ORDINANCE No. 85

MASTER OF COMPUTER APPLICATION (M.C.A.) SEMESTER EXAMINATION.

(*Approved in Faculty of Science held on 2002***)**

1. There shall be the following six examinations for the Degree of Master in Computer Applications as stated below :-
   Master of Computer Applications (First Semester)
   Master of Computer Applications (Second Semester)
   Master of Computer Applications (Third Semester)
   Master of Computer Applications (Fourth Semester)
   Master of Computer Applications (Fifth Semester)
   Master of Computer Applications (Sixth Semester)

2. i) MCA First, Second, Third, Fourth and Fifth Semester Examination will comprise of
      (a) Written Papers (b) Sessional Work and (c) Laboratory Work.

   ii) MCA Sixth Semester Examination will comprise of (a) Project Work (b) Sessional Work.

   iii) The examination in written papers shall be held at the end of each semester according to the schemes of Examination given in the appendix 'A'. The detailed scheme of examination and syllabus as may be in force from time to time, shall be published by the University.

3. (a) The duration of the academic years of MCA will be divided into six semesters as follows :-

First, Third and Fifth Semester	i) 1st July to 30th November ii) Examination for written papers at the end of the Semester : 11th December to 30th December.
Second and Fourth Semester	i) 1_{st} January to 30_{th} April ii) Examination for written papers at the end of the Semester : 11th June to 30th June.
Sixth semester	i) 1st January to 30th June ii) Examination for Project Evaluation at the end of Semester.

   (b) After the semester Examination, a candidate may be provisionally admitted to the higher semester till the declaration of the lower semester result. She/he will be permitted to continuing the higher semester only if she/he fulfill the provision of Para 13.

4. A candidate seeking admission to the Master of Computer Applications (MCA) Course should be Graduate of any recognized Indian University or Foreign University or Institute recognized by the concerned University as equivalent thereto. Bachelor's Degree must be of minimum three year duration in any discipline with Mathematics as compulsory or additional subject at (10+2) level or BCA. The admission procedure shall be as decided by University from time to time.

5. Any deficiency in attendance at the course of study for the examination may be condoned subject to a maximum of 15% in accordance with the provisions of the Ordinance No. 6 relating to condo nation of deficiency in attendance.

6. The candidates disobeying the instructions of the Center Superintendent in the Examination Centre of resorting to any sort of unfair means at the examination shall be dealt with according to the provisions of Ordinance No. 5 and 6 of the University and any decision taken by the University in this regard will be final.

7. The scheme of examination for Master of Computer Applications will be prescribed by the Board of Studies [Computer Science], Pt. Ravishankar Shukla University, Raipur from time to time.

8. In case of an examinee for Master of Computer Applications, who is not a regular student of the college, the sessional marks obtained during the period in which he prosecuted the course for the examination in a college shall be taken into account for the purpose of determining his result at the examination.

9. The minimum passing marks which an examinee shall obtain in each subject shall be (i) 40% in each theory paper (ii) 60% in each sessional and (iii) 50% in each laboratory test/viva examination/project evaluation and (iv) 50% of the total aggregate.

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10. A candidate shall be eligible to appear in the succeeding semester examination only after having passed the preceding semester examination provided that if a candidate fails in not more than two (theory/practical) papers in any one-semester examination, he will be promoted to the next semester course. A candidate failing in not more than two (theory/practical) paper of any semester shall be eligible to take examination of the paper in which he has failed along with the current semester examination. If a candidate fails in more than two (theory/practical) papers in any one-semester examination he/she will be year back and he/she will be appearing in the failing papers only. He/She shall be eligible to carry the backlog of maximum two papers of each semester but in any case he/she shall not be permitted to carry backlog of more than four papers (theory/practical) at a time. However in any case the result of Sixth Semester Examination of MCA shall not be declared unless he/she has fully cleared all the previous semesters including the project work.

11. (a)   There shall be no classification of the examinees successful in each semester of the examination.
    (b)   The classification of examinees after having passed all the six semester examinations shall be made as follows
        i)   The examinees who have obtained 75% or more marks in the aggregate considering all the six semester taken together shall be placed in First Division with Honours.
        ii) The examinees who have obtained 65% or more marks but less than 75% in the aggregate considering in all the six semester taken together shall be placed in the First Division.
        iii) The examinees who have obtained less than 65% marks and more than 50% in the aggregate considering all the six semester taken together shall be placed in the Second Division.
        iv) An examinee must secure 50% of the total aggregate to be declared successful in any semester examination.

12. (a) As soon as possible after the examination the Executive Council shall publish a list of successful examinee arranged in the three divisions. The names of the examinee who obtain the first ten places in First Division being arranged in order of Merit.

    (b) A candidate who is successful at the sixth semester of the MCA examination shall be awarded the MCA Degree in the form prescribed by the Academic Council in this behalf.

13. SCRUTINY OF MARKS EVALUATION : A candidate whose result has been declared, may apply to the Registrar for the scrutiny of his/her marks in written papers and the rechecking of his result, or for revaluation of his answer books but not more then to within 30 days of declaration of the result. According to the provisions laid down in Ordinance No 5 & 6. The fee for scrutiny of marks and for revaluation and retotaling shall be as per University rules.

Weightage of marks in each semester are as follows :

Semester	Weightage of Marks
First Semester	5%
Second Semester	5%
Third Semester	15%
Fourth Semester	15%
Fifth Semester	30%
Sixth Semester	30%

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MASTER OF COMPUTER APPLICATIONS

FIRST SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA101	Object Oriened Programming With 'C++'	3	2	-	4	100	50	-	150	40	30	-	70
MCA102	Mathematical Foundations Of Computer Science	3	2	-	4	100	50	-	150	40	30	-	70
MCA103	Essentials of Information Technology	3	2	-	4	100	50	-	150	40	30	-	70
MCA104	Data Structure through algorithms With 'C'	3	2	-	4	100	50	-	150	40	30	-	70
MCA105	Communication Skill	3	2	-	4	100	50	-	150	40	30	-	70
MCA106	Programming Lab 'C++"	-	-	3x2	3	-	25	100	125	-	15	50	65
MCA107	Data Structure through Algorithms "Lab"	-	-	3x2	3	-	25	100	125	-	15	50	65
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

SCHEME OF TEACHING AND EXAMINATIONS   2014-2015
MASTER OF COMPUTER APPLICATIONS

SECOND SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA201	Program Based Numerical Analysis in C++	3	2	-	4	100	25	-	125	40	15	-	55
MCA202	Computer System Architecture	3	2	-	4	100	25	-	125	40	15	-	55
MCA203	RDBMS & ORACLE	3	2	-	4	100	25	-	125	40	15	-	55
MCA204	Operating System	3	2	-	4	100	25	-	125	40	15	-	55
MCA205	Financial Management & Accountancy	3	2	-	4	100	25	-	125	40	15	-	55
MCA206	Programming Lab on MCA203	-	-	3x2	3	-	50	100	150	-	30	50	80
MCA207	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA208	Common Software / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA209	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

SCHEME OF TEACHING AND EXAMINATIONS   2014-2015
MASTER OF COMPUTER APPLICATIONS

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA301	Programming in VB & VC++	3	2	-	4	100	25	-	125	40	15	-	55
MCA302	Computer Network & Data Communication	3	2	-	4	100	25	-	125	40	15	-	55
MCA303	Operation Research	3	2	-	4	100	25	-	125	40	15	-	55
MCA304	A.I. & Expert System	3	2	-	4	100	25	-	125	40	15	-	55
MCA305	System Analysis Design & MIS	3	2	-	4	100	25	-	125	40	15	-	55
MCA306	Programming Lab VB/VC++	-	-	3x2	3	-	50	100	150	-	30	50	80
MCA307	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA308	Common Software / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA309	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

FOURTH SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA401	Programming in Java	3	2	-	4	100	25	-	125	40	15	-	55
MCA402	Software Engineering	3	2	-	4	100	25	-	125	40	15	-	55
MCA403	Interactive Computer Graphics	3	2	-	4	100	25	-	125	40	15	-	55
MCA404	Unix / Linux	3	2	-	4	100	25	-	125	40	15	-	55
MCA405	Elective : 1. Compiler Designing 2. Advanced Computer Architecture	3	2	-	4	100	25	-	125	40	15	-	55
MCA406	Programming Lab JAVA	-	-	3x2	3	-	50	100	150	-	30	50	80
MCA407	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA408	Common Software / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA409	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

