Writing a Technical Paper by Menzal and D.H.Jones, McGraw Hill, 1960.
4. Business Communication : Strategy and Skill, Prentice Hall New Jersey, 1987.





MSCS 1.6 E1: Computer Organization and Architecture

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 1.6 E1	M.Sc.	Elective	4	4	25	75	-	-	-	100

UNIT 1

Binary Systems: Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, Complements, Binary Codes. Boolean Algebra and Logic Gates: Boolean Functions, Digital Logic Gates. Simplification of Boolean Functions: The Map Method, Two and Three Variable Maps, Four Variable Map, Product of Sums Simplification, NAND and NOR Implementation, Don't-Care Conditions.

UNIT 2

Combinational Logic: Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure. Combinational Logic with MSI and LSI: Binary Parallel Adder, Decoders, Multiplexers. Sequential Logic: Introduction, Flip-Flops, Triggering of Flip-Flops.

UNIT 3

Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation Tables, Design Procedure, Design of Counters. Processor Logic Design: Introduction, Processor Organization, Arithmetic Logic Unit, Design of Arithmetic Circuit, Design of Logic Circuit, Design of Arithmetic Logic Unit, Status Register, Design of Shifter, Processor Unit.

UNIT 4

Microcomputer System Design: Introduction, Microcomputer Organization, Microprocessor Organization, Instructions and Addressing Modes, Subroutines, and Interrupt.

UNIT 5

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory. Input Output Organization: Peripheral Devices, Input-Output Interface, Direct Memory Access (DMA), Input-Output Processors (IOP).

Reference Books:

1. Digital Logic and Computer Design, M. Morris Mano, P.H.I., Eastern Economy Edition.
2. Computer System Architecture (3rd ed.), M.Morris Mano, P.H.I., Eastern Economy Edition.
3. Computer Architecture and Organization, J.P. Hays, McGraw Hill.
4. Digital Principle and Applications, Malvino and Leach
5. Digital Computer Fundamentals, Thomas C. Bartee

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MSCS 1.6 E2: Object Oriented Programming Using C++

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 1.6 E2	M.Sc.	Elective	4	4	25	75	-	-	-	100
MSCS 1.4	M.Sc.	Core	8	4	25		75	-	-	100

UNIT 1

Object Oriented Systems Development : Introduction to traditional programming with C. Objectives of OOP, Object Oriented Analysis, Object Oriented Programming in C++: Concepts of Objects, Classes, Data Abstraction, Encapsulation, Inheritance, Polymorphism, Dynamic Binding and Message passing.

UNIT 2

Object modeling, Dynamic modeling, Events, Status, Scenarios, Event hate diagrams, Operations, State diagrams, Functional Models, Dataflow diagrams, Constraints specification, Relation of object, Functional and Dynamic models.

UNIT 3

Tokens, Expressions and Control Structures, Classes and Objects, Overloading and information hiding, Function overloading, Operator overloading in C++, Memory Management: Constructors, Overloading of constructors, copy constructors, destructors.

UNIT 4

Inheritance : Inheritance, Derived and base classes, Single, Multilevel, Hierarchical, Hybrid Inheritance, Protected member, overriding member function, class hierarchies, multiple inheritance, Containership

UNIT 5

Polymorphism : virtual functions, late binding, pure virtual functions, abstract classes, friend functions, friend classes, static functions, this pointer, templates, function templates, Class templates.

Reference Books:

1. Object-Oriented Programming with C++: E. Balagurusamy, TMH, 2005
2. Object Oriented Programming in C++, Robert Lafore, Galgotia Publication.
3. Object Oriented Programming, Tomothy Budd, Pearson education.
4. Object Oriented Modelling and Design, J. Rambaugh, M. Blaha, W. Premerlani, F. Eddy, W. Lorensen, P.H.I.





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MSCS 1.6 E3: Techniques of Operation Research

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 1.6 E3	M.Sc.	Elective	4	4	25	75	-	-	-	100

UNIT 1

Introduction: nature and meaning of O.R. Modelling in operations research, features of operation research, scope of operations research. Linear Programming Problem: formulation of L.P.P. solution of L.P.P. graphical method, simplex methods, duality.

UNIT 2

Assignment problems: Mathematical formulation, Reduction theorem, methods of solving the assignments problems, Unbalanced assignment problem, Transportation problem: formulation, basic feasible solution: North-West-Corner method, least cost method, Vogel's approximation method, Optimum solution: Modi method.

UNIT 3

Project management: introduction, network diagram representation, time estimates and critical path in network analysis, project evaluation and review techniques. Job sequencing: processing n jobs through 2 machines, processing n jobs through 3 machines, processing 2 jobs through m machines.

UNIT 4

Queuing Theory: introduction, queuing system Transient and steady traffic inlets, Distribution of arrival distribution of departure, M/M/1: ∞ / FCFS model. Replacement problems: replacement policy for items whose maintenance cost increases with time and money value is constant.

UNIT 5

Deterministic Inventory Models, what is inventory, types of inventory, inventory decisions, how to develop n variables model, costs involved in inventory problems, variables in inventory problem, classification of characteristics of inventory systems, EOQ model without shortage.

