

MASTER OF COMPUTER APPLICATIONS

SCHEME

SEMESTER V

NO	Subject	No.of Periods per week		Duration of exam in hours	Max. Marks		Total Marks
		Lecture	Lab		Sessional	Uty. Exam	
MCA 501	Design and Analysis of Computer Algorithms	4	--	3	25	75	100
MCA 502	Software Engineering	4	--	3	25	75	100
MCA 503	Artificial Intelligence	4	--	3	25	75	100
MCA 504	Internet Technology and Programming	4	--	3	25	75	100
MCA 505	Elective-2	4	--	3	25	75	100
MCA 506	Software Lab-5 (Internet Programming and Seminar)	--	6	--	100	--	100
	Total	20	6	--	225	375	600

1 Period is 1hour duration

SYLLABUS

MCA 501 DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS

Intoduction: Algorithms – Design strategies – Concepts in analysis of algorithms – Time & space complexity – apriori & posteriori analysis – Asymptotic notation – Profiling.

Divide & conquer Method: Divide & conquer approach, general strategy – finding maximum & minimum , merge sort & quick sort examples, selection sort strassen's Matrix Multiplication.

Greedy & Dynamic Programming Methods:- General strategy – optimal storage on tapes, PRIM'S & KRUSKAL'S algorithm for minimum cost spanning tree – knapsack problem – Dynamic programming :- general strategy – Multistage graph problem – all pairs shortest path problem - Traveling salesman problem.

Backtracking, Branch & Bound Techniques:- General strategy – 8- queens problem – sum of subsets Branch and Bound :- The methods of LC search – traveling sales person.

Lower Bound theory & NP hard problems:- Lower bound techniques, comparison tree for sorting & searching – Concept of NP hard & NP Completer problems.

References:

1. Fundamentals of computer Algorithms – Horowitz & Salini(Galgoni Pub).
2. The design & analysis of Computer algorithms – Aho A.V.Hopeaft J.E.Ullman J.D(Addision Klesly Pub)
3. Fundamentals of algorithms – Gill Brarsaed, Paul Brachly PHI

MCA 502 :SOFTWARE ENGINEERING

PHILOSOPHY AND OVERVIEW : Definitions and taxonomy- what is software what is Engineering; Aims of software Engineering software crisis; software metrics .

SOFTWARE DEVELOPMENT PARADIGM-Water –Fall Model; prototyping iterative enhancement spiral model;4GL Technologies

CASE METHADODOLOGY:-Functional requirement analysis and collections, Qualitative requirements ;principles of analysis; prototyping as an analysis tool or method ; Representation schemes and specifying the result of analysis, Different analytical frame works and their applicability- structured analysis, object oriented analysis ;data oriented analysis verification and validation of the analysis (VandV); Introduction to CASE tools and their utility in analysis and representation. Detailed design and implementation Design strategies; Design tools and diagramming aids; Design concepts ,effective

modular design ;design metrics for evaluating a design ;Architectural design; Data flow oriented design; user I/F design real time design, CASE tools and system design,verifying and validating the product design

SOFTWARE PROJECT MANAGEMENT:-Software Management Activities ; Software Management structures; programmer productivity ;option analysis, project milestones; work definitions Allocation and assignments ;projects scheduling; estimating efforts and lines scales ;Algorithmic cost modeling **THE COCOMO MODEL**

SOFTWARE QUALITY:-Criteria for software quality; S/W reliability ;software standards ,software metrics ;software validation; testing techniques and strategies; software Maintenance ;software configuration management

CASE TOOLS AND MANAGERMENTS:-Project Management tools; Documentation tools ;Analysis and Design tools ; Programming tools ;Integration and testing tools; project tools; Maintenance tools; Integrated CASE Environments

Text book:

- 1.Software Engineering .a practitioner's Approach,pressman.Me Graw Hill
- 2.Fundamentals of S/w Engg—Ghezzi,Jazayer's and Mandrioli(PHI)

Reference:

- 1.S/w Engg- Design Raliability and Management
Martin .L.Schooman(MC.Graw Hill)
- 2.S/w Engg concepts –Richard Fairley(Me Graw Hill)

MCA 503 . ARTIFICIAL INTELLIGENCE

INRODUCTION TO ARTIFICIAL INTELLIGENCE:- architecture of artificial Intelligence system

PROBLEM SOLVING:-Problems and problem spaces .Problem definitions- production systems-control strategies-search strategies, problem characteristics –production system characteristics.