SCHEME OF TEACHING AND EXAMINATIONS   2014-2015
MASTER OF COMPUTER APPLICATIONS

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA501	Advanced Programming Tools - **Java**	3	2	-	4	100	25	-	125	40	15	-	55
MCA502	Introduction to .Net Technology & C#	3	2	-	4	100	25	-	125	40	15	-	55
MCA503	Data Mining and Data Warehouse	3	2	-	4	100	25	-	125	40	15	-	55
MCA504	Electives : 1. **Soft Computing** 2.Simulation & Modeling 3.OOAD 4.Introduction to I SO & CMM	3	2	-	4	100	25	-	125	40	15	-	55
MCA505	Electives : **1.** Satellite & Mobile Communication 2. Embedded Programming 3. Robotics 4. Artificial Neural Network & fuzzy logic	3	2	-	4	100	25	-	125	40	15	-	55
MCA506	Programming Lab	-	-	3x2	3	-	50	100	150	-	30	50	80
MCA507	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA508	Common Software/Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA509	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	20	26	500	300	200	**1000**	200	180	100	**480**

MASTER OF COMPUTER APPLICATIONS

<u>SIXTH SEMESTER</u>

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Sessional Marks of Project Work	Project Viva-Voce	Pr	Total	Sessional Marks of Project Work	Project Viva-Voce	Pr	Total
MCA601	System Development Project (System Design & Implementation)	5	-	30	20	200	200	-	400	120	100	-	220
	TOTAL	5	-	30	20	200	200	-	400	120	100	-	220

SCHEME OF TEACHING AND EXAMINATIONS   2014-2015
MASTER OF COMPUTER APPLICATIONS

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA101	Object Oriened Programming With 'C++'	3	2	-	4	100	50	-	150	40	30	-	70
MCA102	Mathematical Foundations Of Computer Science	3	2	-	4	100	50	-	150	40	30	-	70
MCA103	Essentials of Information Technology	3	2	-	4	100	50	-	150	40	30	-	70
MCA104	Data Structure through algorithms With 'C'	3	2	-	4	100	50	-	150	40	30	-	70
MCA105	Communication Skill	3	2	-	4	100	50	-	150	40	30	-	70
MCA106	Programming Lab 'C++"	-	-	3x2	3	-	25	100	125	-	15	50	65
MCA107	Data Structure through Algorithms "Lab"	-	-	3x2	3	-	25	100	125	-	15	50	65
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

Object Oriented Programming with 'C++'

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Language Fundamental

Advantages of OOP, The Object Oriented Approach, and Characteristics of object oriented languages- Object, Classes, Inheritance, Reusability, and Polymorphism. OMT.

Overview of C++: History of C++, Data Types - int, float, char, double, void. Constants and Variables. Operators and Expressions. Control constructor: if , if-else, nested if-else, while(), do-while() , for(;;), break, continue, switch, goto. Storage class.

UNIT - II : Structure, Function & Array

Structures : A Simple structures ,specify the structures, Defining a structure variable, Accessing structures member, Enumeration data type.

Function: Function Declaration, Calling Function, Function Defines, Passing Argument to function, Passing Constant, Passing Value, Reference Argument, Passing struct variable, Overloaded Function, Inline Function, Default Argument, return statement, returning by reference.

Array: Defining array, array element, initiation array, multi dimensional array, passing array to function.

UNIT - III : Object Classes and Inheritance

Object and Class, Using the class, class construct, class destructors, object as function argument, struct and classes , array as class member, operator overloading. Type of inheritance, Derive class, Base class. Access specifier: protected. Overriding, member function, String, Templates.

UNIT - IV : Pointers

Pointers : & and * operator pointer variables, pointer to void, pointer and array, pointer and function, pointer and string, memory management, new and delete, pointer to object, pointer to pointer.

UNIT - V : Virtual Function and File & Stream

Virtual Function : Virtual Function, Virtual member function, accesses with pointer, Late binding, pure virtual function, Friend function, Friend class, static function, this pointer.

File and Stream : C++ streams, Stream class, string I/O, char I/O, Object I/O, I/O with multiple object, File pointer, Disk I/O.

RECOMMENDED BOOKS :

1. Object Oriented Programming   : McGregor and Sykes S A, 1992 Van Nostrand.
2. The C++ Programming Language   : Strustrp B,Addision Wasley.
3. Object Oriented Programming in C++   : Lafore R, Galgotia Publications.
4. Introduction to Object Oriented Programming : Witt KV, Galgotia Publications.
5. Object Oriented Programming   : Blaschek G, Springer Verlag
6. Object Data Management   : Cattel R, Addison Wasley.

FIRST SEMESTER : MCA-102

Mathematical Foundation Of Computer Science

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Mathematical Logic, Sets Relations and functions

Mathematical Logic : Notations, Algebra of Propositions & Propositional functions, logical connectives, Truth values & Truth table Tautologies & Contradictions, Normal Forms, Predicate Calculus, Quantifiers.

Set Theory: Sets, Subsets, Power sets, Complement, Union and Intersection, De-Morgan's law Cardinality, relations: Cartesian Products, relational Matrices, properties of relations equivalence relation functions: Injection, Surjection, Bijection, Composition, of Functions, Permutations, Cardinality, the characteristic functions recursive definitions, finite induction.

UNIT – II : Lattices & Boolean Algebra

Lattices : Lattices as Algebraic System, Sub lattices, some special Lattices(Complement, Distributive, Modular).

Boolean Algebra : Axiomatic definitions of Boolean algebra as algebraic structures with two operations, Switching Circuits.

UNIT – III : Groups Fields & Ring

Groups : Groups, axioms, permutation groups, subgroups, co-sets, normal subgroups, free subgroups, grammars, language).

Fields & Rings : Definition **,** Structure, Minimal Polynomials, Irreducible Polynomials, Polynomial roots & its Applications.

UNIT - IV : Graphs

Graphs : Simple Graph, Multigraph & Psuedograph, Degree of a Vertex, Types of Graphs, Sub Graphs and Isomorphic Graphs, Operations of Graphs, Path, Cycles and Connectivity, Euler and Hamilton Graph, Shortest Path Problems BFS(Breadth First Search, Dijkastra's Algorithm, Representation of Graphs, Planar Graphs, Applications of Graph Theory.

UNIT - V : Trees

Trees : Trees, Properties of trees, pendant vertices in a tree, center of tree, Spanning tree, Binary tree, Tree Traversal, Applications of trees in computer science.

BOOKS RECOMMENDED :

1. A text book of Discrete Mathematics – By Swapan Kumar Sarkar.(S.Chand & company Ltd.).
2. Discrete Mathematical structure with - By J.P Trembly & R.P. Manohar.
   applications to computer science
3. Discrete Mathematics   -By K.A Ross and C.R.B writht.
4. Discrete Mathematics Structures   -By Bernard Kohman & Robert C. Bushy.
   for computer science
5. Discrete Mathematics   -By Seymour Lipschutz Mare Lipson. Tata McGraw-Hill Edition.

FIRST SEMESTER : MCA-103
Essentials Of Information Technology

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Introduction –

Basics concept of IT, concept of data and information, **History** of computer, **Generations** of Computers, organization of computers, Input and Output devices, storage devices, Data processing and file organization.

UNIT - II : Software concept -

Software and its need, Types of Software- System software, application software; Utility Programs; compilers, interpreters and Assemblers; Linker and Loader; Debugger; Operating system, elementary command of DOS, UNIX and WINDOWS (file handling directory, management and general purpose user interfacing command).

UNIT – III : Computer languages –

Introduction of Programming Languages, Types of Programming Languages, Generations of Programming Languages, Programming Paradigms, ,general purpose and concept of oop and SQL, Functional Programming; Process oriented Programming.

UNIT - IV : Communication and network technology -

Communication process, Communication and system elements, communication mode (Analog and Digital, Synchronous and Asynchronous, Simplex, Half duplex, Full duplex, circuit switching), communication media (Speed and capacity, twisted pair, coaxial cable, optics, wireless), communication protocols, Computer Network, Types of Network, Topology, protocols (ISO/OS, reference model, TCP/IP), Medias- NIC,NOS, Bridges, HUB, Routers, Gateways.

UNIT - V : Internet

Technical foundation of Internet, Internet Service Provider, Anatomy of Internet, ARPANET and Internet History of World Wide Web, Services Available on Internet; Basic Internet Terminologies, Net Etiquette, Applications of Internet. Client server computing, Distributed Computing, Domain naming system, DNS Server, Internet Security – Fire walls, Encryptions etc.

Internet Applications - E-mail, WWW, E-commerce, Teleconferencing,

Application of Information Technology - State of Art Application of IT, Application of IT in business, Industry, home, education and training entertainment, science and engineering and medicine.

RECOMMENDED BOOKS :
1. Fundamental of Computer   - V.Rajaraman
2. Computer today   - Sanders D.H
3. Information technology today   - S.Jaiswal

FIRST SEMESTER : MCA-104
Data Structure Through Algorithms

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Introduction and Preliminaries -
Introduction, Basic terminology, Elementary data organization, Data structure, Data structure operation, Algorithms : complexity , time-space Tradeoff.. Mathematical Notation and functions, Algorithmic Notation, Control Structures, Complexity of Algorithms, Sub algorithms, Variables, Data Type.