Reference Books:

1. Operations Research by Taha.
2. Operations Research by S D Sharma.
3. Introduction to Operations Research (Sixth Edition) by F.S. Hillier and G.J. Lieberman, Mc Graw Hill International Edition, Industrial Engineering Series, 1995.
4. Linear Programming by G. Hadley, Narosa Publishing House, 1995.

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MSCS 1.6 E4: Data Communication & Computer Network

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 1.6 E4	M.Sc.	Elective	4	4	25	75	-	-	-	100

UNIT 1

Data Communication networks and system standards : Data Communication networks and open system standards: Data communication networks, Standards. ISO reference model. The Electrical Interface: Transmission media. Attenuation and distortion sources.

UNIT 2

Data Transmission: Data transmission basics. Asynchronous transmission. Synchronous transmission, Error detection methods. Data compression. Transmission control circuits. Communications control devices. Protocol basics: Error Control, Idle RQ, Continuous RQ, Link management.

UNIT 3

Local Area Networks : Topology Transmission Medium , Medium Access Control Methods, ICSMA/CD Bus, Token Ring , Performance , Wireless LANs , Wireless Media, Protocols, Network Layer, Bridges, Bridges, Source Routing Bridges Transparent , Internetworking with different types, Introduction to WAN.

UNIT 4

Transport Protocol : User Data Gram Protocol, TCP, Reliable Stream Service , Protocol Operations, Application support protocol, Session Layer, Token Concept, Presentation Layer, Data Encryption, Terminology, Message Authentication,

UNIT 5

TCP/IP Application protocols: Introduction to TELNET , FTP , SMTP , SNMP , World Wide Web, Directory Services, Domain Name system.

Reference Books:

1. Data Communications and Networking, Behrouz A. Forouzan, Tata McGraw Hill, 3rd Edition, ISBN 0-07-058408-7.
2. Data Communications and Networks, Godbole A, Tata McGraw-Hill Publications.
3. Data Communications, Gupta P., PHI, 2004, ISBN 81 - 203 - 1118 - 3
4. Understanding Data Communications and Networks, Shay W., Third Edition, Brooks Kale Thomson Learning/Vikas Publishing House, ISBN 981-254-966-8

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MSCS 2.1: Data Structures Using C++

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 2.1	M.Sc.	Core	4	4	25	75	-	-	-	100
MSCS 2.3	M.Sc.	Core	8	4	25	-	75	-	-	100

UNIT 1

Stacks and Queues: Introduction to Data Structures, ADT Stack and its implementation in C++, Evaluation of postfix expressions, ADT Queue and its implementation in C++.

UNIT 2

Searching algorithms: Linked Lists: Defining & implementing linked lists with creation, insertion and deletion operations in C++, Sequential search & Binary search algorithms, Implementation in C++.

UNIT 3

Sorting Algorithms: Implementation and Algorithm Analysis of Insertion sort, Selection sort, Merge Sort and Quick Sort.

UNIT 4

Trees and Graphs: Definition and Implementation of ADT Binary tree, AVL Trees. Definition of Graph, Representation of Graphs, Graph Traversal methods.

UNIT 5

Hash Tables, Hashing Functions, Overflow Handling, Chaining. Fields, records, files, index techniques, cylinder-surface indexing, tree indexing-B-trees, trie indexing, file organizations.

Reference Books:

1. Introduction to Data Structures and Algorithms with C ++, GLENN W. ROWE, Prentice Hall India, 2003
2. Data Structures and Algorithms, Alfred V. Aho, John E. Hopcraft, Jaffrey D. Ullman, Pearson education

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MSCS 2.2: Database Management System

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 2.2	M.Sc.	Core	4	4	25	75	-	-	-	100

UNIT-1

Introduction to data base system concepts: An overview of a data base system, basic data base system terminology.

UNIT-2

Entity relationship model, E.R. diagram, data independence, data definition and manipulation languages . an architecture for a data base system.

Data models, relational model hierarchical model, network model.

UNIT-3

Storage structure, relational algebra, relational calculus, relational query language and manipulation. Functional dependencies, Normal form 1NF, 2NF, 3NF, Good and bad Decomposition, BCNF, Multivalued Dependecy, 4NF, Join Dependencies, 5NF.,

UNIT -4

Decomposition, integrity, protection ,security, concurrency, distributed data base.
Database recovery: Introduction, Transactions, Transaction recovery, System recovery, Two-phase commit.

UNIT -5

Concurrency control: Introduction, Concurrency Problem, Locking, Deadlock, Serializability, Intent Locking.

Reference Books:

1. Ullman J.D. : Data base management systems
2. Date C.J. : Data base management systems vol. 1.
3. Korth : data base management systems.



