HIMALAYAN GARHWAL UNIVERSITY

SYLLABUS &ORDINANCE
OF
MASTER OF SCIENCE
(COMPUTER SCIENCE)

HIMALAYAN GARHWAL UNIVERSITY
STUDENT EVALUATION SYSTEM

Continuous Assessment

All courses undertaken by students are evaluated during the semester using internal system of continuous assessment. The students are evaluated on class /tutorial participation, assignment work, lab work, class tests, mid-term tests, quizzes and end semester examinations, which contribute to the final grade awarded for the subject. Students will be notified at the commencement of each courses about the evaluation methods being used for the courses and weightages given to the different assignments and evaluated activities.

In order to make the evaluation system as similar and transparent with any of the globally reputed educational institutions like N.I.Ts, I.I.Ts etc. the Himalayan Garhwal University Academic Council has adopted the grading practices. Here marks obtained in the continuous assessment and end semester examination are added together and a 10-point grading system will be used to award the student with on overall letter grade for the course (subject).

Distribution of Marks

(i)Courses without Practical Components

(a.) Attendance, Class Participation, Class test, Quiz, Project, etc - 10

(c.) Mid –Term Examination - 30

(d.) End –Term Examination - 60

Total : 100

(ii)Courses with Practical Components only

(a.)Continuous Assessment & Internal Examination (Practical) - 40

(b.) End –Term Examination (Practical) - 60

Total : 100

Letter Grading system

Final evaluation of course is carried out on a TEN POINT grading system. Performance Grade and Grade Points are as shown below:

Table 1

Marks	Grade Value	Grade	Description
90 to 100	10	O	Out Standing
75 to 89	9	A+	Excellent
65 to 74	8	A	Very Good
60 to 64	7	B	Good
55 to 59	6	B+	Above Average
51 to 54	5	C	Average
Equal to 50	4	P	Pass
Less than 50	0	F	Fail
Absent in Final Examination	0	Ab	Absent

**However, within the above grading system the student has to earn a minimum of 24marks each in Continuous Assessment and End Term Examination, that is a total of (24) + (24) =48 marks have to be secured forgetting declared pass in the "Fair" category.*

***Note**: In order to convert the GPA and CGPA into percentile, multiply the same with the Conversion factor of 9.10.*

A student who earns a minimum of 5 grade Point (E grade) in a course (subject) is declared to have successfully completed the course, and is deemed to have earned the credits assigned to that course. A course successfully completed cannot be repeated.

A student should have appeared for the end semester examination of the prescribed course of study (mere appearance in the continuous assessment test is not sufficient) to be eligible for the award of the degree in the course.

If a student is eligible for but-fails to appeared in the end semester examination, he/she will be awarded an 'I grade (in complete) on the grade sheet. For all practical purposes an 'I'Grade is treated as an 'F'.

If a student is not eligible to appear in the end semester examination owing to his/her not fulfilling the minimum attendance requirements, he may be permitted to re-register for those courses in which he/she had attendance shortage, at the next available opportunity.

Grade Point Average (GPA) &Cumulative Grade Point Average (CGPA)

Each course grade will be converted into a specific number of points associated with the grade as mentioned in above Table 1. Here points are weighted with the number of credits assigned to a course. The Grade Point Average (GPA) is the weighted average of grade points awarded to a student. The Grade Point Average for each semester will be calculated only for those students who have passed all the courses of that semester. The weighted average of GPA's of all semester that the student has completed at any point of time is the Cumulative Grade Point Average (CGPA) at that point of time.

CGPA upto any semester will be calculated only for those students who have passed all the courses upto that semester.

Calculation of GPA and CGPA :

Example:
Table 2

Courses	**Credits**	**Letter Grade**	**Grade Value**	**Credit Value**	**Grade Points**
Mathematics	3	C	7	3x7	21
Computer Science	3	B	8	3x8	24
Physics	3	A	9	3x9	27
Language Lab	2	B	8	2x8	16
TOTAL	11			TOTAL	88

In this case GPA = $\frac{\text{Total Grade Points}}{\text{Credits}} = \frac{88}{11} = \mathbf{8.0}$

Suppose the GPAS in two successive semesters are 7.0 and 8.0 with 26 and 24 respective course credits, then the

$$\text{CGPA} = \frac{7x26+8x24}{26+24} = \frac{374}{50} = 7.48$$

After the results are declared, grade cards will be issued to each student which will contain the list of courses for that semester and the grades obtained by the student, as well as GPA of that semester. However, a conversion factor of "9.1", will be included, enabling students and future employers for transforming CGPA into percentage of marks at par with the existing practices of I.I.Ts, N.I.Ts and A.I.C.T.E.

Minimum Eligibility Requirements in Himalayan Garhwal University for proceeding to the next academic year of study

A First year Student of Himalayan Garhwal University satisfying the below mentioned requirements is eligible to study in the 3rd Semester of next academic year.

"Pass with Minimum E Grade in Four Theory Papers & Pass in Four Laboratory Papers in the I & II Semester (Combined)"

SYLLABUS

FOR

M.Sc. (Computer Science) Programme

HIMALAYAN GARHWAL UNIVERSITY

M. Sc. (Computer Science)

Programme Structure

SEMESTER - I

MCS101: Computer Fundamental & Programming in „C"

MCS102: Combinatorics & Graph Theory

MCS103: Relational Data Base Management System

MCS104: Digital Electronics & Computer System Architecture

MCS105: Operating System with Case Study of UNIX/LINUX

MCSP11: Programming & Problem Solving in "C"

MCSP12: Shell Programming

SEMESTER - II

MCS201: Data Structures

MCS202: Object Oriented Programming in C++

MCS203: Theory of Computation

MCS204: Software Engineering

MCS205: Data Communication and Computer Networks

MCSP21: Data Structures Using "C"

MCSP22: Data Communication and Computer Networks

MCSS21: Self Study*

SEMESTER - III

MCS301: Network Security and Cryptography

MCS302: Design and Analysis of Algorithm

MCS303: Mobile and Wireless Computing

MCSE1: Elective I

MCSE2: Elective II

MCSEP31: Elective I

MCSEP32: Elective II

MCSS31: Self Study*

SEMESTER - IV

MCSE3: Elective III

MCSPR41: Project

MCSS41: Self Study*

FIRST SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	MCS101	Computer Fundamental & Programming in "C"	3	-	-	10	30	40	60	100	3
2.	MCS102	Combinatorics & Graph Theory	3	-	-	10	30	40	60	100	3
3.	MCS103	Relational Database Management System	3	-	-	10	30	40	60	100	3
4.	MCS104	Digital Electronics & Computer System Architecture	2	-	-	10	30	40	60	100	2
5.	MCS105	Operating System with Case Study of UNIX/LINUX	3	-	-	10	30	40	60	100	3
Practical											
1.	MCSP11	Programming & Problem Solving in "C"	-	-	3	40	-	40	60	100	2
2.	MCSP12	Shell Programming	-	-	3	40	-	40	60	100	2
		Total	**14**	**-**	**6**	**130**	**150**	**280**	**420**	**700**	**18**