UNIT - II : String Processing, Arrays, Records And Pointers –
Basic Terminology, Storing String, Character Data Type, String Operations, Word Processing, Pattern Matching Algorithms. Linear Array, Representation of linear Array in Memory, Traversing Linear Arrays, Inserting And Deleting, Sorting; Bubble Sort, Searching; Liner Search, Binary Search, Multidimensional Array, Pointers; Pointer Array, Records; Record Structures, Representation of Records in Memory; Parallel Arrays, Matrices, Sparse Matrices.

UNIT - III : Linked Lists, Stacks, Queues, Recursion -
Linked list, Representation of linked lists in memory, Traversing a linked list, Searching a linked list, Memory Allocation; Garbage Collection, Insertion into a linked List, Deletion from a Linked List, Header Linked List, Two- Way Linked Lists. Stacks, Array Representation of Stack, Arithmetic Expressions; Polish Notation, Quick sort, an application of Stacks, Recursion, Tower of Hanoi, Implementation of Recursive Procedures by Stacks, Queues, Dequeues, Priority Queues.

UNIT - IV : Trees & Graphs -
Binary Trees, Representing Binary Trees in Memory, Traversing binary tree, Traversal Algorithms using stacks, header nodes; threads, Binary Search Tree, Searching and Inserting in Binary Search Tree, Deleting in Binary Search tree, Heap; Heap sort, Path Lengths; Huffmans Algorithms, General Tree. Graph Theory Terminology, Sequential Representation of Graph; Adjacency Matrix, Path Matrix, Linked Representation of Graph.

UNIT - V : Sorting And Searching –
Sorting, Insertion Sort, Selection Sort, Merging, Merge Sort, Radix Sort, Searching and data modification, hashing.

BOOKS RECOMMENDED :

1. Data Structure   **- Seymour Lipschutz (Schaum's Series).**
2. Data Structure & Program Design   **- Robert L. Kruse, 3rd Ed., Prentice Hall.**

FIRST SEMESTER : MCA-105
Communication Skills

Max Marks : 100   **Min Marks : 40**

Meaning and Process of communication, importance of effective communication, communication situation and communication skills, barriers to communicate, objective 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 prepared for oral presentation, conditional presentation, developing communication skill.

Interview - how to face and how to conduct, preparation of bio-data, seminars, pair, bibliography, graph discussion, official correspondence.

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

BOOKS RECOMMENDED :
1. Essentials of business   - by Rajendra Pal, & J.S.Karlahalli & S.Chand publication
   Communication
2. Business Communication   - by U.S.Rai & S.H.Rai , Himalaya publishing house,
3. Writing technical paper   - by Menzal nad, D.H.Jones,McGraw Hill 1961
4. Business communication, Strategy and skill,   -Pentice Hall, New Jersey.

SCHEME OF TEACHING AND EXAMINATIONS   2014-2015
MASTER OF COMPUTER APPLICATIONS

SECOND SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA201	Program Based Numerical Analysis in C++	3	2	-	4	100	25	-	125	40	15	-	55
MCA202	Computer System Architecture	3	2	-	4	100	25	-	125	40	15	-	55
MCA203	RDBMS & ORACLE	3	2	-	4	100	25	-	125	40	15	-	55
MCA204	Operating System	3	2	-	4	100	25	-	125	40	15	-	55
MCA205	Financial Management & Accountancy	3	2	-	4	100	25	-	125	40	15	-	55
MCA206	Programming Lab on MCA203	-	-	3x2	3	-	50	100	150	-	30	50	80
MCA207	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA208	Common Software / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA209	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

SECOND SEMESTER : MCA - 201
Program Based Numerical Analysis

Max. Marks: 100   **Min Marks:40**
NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. **Simple/Scientific calculators are allowed.**

UNIT – I : Solution of Polynomial and Transcendental Algebraic Equations
Bisection method, Regulafalsi method & Newton's method, Solution of Cubic & Biquadrate Equation, Complex roots of polynomial equations.

UNIT – II : Simultaneous Equations and Matrix
Gauss-Jordan method, Cholesky's method, Reduction to lower or upper Triangular forms, Inversion of matrix, method of partitioning, Characteristics equation of matrix, Power methods, Eigen values of matrix, Transformation to diagonal forms.

UNIT - III : Curve-Fitting from Observed Data
Divided difference table for evenly or unevenly spaced data, polynomial curve-fitting - Newton's, Gauss and Langranges form of interpolation and Divided Differences, method of least square for polynomials,.

UNIT - IV : Numerical Differentiation and Integration
Forward and Backward differential operators, Newton - cotes integration formula: Trapezoidal Rule, Simpson's Rule, Boole's Rule, Weddle Rule, Legendre's rule, method of weighted coefficients.

UNIT - V : Solution of Differential Equations
Numerical Solution of ordinary differential equations, one step method, Taylor's Series, Predictor-Corrector Method, Euler's Method, Runga-Kutta Method, Milne's method.

BOOKS RECOMMENDED

1. *Garewal*   :   Numerical methods
2. *Gupta & Mallic*   :   Numerical Methods
3. *Hamming R.W.*   :   Numerical methods for scientist & Engineers. (McGraw Hill)
4. *Conle S.D.*   :   Elementary numerical analysis
   Carl De Boor   (International Book Company London)
5. *Jain M.K.*   :   Numerical methods for Science and Engineering
   Iyengar S.R.K   Calculations (John Willey & Sons)

SECOND SEMESTER: MCA – 202
Computer System Architecture

Max Marks: 100   **Min Marks: 40**
NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Representation of Information

Number system, Integer & Floating point representation Character code (ASCII, EBCDIC), Error Detect and Correct code, Basic Building Blocks, Boolean Algebra, MAP Simplification, Combination Blocks: Gates, Multiplexers, Decoders etc. , Sequential building block: flip-flop, registers, counters, ALU, RAM etc.

UNIT - II : Register transfer language and micro operations

Register Transfer Language, Register Transfer, Concepts of bus, Bus and Memory transfers, data movement along registers, a language to represent conditional data transfer, data movement from its memory, arithmetic and logic Micro operations Register Files, Realization of Gates through transistors, IC fabrication.

UNIT - III : Basic Computer Organization and Design

Instruction codes, Computer Instructions, Timing and Control, Instruction Cycle, Execution of Instruction, Memory Reference Instructions, Input-Output and Interrupt, Design of Basic Computer.

UNIT - IV : Computer Software

Programming Language, Assembly Language, Assembler, Program Loops, Input /Output Programming, System Software. Central Processor Organization: - Processor Bus Organization, Arithmetic Logic Unit, Stack Organization, Instruction Formats, Addressing modes, Data transfer and Manipulation, Program Control, Microprocessor Organization, Parallel Processing.

UNIT - V : Input –Output & Memory Organization

Input –Output Organization : Peripheral Devices, Input/output Interface, Asynchronous Data Transfer, Direct Memory Access (DMA), Priority Interrupt, Input-Output Processor, Multiprocessor System Organization, and Data Communication Processor**.**

Memory Organization : Auxiliary Memory, Micro Computer Memory, Memory Hierarchy, Associative Memory, Virtual Memory, Cache Memory, Memory Management Hardware.

BOOKS RECOMMENDED:

1.	Computer System Architecture	- M. Morris Mano (PHI).
2.	Digital Computer Electronics	- Malvino.
3.	Digital Computers and Logic Design	- M.Morris Mano (PHI).
4.	Structured Computer Organization	- Andrew M. Tanenbanm (PHI).
5.	Modern Digital Electronics	- R.P.Jain(Tata Mcgraw-Hill)
6.	Fundamental of microprosessor and Microcomputer -6th Edition	- B. Ram

SECOND SEMESTER : MCA - 203
RDBMS & ORACLE

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Overview of Database Management -

Data, Information and knowledge, Increasing use of data as a corporate resource, data processing verses data management, file oriented approach verses database oriented approach to data management; data independence, database administration roles, DBMS architecture,

different kinds of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages. Data models: network, hierarchical, relational. Introduction to distributed databases, Client/Server databases, Object-oriented databases, Object-relational databases, Introduction to ODBC concept.

UNIT - II : Relational Model & Relational Algebra -
Entity - Relationship model as a tool for conceptual design-entities, attributes and relationships. ER diagrams; Concept of keys; Case studies of ER modeling Generalization; specialization and aggregation. Converting an ER model into relational Schema. Extended ER features, Introduction to UML, Representation in UML diagram (Class Diagram etc.).

Relational Algebra: select, project, cross product different types of joins (inner join, outer joins, self join); set operations, Tuple relational calculus, Domain relational calculus, Simple and complex queries using relational algebra, stand alone and embedded query languages.