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MSCS 2.3: Practical Lab-I (based on MSCS 2.1)

MSCS 2.1 Data Structures using C++

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 2.1	M.Sc.	Core	4	4	25	75	-	-	-	100
MSCS 2.3	M.Sc.	Core	8	4	25	-	75	-	-	100

MSCS 2.4: Minor Project / Practical Lab-II (based on Elective)

MSCS 2.6 E2: Programming with VB.Net

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 2.6 E2	M.Sc.	Elective	4	4	25	75	-	-	-	100
MSCS 2.4	M.Sc.	Core	8	4	25	-	75	-	-	100

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MSCS 2.5: Written Communication

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 2.5	M.Sc.	Core	4	4	100	-	-	-	-	100

UNIT-1

Reading and understanding , business letters, Reports and memos, Reading and understanding scientific texts, Reading a dictionary, thesaurus, and encyclopedia, Reading passages and poems.

UNIT-2

Letters- Formal and Informal, Reports, Curriculum Vitae, Making advertisements for newspapers, rearranging the jumbled sentences

UNIT-3

Use of Grammar and usage reference sources , Morphology: Word formation processes, Word classes, Phrase, Clause and Sentence, Punctuation and Capitalization, Common errors in the use of English.

UNIT- 4

Precise writing, Mechanics of writing, paragraphing, precise, report writing, technical reports, length of written reports, organizing reports, writing technical reports.

UNIT- 5

Writing Technical reports , Survey report, Report of Trouble, Laboratory report and project report on the technical subjects.

Reference Books:

1. Business Correspondence and Report Writing – Krishna Mohan, Prentice Hall India.
2. Living English Structure- W. Stannard Allen, Longmans.



MSCS 2.6 E1: Theory of Computation

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 2.6 E1	M.Sc.	Elective	4	4	25	75	-	-	-	100

UNIT 1

Finite Automata & Regular Expression: Finite State Systems, Basic Definitions, Transition System, properties of transition system, Acceptability of a string by a Finite Automaton, Nondeterministic Finite Automata, Minimization of Finite Automata , Finite Automata with ϵ -moves.

UNIT 2

Regular Expressions, Two-way Finite Automata, Crossing Sequence of Two way Finite Automata Finite Automata with Output, Applications of Finite Automata, Closure Properties of Regular Sets.

UNIT 3

Context Free Grammars: Motivation and Introduction, Context-free Grammars, Chomsky classification of languages, Derivation Trees, Ambiguity in Context-free Grammars, Simplification of Context-free Grammars.

UNIT 4

Constuction of Reduced Grammars, Elimination of null production, Unit Production Chomsky Normal Forms, The existence of inherently ambiguous context-free languages, Closure properties of Context Free Languages.

UNIT 5

Turing Machines: Introduction, The Turing Machine Model. Representation of Turing Machine, Design of Turing Machine,Types of TM, Universal Turing Machine.

Reference Books:

1. Introduction to Automata Theory, Languages & Computation, J E Hopcraft & JD Ullman, Narosa Publications.
2. Theory of Computer Science, KLP Mishra & N Chandra Sekhar, PHI
3. Mathematical Foundations of Computer Science, Beckman

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MSCS 2.6 E2: Programming with Visual Basic.Net

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 2.6 E2	M.Sc.	Elective	4	4	25	75	-	-	-	100
MSCS 2.4	M.Sc.	Core	8	4	25	-	75	-	-	100

UNIT 1

Introduction to .NET, .NET Framework features & architecture, CLR, Common Type System, MSIL, Assemblies and class libraries. Introduction to visual studio, Project basics, types of project in .Net, IDE of VB.NET- Menu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser.

UNIT 2

The VB.NET Language- Variables -Declaring variables, Data Type of variables, Forcing variables declarations, Scope & lifetime of a variable, Constants, Arrays, types of array, control array, Collections, Subroutines, Functions, Passing variable, Number of Argument, Optional Argument, Returning value from function. Control flow statements: conditional statement, loop statement. MsgBox & Inputbox.

UNIT 3

Working with Forms : Loading, showing and hiding forms, controlling One form within another. Using MDI form. Windows Form Control (with Properties, Methods and events): Textbox, Rich Text Boxes, Label, Link Label, Button, Checkbox, Radio Button, Panel, Group Box, Picture Box, Listbox, Combobox, Check Listbox, scroll bar, Timer. Advance Controls: Menus, Context Menus , Built-in Dialog Box: OpenFileDialog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog, Printing. ListView, TreeView, toolbar, StatusBar..

UNIT 4

Object oriented Programming: Classes & objects, constructor, destructor, inheritance. Access Specifiers, Interfaces, Polymorphism. Exception Handling: using Try, Catch, Finally, Throw Keywords. Graphics Handling: Using Graphics & Pen classes for drawing colors and figures. File Handling: Opening or Creating a File, Writing & Reading Text.

UNIT 5

Database programming with ADO.NET – Overview of ADO, from ADO to ADO.NET, Accessing Data using Server Explorer. Creating Connection, Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Data on data bound controls, display data on data grid. Generate Reports Using CrystalReportViewer.