SECOND SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	MCS201	Data Structures	3	-	-	10	30	40	60	100	3
2.	MCS202	Object Oriented Programming in C++	3	-	-	10	30	40	60	100	3
3.	MCS203	Theory of Computation	3	-	-	10	30	40	60	100	3
4.	MCS204	Software Engineering	2	-	-	10	30	40	60	100	2
5.	MCS205	Data Communication and Computer Networks	3	-	-	10	30	40	60	100	3
Practical											
1.	MCSP21	Data Structures Using "C"	-	-	3	40	-	40	60	100	2
2.	MCSP22	Object Oriented Programming in C++	-	-	3	40	-	40	60	100	2
		Total	**14**	**-**	**6**	**130**	**150**	**280**	**420**	**700**	**18**
1.	MCSS21	Self Study	2	1	-	-	-	-	-	-	3

TA : Teacher Assessment
CT : Class Test
ESE : End Semester Examination
SUB TOT. : Subject Total
TOT. : Total

THIRD SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	MCS301	Network Security and Cryptography	2	-	-	10	30	40	60	100	2
2.	MCS302	Design and Analysis of Algorithm	3	-	-	10	30	40	60	100	3
3.	MCS303	Mobile and Wireless Computing	3	-	-	10	30	40	60	100	3
4.	MCSE1	Elective I	3	-	-	10	30	40	60	100	3
5.	MCSE2	Elective II	3	-	-	10	30	40	60	100	3
Practical											
1.	MCSEP31	Elective I	-	-	3	40	-	40	60	100	2
2.	MCSEP32	Elective II	-	-	3	40	-	40	60	100	2
		Total	**14**	**-**	**6**	**130**	**150**	**280**	**420**	**700**	**18**
1.	MCSS31	Self Study	2	1	-	-	-	-	-	-	3

FOURTH SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	MCSE3	Elective III	3	-	-	10	20	30	70	100	3
2.	MCSE4	Elective IV	3	-	-	10	20	30	70	100	3
Practical											
1.	MCSEP41	Elective III	-	-	3	30	-	30	70	100	2
2.	MCSPR41	Project	-	2	12	-	-	-	400	400	10
		Total	**6**	**2**	**15**	**50**	**40**	**90**	**610**	**700**	**18**
1.	MCSS41	Self Study	2	1	-	-	-	-	-	-	3

TA : Teacher Assessment
CT : Class Test
ESE : End Semester Examination
SUB TOT. : Subject Total
TOT. : Total

Elective I
(Choose any one)

E1.1 Computer Graphics

E1.2 Computer Organisation

E1.3 C#

Elective II

(Choose any one)

E2.1 ASP.NET

E2.2 Compiler Designing

E2.3 Human- Computer Interaction

Elective III

(Choose any one)

E3.1 Image Processing

E3.2 Unified Modeling Language

E3.3 Multimedia Technology and Applications

Elective IV

(Choose any one)

E4.1 Artificial Intelligence

E4.2 Wireless Networks

E4.3 Data Mining & Data Warehousing

E4.4 Genetic Algorithms and Machine Learning

***Self Study**
(Choose any one for semester II, III& IV)

Speech Recognization
Biometrics
Robotics
Pattern Recognistaion Techniques
Cloud Computing
E-Governance
Fuzzy logic & Neural Networks
Ethical Hacking

MCS101: Computer Fundamental & Programming in 'C'

Introduction to Computers: Computer hardware Components, Disk Storage, memory, keyboard, mouse, printers, monitors, CD etc., and their functions, Comparison Based analysis of various hardware components.

Basic Operating System Concepts: MS-DOS, WINDOWS, Functional knowledge of these operating systems. Introduction to Basic Commands of DOS, Managing File and Directories in various operating Systems, Introduction to internet, Basic terms related with Internet, TCP/IP.

Programming in C: History, Introduction to C Programming Languages, Structure of C programs, compilation and execution of C programms. Debugging Techniques, Data Types and Sizes, Declaration of variables, Modifiers, Identifiers and keywords, Symbolic constants, Storage classes (automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor

Operators: Unary operators, Arithmetic & logical operators, Bit wise operators, Assignment operators and expressions, Conditional expressions, precedence and order of evaluation. Control Statements: if-else, switch, break, continue, the comma operator, go to statement. Loops: for, while, do-while.

Functions: built-in and user-defined, function declaration, definition and function call, parameter passing: call by value, call by reference, recursive functions, multifile programs. Arrays: Linear arrays, multidimensional arrays, Passing arrays to functions, Arrays and strings.

Structure and Union: Definition and differences, self-referential structure. And address of (&) operator, pointer to pointer, Dynamic Momory Allocation, calloc and malloc functions, array of pointers, function of pointers, structures and pointers.

References:

1. V. Rajaraman, "Fundamentals of Computers", PHI
2. Pater Norton's "Introduction to Computer", TMH
3. Hahn, "The Internet complete reference", TMH
4. Peter Nortton's, "DOS Guide", Prentice Hall of India
5. Gottfried, "Programming in C, Schaum's Series Tata McGraw Hill

MCS102 : Combinatorics & Graph Theory

Rules of sum and products, Permutation, Combination, Permutation groups and application, Probability, Remsey Theory, Discrete numeric function and generating function, combinatorial problems, Difference equation.

Recurrence Relation: Introduction, Linear recurrence relation with constant coefficient, Homogeneous solution, Particular solution, Total solution, Solution by the method of generating function.

Graphs, sub-graphs, some basic properties, Walks, Path & circuits, Connected graphs, Disconnected graphs and component, Eular and Hamiltonian graphs, Various operation on graphs, Tree and fundamental circuits, Distance diameters, Radius and pendent vertices, Rooted and binary trees, Counting trees, Spanning trees, Finding all spanning trees of a graph and a weighted graph.

Cut-sets and cut vertices, some basic properties, All cut sets in a graph, Fundamental circuit and cut sets, Connectivity and seperatability, Network flows, Planner graphs, Combinatorial and geometric dual, Kuratowski to graph detection of planarity, Geometric dual, Some more criterion of planarity, Thickness and Crossings, Vector space of a graph and vectors, basis vectors, cut set vector, circuit vector, circuit and cut set verses sub spaces, orthogonal vector and sub space. Indicidence matrix & adjacency matrix of graphs.