UNIT - III : SQL and Relational Database Design
Introduction to SQL constructs (SELECT…FROM, WHERE… GROUP BY… HAVING… ORDERBY….), INSERT, DELETE, UPDATE, DROP, VIEW definition and use, Temporary tables, Nested queries, and correlated nested queries, Integrity constraints: Not null, unique, check, primary key, foreign key, references, Triggers. Embedded SQL and Application Programming Interfaces. Normalization concept in logical model; Pitfalls in database design, update anomalies: Functional dependencies, Join dependencies, Normal forms (1NF, 2NF, 3NF). Boyce Codd Normal form, Decomposition, Multi-Valued Dependencies, 4NF, 5NF. Issues in physical design; Concepts of indexes, File organization for relational tables, De-normalization, Clustering of tables, Clustering indexes

UNIT - IV : PL/SQL -
Introduction to PL/SQL variables – literals – data types – advantages of   PL/SQL; Control statements **:** if ; iterative control – loop, while, for , goto ; exit when; Cursors : Types – implicit, explicit – parameterized cursors – cursor attributes; Exceptions: Types – internal , user-defined , handling exceptions – raise statement; PL/SQL tables and records: Declaring PL/SQL tables - referring PL/SQL tables, inserting and fetching rows using PL/SQL table, deleting rows; records - declaration of records - deleting records; Sub programs: Functions - procedures - in, out, inout parameters; purity functions - packages - package specification - advantages of packages - private and public items - cursors in packages.

UNIT - V : Query Processing, Protecting Database and Data Organization -
Parsing, translation, optimization, evaluation and overview of Query Processing. Protecting the Data Base - Integrity, Security and Recovery. Domain Constraints, Referential Integrity, Assertion, Triggers, Security & Authorization in SQL.
Data Organization - File Organization: -Fixed length records, variable length records, Organization of records in files, Indexing: - indexed files -B-tree, B+-tree, and Hashing Techniques.

BOOKS RECOMMENDED :
1. Database system concept   - **H. Korth and A. Silberschatz, TMH**
2. Data Base Management System   - **Ivan Bayross**
3. Data Base Management System   - **James Matin**
4. Principles of Database System   - **Ullman**
5. An Introduction to database systems - **Bipin Desai, Galgotia Publication.**
6. Database Management System   - **A. K. Majumdar & P.Bhattacharya, TMH**

SECOND SEMESTER : MCA - 204
Operating System

Max Marks : 100   **Min Marks : 40**
NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Introduction:
What is operating system, basic concept, terminology, batch processing, spooling, multiprogramming, time sharing, real time systems, protection, multiprocessor system, operating system as resource manager, process view point, memory management, process

management, device management and information management, other views of operating system, historical, functional job control language and supervisor service control.

UNIT - II : Memory Management -

Preliminaries of memory management, memory handling in M/C, relocation, swapping and swap time calculation, multiple partitions, partitioned allocation MFT, fragmentation, MVT, compaction, paging, job scheduling implementation of page tables, shared page, virtual memory-overlays, concepts of virtual memory demand page, memory management and performance, page replacement and page replacement algorithms. Allocation algorithms. Storage hierarchy disk and drum scheduling - physical characteristics fcfs scheduling SCAN, short of seek time first disk scheduling algorithms sector queuing.

UNIT - III : Information Management (File System) -

File concept, file type, typed based system, disk based system, general model of file system, file directory maintenance, symbolic file system, basic file system, physical file system, file support device directory, access methods free space management contiguous, linked allocation and indexed allocation performances.

UNIT - IV : Processor Management (CPU Scheduling) -

Reviewing of multiprogramming concept, scheduling concept, basic concept, CPU I/O burst cycle process state, PCB (Programme Control Block) scheduling queries, schedulers, scheduling algorithms - performance criteria, first-come - first served shortest job - first priority, preemptive algorithm, round robin, multilevel queues and multilevel feedback queues, algorithm evolution, multiprocessor scheduling, separate system, coordinated job scheduling, master / slave scheduling.

UNIT - V : Dead Locks and Device Management

The dead lock problem - dead lock definition, dead lock detection, detection algorithm usage, dead lock characterization, resource allocation graph, dead lock prevention, mutual exclusion, hold and wait, no preemption and circular wait, dead lock avoidance-bankers algorithm. Recovery from deadlock process termination, resource preemption, combined approach to deadlock handling.

Device Management: Dedicated, shared and virtual devices, sequential access and direct access device, channel and control units, I/O schedulers. Introduction to assembly language programming, introduction to I/O programming. Introduction to interrupts and their programming.

BOOKS RECOMMENDED :

1. Principles of Operating System   - **Peterson.**
2. Operating System   - **Mandinick & Donovan**

SECOND SEMESTER : MCA – 205
Financial Management & Accountancy

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

1.   Financial Accounting

Meaning and Nature, Accounting Principles underlying the preparation of financial statements.

2. Preparation of Financial Statements

A Synoptic view-Profit and Loss account, Balance Sheet

UNIT - II

3. **Financial statement Analysis**
   Ratio analysis (Liquidity, Solvency, Profitability, Efficiency), Statement of Changes in financial position-working capital basis.

4. **Conceptual Framework of Cost Accounting**
   Meaning nature and need of cost accounting, Elements of cost, Preparation of cost – sheet, Cost concept –Fixed and variable costs, sunk costs, Out of pocket costs, Relevant and irrelevant costs, Opportunity and imputed costs.

UNIT - III

5. **Cost – volume Profit (CVP) relationship**
   Break-even analysis; (single and multiple products), Determination of sales volume to attain desired profits, Cash break-even point. Graphic presentation of CVP relationship. Assumptions and limitation of break-even analysis

UNIT - IV

6. **Budgeting**
   Definition and objective. Preparation of various types of budgets including cash budget. Fixed and flexible budgets.

UNIT - V

7. **Cost Accumulation System**
   Job and Process (simple treatment)

8 **Variable and absorption costing systems**
   Comparison for income determination (simple treatment), Variable costing as a tool of decision-making

SCHEME OF TEACHING AND EXAMINATIONS   2014-2015
MASTER OF COMPUTER APPLICATIONS

THIRD SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total

MCA301	Programming in VB & VC++	3	2	-	4	100	25	-	125	40	15	-	55
MCA302	Computer Network & Data Communication	3	2	-	4	100	25	-	125	40	15	-	55
MCA303	Operation Research	3	2	-	4	100	25	-	125	40	15	-	55
MCA304	A.I. & Expert System	3	2	-	4	100	25	-	125	40	15	-	55
MCA305	System Analysis Design & MIS	3	2	-	4	100	25	-	125	40	15	-	55
MCA306	Programming Lab VB/VC++	-	-	3x2	3	-	50	100	150	-	30	50	80
MCA307	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA308	Common Software / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA309	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

THIRD SEMESTER : MCA - 301
Programming Language III - VB & VC++

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

Introduction to Visual Basic : Windows and DOS; hardware; windows, icons and menus; Event Driven Programming; terminology; the working screen; controls and events; the menu systems; the programming language.

Designing and Creating Programs : Program Design; the launch program; the form and the controls; writing the code; save your work; running and testing; making an EXE file; printouts.
Program Flow : Logical testing; branching with if; Select Case; Go To; For…Next; Do Loops; While… Wend.

UNIT - II

Interacting with user : Msg boxes, the input box function, scroll bars, frames, options, check boxes, menus and various components. (Like timer, dbgrid, dbcombo, msflex Grid, etc)

Testing and Debugging : Errors and error spotting, debugging tools, break points and watches, keeping watch, stapping through, error trapping.

Graphics : Objects and properties for drawing, the drawing methods, working with imported graphics, animation.

UNIT - III

Procedures, Functions and Forms : Procedures and Functions, creating a procedures, creating a function, recursive functions, multiple forms (MDI), startup forms, starting from sub main, transferring between forms, procedures and modules.

Arrays : Dimensions, elements and subscripts, arrays and loops, control arrays, creating a control arrays.

Sequential Files : Saving data to files, basic filing, data analysis and file, the extended text editor.

UNIT - IV

Records and Random Access Files : Record structures, random access files, the staff database, design and coding, MDI Forms - parent and child.

Accessing Data - Data Manager and Data Control : Creating database, what is database, planning your database, using the data manager, adding an index, using the data manager to enter data, creating a form with data aware controls, what is data control, what are data aware controls, creating a menu bar.

ADO & RDO controls and introduction to ActiveX control

UNIT – V : Visual C++

Introduction to VC++- C under windows, Overview of VC++, VC++ workspace & projects, creating source code file, adding C++ code to a program.

Introduction to MFC - The part of VC++ programs, the application object, the main window object, the view object, the document object, Windows event oriented programming, What is device context., Windows Application using MFC.

OLE (object linking and embedding technique), Features of OLE, introduction to ActiveX controls, introduction to COM and DLL.

BOOKS RECOMMENDED :
1.   Programming in Visual Basic - SAHU By BPB Publications.
2.   Unreleased Visual Basic Guide

VC++
1.   The complete Reference VC++   : Chris H.Pappas & William H.Murray, Tata McGraw
2.   Visual C++ in Record time   : Steven Holzner
3.   Visual C++ Programming   : Yashwant P. Kanetkar

THIRD SEMESTER : MCA - 302
Computer Networks And Data communication

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

Introduction to Computer Networking : The Concept of Networking, Data Communication, Required network elements, The role of Standards Organization. Line Configuration, Various Topologies, Transmission Mode, Categories of Networks- LAN, MAN, WAN. The benefits of a Computer Networks.