Reference Books:

1. VB.NET Programming Black Book by steven holzner –dreamtech publications
2. Mastering VB.NET by Evangelos petroustos- BPB publications
3. Introduction to .NET framework-Worx publication

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MSCS 2.6 E3: Internet Programming

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 2.6 E3	M.Sc.	Elective	4	4	25	75	-	-	-	100

UNIT 1

Introduction to Internet Programming- Client-Server model, Browsers-Graphical and Hypertext Access to the Internet, HTTP–Hyper Text Transfer Protocol (how it actually works), The Phases of Web Site Development

UNIT 2

Creating Internet World Wide Web pages- HTML - Hypertext Markup Language , Basic HTML Concepts, HTML: Structured Language ,headers, body, html tags, tables , Text, graphics, sounds, video clips, multi- media ,Client side image mapping

UNIT 3

HTML forms programming: Building a form, Text fields and value, size, max length html buttons, radio, checkboxes, Selection lists.

CSS: Introduction To Style sheet, types of style sheets- Inline, External, Embedded CSS, text formatting properties, CSS Border, margin properties, Positioning Use of classes in CSS, color properties, use of <div>&

UNIT 4

Intro to script, types, intro of JavaScript, JavaScript identifiers, operators, control & Looping structure, Intro of Array, Array with methods, Math, String, Date Objects with methods User defined & Predefined functions, DOM objects, Window Navigator, History, Location, Event handling, Validations On Forms

UNIT 5

Intro & features of XML, XML writing elements, attributes etc. XML with CSS, DSO, XML Namespaces XML, DTD, XML Schemas, Writing Simple sheets using XSLT, SAX & DOM Parsers, SOAP Introduction.

Reference Books:

1. Joe Fawcett,Danny Ayers,Liam R.E. Quin, “Beginning XML” Wrox Press, 5th Ed., 2012
2. Deitel & Deitel, “XML how to program”, Pearson, 2000
3. Hofstetter fred , “Internet Technology at work”, Osborne pub. , ISBN : 9780072229998, 2004
4. Ivan Bayross , “HTML, DHTML, JavaScript, Perl & CGI” ,BPB pub. 3rd Ed.,2004
5. Ivan Bayross, “Web enabled commercial application development using HTML, DHTML, JavaScript, PERL-CGI”, BPB pub., 2nd Ed., 2000

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MSCS 2.6 E4: Computer System Architecture and Parallel Processing

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 2.6 E4	M.Sc.	Elective	4	4	25	75	-	-	-	100

UNIT 1

Programming and language : Relationship between Electronics & Programming. Flow Chart, Programming Language, assembly Language.

UNIT 2

Computer Architecture, Microprocessor Architecture, Microprocessor Families , 6502 family, 6800/6808 family.

UNIT 3

Addressing Modes, Arithmetic Instruction, Logical Instructions, 8086/8088 family.

UNIT 4

Parallel Processing : Mechanism, Parallelism in uniprocessor system, Parallel Computer Structure, Architecture Classification Scheme.

UNIT 5

Pipeline and Vector Processing : Instruction and arithmetic Pipeline, SIMD Computers.

Reference Books:

1. Hawang, K.,Briggs, F.A. : Computer Architecture and Parallel processing, Mcgraw Hill,1985.
2. Kogg, H.: The Architecture of pipelined computers Mcgraw Hill,1981.
3. Bear, J.L.: Computer system architecture,computer sci.Press,1980
4. Evans,D.J.: Parallel processing System, Cambridge Univ.1982
5. Hockney,R.W.,Jesshope, C.R.:Parallel computers : Architecture proggmming and Algorithm, Adam.Hilger,1981.
6. Malvino , Brown : Digital Computer electronics

 

MSCS 3.1: Theory of Compiler Design

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 3.1	M.Sc.	Core	4	4	25	75	-	-	-	100

UNIT 1

Structure of a compiler, cross compiler, finite automata and lexical analysis : The roll of lexical analyzer, design of lexical analyzer.

UNIT 2

Regular expressions, finite automata, definite finite automata minimizing the no. of states of a DFA ,context free grammars.

UNIT 3

Derivations and parse trees, basic parsing techniques, parses, shift -reduce parsing , operator precedence ,parsing, top-down parsing.

UNIT 4

Run-time Storage administrations, implementation of a simple stack, allocation scheme.

UNIT 5

Implementation of block structured languages, storage allocation in block, structured languages, code generator.

Reference Books:

- 1 Aho, ullman : Principles of compiler design

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MSCS 3.2: Data Mining and Data Warehousing

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 3.2	M.Sc.	Core	4	4	25	75	-	-	-	100
MSCS 3.3	M.Sc.	Core	8	4	25	-	75	-	-	100

UNIT 1

Introduction : Data Mining: Definitions, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas. Association Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori, Partition, Pincer search etc., Generalized association rules.

UNIT 2

Clustering paradigms; Partitioning algorithms like K-Medoid, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS. Other DM techniques & Web Mining: Application of Neural Network, AI, Fuzzy logic and Genetic algorithm, Decision tree in DM. Web Mining, Web content mining, Web structure Mining, Web Usage Mining.

UNIT 3

Temporal and spatial DM: Temporal association rules, Sequence Mining, GSP, SPADE, SPIRIT, and WUM algorithms, Episode Discovery, Event prediction, Time series analysis. Spatial Mining, Spatial Mining tasks, Spatial clustering, Spatial Trends.