Coloring and covering partitioning of graph, Chromatic number, Chromatic partitioning, Chromatic polynomials, Matching, covering, Four color problem, Directed graph, Types of directed graphs, Directed paths and connectedness, Euler digraph, Tree and directed edges, Fundamental circuit in digraph, Matrices A,B,C of digraph adjacency matrix of digraph, Enumeration and its types, counting of labeled and unlabeled trees, Polya's theorem, Graph enumeration with polyas theorem, Graph theoretic algorithm.

References:

1. Deo Narsing, :Graph Theory with applications to engineering and computer science", PHI
2. Tremblay and Manohar, :Discrete mathematical structures with applications to computer Science:, TMH
3. Joshi K.D., "Fundamental of discrete mathematics:, New Age International
4. John Truss, "Discrete mathematics of computer scientist"
5. C.L. Liu, "Discrete mathematics"

MCS103: Relational Data Base Management System

Introduction to database systems-Operational Data, File Management Vs Data Management, characteristics of Database approach, An Architecture for a Database System, Advantages and Disadvantages of DBMS, Data associations - Entities, Attributes and Associations, Relationship among Entities, Representation of Associations and Relationship, Data Model Classification, Entity Relationship Model,Relational Data Model, Network Data Model, Hierarchical Data Model .Objects – Relational Model Objects, Relationship, Composite Objects, Procedures, Types and Inheritance.

Relational data structure-A Review of Set Theory, Relations, Domains and Attributes, Tuples, Keys. Integrity Rules Extensions And Intensions, Base Tables, Indexes Relational Algebra and Operations, Retrieval Operations, Relational Calculus and Domain Calculus.

Relational database design-Universal Relation, Anomalies in a Database, Normalization Theory, Functional Dependencies. Closure of a Set of F.D Covers, Non Redundant and Minimum Cover, Canonical Cover, First, Second and Third Normal Forms, Relations with more than one Candidate Key, Good and Bad Decompositions, Boyce Codd Normal Form, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

Query processing-Query Processing Stages, Query Interpretation, Equivalence of Expression, Query Execution Statistics. Query Execution Plan, Query Estimation, Query Evaluation, View Processing, Integrity & Security, Need for Integrity and Security Integrity Constraints.

The distributed databases -Motivation for Distributed Database . Distributed Database concepts, Types of Distribution Architecture of Distributed Databases, The Design of Distributed Databases, Distributed Query Processing, Recovery In Distributed Systems, Commit Protocols for Distributed Databases, Multi Database System.

References:

1. Date C.J. "An Introduction to Database System". Addision Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts" McGraw Hill
3. Database Management System: V. K. Jain, Wiley dreamtech
4. Elmasri, Navathe, "Fundamentals of Database Systems" Addision Wesley
5. Paul Beynon Davis, "Database Systems" Palgrave Macmillan
6. Bipin C. Desai, "An introduction to Database Systems", Galgotia Pub.
7. Begining SQL: Paul Wilton, Wiley dreamtech

MCS104: Digital Electronics & Computer System Architecture

Representation of information & Basic Building Blocks: Introduction to Computer, Computer hardware generation, Number System: Binary, Octal, Hexadecimal, Character Codes (BCD), ASCII, EBCDIC and their conversion. Logic gates, Boolean Algebra, K-map simplification, Half Adder, Full Adder, Subtractor, Decoder, Encoders, Multiplexer, Demultiplexer, Carry look ahead adder, Combinational logic Design, Flip-Flops, Registers, Counters (Synchronous and asynchronous), ALU, Micro-operation. ALU-chip, Faster Algorithm and Implementation (multiplication & Division).

Basic Organization: Operational flow chart (Fetch, Execute, Instruction Cycle), Organization of Central Processing Unit, Hardwired & micro programmed control unit, Single Organization, General Register Organization, Stack Organization, Addressing modes, Instruction formats, data transfer & Manipulation, I/O Organization, Bus Architecture, Programming Registers.

Memory Organization: Memory hierarchy, Main memory (RAM/ROM) chips), Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory Management Hardware, hit/miss ratio, magnetic disk and its performance, magnetic Tape etc.

I/O Organization: Peripheral devices, I/O interface, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor, and Serial Communication. I/O Controllers, Asynchronous data transfer, Strobe Control, Handshaking.

References:

1. Willam Stalling, "Computer Organization & Architecture" Pearson Education Asia
2. Mano Morris, "Computer System Architecture" PHI
3. Zaky & Hamacher, "Computer Organization: McGraw Hill
4. B. Ram, "Computer Fundamental Architecture & Organization" New Age
5. Tannenbaum, "Structured Computer Organization" PHI.

MCS105: Operating System with Case Study of UNIX/LINUX

Introduction: Definition, Design Goals, Evolution; Concept of User, job and Resources; Batch processing, Multi-programming, Time sharing; Structure and Functions of Operating System.Process Management: Process states, State Transitions, Process Control Structure, Context Switching, Process Scheduling, Threads.

Memory Management: Address Binding, Dynamic Loading and Linking Concepts, Logical and Physical Addresses, Contiguous Allocation, Fragmentation, Paging, Segmentation, Combined Systems, Virtual Memory, Demand Paging, Page fault, Page replacement algorithms, Global Vs Local Allocation, Thrashing, Working Set Model, Paging.

Concurrent Processes: Process Interaction, Shared Data and Critical Section, Mutual Exclusion, Busy form of waiting, Lock and unlock primitives, Synchronization, Classical Problems of Synchronization, Semaphores, Monitors, Conditional Critical Regions, System Deadlock, Wait for Graph, Deadlock Handling Techniques: Prevention, Avoidance, Detection and Recovery.

File and Secondary Storage Management: File Attributes, File Types, File Access Methods, Directory Structure, File System Organization and Mounting, Allocation Methods, Free Space management; Disk Structure, Logical and Physical View, Disk Head Scheduling, Formatting, Swap Management. Protection & Security.
Case Study of UNIX/LINUX

References:

1. Silberschatz and Galvin, Operating System Concepts 6/ed, Addison Wesley.
2. William Stalling, Operating Systems: Internals and Design Principles 5/ed, PHI.
3. Tanenbaum, Modern operating Systems, PHI.
4. J Bach, The Design of UNIX Operating System, Pearson Education.
5. Vijay Mukhi, The C Odessy, BPB.
6. Peterson and Silberschatz, Operating System Concepts, Addison Wesley.
7. P. B. Hansen, Operating System Principles, PHI.
8. K. Christian, The UNIX Operating System, John Wiley.
9. A. N. Haberman, Introduction to Operating System Design, Galgotia.

MCS201: Data Structures

Introduction to data structures, Abstract data types

Stacks - Introduction to stack & primitive operation on stack, Stack as an abstract data type, Stack‟s applications - Infix, post fix & Prefix expressions, Recursion, Multiple stacks Queues -Introduction to queues, Primitive Operations on the Queues, Queue as an abstract data type, Circular queue, Dequeue, Priority queue.