The OSI and TCP/IP Reference Model : The Concept of Layered Architecture, Design Issues for the Layers. Interfaces and services, Detailed Functions of the Layers. Comparison between OSI and TCP/IP Reference model.

UNIT - II

Transmission of Digital Data : Shannon's and Nyquist theorems for maximum data rate of a

channel. Transmission media- Co-axial, UTP, Fiber optic and wireless. Analog and digital data Transmission- parallel and serial transmission. DTE-DCE interface using RS-232C. Study of modems- 56k and Cable Modem. Modem standards.

Multiplexing and Switching : The Concept of Multiplexing- FDM, TDM, WDM. The Concept of Switching- Circuiting, Message switching, Packet switching.

UNIT - III
Data Link Layer and Routing Algorithms : Line Discipline, Flow Control- stop and wait, sliding window, Go back N, Error Control- ARQ stop and wait, sliding window ARQ. HDLC, SLIP, PPP. Multiple access protocols- ALOHA, Slotted ALOHA, CSMA/CD. IEEE standards for LAN's and MAN's. The IP protocol, and its header. IP address classes and subnet mask.

The concept of ICMP, ARP, RARP, RSVP, CIDR and Ipv6. : Routing algorithms- shorted path first, Distance Vector, Link State. Congestion Control-The leaky bucket and Token bucket Algorithms.

UNIT - IV
Transport Layer : The Concept of client and Server in terms of Socket addressing in Transport layer. Two way and three-way handshaking. TCP header.
Network Performance Issues. The Concept of Domain Name System, Various Resource Records. Architecture and services of E-mail (RFC-822 and MIME). The Concept of World Wide Web- server side and client side.

ATM : The concept of ATM, ATM Adoption layers- AAL1, AAL2, AAL3/4, AAL5, Comparison of AAL protocols. Cell formats for UNI and NNI. Service Categories, Quality of service, Congestion Control in ATM.

UNIT - V
Comparative study of Networking Technologies : X.25, Frame Relay, ATM, SONET, SMDS, ISDN.

Network Security : The Importance of Security in Networking. Traditional Cryptography, Data Encryption Standards, RSA algorithm.

BOOKS RECOMMENDED :
1.   Computer Networks   - A S Tanenbaum
2.   Data Communication and Networking   - Forouzan

THIRD SEMESTER : MCA - 303
Operation Research

Max Marks : 100   **Min Marks : 40**
NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.
UNIT - I
Linear Programming -
     L P formulations, Graphical method for solving LP's with 2 variables, Simplex method, Duality theory in linear programming and applications, Special Linear Programming Problems, Transportation Problem (Stepping Stone Method), Assignment problem (Hungarian Method)

UNIT - II
Network Analysis -
     Examples of network flow problems, Shortest –route problems, Dijkstras Algorithm, Applications of shortest – route problems, Max flow problem, Flow network, Labeling routine, Labeling algorithm for the max flow problems, Min-cut and max –cut theorem.

UNIT - III
Project Scheduling by PERT/CPM -
     Project management origin and the use of PERT origin and use of CPM, Application of Pert

and cpm; Project network - Diagram representation, Critical path calculations by linear programs, Critical path calculations by network analysis and critical path method (cpm), Determinations of floats, Constructions of time chart and resource labeling, Project cost curve and crashing in project management, Program evaluation and Review technique (pert).

UNIT - IV
Dynamic Programming -

Basic concepts - Bellman's optimality principles, Examples of D.P. models and computations. Examples to be taken from Different areas of allocations, replacement, sequencing, and scheduling, networks and other related O>R areas.

Queuing Models -

Notations and assumptions, Queuing models with Poisson input and exponential service

UNIT - V
Sequencing Models -

Sequencing Problem, Johnson's algorithm for processing n jobs through 2 machines, Johnson's Algorithm for processing n jobs through 3 machines, Processing 2 jobs through n machines, graphical solution.

Inventory Models -

Introduction to the inventory problem, Deterministic models - The classical EOQ (Economic Order Quantity) model, Non- zero lead time, The EOQ with shortages allowed.

BOOKS RECOMMENDED :
1. Operation Research : By Giltte.
2. Operation Research : Gupta and Kumar.
3. Operation Research : Gupta and Manmohan.

THIRD SEMESTER : MCA - 304
Artificial Intelligence And Expert Systems

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I
General Issues and overview of AI :

The AI problems; what is an AI technique; Characteristics of AI applications

Problem solving, search and control strategies :

General problem solving; production systems; control strategies: forward and backward and backward chaining Exhaustive searches: Depth first Breadth first search

UNIT - II
Heuristic Search techniques :

Hill climbing; Branch and Bound technique; Best first search and A* algorithm; AND/Or Graphs; problem reduction and AO* algorithm; constraint satisfaction problems

Game playing :

Minimax search procedure; Alpha-Beta cutoffs; Additional Refinements

UNIT - III
Knowledge Representation :

First order predicate calculus; Skolemization Resolution principle and unification; Inference Mechanisms; Horn's clauses; semantic Networks; frame systems and value inheritance. Scripts; conceptual dependency;

AI Programming Languages :
Introduction to Lisp, Syntax and Numeric functions; List manipulation functions; Iteration and Recursion; Property list and Arrays, Introduction to PROLOG.

UNIT - IV
Natural language processing :
Parsing technique; context—context- free grammar; Recursive Transition Nets (RTN); Augmented Transition Nets ((ATN); case and logic grammars; semantic analysis.

Planning :
Overview- An example Domain: The Blocks Word; Component of planning systems: Goal Stack Planning (linear planning); Non-linear planning using goal sets; probabilistic reasoning and Uncertainty; probability theory; Bayes Theorem and Bayesian networks; certainty factor.

UNIT - V
Expert Systems :
Introduction to expert systems and Applications of expert systems; various expert system shells: vidwan; frame work; knowledge acquisition; case studies; MYCIN.

Learning :
Role learning; learning by induction; Explanation based learning.

BOOKS RECOMMENDED :
1. Elaine Rich and Kevin knight: Artificial Intelligence-Tata McGraw hill.
2. Dan W. Patterson: Introduction to Artificial Intelligence and Expert Systems. Prentice hall of India.
3. Nills j. Nilson: Principles of Artificial Intelligence; Narosa publishing house.
4. Clocksin & C.S. Melish ; Programming in PROLOG – Narosa publishing house.
5. M.sasikumar ,S.Ramani. etc : Rule based expert system (A practical Introduction) narosa publishing house.

THIRD SEMESTER : MCA - 304
System Analysis Design & MIS

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I
Introduction : Systems Concepts and the information systems environment - Definition of system, Characteristics of system, elements of system, types of system, The system Development life cycle :   consideration of candidates system. The Role of system Analyst - Introduction, the multiphase role of the analyst, the analyst / user interface, the place of the analyst in the MIS Organization.

UNIT - II
System Analysis and its Tools :
System Planning and initial investigation : basis for planning in systems analysis, fact finding, fact analysis, Feasibility study. Information Gathering Tools & technique, System Planning and initial investigation : basis for planning in systems analysis, fact finding, fact analysis, Feasibility study. Information Gathering Tools & technique,
Structured Analysis, DFD, Data Dictionary, Decision Tree, Decision Table. Cost-benefit Analysis.

UNIT – III
System Design : The process of Design Methodologies, Audit Consideration. Input

Design, Output Design, Form Design, File Structure, Database structure.

System Implementation -
System Testing, the test plan, quality assurance, data processing auditor. Conversion, Post Implementation review, Software Maintenance. Computer Industry, the software Industry, A procedure for Hardware Software Selection, Project scheduling & Software. System Security, disaster/recovery planning, ethics in system development.

UNIT - IV
Introduction to MIS : Definition of MIS, Benefits of MIS, Function of MIS, Characteristics of MIS, Operating Elements of Information System, Components of Information System, Three Dimension of Information System; MIS and Other Subsystems – Information Generator, Information System Levels, Open and Closed Loop System, MIS Organizations, Types of Information System, Establishing MIS. Introduction of Transaction Processing Systems.

UNIT - V
The strategic impact of the internet and E-commerce : About internet, an overview of internet Application. Business uses of Internet, Electronic marketing and on-line communities of worldwide web.
Information Technology Assets : Managing Hardware Assets, Managing Software Assets, Managing Data Resources, MIS and Decision Support System, Strategic Information System.

RECOMMENDED BOOKS -
1.