UNIT 4

Data Mining of Image and Video: A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

UNIT 5

The vicious cycle of Data mining, data mining methodology, measuring the effectiveness of data mining data mining techniques. Market baskets analysis, memory based reasoning, automatic cluster detection, link analysis, artificial neural networks, generic algorithms, data mining and corporate data warehouse, OLA

Reference Books:

1. Data Mining Techniques ; Arun K.Pujari ; University Press.
2. Data Mining; Adriaans & Zantinge; Pearson education.
3. Mastering Data Mining; Berry Linoff; Wiley.



MSCS 3.3: Practical Lab-I (based on MSCS 3.2)

MSCS 3.2 Data Mining and Data Warehousing

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 3.2	M.Sc.	Core	4	4	25	75	-	-	-	100
MSCS 3.3	M.Sc.	Core	8	4	25	-	75	-	-	100

MSCS 3.4: Minor Project / Practical Lab-II (based on Elective)

MSCS 3.6 E1: Object Oriented Programming with JAVA

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 3.6 E1	M.Sc.	Elective	4	4	25	75	-	-	-	100
MSCS 3.4	M.Sc.	Core	8	4	25	-	75	-	-	100

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MSCS-3.6 E1: Object-Oriented Programming with Java

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 3.6 E1	M.Sc.	Elective	4	4	25	75	-	-	-	100
MSCS 3.4	M.Sc.	Core	8	4	25	-	75	-	-	100

UNIT 1

Java Evolution, Overview of Java Language : Java Program Structure, Java Tokens, Java Statements, Java Virtual Machine, Command Line Arguments. Constants, Variables and Data Types : Constants, Variables, Data Types, Scope of Variables, Symbolic Constants, Type Casting. Operators : Arithmetic, Relational, Logical, Assignment, Increment & Decrement, Conditional, Bitwise, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence and Associativity, Mathematical Functions.

UNIT 2

Control Statements : Java's Selection Statements : If, Switch. Iterative Statements : While, Do-while, For, Some for loop variations, Nested Loops. Jump Statements : Using breaks, Using continue, return. Classes, Objects and Methods : Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, Visibility Control, The *this* Keyword, Garbage Collection, Overloading Methods, Recursion. Arrays, Strings and Vectors.

UNIT 3

Inheritance : Inheritance basics, Using super, Creating Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using *final* with Inheritance, The Object Class. Packages and Interfaces : Java API Packages, Using System Packages, Creating & Accessing Packages, Hiding Classes, Access Protection, Importing Packages, Interfaces : Defining, Implementing, Applying Interfaces, Variables in Interfaces. Exception Handling: Exception-Handling Fundamentals, Exception Types, Uncaught Exception, Using try and catch, Multiple catch Clause, Nested try Statements, throw, throws, finally, Java's Built-in Exceptions. Multithreaded Programming: Creating Threads, Extending the Thread Class, Stopping and Blocking a Thread.

UNIT 4

Applet Programming : Preparing to write Applets, Building Applet Code, Applet Life Cycle, Creating and Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing parameters to Applet, Aligning the Display, Displaying Numerical values, Getting input from the User.

UNIT 5

Introductory Graphics Programming : class, Lines , Rectangle, Circles, Ellipes, Arcs, Polygons, Line Graphs. I/O in Java : Streams, stream classes, Byte and Character stream classes. I/O exceptions, Interactive I/O. JDBC Connection and Implementation, Server side programming using Servlet and JSP.

Reference Books:

1. JAVA: The Complete Reference, Third Edition, P. Naughton & H. Schildt, Tata McGraw Hill.
2. Programming with Java, Second Edition, E. Balagurusamy, Tata McGraw-Hill
3. Teach Yourself JAVA, Joseph O'Neil & Herb Schildt, McGraw-Hill.





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MSCS 3.6 E2: Network Security

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 3.6 E2	M.Sc.	Elective	4	4	25	75	-	-	-	100

UNIT 1

Convention Encryption : Conventional Encryption Model , Steganography , Classical Encryption Techniques, Simplified DES , Block Cipher Principles , The Data Encryption Standard, The Strength of DES , Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of operation, Conventional

UNIT 2

Encryption algorithms: Public Key Encryption And Hash Functions Public Key Cryptography , Principles of Public Key Cryptosystems , The RSA Algorithm , Key Management , Diffie Hellman Key Exchange , Elliptic Curve Cryptography.

UNIT 3

Message Authentication and Hash Functions Authentication Requirements, Authentication Functions, Message Authentication Codes , Hash Functions , Security of Hash Functions

UNIT 4

Hash And Mac Algorithms MD5 Message Digest Algorithm , Secure Hash Algorithm (SHA-I) , RIPEMD ,HMAC

Unit 5

Digital Signatures and Authentication Protocols Digital Signatures , Authentication Protocols - Digital Signature Standard Authentication Applications , IP Security , Web Security Intruders, Viruses and Worms Intruders , Viruses and Related Threats Firewalls Firewall Design Principles , Trusted Systems

Reference Books:

1. William Stallings, " Cryptography and Network Security", Second edition, Prentice Hall, 1999.
2. Atul Kahate, " Cryptography and Network Security," TMH
3. William Stallings, "Cryptography and Network Security", Third Edition, Pearson Ed
4. Introduction to network security, Krawetz, Cengage




MSCS 3.6 E3: Systems Analysis and Design

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 3.6 E3	M.Sc.	Elective	4	4	25	75	-	-	-	100

UNIT 1

Overview of system analysis and design, system development life cycle, project selection, feasibility analysis, design, implementation, testing and evaluation.