Linked List - Introduction to the Linked List, Operation on Linked List, Linked List representation of stack and Queue,Header nodes.

Types of Linked List - Doubly Linked List, Circular Linked
List Application of Linked List.

Trees -Basic Terminology of Trees, Binary Trees, Tree Representations as Array & Linked List Binary tree representation, Traversal of binary trees - In order, Preorder & post order, Application of Binary tree, Threaded binary tree

Balanced tree, AVL tree, B-tree, B+ & B* trees, Conversion of General Tree to Binary Tree, Counting Binary Trees, 2-3 Trees, algorithm for manipulating 2-3 Trees.

Searching - Sequential Searching, Binary search and their Comparison.

Sorting - External & Internal sorting, Insertion sort, Selection sort, Quick sort, Bubble sort, Heap sort, Merge sort, Comparison of sorting methods Algorithms of sorting and searching in Linked list and Arrays.
Tables - Hash table,Collision resolution Techniques.
Graphs - Introduction to graphs, Basic Terminology, Directed, Undirected & Weighted graph, Representation of graphs, Warshall‟s algorithem for path matrix and shortest path
Graph Traversals-Depth first & Breadth first search.

References:

1. Lipshutz, Data Structure, McGraw Hill.
2. Standish, Data Structure, Addison-Wesley.
3. B. Salzberg, File Structures, Prentice-Hall, 1988.
4. A.L. Tharp, File Organization and Processing, John Wiley and Sons, 1988.
5. A. M. Tennenbaum, Y. Langsam and M. J. Augenstein, Data Structures using C, PHI, 1991.
6. S. Lipschutz, Data Structure, Schaum Series.
7. D. E. Knuth, Fundamental Algorithms, Narosa Publication.

MCS202: Object Oriented Programming using C++

OOAD and OOP, Object Oriented Programming paradigm and design; General Concepts: Object, Class, Data Abstraction and Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing; Benefits of OOP, Object-oriented Languages.

Object oriented Programming using C++: Data Types, Operators, Classes and Objects, Constructors and Destructors, Operator Overloading, Type Conversions, Inheritance, Pointers, Virtual Functions, Polymorphism,

Stream I/O in C++, File Processing, Templates, Standard Template Library, Program defined exceptions, Events; Introduction to Class Wizard, Application Wizard and MFC.

Use of OOAD and OOP concepts in different areas: - Object-oriented Software Engineering, Object-oriented OS.

References:

1. B. Stroustrup, The C++ Programming Language, Addison-Wesley.
2. E. Balagurusamy, Object oriented Programming with C++, 2/ed, TMH.
3. G. Booch, Object Oriented Analysis and Design, Addison-Wesley.
4. Rumbagh et. Al., Object Oriented Modeling, PHI.
5. R. S. Pressman, Software Engineering – A Practitioner‟s Approach, McGraw Hill.

MCS203: Theory of Computation

A brief review of Finite Automata, Regular expressions, Regular languages, Deterministic and non-deterministic computations. Pumping Lemma for Regular languages,

Context free languages, Pushdown automaton, Pumping Lemma for Context free languages, Grammar types and Chomsky Hierarchy.

Turing Machines (TM), Variations of TM‟s, Universal Turing Machines (UTM),

Church-Turing Thesis, Relation of Languages to Automata. Turing computable functions, Halting problem, Solvability, Undecidability and Computability.

References:

1. J.E.Hopcraft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education
2. Cohen, "Introduction to Computer Theory", John Wiley.
3. M. Sipser, Introduction to Theory of Computation, PWS Publishing Corporation, 1997.
4. J.E. Hopcroft, J.D. Ullman, Introduction to Automata Theory, Languages and Computation, Addison-Wisley, 1979.
5. T.C. Martin, Theory of Computation, Tata McGraw-Hill
6. H.R. Lewis, C.H. Papadimitrou, Elements of the Theory of Computation, PHI.

MCS204: Software Engineering

Software **:** software characteristics, components & applications, software engineering - a layered technology, software process models - linear sequential model, prototype & rad model., evolutionary software process model – incremental model and spiral model.

Software project management **:** project management concepts – people problem and process

S/w process and project metrics : metrics in the process and project domains . Software measurement –size oriented, function oriented metrics, extended function

Software project planning: objectives, scope, project estimation, decomposition techniques, empirical estimation models.

Analysis concept and principles : requirement analysis, communication techniques, analysis principles, software prototyping, specifications.

Analysis modeling: elements of the analysis modeling, data modeling . Functional modeling and information flow, behavioral modeling, data dictionary.

Design concepts and principles: design process, design concepts, design principles, effective modular design .

Design methods : architectural design process, transform mapping and transaction mapping,interface design, - internal and external design, human omputer interface design, interface design guidelines, procedural design,

S/w quality assurance : quality concepts, matrix for software quality, quality movement, s/w q a, s/w review, formal technical reviews, formal approaches to sqa, s/w reliability, iso 9000quality standards

S/w testing models : s/w testing fundamentals, test case design, white and black box testing, basic path testing, control structure

S/w testing strategies : strategic approach to s/w testing, unit testing, integration testing, validation testing, system testing, debugging

S/w reuse : reuse process,building reuse components, classified and retrieving components, economics of s/w reuse

Computer aided s/w engineering: introducing of case, building block for case, taxonomy of case tools, integrating case environment, integrating architecture, case repository

References:

1. Software Engineering By R.S.Pressman
2. An Integrated Approach To Software Engineering By Pankaj Jalote

MCS205: Data Communication and Computer Networks

Introduction to Computer Networking: Use, advantage, structure of the communications network topologies the telephone network, analog to digital communication.

Communication Between Analog Computers & Terminals Layered Protocols, Network & The OSI Models, Traffic control and accountability wide area and local area networks, connection oriented and connectionless networks, classification of communication protocols polling/selection systems, non-priority system priority system, rotation for layered protocols foals of layered protocols, network design problems, communication between layers, A parametric illustration, introduction to standards organizations and the ISO standard.

Polling/Selection, Satellite and Local area Networks: Binary synchronous control, other BSC system, conversion using satellite communication SPUS, and the Tele-port primary attribute of a LAN, IEEE LAN standards, LAN topology and protocols.

Switching and routing in Network: Telephone switching system, message switching, packet switching, packet switching support to circuit switching networks.

The X.25 & Digital Networks: Layers of x.25, features of x.25 flow control principles, other packet type, x.25 logical channel states time out and time limits, packet formats, flow control and windows x.25 facilities, other standards layer the pad, communication networks communication between layers, advantage of digital networks, Digital‟s switching, voice transmission by packet.

Personal Computer Network: Personal computer communications, characteristics, using the personal computers as server linking the personal computer to mainframe computers, semaphores of vendor offerings. File transfer on personal computers, personal computer and local area networks. Personal computer networks and the OSI models.