MCA-307 DATA COMMUNICATION AND NETWORKING

1. Running the Diagnostic utility for NIC provided with the Driver Floppy/CD.

2. Demonstration of UTP Flat and Cross Cable Crimping.

3. Configuration of Windows 98 Peer-to-Peer Networking.

4. Installation of Windows 2000 server along with Common Software Installations.

5. Concept of Active Directory and DNS with their Configuration in Windows 2000.

6. User and Group Administration in Windows 2000 Server.

7. Implementation of NTFS File and Folder permission and Security.

8. Windows 2000 Server as a DHCP Server Installation and Configuration.

9. Windows 2000 Server as a WINS Server Installation and Configuration.

10. Implementation of Monitoring Tools.

11. Interconnectivity with Windows 98, Linux 8.0.

12. Implementation of Terminal Services on Windows 2000 Server.

13. Installation of Oracle 8i on 2000 Server and Network Client on WIN98 and Connectivity between them.

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SCHEME OF TEACHING AND EXAMINATIONS   2014-2015
MASTER OF COMPUTER APPLICATIONS

FOURTH SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA401	Programming in Java	3	2	-	4	100	25	-	125	40	15	-	55
MCA402	Software Engineering	3	2	-	4	100	25	-	125	40	15	-	55
MCA403	Interactive Computer Graphics	3	2	-	4	100	25	-	125	40	15	-	55
MCA404	Unix / Linux	3	2	-	4	100	25	-	125	40	15	-	55
MCA405	Elective : 1. Compiler Designing 2. Advanced Computer Architecture	3	2	-	4	100	25	-	125	40	15	-	55
MCA406	Programming Lab JAVA	-	-	3x2	3	-	50	100	150	-	30	50	80

MCA407	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA408	Common Software / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA409	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

FOURTH SEMESTER – MCA401
Programming in JAVA

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Introduction to java programming

An overview of Java: Object Oriented Programming, Features of Java, Java Virtual Machine, Java Environment: Java Development Kit, Java Standard Library, Data Types, Variables: Declaring a variable, Dynamic Initialization, The scope and life time of variable, Type conversion and Casting: Narrowing and Widening Conversions, Numeric Promotions, Type Conversion Contexts; Operators: Arithmetic Operators, Relational Operators, Logical Operators, Bit wise Operators, Conditional Operators, new operator, [ ] and instance of operator. Control Statements: Java's Selection statement, Iteration Statement, Jump Statement, Array: Declaring Array variables, Constructing an Array, Initializing an Array, Multidimensional Arrays, Anonymous Arrays.

UNIT - II : Define the Class and interface

Introducing Classes: Class Fundamentals, Declaring Object, Assigning Object Reference Variables, Defining Methods, method overloading, Using objects as parameter, Constructors, Garbage collection, finalize () method. Inheritance: Inheritance basic, method overloading, object reference this and super, Chaining constructor using this () and super (), Member accessibility modifier: public, protected, default accessibility of member, private protected, private, Package: Define package, CLASSPATH, importing package, Interface: Define an interface, implementing interface, extending interface, variable in interface, Overview of nested class: Top level nested class and interface, Non static inner class, Local class, Anonymous class.

UNIT - III : Exception handling and Multithreading

Exception Handling: Exception types, Uncaught Exception, Using try and catch, multiple catch, nested try block, throw, and throws, finally.

Multithreading: creating thread, Thread priority, synchronization, thread Scheduler, Running & yielding, sleeping and waking up, waiting and notifying, suspend and resume, miscellaneous method in thread class.

UNIT - IV : Input output, Networking and Fundamental class of java

Object class, String class, String Buffer class, Wrapper class, Math class, Collection: Collection interface, List interface, Set interface sorted interface, Array List class, Liked List class, Tree Set, Comparator, Vector, Stack.

Input output classes and interface: File, Buffer Stream, Character Stream, and Random Access for files, Object Sterilization.

Networking: Socket overview, Client/Server, Proxy Server, Network class and interface, TCP/IP client socket, TCP/IP Server socket, URL Connection, Datagrams, Datagram Packets.

UNIT - V : Applet programming and AWT

Applet : Applet and Application program, Creating Applets, Applet Life Cycle, Applet and Thread, Supplying Applet parameter, Using Images and Sound in Applets, JAR files, Applet Security.

Introducing the AWT : Overview of the java.awt package, Component and Containers: Component, Container, Panel, Applet, Window, Frame, and Dialog classes. Working with Graphics, Working with Fonts, Working with Colors. *GUI Control Components* : Button, Canvas, Checkbox and Checkbox Group, Choice, List, Label, Scrollbar, Text Field and Text Area, Frame, Menu Bars and Menu. *Layout Management*: Layout Management Policies, Flow Layout, Grid Layout, Border Layout, Card Layout, Grid Bag Layout, Customized Layout.

Event Handling: Overview of Event Handling, Event Hierarchy, Event Delegation Model, Event Adapters, Low Level Event Processing.

BOOKS RECOMMENDED :
1.   The Complete Reference Java 2 - Herbert Schildt, Publisher- TMH
2.   A Programmer Guide to Java   - Khlid A. Mughal, R.W. Rasmussen.
3.   Introduction to HTML by   - Kamlesh N. Agarwala, O.P.Vyas, P A. Agarwala.
4.   Web Enabled Commercial Application Java 2   - Ivan Bayross   Publisher- B.P.B.

FOURTH SEMESTER : MCA - 402
Software Engineering

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I
Software Engineering Fundamentals :
Definition of software product; types of Software; introduction to Software Engineering; Need of Software Engineering; Software Crisis; Software Engineering principles (Layers); Software Engineering problems; SDLC; Waterfall Model, Prototype Model, Incremental Model, Spiral Model, RAD Model; Role of management in software development (4P).

UNIT - II
Software Analysis and Design:
software requirements specification (SRS); Structure of SRS; Requirement Engineering; Analysis Model-Data Flow Diagram, Data Dictionary, E-R Diagram, Decision Table, Pseudocode, Software Design, Design Objectives, Strategy of Design, Abstraction, Partitioning and Projection, Process Oriented Design (Gane, Sarson and Yourdon), Data Oriented Design(Warnier-orr), Object Oriented Design (Booch Method), Cohesion and Coupling.

UNIT - III
Software Quality and Case Tools :
Software Matrices, Categories of Matrices, Software quality assurance, McCall's Quality factors, Software Maturity model, ISO Model, Software Reliability, case tools and its scope, Architecture of case tools, case objectives, case classification, categories of case tools, cyclomatic complexity.

UNIT - IV
Coding and Testing :
Choice of Programming Languages; Coding Style; Structured Programming; Coding Standard; Internal Document; Software Testing-Verification and Validation; Testing Techniques -white box, black box; Levels of Testing - Unit, integration, validation and system; Test Plan; Debugging - Debugging Process, Error, Fault and Failure.

UNIT - V
Software Maintenance and Project Management :
Introduction to Maintenance; Categories of Maintenance; Belady and Lehman Model, Boehm

Model, Software Project Team; Software Project Planning; Project monitoring and controls; Software Project Estimation, Cost Estimation Model (COCOMO Putnam-slim, Watson and fellix).

RECOMENDED BOOKS:
1. Software Engineering: A Practitioner's Approach   – by Essman Roger, Tata McGraw Hill
2 . An Integrated approach to Software Engineering   - by Jalote Pankaj, Narosa: New delhi. 1991.
3. Software Engineering, An Integrated Approach   – By S.M.Ghosh.
4. Software Engineering   – By Bahrat Bhushan Agrawal.
5. Software Engineering   – By K.K. Agrawal & Yogesh Singh.

FOURTH SEMESTER : MCA - 403
Interactive Computer Graphics

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Display Devices

Refresh Cathode ray tubes, Random Scan and raster Scan Monitors, Direct view storage tubes, continual refresh and storage display, plasma panel displays, LED & LCD devices, color display techniques, shadow marking and penetration, hard copy devices-printer and plotters.

UNIT - II : Output Primitives

Points and Lines, Line drawing algorithms - vecgen and Bresenham Antialiasing. Circle generating Algorithms, Bresenham Circle Algorithms Ellipse, Character generating and text display. Matrix and Stork fonts, output command for various geometrical shapes, fill areas horizontal scan for Polygons. Attribute of outputs primitives, line style, text style, bundled attributes, fill colors and patterns Program in Java or c++ for related Algorithms.

UNIT - III : Display Description

Word/user coordinates, device coordinate, normalized device coordinates, two dimensional viewing. Transformation - Translation, scaling rotation, reflection, shearing. Matrix representation of transformation and homogenous coordinates, Concatenation of transformation. Viewing algorithms- windows and viewpoints, windowing and clipping, line, area text clipping, blanking windows to view point transformation zooming and planning. Segment, concepts and file, segment attributes.

UNIT - IV : Interactive Graphics

Physical Input devices, logical classification, interactive picture construction techniques, input function.

3-D Transformation

Translation, Scaling, Rotation about standard and arbitrary axis, transformation commands.

UNIT - V : 3-D Projection

Viewing Pipeline, Viewing transformation and clipping, Normalized view volume, viewing Pipeline, hidden line and surface elimination algorithms backface removal, depth buffer method, scan line method, depth sorting method, area subdivision and octree method.