UNIT 2

Feasibility study- Technical and economical feasibility, cost and benefit analysis.

UNIT 3

System requirement specification and analysis: Fact finding techniques, Data flow diagrams, Data dictionaries, process organisation and interactions, decision analysis, decision trees and tables.

UNIT 4

Detailed design- Modularisation, module specification, file design, system development involving data bases. System Control and Quality Assurance- reliability and maintenance.

UNIT 5

Software design and documentation tools, top-down ,bottom-up and variants. Units and integration testing, testing practices and plans. System controls , Audit trails.

Reference Books:

1. James,A.S.: Analysis of design of Information systems,Mcgraw Hill 1986.
2. Ludeberg, M., Golkuhl, G. and hilsson,A. : Information systems development, Asystematis approach, Prentice Hall international 1981.
3. lesson,M.: System analysis and design, science research associates,1985
4. Sempriv,P.C.: System analysis-Definition Process and Design,1982
5. Richard,D.: System analysis design,Irwin Inc.1979.
6. Awad,E. Homewood : System analysis and design,Awad,Irwin 1979.

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MSCS 3.6 E4: Cloud Computing

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 3.6 E4	M.Sc.	Elective	4	4	25	75	-	-	-	100

UNIT -1

Cloud Computing: Definition, Cloud Architecture, Cloud Storage, Advantages and Disadvantages of Cloud Computing, Companies in the Cloud Today, Cloud Services, Cloud Types: The NIST Model, The Cloud Cube Model, Deployment Models, Service Models Cloud Computing, Service Models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS).

UNIT -2

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

UNIT -3

Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

UNIT -4

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files

UNIT -5

Cloud computing security architecture: Architectural Considerations- General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access control Identity management, Access control, Autonomic Security Cloud computing security challenges: Virtualization security management virtual threats, VM Security Recommendations, VM-Specific Security techniques, Secure Execution Environments and Communications in cloud.

Reference Books:

1. Barrie Sosinsky, "Cloud Computing Bible", Wiley India pub
2. Dinakar Sitaram, "Moving to The Cloud", Elsevier, 2014.
3. Danc.Marinercus, "Cloud Computing Theory And Practice", Elsevier, 2013.

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MSCS 4.1: Computer Graphics and Multimedia

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 4.1	M.Sc.	Core	4	4	25	75	-	-	-	100
MSCS 4.3	M.Sc.	Core	8	4	25	-	75	-	-	100

UNIT 1

Overview of Graphic Systems: Display Devices, Refresh Cathode-Ray Tubes, Random-Scan and Raster-Scan Monitors, Color CRT Monitors, Direct-View Storage Tubes, Plasma-Panel Displays, LED and LCD Monitors. Hard-Copy Devices: Printers, Plotters. Interactive Input Devices.

UNIT 2

Output Primitives: Points and Lines, Line-Drawing Algorithms, DDA Algorithm, Bresenham's Line Algorithm, Antialiasing Lines, Circle-Generating Algorithms, Circle Equations, Bresenham's Circle Algorithm, Character Generation. Attribute of Output Primitives: Line Styles, Line Types, Line Width, Line Color. Color and Intensity: Color Tables, Gray Scale. Area Filling: Scan-Line Algorithm.

UNIT 3

Two Dimensional Transformations: Basic Transformations, Translation, Scaling, Rotation. Matrix Representations and Homogeneous Coordinates. Composite Transformations: Translations, Scalings, Rotations, Scaling Relative to a Fixed Point, Rotation about a Pivot Point, General Transformation Equation. Windowing and Clipping: Windowing Concepts, Clipping Algorithms, Line Clipping, Polygon Clipping, Area Clipping, Text Clipping, Window to Viewport Transformation.

UNIT -4

Viewing in 3D: Three dimensional transformation, Translation, Scaling, Rotation. Matrix Representations projections : Parallel, prospective, view points . Colour Model.

UNIT 5

Introduction to Multimedia, Multimedia Components, Multimedia Hardware, SCSI, IDE, MCI, Multimedia Data and File Formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia Tools, Presentation Tools, Authoring Tools. Computer Aided Design. Graphs Charts and Models. Computer Art, Computer Animation, Graphical User Interface, Graphics for Home use, Image Processing.