TCP/IP: TCP/IP and internetworking, example of TCP/IP operations, related protocols ports and sockets. The IP address structure, major features of IP, IP datagram, Major IP services. IP source routing, value of the transport layer, TCP, Major features of TCP, passive and active operation, the transmission control block (TCB), route discovery protocols, examples of route discovery protocols, application layer protocols.

References:

1. Tannanhaum, A.S. : Computer Network, PHI – 1995.
2. Martin J.: Computer Network and Distributed processing, 1985.
3. Black : Computer Network; Protocols, Standards and Interface PHI – 1995.
4. Black : Data Network; Concepts, Theory and Practices, PHI
5. Starlings, William : Local Networks; and Introduction Mack Publishing Co.
6. Comer; Internetworking : Principles, Protocols Architecture, PHI with TCP/IP
7. Crichlow : Introduction to Distributed and Parallel Comp.
8. Ahuja : Design and Analysis of Computer Communication Network, McGraw Hill Co.
9. Chorafas: Designing and Implementing Networks, McGraw Hill Co.

MCS301: Network Security and Cryptography

Introduction of Cryptography: Introduction To security: Attacks, Services and Mechanisms, Security, Attacks, Security Services, Conventional Encryption: Classical Techniques, Conventional Encryption Model, and steganography, Classical Encryption Techniques. Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operations.

Conventional Encryption Algorithms: Triples DES, Blowfish, International Data Encryption Algorithm, RCS, CAST-128, CR2 Placement and Encryption Function, Key Distribution, Random Number Generation, Placement of Encryption Function.

Public Key Encryption: Public-Key Cryptography: Principles of Public-Key Cryptosystems, RSA Algorithm, Key, Key Management, Fermat's and Euler's Theorm, Primality, Chinese Remainder Theorem.

Hash Functions: Message Authentication and Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Function Birthday Attacks, Security of Hash Function and MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signatures: Digital Signature, Authentication Protocol, Digital Signature Standard (DDS) Proof of Digital Signature Algorithm.

Network and System Security: Authentication Applications: Kerberos X-509, Directory Authentication Service, Electronic Mail Security, Pretty Good Privacy (PGP),S/Mine Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management, Web Security: Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction (Set), System Security: Intruders, Viruses, Firewall Design Principles, Trusted Systems.

References:

1. 1.William Stallings, "Cryptography and Network Security: Principles and Practice"' Prentice hall, New Jersey
2. Johannes A. Buchmann, "Introduction to Cryptography" Springer-Verlag
3. Atul Kahate, "Cryptography and Network Security" TMH
4. Network Security Bible : Eric Cole, Wiley dreamtech India Pvt. Ltd.
5. 5.Practical Cryptography “Bruce Schneier” Wiley dreamtech India Pvt. Ltd.

MCS302: Design and Analysis of Algorithm

Elementary Data Structures, Basic Computational Models.
Simple Algorithms. Analyzing Algorithms, Asymptotic Notation.

Design Methods : General Consideration, Algorithm design paradigms and representative problems: Divide and Conquer (Binary search, Merge Sort, Quick Sort, Arithmetic with Large integers, etc.), Greedy Method (Minimal Spanning Tree, Shortest Paths, Knapsack, etc.), Dynamic Programming (Chained Matrix Multiplication, Optimal Storage on Tapes, Shortest Paths, Optimal Search Trees, etc.), Backtracking (8-queens problem, Graph Colouring, Hamiltonian Cycles, etc.), Branch and Bound (0/1 Knapsack problem, Travelling Salesperson, etc.),

Approximation (Graph Colouring, Task Scheduling, Bin Packing, etc.), Probabilistic Algorithms (Numerical Integration, Primality Testing, etc.).
Graph Algorithms: BFS, DFS and its applications.

Polynomial Evaluation and Interpolation, Fast Fourier transforms.
Intractable Problems : Basic Concepts, Nondeterministic Algorithms, NP Completeness, Cook's Theorem, Examples of NP-Hard and NP-Complete problems. Problem Reduction.
Lower Bound Techniques: Comparison tree, Reduction, Adversary argument.

References:

1. A.Aho, J. Hopcroft and J.Ullman, The Design and Analysis of Computer Algorithms, Addison Wesley.
2. E. Horowitz and S. Sahani, Fundamentals of Computer Algorithms, Galgotia, New Delhi.
3. S.E.Goodman and S.T.Hedetniemi, Introduction to the Design and Analysis of Algorithms, McGraw Hill.
4. G.Brassard and P.Bratley, Algorithmics, PHI.
5. S.K.Basu, Design Methods and Analysis of Algorithms, PHI, 2005.

MCS303: Mobile & Wireless Computing

Introduction to Personal Communications Services (PCS): PCS Architecture, Mobility management, Networks signalling. Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signalling.

General Packet Radio Services (GPRS): GPRS Architecture, GPRS Network Nodes. Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard,

Mobile IP.

Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML). Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.

Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems. Wireless Enterprise Networks: Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols.

Reference :

1. "Pervasive Computing", Burkhardt, Pearson
2. "Mobile Communication", J. Schiller, Pearson
3. "Wireless and Mobile Networks Architectures", Yi-Bing Lin & Imrich Chlamtac, John Wiley & Sons, 2001
4. "Mobile and Personal Communication systems and services", Raj Pandya, Prentice Hall of India, 2001.
5. "Guide to Designing and Implementing wireless LANs", Mark Ciampa, Thomson learning, Vikas Publishing
6. House, 2001.
7. "Wireless Web Development", Ray Rischpater, Springer Publishing,
8. "The Wireless Application Protocol", Sandeep Singhal, Pearson .
9. "Third Generation Mobile Telecommunication systems", by P.Stavronlakis, Springer Publishers,

E1.1 Computer Graphics

Introduction to computer graphics & graphics systems

Overview of computer graphics, representing pictures, preparing, presenting & interacting with pictures for presentations; Visualization & image processing; RGB color model, direct coding, lookup table; storage tube graphics display, Raster scan display, 3D viewing devices, Plotters, printers, digitizers, Light pens etc.; Active & Passive graphics devices; Computer graphics software.

Points & lines, Line drawing algorithms; DDA algorithm, Bresenham‟s line algorithm, Circle generation algorithm; Ellipse generating algorithm; scan line polygon, fill algorithm, boundary fill algorithm, flood fill algorithm.

2D transformation & viewing Basic transformations: translation , rotation, scaling ; Matrix representations & homogeneous coordinates, transformations between coordinate systems; reflection shear; Transformation of points, lines , parallel lines, intersecting lines. Viewing pipeline, Window to viewport co-ordinate transformation , clipping operations , point clipping , line clipping, clipping circles , polygons & ellipse.

3D transformations: translation, rotation, scaling & other transformations. Rotation about an arbitrary axis in space, reflection through an arbitrary plane; general parallel projection transformation; clipping, viewport clipping, 3D viewing.