Design for User Interface

Components and user model, command language, memorization user help, backup and error

handling, response time, command language style, menu design, feedback, output formats. Development of graphics in Matlab

RECOMMENDED BOOKS :
1. Computer Graphics   - Hearn D. & Baker P.M.
2. Computer Graphics : A Programming Approach   - Harringron S.
3. Procedural Elements for Computer Graphics   - Rogers D.F.

FOURTH SEMESTER : MCA – 404
Unix / Linux

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

Introduction : Introduction to Multi-user System, Emergency and history of Unix, Feature and benefits, Versions of Unix. **System Structure:-**Hardware requirements, Kernel and its function, introduction to System calls and Shell.

File System : Feature of Unix File System, Concept of i-node table, links, commonly used commands like who, pwd, cd, mkdir, rm, ls, mv, lp, chmod, cp, grep, sed, awk, pr, lex, yacc, make, etc. Getting started (login / logout), File system management, file operation, system calls, buffer cache **.Vi Editor:-**Intro to text processing, command and edit mode, invoking vi, command structure, deleting and inserting line, deleting and replacing character, searching strings, yanking, running shell command, command macros, set windows, set auto indent, set number, intro to exrc file.

UNIT - II

Shell Programming : Introduction to shell feature, wild card characters, i/out redirections, standard error redirection, system and user created shell variables, profile files, pipes/tee, background processing, command line arguments, command substitution, read statement, conditional execution of commands, special shell variables $ #, #?, $* etc. Shift commands, loops and decision making- for, while and until, choice making using case…esac, decision making if ….fi, using test, string comparison, numerical comparison, logical operation, using expr.

UNIT - III

Introduction to Shell : Features, changing the login shell, cshrc, login, logout files, setting environment, variables, history and alias mechanism, command line arguments, redirection/appending safely, noclobber, noglob, ignore eof, directory stacks (pushd, popd), feature of other shell (rsh, vsh).

Process Control : Process management, process states and transition, regions and control of process, sleep and waking, process creation, process killing, signals, system boot and init process, traps, sitting process priorities.

UNIT - IV

Inter-process Communication : I/O Sub system, terminal drives, disk drives, messages, shared memory, semaphores, memory management, swapping, demand paging.

System Calls and Unix -C Interface : File handling calls like - access (), open(), create(), read(), write(), close(), fseek(), process control system calls like kill(), exec(), fork(), wait(), signal(), exit(), comparing stdio library and calls.

UNIT - V

System Administration : Process and Scheduling, Security, Basic System Administration:- Adding a User, User Passwords, Delete of a User, Adding a Group, Deleting a Group, Super User, Startup and Shutdown. Advanced System Administration:-Managing Disk Space, Backup and Restore, Managing System Services. Xwindows:- Introduction to Xwindows concept

BOOKS RECOMMENDED :
1. Design of Unix Operating System   - Maurice Bach
2. Advanced Unix   - Stephan Prata
3. The Unix Programming Environment   - Kennighan and Pike
4. Unix Programmers Guide   - P. P. Selvester
5. Introduction to Unix System   - Rachell Morgan
6. Complete Reference Red Hat Linux   - Richard Peterson
7. Complete Reference Unix

FOURTH SEMESTER : MCA – 405
Elective – 1 : Compiler Design

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

Introduction to Compiling and one pass compiler :
Compilers & translators, Phases of compilers, Compiler writing tools, Bootstrapping; overview of one pass compiler.

Finite Automata and Lexical Analysis –
Role of Lexical Analyzer; specification of tokens, Recognition of tokens, Regular expression, Finite automata, from regular expression to finite automata, DFA and NFA, Implementation of lexical analyzer; tools for lexical analyzer -LEX.

UNIT - II

Syntax analysis & Parsing Technique -
Context free grammars; Bottom up parsing, Shift reduce parsing, Operator Precedence parsing, Top down parsing, elimination of left recursion; recursive descent parsing, Predictive parsing.

Automatic Construction of Efficient parsers –
LR parser, construction of SLR and canonical LR parser table, Using ambiguous grammar, An automatic parser the generator, YACC, Using YACC with ambiguous grammar, creating YACC lexical analyzer with LEX, Error recovery in YACC.

UNIT - III

Syntax Directed Translation –
Syntax directed schema, Construction of syntax tree, Translation with top down parser.

Run Time Environment –
Source Language issues, Storage organization and allocation strategies, Parameter passing, Implementation of block-structured language.

UNIT - IV

Intermediate Code Generation –
Intermediate languages; Postfix notation, Three-address code, Quadruples and triples, Translation of assignment statements, Boolean expression, and Procedure call.

Error Detection & recovery –
Lexical & syntactic phase error, semantics error.

UNIT - V

Code Optimization –
Optimization of basic block, Loop optimization global data flow analysis, Loop in variant computation.

Code Generation –
Issue and design of code generator, the target machine, a simple code generator.

BOOKS RECOMMENDED :

1 Principles of Compiler Designing   - **by Alfred V. Aho and J.D. Ullman.**
2.Principles of Compiler-Principles, Technique and Tools - **Alfred V. Aho, Ravi Sethi**

FOURTH SEMESTER : MCA – 405
Elective – 2 : Advanced Computer Architecture

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT I:

Introdution - Parallel Computing, Generation, Application, Example of some parallel computers with configurations. Differentiation of Parallel and Distributed Computing. RISC, CISC and VLIW architecture.

UNIT II:

Interconnection network – Introduction, types- Static and Dynamic interconnection networks. Architecture and routing in static and dynamic interconnection networks. Performance parameters of interconnection network. Benchmarks and Amdahl's law.

UNIT III:

Architectural classification scheme- Flynn's and Feng's. Memory models: UMA,NUMA,COMA,NORMA. Parallel algorithm for matrix addition and subtraction. Fortran 90 array notation.

UNIT IV:

Pipelining and its types : Scalar, Superscalar, Super pipelining, superscalar superpipelining, underpipelining. Hazards and its types, Hazard avoidance. Latency analysis and calculation of MAL.

UNIT V:

Iso efficiency concepts. Case study of Cray 1. Arithmetic pipeline design using CSA and CPA.

Text Books:

1. Computer Architecture & Parallel Processing by Kai Hwang and F.A. Briggs-Mc Graw Hill.
2. Advanced Computer Architecture By Kai Hwang –Mc Graw Hill.
3. Parallel Computing by M.R. Bhujade – New Age Publication.

Reference Books:
Parallel Computing Theory and practice by Michael J. Quinn –Tata Mc-Graw Hill

MASTER OF COMPUTER APPLICATIONS

FIFTH SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA501	Advanced Programming Tools - **Java**	3	2	-	4	100	25	-	125	40	15	-	55
MCA502	Introduction to .Net Technology & C#	3	2	-	4	100	25	-	125	40	15	-	55
MCA503	Data Mining and Data Warehouse	3	2	-	4	100	25	-	125	40	15	-	55
MCA504	Electives : 1. **Soft Computing** 2.Simulation & Modeling 3.OOAD 4.Introduction to I SO & CMM	3	2	-	4	100	25	-	125	40	15	-	55
MCA505	Electives : **1.** Satellite & Mobile Communication 2. Embedded Programming 3. Robotics 4. Artificial Neural Network & fuzzy logic	3	2	-	4	100	25	-	125	40	15	-	55
MCA506	Programming Lab	-	-	3x2	3	-	50	100	150	-	30	50	80
MCA507	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA508	Common Software/Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA509	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	20	26	500	300	200	**1000**	200	180	100	**480**

FIFTH SEMESTER : MCA – 501
Advanced Programming Tools – JAVA

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : JDBC

Introduction to JDBC, JDBC Drivers Type, Connection, JDBC URLs, Driver Manager, Statement – Creating, Executing, Closing, Result Set – Data Types and Conversions. Prepared Statement, Callable Statement, Mapping SQL and Java Types, JDBC-ODBC Bridge Driver

UNIT - II : RMI

Distributed Applications, Introduction to RMI, Java RMI Architecture, Writing an RMI Server, Designing a Remote Interface, Implementing a Remote Interface, Creating a Client Program, Compiling the Programs, Running the Programs

UNIT - III : Servlets

Movement to Server Side JAVA, Overview of Servlets, Common Gateway Interface (CGI), The JAVA Servlet Architecture, Generic Servlet and HTTP Servlet, The Servlet Interface, Requests and Responses, The Life Cycle of a Servlet, Retrieving Form Data in a Servlet, Session Tracking, Cookies.

UNIT - IV : Java Beans

Java Beans Concepts and the Beans Development Kit, Using the Bean Box, Writing a Simple Bean, Properties, Manipulating Events in the BeanBox, The BeanInfo Interface, Bean Customization, Bean Persistence.