KNOWLEDGE REPRESANTATION SCHEMES:- Propositions and predicate logic – syntax and semantics-properties of WFFS- conversion to clausal form –Inference rules-resolution-Non Deductive Inference methods-Representation using rules. Associative Network .Frames and object oriented representation of knowledge .Associative networks –Frame structures, conceptual dependencies and scripts overview of object oriented systems, objects, classes , messages and methods

KNOWLEDGE ORGANISATION AND MANIPULATION:-Search and control strategies- examples of search problem-Uniformed or Blind search problem- informed search-searching AND OR graphs. Matching Techniques- structures used for Matching-measures for matching, Knowledge organization and management-Indexing and retrieval techniques-Integrating knowledge in memory-Memory organisation system.

Knowledge Acquisition: General concept in knowledge Acquisition – Types of learning, Difficulty in knowledge Acquisition, General learning model performance measures.

Early work in machine learning- perceptrons -checker playing example learning
Automata- Genetic Algorithms Intelligent Editors. Analogical and
Explanation Based Learning .Analogical Reasoning and learning,-Examples, Explanation
Based Learning.

AI Application: Natural Language Processing-Overview of Linguistics, Grammers and
Languages, Basic Parsing Techniques, semantic analysis and Repr structures Natural
Language generation ,Natural Language system. Pattern Recognition-Recognition and
classification process- classification patterns recognizing and understanding speech.
Perception- solving perceptual problem.

Expert system Architectures- Rule based system, Non production system, Dealing with
uncertainty, knowledge acquisition and validation, knowledge system Building tools.

A.I Language: Introduction to LISO/PROLOG

Text Books

1. Introduction to A.I and Expert system D.W.Patterson,Prentice Hall of India.
2. Artificial Intelligence,Elaine Rich,Mc GrawHill

References:

1. principles of Artificial Intelligence, Nilson.N.J,Springer verlag
2. Introduction to Artificial Intelligence,Charvanak.E and mc DermotD, Addison
Wesley.

MCA 504-INTERNET TECHNOLOGY AND PROGRAMMING

Internet:- Definition, TCP/IP protocol architecture, operation of TCP/IP. Principles of
Internet working, connection less internet working, the internet protocol(IP) , IP services,
IP protocol, IP address, ICMP, routing protocols, Border Gate Protocol, IPNG(Ipv6).

The internet transport protocols- TCP,TCP services, TCP protocol. TCP
connection management, UDP.

CONNECTION TO INTERNET-Internet services provider, shell account/(TCP/IP)
account connectivity, SLIP/PPP protocols, Getting an internet account.

DISTIBUTED APPLICATION

E-mail- Architecture and services sending E=mail, Reading Email, and Message
Formats.

World Wide Web:-definition, Linking of documents in WWW, URL, DNS,
major categories of websites over internet-institutional, business, Tourism industry,
Entertainment industry websites. Browsers, Browsing the web, Getting and viewing the
document , searching for information, HTTP, study of HTML, Writing a web page in
HTML, study of Java-Java applets-Design of a simple GUI- To access a file from a
website.

Multimedia: Audio and audio standards, Video, Video standards –JPEG. MPEG, video
on demand, Video server.

References:-

Computer Networks-TanenbaumPrentice Hall 3ed Edn.

Data and computer Communication-William Stallings, Prentice Hall.
 Internet—M.K.Goel
 Java API documentation(vo.1) -James Gosling,
 Frank Yelling &the Jave Team(Addison wes)
 ” ” (Vol.2) - ”
 Java Programming - James Gosling.
 Java: The Complete reference-Patrick Naughton &Herbert Schillt, Tata Mc.Graw Hill.

MCA-505:IMAGE PROCESSING AND PATTERN RECOGNITION

(Elective-11)

Digital Image Processing: Introducing, Digitalizing and Displaying, Description of Images ,Sampling and Quantization Image models, redundancy and its removal, review of delta, PCM, DPCM, Modems, Predictive and Adaptive coding. Theoretical considerations. Processing Sampled data., Image compression, Restoration, Segmentation and measurements, Transform Techniques- Fourier, Hadamard, Sine, Cosine transforms, Image Enhancement.

Pattern Recognition: Geometrical and statistical theory of pattern recognition and interference characterization Extraction, Generalization. Parametric and Non parametric methods. Clustering fearature extraction. applications character recognition, finger print identification., speech recognition.