Curves Curve representation, surfaces , designs , Bezier curves , B-spline curves, end conditions for periodic B-spline curves, rational B-spline curves.

Hidden surfaces Depth comparison, Z-buffer algorithm, Back face detection, BSP tree method, the Printer‟s algorithm, scan-line algorithm; Hidden line elimination, wire frame methods , fractal - geometry. Color & shading models Light & color model; interpolative shading model; Texture;

Text Books:

1. Hearn, Baker – “ Computer Graphics (C version 2nd Ed.)” – Pearson education
2. Z. Xiang, R. Plastock – “ Schaum‟s outlines Computer Graphics (2nd Ed.)” – TMH
3. D. F. Rogers, J. A. Adams – “ Mathematical Elements for Computer Graphics
4. Mukherjee, Fundamentals of Computer graphics & Multimedia, PHI
5. Sanhker, Multimedia –A Practical Approach, Jaico
6. Buford J. K. – “Multimedia Systems” – Pearson Education
7. Andleigh & Thakrar, Multimedia, PHI
8. Mukherjee Arup, Introduction to Computer Graphics, Vikas
9. Hill,Computer Graphics using open GL, Pearson Education

E1.2 Computer Organisation

Introduction: Function and structure of a computer, Functional components of a computer, Interconnection of components, Performance of a computer. Representation of Instructions: Machine instructions, Operands, Addressing modes, Instruction formats, Instruction sets, Instruction set architectures - CISC and RISC architectures.

Processing Unit: Organization of a processor - Registers, ALU and Control unit, Data path in a CPU, Instruction cycle, Organization of a control unit - Operations of a control unit, Hardwired control unit, Microprogrammed control unit.

Memory Subsystem: Semiconductor memories, Memory cells - SRAM and DRAM cells, Internal Organization of a memory chip, Organization of a memory unit, Error correction memories, Interleaved memories, Cache memory unit - Concept of cache memory, Mapping methods, Organization of a cache memory unit, Fetch and write mechanisms, Memory management unit - Concept of virtual memory, Address translation, Hardware support for memory management.

Input/Output Subsystem: Access of I/O devices, I/O ports, I/O control mechanisms -Program controlled I/O, Interrupt controlled I/O, and DMA controlled I/O, I/O interfaces- Serial port, Parallel port, PCI bus, SCSI bus, USB bus, Firewall and Infiniband, I/O peripherals - Input devices, Output devices, Secondary storage devices.

References

1. C. Hamacher, Z. Vranesic and S. Zaky, "Computer Organization", McGraw- Hill, 2002.

2. W. Stallings, "Computer Organization and Architecture - Designing for Performance", Prentice Hall of India, 2002.

3. D. A. Patterson and J. L. Hennessy, "Computer Organization and Design - The Hardware/Software Interface", Morgan Kaufmann,1998.

4. J .P. Hayes, "Computer Architecture and Organization", McGraw-Hill, 1998.

E1.3 C#

MS.NET Framework Introduction

The .NET Framework - an Overview , Framework Components , Framework Versions

Types of Applications which can be developed using MS.NET , MS.NET Base Class Library , MS.NET Namespaces , MSIL / Metadata and PE files.

The Common Language Runtime (CLR) ,Managed Code , MS.NET Memory Management / Garbage Collection , Common Type System (CTS) , Common Language Specification (CLS)

Language Basics

Datatypes & Variables Declaration , Implicit and Explicit Casting , Checked and Unchecked Blocks – Overflow Checks , Casting between other datatypes Operator Overloading, Partial Class, Attributes, Reflection, Configuration

Boxing and Unboxing , Enum and Constant , Operators , Control Statements , Working with Arrays, Working with Methods , Pass by value and by reference and out parameters

Exception Handling

What is Exception , Rules for Handling Exception , Exception classes and its important properties, Understanding & using try, catch keywords , Throwing exceptions

Importance of finally block , "using" Statement , Writing Custom Exception Classes.

Working With Collections and Generics

Importance of IList and IDictionary., Using ArrayList and Hashtable. , Understanding IEnumerable and IEnumerator. Sorting Items in the collection using IComparable.

Typesafety issue with ArrayList and Hashtable classes. Writing custom generic classes. Working with Generic Collection Classes.

WinForms

Introduction, Controls, Menus and Context Menus, MenuStrip, ToolbarStrip. Graphics

and GDI , SDI and MDI Applications , Dialogbox (Modal and Modeless) Form

Inheritance, Developing Custom, Composite and Extended Controls

Other Misc topics., Working with Resource Files , Working with Settings

Data Access using ADO.NET – DataSet

Dataset, Advantages of DataSet, DataSet Object Model, Fetching data using Fill methods of Data Adapter and filling data into Dataset to create a DataTable, Showing DataTable in DataGridView

E2.1 ASP.NET

Introduction to ASP

Introduction to ASP. Types of Path. Examples using Response object of ASP. Working with FORM tag. Important Points about the FORM submission. Problem with ASP.

Validation Controls

BaseValidator, ValidationSummary, RequiredFieldValidator, CompareValidator RangeValidator, RegularExpressionValidator, CausesValidation Property of Button Grouping Controls for Validation

Applying Themes and Styles to Controls

Working with CSS ,Using Themes to Customize a Site , Named Skins within a Theme Server-side Styles using Themes , Contents of a Theme and Skin, Themes and Profiles

ASP.NET Architecture

What is AppDomain, Life cycle of a WebForm when requested by a client., How does a control manages its state, EnableViewState property, Event Handling in WebForms , Writing / Using Custom Classes in WebApplication

Page Navigation Options

Response.Redirect, Server.Transfer, CrossPagePostBack property of Button a. Accessing controls of PreviousPage b. Accessing Properties of PreviousPage c. PreviousPageType page directive

Creating a Layout Using Master Pages

Why Master Pages. , Significance of ContentPlaceHolder Tag in MasterPage and Content Tag in WebForm. How a control of MasterPage can be accessed / programmed in WebForm. a. Master.FindControl b. Public property in MasterPage and <%@MasterType directive in WebForm. Load and LoadComplete events of the Page and MasterPage classes. Understanding ClientID and UniqueID properties.

E2.2 Compiler Designing

Compiler Structure: Compilers and Translators, Various Phases of Compiler, Pass Structure of Compiler, Bootstrapping of Compiler.

Programming Language: High level languages, lexical and syntactic structure of a language, Data elements, Data Structure, Operations, Assignments, Program unit, Data Environments, Parameter Transmission. Lexical Analysis: The role of Lexical Analyzer, A Simple approach to the design of Lexical Analyzer, Regular Expressions, Transition Diagrams, Finite state Machines, Implementation of Lexical Analyzer, Lexical Analyzer Generator: LEX, Capabilities of Lexical Analyzer.