Reference Books:

1. Computer Graphics, Donald Hearn and M.Pauline Baker, PHI 2nd Edition
2. Multimedia Making it Works, Third Edition: Tay Vaughan, Tata-McGraw-Hill
3. Procedural Elements of Computer Graphics, Rogers, McGraw Hill
4. Principles of Interactive Computer Graphics, Newman and Sproull, McGraw Hill
5. Mathematical Elements of Computer Graphics, Rogers, McGraw Hill

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MSCS 4.2: Artificial Intelligence

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 4.2	M.Sc.	Core	4	4	25	75	-	-	-	100

UNIT 1

Introduction of Artificial Intelligence: What is AI ? The Importance of AI. AI and related fields. Introduction to Natural Language Processing . Basic Problem solving methods: Production systems-state space search, control strategies, Breadth first search, Depth first search, Heuristic search, Hill Climbing techniques: Best First search, forward and backward reasoning.

UNIT 2

Knowledge : General Concepts, Definition and Importance of Knowledge, Knowledge based system, representation of Knowledge, Knowledge Organization , Knowledge Manipulation , Acquisition of Knowledge. Introduction to Expert System: Definition, Characteristics, Importance and Applications of Expert System, structure of Expert System. Case study of MYCIN & DENDRAL.

UNIT 3

LISP AND AI PROGRAMMING LANGUAGES : Introduction to LISP : Syntax and Numeric Functions, Basic List Manipulation Functions in LISP , Functions, Predicates, and Conditionals, Input, Output, and Local Variables, Iteration and Recursion, Property List and arrays, PROGLOG and Other AI Programming Languages.

UNIT 4

FORMALIZED SYMBOLIC LOGICS : Introduction , Syntax and Semantics for Propositional Logic , Syntax and Semantics for FOPL , Properties of Wffs , Conversion to Clausal Form, Inference Rules , The Resolution Principle , Representations Using Rules.

UNIT 5

Neural Network: Basic structure of neuron, perception, feed forward and back propagation, Hopfield network.

Reference Books:

1. Dan W. Patterson: Introduction to Artificial Intelligence and Expert System, Prentice Hall.
2. Peter Norvig: Artificial Intelligence: A Modern Approach, Pearson New International Edition
3. Elaine Rich and Kevin Knight: Artificial Intelligence
4. Charniak, E. : Introduction of Artificial Intellegence, Narosa publ. House.
5. Winston,P.H. : LISP, NArosa publ. House.
6. clark, K.L. : Micro Prolog , Prentice Hall india.1987.

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MSCS 4.3: Minor Project / Practical Lab-I (based on MSCS 4.1)

MSCS 4.1 Computer Graphics and Multimedia

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 4.1	M.Sc.	Core	4	4	25	75	-	-	-	100
MSCS 4.3	M.Sc.	Core	8	4	25	-	75	-	-	100

MSCS 4.4: Major Project

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 4.4	M.Sc.	Core	8	4	25	-	75	-	-	100

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MSCS 4.6 E1: Software Engineering

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 4.6 E1	M.Sc.	Elective	4	4	25	75	-	-	-	100

UNIT 1

Introduction to Software Engineering : Software development, and life cycle; Project size and its categories; Planning a software project.

UNIT 2

Project control & Project team standards; Design of solution strategies; Software cost estimation and evaluation techniques.

UNIT 3

Software Design : Various Design concepts and notations; Modern design techniques; Verification and validation methods; Documentation & implementation procedures; Performance of software systems; Software metrics and models. Documentation of Project-systems, manuals and implementation.

UNIT 4

Software Reliability : Definition and concept of software reliability; software errors, faults, repair and availability; Reavailability & availability models; Use of database as a study tool.

UNIT 5

Modern Programming Language Features Relevant to Software Engineering: data abstraction, exception handling, concurrency mechanism, etc; Software development environments.

Reference Books:

1. Fairley, B.E. : Software Engineering concepts, Mcgraw- Hill 1985.
2. Lewis, T.G. : Software Engineering concepts, Mcgraw Hill,1982.
3. Kernighan,B., Plauger, P. : software tools, Addison Wesley ,1976.
4. Meyers,G. : The Art of software testing, Wiley-inter- science,1979.
5. Gehani,N : Introduction of ADA, Mcgraw Hill, 1983.
6. Chatree : Software engineering concepts.
7. Hiborard : Constructing Quality software.

 

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MSCS-4.6 E2: Internetwork Applications

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 4.6 E2	M.Sc.	Elective	4	4	25	75	-	-	-	100

UNIT 1

TCP/IP Model: Comparison with ISO -OSI reference model. TCP/IP Protocol Family : Transport : Transmission Control Protocol, TCP Header Format, UDP Routing : IP Addressing, limitations , Brief overview of IPV6 i.e. the next generation IP, IP header format. Network Addresses: ARP, Domain Name System (DNS), RARP.

UNIT 2

User Services /Applications : File Transfer Protocol (FTP) : Channel Connection, Command : internal & Users, Connections, debugging option with FTP, third party transfer, anonymous FTP, FTP Servers, TFTP, Telnet, BOOTP, Gateway Protocols : brief overview of EGP, CGP & IGP, Other protocols : NFS, NIS, RPC, SMTP, SNMP.

UNIT 3

Internet : Uses, Goals/advantages, WWW, Intranet : Goals, benefits, how TCP/IP, bridges, routers, E-mail works in an intranet, Intranet and WWW : IP Networks, HTTP, Commands.