UNIT - V : Java Server Pages (JSP) & J2ME

Overview of JSP, JSP Scripting elements, Compare and Contrast JSP with CGI and Servlet Technologies, List JSP directives, Integrate JSP with Java Beans Components, Handle JSP exceptions, Develop a basic Java Server Pages, Deploy Java Server Pages, Compare two-tier and multi-tier web application architectures, Database Connectivity. Introduction of J2ME, Variable declaration and syntax, Application, documentation and implementation of Java apps,

FIFTH SEMESTER : MCA – 502

Introduction to .NET Technology

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Inside the .NET framework :

Overview of .net framework, Managed Execution process, CLR, common language specification, JIT Compilation , MSIL, Namespaces, Assemblies, metadata, Common Type System, cross language, interoperability, Garbage collection.

UNIT - II : Programming with .NET Framework

Windows form : working with Visual Studio IDE, creating a .NET solution, MDI application, components and controls, Data types, variables, Type conversions, Operators, Control Structures : conditional statements, loops, arrays, types of methods, method data, Introduction to exception handling-exception statements.

UNIT - III : XML, Windows process and File Handling

Types, structures, Enumerations, classes, Interfaces, Working with files-Files and directories, streams, Readers and writers, Reading and writing XML files, XML serialization, processing Transaction, Monitoring and Managing Windows Process, retrieving information about process.

UNIT - IV : Building .NET Framework Applications

Introduction to ASP .NET, Differentiate classic ASP and ASP .NET, Web application, Web forms, Form validations – Client side, Server side, controls in web forms, Events in Web form.

UNIT - V : Advanced concepts and Database Programming

Delegates, ADO .NET Architecture, .NET dtat provider, dataset components, creating database applications using Window forms and web forms (Database connectivity through ADO .NET), Introduction to web services, web services for Mobile application, Remote overview.

BOOKS RECOMMENDED

1. MSDN online – by Microsoft
2. Visual Basic .NET Complete - By BPB Publications, New Delhi.
3. The Complete Reference VB .NET – By Jeffery R. Shapiro, Tata Mcgraw Hill.
4. Professional VB .NET 2003 – by bill Evjen & others, Wiley Dreamtech India (P) Ltd. New Delhi.

FIFTH SEMESTER : MCA – 503
Data Mining & Data Warehousing

Max Marks : 100   **Min Marks : 40**
NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Introduction & Data Warehousing and OLAP Technology for Data Mining – What is data mining?, Data Mining: On what kind of data?, Data mining functionality, Are all the patterns interesting?, Classification of data mining systems, What is a data warehouse?, A multi-dimensional data model, Data warehouse architecture, Data warehouse implementation, Further development of data cube technology, From data warehousing to data mining. Concept of Transaction, Transactional database, Distributed Database, Commit Protocols.

UNIT - II : Data Preprocessing, Data Mining Primitive, Languages and System Architecture – Why preprocess the data?, Data cleaning ,Data integration and transformation, Data reduction, Discrimination and concept hierarchy generation, Data Mining Primitive, Data Mining Query Language, Architecture of data mining system.

UNIT - III : Mining Association Rules in Large Databases-
Association rule mining, Mining single-dimensional Boolean association rules from transactional databases, Mining multilevel association rules from transactional databases, Mining multidimensional association rules from transactional databases and data warehouse, From association mining to correlation analysis, Constraint-based association mining.

UNIT - IV : Classification and Prediction & Cluster Analysis –
What is classification? What is prediction? Issues regarding classification and prediction, Classification by decision tree induction, Bayesian Classification, Classification by back propagation, Classification based on concepts from association rule mining, Other Classification Methods ,Prediction, Classification accuracy, What is Cluster Analysis?, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

UNIT - V : Mining Complex Types of Data & Applications and Trends in Data Mining -
Multidimensional analysis and descriptive mining of complex data objects, Mining spatial databases, Mining multimedia databases, Mining time-series and sequence data, Mining text databases, Mining the World-Wide Web, Data mining applications, Data mining system products and research prototypes, Additional themes on data mining, Social impact of data mining, Trends in data mining.

BOOKS RECOMMENDED1. Data Mining: Concepts and Techniques - Jiawei Han and Micheline Kamber
2. Data Mining Concepts   - H. Marget

FIFTH SEMESTER : MCA – 504
Elective 1 : Soft Computing

Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Introduction to Fuzzy Logic System
Fuzzy Sets Operation Of Fuzzy Sets, Properties Of Fuzzy Sets, Fuzzy Relations, Fuzzy Arithmetic, Membership Functions, Fuzzy To Crisp Conversion. Fuzzy Logic, Fuzzy Rule Based Systems, Fuzzy Decision Making, Fuzzy Database, Fuzzy Intelligent System.

UNIT - II : Introduction to Artificial Neural Networks
Introduction to Artificial Neural Network, Artificial Neuron, Classification of Artificial Neural Network, Architecture of a Artificial Neural Network, Activation Function, Training an Artificial Neural Network, Application of Artificial Neural Network.

UNIT - III : Perceptron and Associative Memories
Amari General Learning Rule, HEBB Learning Rule, ADLINE, Perceptron Layer Network, Associative memory: Auto associative Memory, Bi-directional memory, Back-propagation Network: Architecture, Training Algorithm Application of Back-propagation algorithm

UNIT - IV : Machine Learning
Regression And Classification, Decision Tree, SPRINT, Gini Index, Entropy, Pruning, C4.5, Active Learning - Feature Selection, Clustering, Models And Methods, Neural Networks, Markov Chain/Processes, Hidden Markov Models (HMM).

UNIT - V : Soft Computing Tools
Introduction to MATLAB, Features, Matrix Operations, Curve Plotting, Toolbox Introduction, Introduction to Simulink.

RECOMMENDED BOOKS:
1. Fuzzy systems and Fuzzy Logic, Klir and Uuna, PHI Publications.
2. Introduction to Artificial Neural Networks, S. N. Sivanandam and M. Paulraj, Vikas publication.
3. Neural Network Design by Hagan & Demuth, Vikas Pub. Comp.
4. Fundamentals of Artificial Neural Networks, M.A.Hassaoun.
5. Fuzzy sets, uncertainty and information George J. Kir, & TA Folger.
6. Fuzzy sets, Decision making and Expert system, HJ Zimmerman, Kluwer, Boston.
7. Fuzzy set theory and its applications, H. J. Zimmerman, Kluwer, Boston.

FIFTH SEMESTER : MCA – 505

Elective 1 : Satellite & Mobile Communication
Max Marks : 100   **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Introduction.

Introduction to Mobile Communication, Short history of wireless communication, Applications, Vehicles, Emergency, Business, Replacement of wired network, Location dependent services, infotainment, Mobile and Wireless devices, A Simplified reference model, some open research topics in mobile communication.

UNIT - II : Satellite Systems

History of satellite system, Applications of satellite systems, Type of satellite systems, characteristics of satellite systems, satellite system infrastructure, satellite system architecture, Global Positioning system (GPS), Limitations of GPS. Beneficiaries of GPS, Applications of GPS

UNIT - III : Mobile Communication Systems

Introduction, Cellular System Infrastructure,, Registration, Handoff Parameters and Underlying support, Roaming Support Using System Backbone, to Mobile IP, Functions of Mobile IP, Mobile Node, Corresponding Node, Home Network, Foreign Network, Home Agent , Foreign Agent, Care-of Address, IP Packet Delivery, Agent Discovery, Agent Solicitation , Registration, Tunneling , Dynamic host configuration protocol.

UNIT - IV : Wireless LANs and PANs

Introduction to IEEE 802.11, Ricochet, Ricochet Wireless Modem, Services Provided by Ricochet , Home RF, Home RF Technology, Hiper LAN, Blue tooth , Advantages and disadvantages of Wireless LAN, Infra red vs radio transmission , introduction to MAC. Technologies influence WLANs / WPANs in future.

UNIT - V : Mobile Adhoc Network

Introduction to Mobile Adhoc Network(MANET), Characteristics of MANET, Applications of MANET, Routing, Need for Routing, Routing Classification, Table-Driven Routing Protocol – Destination Sequenced Distance Vector Routing Protocol, Cluster-Head Gateway Switch Routing, Wireless Routing Protocol. Source initiated On-demand Routing- Adhoc On Demand Distance Vector Routing, Dynamic Source Routing, Temporarily Ordered Routing Algorithms, Hybrib Protocol – Zone Routing Protocol.

RECOMMENDED BOOKS :

1.   Mobile Communication: Jochen H. Schiller, Pearson Education Publication
2.   Introduction to Wireless and Mobile Systems: D.P. Agrawal , Qing-An Zing , Vikas Publishing House

SCHEME OF TEACHING AND EXAMINATIONS   2014-2015
MASTER OF COMPUTER APPLICATIONS

SIXTH SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks								
						Max. Marks				Min. Marks				
		L	T	P		Sessional Marks of Project Work	Project Viva-Voce	Pr	Total	Sessional Marks of Project Work	Project Viva-Voce	Pr	Total
MCA601	System Development Project (System Design & Implementation)	5	-	30	20	200	200	-	400	120	100	-	220
	TOTAL	5	-	30	20	200	200	-	400	120	100	-	220

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