The Syntactic Specification of Programming Languages: CFG, Derivation and Parse tree, Ambiguity, Capabilities of EFG.

Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive descent Parsers, Predictive Parser, Bottom-up Parsers, Shift-Reduce Parsing, Operator Precedence Parsers, LR parsers (SLR, Canonical LR, LALR) Syntax Analyzer Generator: YACC

Intermediate Code Generation: Different Intermediate forms: Three address code, Quadruples & Triples, Syntax Directed Translation mechanism and attributed definition. Translation of Declaration, Assignment, Control flow, Boolean expression, Array References in arithmetic expressions, procedure calls, case statements, postifix translation.

Run Time Memory Management: Static and Dynamic storage allocation, stack based memory allocation schemes, Symbol Table management.

Error Detection and Recovery: Lexical phase errors. Syntactic phase errors, semantic errors.

Code Optimization and Code Generation: Local optimization, Peephole optimization, Basic blocks and flow Graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection.

References:

1. Alfred V Aho, Jeffrey D. Ullman, "Principles of Compiler Design", Narosa
2. A.V. Aho, R. Sethi and J.D.Ullman, "Compiler Principle, Tech & tools" AW
3. H.C. Holub "Compiler Design in C", Printice Hall Inc.
4. Apple, "Modern Computer Implementation in C: Basic Design" Cambridge Press
5. Modern Compiler Design: Dick Grune, Wiley dreamtech India Pvt. Ltd.
6. Starting Out with Modern Compiler " David Gaddis Wiley dreamtech India Pvt. Ltd.

E2.3 Human- Computer Interaction

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design,

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

Screen Designing:- Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

Software tools – Specification methods, interface – Building Tools.

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

References:

1. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech,
3. User Interface Design, Soren Lauesen , Pearson Education.

E3.1 Image Processing

Introduction: Digital Image Processing, The origins of Digital Image Processing, Examples of Digital Image Processing application, Fundamental steps in Digital Image processing, Components of Image Processing system Fundamentals: Elements of Visual Perception, Light and Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some basic Relationships between Pixels, Linear and Nonlinear Operations.

Image Enhancement in the spatial domain: Background, Some basic gray level transformation, Introduction of Histogram processing, Enhancement using Arithmetic/Logic operations, Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters, Image Enhancement in the Frequency Domain: Introduction.

Image Restoration: Model of the Image Degradation/Restoration process, Noise Models, Restoration in the presence of noise only spatial filtering, Inverse filtering, Minimum Mean Square Error (Wiener) filtering, Geometric mean filter, Geometric Transformations, Image Compression: Fundamentals, Lossy Compression, Lossless Compression, Image Compression models, Error-free Compression : Variable length coding, LZW coding, Bit plane coding, Run length coding, Introduction to JPEG.

Morphology: Dilation, Erosion, Opening and Closing, Hit-and Miss transform, Morphological Algorithms : Boundry Extraction, Region filling, Extraction of connected components, Convex Hull, Image Segmentation: Definition, characteristics of segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region based segmentation. Introduction to Representation & Description, Introduction to Object Recoginition.

References:

1. Digital Image Processing: Rafael C. Gonzalez and Richard E.Woods. Addision Wesley.
2. Fundamentals of Digital Image Processing. Anil K. Jain, PHI.
3. Digital Image Processing and Analysis : B. Chanda & D. Dutta Majumber, PHI.
4. Image Processing in C : Dwayne Phillips, BPB.

E3.2 Unified Modeling Language

Introduction: The Evolution of Technology, Structured Analysis and Design, Object-Oriented Technologies, Comparison between the main technologies.

The Unified Process and Features: Unified Process, Static Structure: Process Representation, Dynamic Structure: iterative development, an architecture-centric process, A use-case-driven process, Use case models, Notations and Terminology.

Process Components (Workflows): Business Modeling Workflow, Requirement Workflow, Analysis and Design Workflow, Deployment workflow.

Understanding Object –Oriented Technologies, Current status of Object Technologies, The static object model- Class, Collaborations and Object Diagrams, Generalization, Composition, Aggregation, Multiplicity & Association with concept and examples.

Use Case Analysis: Discussion on use cases, terminology, notations and analysis, what they are and aren‟t, Use case- an example, Use case- formal Scenario template.

Static chart Diagram: Composite states, nested states, Events, Simple transitions.

UML Activity and sequence diagrams: Usage and Syntax, Guarded Transitions, Synchronization Bars, Swim lanes Purpose, Proper Usage of Activity diagram. Transition time sequence diagram: Objective and Modeling guidelines, Objective Interaction, Sequence diagram- UML notation, Object and Stereotypes.

References:

1. UML distilled by Martin Fouler- Pearson Education.
2. Object –Oriented Modeling by James Raumbaugh, PHI.
3. UML a nutshell by Dan Pillone, O‟Reilly Publication.
4. The elements of UML by Scott Amber, Cambridge University Press.
5. Designing Object-Oriented Software by Rebecca Wirf Brock, PHI.

E3.3 Multimedia Technology and Applications

Evolution of Multimedia and its objects, Scope of multimedia in business & work, production and planning of Multimedia applications. Multimedia hardware, Memory of Storage Devices, Communication Devices, Multimedia Software, Presentation and object generation tools, Video, sound, Image capturing Authoring Tools, Card & Page Based Authoring Tools.

Production and Planning of Multimedia building blocks, Text, sound (MIDI), Digital Audio, Audio File Formats, MIDI under Windows environment, Audio & Video Capture.

Macromedia products, Basic drawing techniques, Advance animation techniques, Creating Multi layer combining interactivity and multiple scenes, Creating transparency effects using text in Flash, Flash animation.

Digital Audio Concepts, Sampling variables, Loss Less compression, of sound, Lossy compression & Silence compression.

Multimedia monitor bitmaps, Vector drawing , Lossy graphic compression, Image file formatic animations, Image standards, JPEG compression, Zig Zag coding. Video representation, colors, video compression, MPEG standards, MHEG standard, recent development in multimedia. Multimedia Application Planning, Costing, Proposal preparation, and Financing-Case study of a typical industry.

References:

1. Andreas Halzinger, "Multimedia Basics" Vol-I to VOL-III Firewall Media
2. Tay Vaughan, "Multimedia Making It work" Tata McGraw Hill
3. Buford, "Multimedia Systems" Addison Wesley
4. Agarwal and Tiwari, "Multimedia Systems" Excel
5. Rosch, "Multimedia Bible" Sams Publishing
6. Digital Multimedia "Nigel Chapman" Wiley dreamtech India Pvt. Ltd.
7. Sleinreitz, "Multimedia Bible" Sams Publishing
8. Ken Milburn, John Ckroteau, "Flash 4 Web special Effects, Animation & Design Handbook" Dreamtech Press
9. John. Villamil-Casanova & Louis Molina, "Multimedia-Production, Planning & Delivery" PHI
10. Flash MX 2004 Bible: Robert , Wiley dreamtech India Pvt. Ltd.