UNIT 4

Overview of an intranet security system : Security and access policies, Server Security, Firewalls, General Security. WAN : overview of DDS, T-1, T-3 , Frame Relay, Sonet, SMDS, ATM Services, WAN implementation, Connecting the LANs : Bridges, routers, Accessing WAN, Message handling system : X.400 & X.500 , Message Transfer Agents (MTA), Mailbox.

UNIT 5

Intranet applications : Overview of Web-Servers : essential & desirable features of a web server : authentication , authorization and encryption ; proxy services ; Subnetting an intranet.

Reference Books:

1. Douglas J. Comer : Internetworking with TCP/IP (Vol I)
2. Richard Stevens : Unix Networking

 

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MSCS-4.6 E3: Design and Analysis of Algorithm

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 4.6 E3	M.Sc.	Elective	4	4	25	75	-	-	-	100

Unit 1

Introduction and Review: What is an Algorithm, Algorithm's Performance, order architecture: Θ -Notation, O -Notation, Ω -Notation, Algorithm Analysis: time space complexities, Worst-case Complexity, Average-case Complexity.

Unit 2

Divide and conquer: Structure of divide-and-conquer algorithms: examples, Binary search, quick sort, Analysis of divide and conquer, run time recurrence relations.

Unit 3

Graph Searching and Traversal: Overview, Traversal methods: depth first and breadth first search.

Greedy Method: Overview of the greedy method, Minimum spanning trees, Single source shortest paths.

Unit 4

Dynamic programming: The general method, principle of optimality, difference between dynamic programming and greedy method, Applications: optimal binary search trees, Back tracking: The general method, 8-queens problem.

Unit 5

Branch and Bound Algorithm: The Branch and bound method, FIFO and LIFO branch and bound, LC (Least Cost) search, Traveling Salesman Problem, LCBB on Traveling Salesman Problem.

Reference Books:

1. Fundamentals of Computer Algorithms By Ellis Horowitz and Sartaj Sahni, Galgotia Publications.
2. Ullman "Analysis and Design of Algorithm" TMH
3. Goodman "Introduction to the Design & Analysis of Algorithms, TMH-2002
4. Sara Basse, A.V. Gelder, "Computer Algorithms, " Addison Wesley
5. T.H. Cormen, Leiserson, Rivert and stein, " Introduction of Computer algorithm, " PHI
6. E. Horowitz, S. Sahni, and S. Rajsekar, "Fundamentals of Computer Algorithms, " Galgotia Publication.

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MSCS-4.6 E4: Mobile Computing

Paper Code	Course Name	Course Type	Contact Hours	Credit	Examination Scheme					
					Internal Assessment	Theory	Practical	Seminar/ Viva Voce	Assignment	Total
MSCS 4.6 E4	M.Sc.	Elective	4	4	25	75	-	-	-	100

UNIT 1

Overview of the emerging fields of mobile computing; Historical perspectives (mainly from the perspective of radio), Mobile applications, Limitations, Health Concerns, Cordless phone, Land mobile vs. Satellite vs. In-building communications systems, Frequencies for radio transmission. Characteristics of Cellular Systems, Mobility support in cellular telephone networks, Personal Communications Systems/Personal Communications Networks, Wireless Personal Area Network, Wireless Local Area Network and Internet Access.

UNIT 2

Mobile communication: Fiber or wire based transmission, Wireless Transmission - Frequencies, Signals, Antennas and Signal Propagation, Modulation Techniques, Multiplexing techniques, Coding techniques. Cellular structure, Voice Oriented Data Communication GSM, CDMA. GSM Architecture, Authentication & security, frequency hopping.

UNIT 3

Satellite Systems: History, Application, and Basics of Satellite Systems: LEO, MEO, GEO, Routing, Handover, VSAT, installation & Configuration. Cyclic repetition of data, Digital Audio Video Broadcasting, Multimedia object transfer Protocol, Wireless LAN topologies, requirements. Physical layer, MAC sub-layer, IEEE802.11.HIPERLAN: Protocol architecture, layers, Information bases and networking, Bluetooth.

UNIT 4

Basics of Discrete Event Simulation, Application and Experimentation, Simulation models. Case Study on Performance Evolution of IEEE 802.11 WLAN configuration using Simulation, Mobile IP, goals, assumptions requirements, entities and terminology, IP packet delivery, tunneling and encapsulation, Feature and format of IPv6, DHCP, TCP over Wireless. Characteristic of Ad Hoc networks, Applications, need for routing, routing classification, Wireless sensor networks, classification and Fundamentals of MAC protocol for wireless sensor networks.

UNIT 5

Economical Benefits of Wireless Networks, Wireless Data Forecast, Charging issues, Role of Government, Infrastructure manufacturer, Enabling Applications Mobile operating System, HTTP versus HTML. WML,XML application for wireless handheld devices. UWB systems Characteristics, Current approaches for security.

Reference Books:

1. Mobile Communications author Jochen Schiller, publication John Willy & Sons, Ltd.
2. Wireless And Mobile Systems, D. P. Agrawal, Qing-An zeng, Thomson publication

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