REFERENCES:

- 1.Digital image processing-Konmeth gastlement – Prentice Hall inc ,1979.
- 2.Computer methods in image analysis Agrawal J.K.&others 1977-IEEE Press.
- 3.Pattern recognition-J R Ullmann,Butter worths,London,1973.
- 4.Digital Images Processing-Gonselves,Addison Wesley,Messachusetts,1987.
- 5.Digital picture processing –Rosefield and Kalc,Acasemics Pres,1982(vol .2 edition 2)
6. Pattern classification and scene analysis-Duda and Hart,JW,NY.
- 7.Fundamentals of digital image processing-Anil k.jain(phi)
- 8.Image processing-M A.Sid,Mc graw hill.

MCA-505 CLIENT SERVER SYSTEMS AND APPLICATIONS (Elective II)

Introduction: Client –server computing Vs Heterogeneous computing ,cross plat form computing, distributed computing. the costs pf client –server computing. Advantages and disadvantages. client server databases

Design : Fundamentals of client server design managing the interaction in client and server, communications techniques protocols and client server interaction protocols. Preparing applications for client server. Optimizing applications for client sever ,examples client server implementations. Request acceptance dispatching, execution of requests, client server interaction using messages

Multitasking: Multi programming Vs Multitasking, multiprocessor, advantages and draw backs of multiple processes, child and parent process, case study novel netware and windows NT. Developing server applications ,threads ,server communications ,model.

Synchronization: Scheduling implementations, processing queues. pre emptive systems, critical sections, mutual exclusion, semaphore implementations in NT and Netware.

Communications: Network communication, interprocess communication, building portable client server applications.

References:

- 1.Client server computing-dawna travis dewier-mc graw hill
- 2.Developing client server application-
- 3.Guide to client server data base-Joe saleni-BPB
- 4.Client Server strategies-David vaskevitch-galgottia
- 5.Novell’s guide to client server application & Architecture-Jeffrey D.SCHqnk-novell Press

MCA –505 NEURAL NETWORKS (Elective –II)

Introduction: Principles, artificial neuron ,activation functions, single layer and multilayer networks, training artificial neural networks, Perception, Representation, Linear separability, Learning Training Algorithms.

Back Propagation: Training algorithm, applications, network configurations, Network paralysis, local minimum, temporal instability.

Counter Propagation Networks: Kebenon layer, Training the cohenen layer, pre initializing the wright vectors, statistical properties, Training the Grosbery layer ,full counter propagation network-Application.

Statistical method: Boltzmann's Training cache training Artificial specific heat methods, application to general non-linear optimization problems.

Hopfield nets: Recurrent networks , stability, Application, Thermodynamic system, statistical Hopfield networks, Bi-directional associative memories, continuous BAM, Adaptive resource theory, Architecture classification , Implementation

Text Book

Neural Computing Theory and Practice-Philip.D.Wasserman

Reference:

- 1.Neural Networks - Simon Hayking
- 2.Adaptive Pattern Recognition & Neural Networks- Pay Y.H
- 3.An Introduction to Neural Computing –Chapman & Hall

MCA 505 MULTIMEDIA SYSTEMS AND PROGRAMMING (Elective II)

Introduction: Definition of multimedia, multimedia, hardware, software, applications & software environments. Media types analog and digital video, digital audio, music and animation , Analog and Digital Video memory storage

Building Blocks: Text-hyper text sound –sound cards, standards. Image-Image types ,image compression, RLE, LZW, JPEG, MPEG, Fractal and wavelet compression, Image file types, Animation capture and play back techniques(basic ideas only)

Multimedia Environments : The compact disc family ,CD interactive, Digital Video interactive ,multimedia PC and Microsoft multimedia extensions

Multimedia Programming: Frame work: Overview ,Media classes, transform classes, Format classes and component classes problems related to programming composition ,synchronization. Interaction, Database integration.

Advanced Multimedia: Moving pictures, techniques realistic image synthesis ,virtual reality. Full motion digital video ,video capture techniques, multimedia networks, desktop video conferencing, Future multimedia.

Reference:

- 1.Multimedia Programming Objects,environments and frame work-Simon J Gibbs. M Dionysios,Adison Wesley
- 2.Multimedia making it work –Tay Van Ghan and asborne ,Tata Mc.Graw Hill
- 3.Multimedia Bible-Winn Lrosch ,Sams
- 4.Multimedia Procedures Bible –Ron Goldberg,comdex.
- 5.Multimedia power Tools –Peter Jellani,randome house Electronic Pub.
- 6.Multimedia Computer –Mathew E.Hodge & Russel M Sasnett,Adison Wesley.