E4.1 Artificial Intelligence

Introduction: Definition and meaning of artificial intelligence, A.I. techniques, pattern recognition, Level of, speech recognition representation in A.I. properties of internal representation.

Production System: Different types of tracing, strategies, graph search strategies, Heuristic graph, search procedure, AND/OR graph, relationship between decomposional and compatible systems, searching Gate Tree, min-max search game playing, actual game playing.

Introduction to Predicate Calculus: Predicates and Arguments, connectives, Simplifications of strategies, extracting answers from Resolution Refutation. Control strategies.

Rule Based Deduction Systems: Forward and backward deduction system, resoling with AND/OR graph, computation, deduction and program synthesis, central knowledge for rules based deduct systems.

Managing Plans of Action: Plan interpreter, planning decisions, execution monitoring and re-planning domain of application robot motion planning and game playing.

Structural Object Representation: Semantic networks semantic market matching deductive operations on structured objects.

Architectural for A.I. Systems: Knowledge, acquisitions representation IMAGES PROCESSING, Natural language processing.

References:

1. Introduction to artificial Intelligence Eugene Charnik Drew MC mott
2. Artificial Intelligence Elaine Rice.
3. Principal of Artificial Intelligence, Nelson, Springer-Verlag.
4. Artificial Intelligence Application Programming: Tim Jones, Wiley dreamtech

E4.2 Wireless Networks

Introduction to Wireless Networks

Elements of a wireless communication system – signal and noise - the radio – frequency spectrum –Analog modulation schemes -Amplitude modulation –frequency and phase modulation – sampling – pulse code modulation – delta modulation – data compression.

Digital Modulation and Radio Propagation

Digital communication- sampling –pulse code modulation – delta modulation - Frequency shift keying – Phase shift keying – Multiplexing and Multiple access – spread spectrum systems - radio propagation.

Principles of Cellular Communication And Multiple Access Techniques

Cellular terminology - Cell structure and Cluster – Frequency reuse concept – Cluster size and system capacity – method of locating co channel cells – frequency reuse distance – frequency division multiple access – time division multiple access – space division multiple access – code division multiple access.

GSM and CDMA Digital Cellular Standards

GSM network architecture –GSM signaling protocol architecture – Identifiers in GSM – GSM channels – GSM handoff procedures – Edge technology – wireless local loop – DECT system – GPRS

Emerging Wireless Technologies

IEEE 802.11 system architecture – mobile ad hoc networks – Mobile IP and mobility management – Mobile TCP - wireless sensor networks – RFID technology – Blue tooth – Wi –Fi standards – Wimax standards. – Femtocell network – Push -to –talk technology for SMS.

References:

1. Roy Blake, *"Wireless communication technology"* CENGAGE Learning , sixth Indian reprint 2010. (Chapter 1,2,3,4,7,14)
2. Singal T.L. , *"Wireless communication"* Tata Mc Graw Hill Education private limited , 2011.**(** chapter 4,8,11,13,14)
3. Dharma Prakash Agrawal , Qing –An Zeng , *" Introduction to wireless and mobile systems"* CENGAGE Learning, first edition 2012.(chapter 16)

E4.3 Data Mining & Data Warehousing

Fundamentals : Data Mining, Data Processing And Data Warehouses

Data Mining – History – Strategies – Techniques – Applications – Challenges – Future- Types of Data – Data Warehouses – Data Processing - Quality Measure – OLAP – Sampling.

Data Types, Input And Output Of Data Mining Algorithms – Different Types of features – Concept Learning – Output of Data Mining Algorithms.

Preprocessing In Data Mining – Steps – Discretization – Feature Extraction, Selection and construction – Missing Data and Techniques for dealing it.

Model Evaluation Techniques: Accuracy Estimation- ROC-Lift Charts- Cost –Bagging and Boosting- Model Ranking Approach.

Association Rule Mining: Concepts, Relevance, Functions of Association rule Mining – Apriori Algorithm- Strengths and Weaknesses of ARM- Applications

Clustering And Estimation

Clustering Task: Introduction- Distance Measure – Types – KNN for clustering – validation - Strengths and Weaknesses of Algorithms – Applications.

Estimation Task: Scatter Plots and Correlation – Linear regression Models – Logistic regression – Regression Analysis - Strengths and Weaknesses of Estimation- Applications.

Introduction to Data Warehouse – Data warehouse delivery method – system process – typical process flow within a Data ware house – query management process – process

architecture.

Design Aspects

Design aspects – Designing dimension tables – Designing star flake schema – Multi dimensional schema – partitioning strategy aggregations – Data marting- Meta data – System Data warehouse process manager.

Hardware Hardware and operational design – server hardware, network hardware – parallel technology – Security input on design of Hardware – backup and recovery –

Service level Agreement – Operating the data warehouse.

References:

1. Shawkat Ali A B M, Saleh A. Wasimi, *"Data Mining: Methods and Techniques*", Third Indian Reprint, Cengage Learning, 2010.
2. Sam Anahory & Dennis Murray, "*Data Warehousing in the real world*",Pearson Education Ltd., 2011
3. Prabhu C.S.R. , "Data Ware housing: Concepts, Techniques, Products and *Applications*", Prentice Hall of India, 2011,

E4.4 Genetic Algorithm and Machine Learning

Introduction To Genetic Algorithm And Machine Learning

Robustness of Traditional Optimization and Search methods – Goals of optimization-GA versus Traditional methods – Simple GA; Machine learningexplanation-machine learning Vs artificial intelligence-supervised and unsupervised machine learning-examples of machine learning.

Mathematical Foundations Of Genetic Algorithm

The fundamental theorem - Schema processing at work. – The 2-armed & karmed Bandit problem. –The building Block Hypothesis. – Minimal deceptive problem.

GA Operators

Data structures – Reproduction- Roulette-wheel Selection – Boltzmann Selection – Tournament Selection-Rank Selection – Steady –state selection –Crossover &mutation – Mapping objective functions to fitness forum. – Fitness scaling.

Applications Of GA

The rise of GA – GA application of Historical Interaction. – Dejung & Function optimization – Current applications of GA - Advanced operators & techniques in genetic search: Dominance, Diploidy & abeyance.

Applications Of Genetics-Based Machine Learning

The Rise of GBML – Learning classifier system--Development of CS-1, the first classifier system. –

Smitch‟s Poker player –GBML for sub problems of learning-- Other Early GBML efforts –Current Applications.

References:

1. David E. Gold Berg, *"Genetic Algorithms in Search, Optimization & Machine Learning"*, Pearson Education, 2013.