TEACHING AND EXAMINATION SCHEME FOR
MASTER OF COMPUTER APPLICATIONS

SEMESTER – I

Paper Name (Theory)	Lec	Tut	Exam Hours	Max Marks	
				Sess Marks	Sem Exam Marks
Computer Organization	5	1	3	20	80
Introduction to Programming	5	1	3	20	80
Open Source Technology & Operating System	5	1	3	20	80
Computer Networks	5	1	3	20	80
Database Management Systems	5	1	3	20	80
Total of Theory (Sess Marks + Sem Exam Marks)					500

Paper Name (Practical)	Prac Hours	Exam Hours	Max Marks
'C' Programming Lab	4	3	50
PC Software, Networking Lab	4	3	50
Microprocessor, DBMS Lab	4	3	50
Open source Lab (Linux, PHP)	4	3	50
Total of Practical			200
Grand Total (Theory + Practical)			**700**

Note:

Part A:

1. 10 Question of 1 mark each – 10 marks
2. Answer should not exceed more than 20 words
3. All questions are compulsory

Part B:

1. 5 Questions of 2 marks each – 10 marks
2. Answer should not exceed more than 50 words
3. All questions are compulsory

Part C:

1. 3 Questions of 20 marks each – 60 marks.
   There will be an internal choice in each question.
2. Answer should not exceed 400 words
3. All questions are compulsory.

All questions are compulsory

There will be sessional (internal assessment) of 20 marks conducted by the department.

Two Practical exams shall be conducted by one internal and one external examiner of a batch of 30 students in day.

Duration of Practical exam is 3 hours.

A Laboratory Exercise File should be prepared by each student for each practical paper and should be submitted during practical examinations.

Practical of 50 marks distribution is as under:

a. 30 marks for practical examination exercise for 3 questions
b. 10 marks for Viva-voce
c. 10 marks for Laboratory Exercise File

Eligibility: BCA/BSC (CS/IT)/BSC/Graduate from any discipline with Maths as one of the subjects with at least 50% marks in aggregate. Admission strictly on the basis of merit.

Scheme of Examination
(For M. C. A.)

Reg. 17 (b)

The examination for the Master of Computer Applications will consist of 6 semesters. The examination shall consist of (a) Theory papers (b) Laboratory / Practical work (c) seminar (d) minor project and (e) industrial dissertation work. Candidates will be required to pursue a regular, full time course of study at the University department for a period of three academic years in order to be eligible for appearing in the examination.

1. Eligibility for M. C. A.: BCA/BSC(CS/IT)/BSC/Graduate from any discipline with Mathematics as one of the subjects with at least 50% marks in aggregate.

2. Examination:
    i. There shall be 51 papers (5 theory and 4 practical in semesters I to V, 5 theory and 1 practical in semester VI and 1 minor project in Semester V and 1 industrial dissertation and 1 seminar in Semester VI) of 5100 marks (I to VI Semester). There will be 1 Elective in III, IV Semester and 2 Electives in V Semester. Theory paper shall be of 3 hours duration having 100 marks. Out of 100 marks 20 marks shall be considered as internal assessment based on internal test and seminars and 80 marks will be of examination at the end of each semester as determined by the University. The practical shall be of 50 marks assessed by external examiner. The Minor Project work shall be of 50 marks based on project presentation and viva-voce, assessed by external examiner. The Seminar in VI Semester will be 100 marks out of which 80 marks will be based on presentation and viva-voce assessed by external examiner and 20 marks will be assessed by internal examiner. The Industrial Dissertation shall be 250 marks out of which 200 will be based on project presentation and viva-voce, assessed by external examiner and 50 marks will be assessed by internal examiner.

    ii. To pass a semester a candidate shall have to score 40% marks in each subject (theory and practical) separately and also 50% marks in aggregate of all the papers prescribed for the examination.

    iii. Due paper(s) will be applicable if a candidate obtains 50% marks in aggregate and fails in not more than two (2) papers (theory). Due paper(s) of I semester will be held along with the III semester, the due of III semester will be held along with V semester, the due paper(s) of II semester will be held along with the IV semester and due papers of the IV semester will be held along with the VI semester. The V and VI semester due paper(s) will be held in the I and II semester respectively of the next year. The chance of due paper(s) will be given thrice in each semester.

    iv. Wherever a candidate appears at for a due paper examination he/she will do so according to the syllabus in force.

    v. A candidate not appearing at any examination/absent in any paper of term end examination shall be deemed as fail.

3. A candidate for a pass in the examination shall be required to obtain:
    i. At least 50% marks in the aggregate of all the papers prescribed for the examination and
    ii. At least 50% marks in the practical(s) wherever prescribed at the examination, provided that if a candidate fails to secure at least 40% marks in each individual paper at the examination notwithstanding his/her having obtained the minimum percentage of marks required in the aggregate for that examination.

    No Division will be awarded in the first, to fifth semester examinations. Division shall be awarded at the end of the sixth semester Examination on the combined marks obtained at the first to fifth semester taken together as noted below:

Passed with First Division	60% of the aggregate marks taken together of all the Six semester examinations
Passed with second division	48%

    All the rest will be declared to have passed the examination.

    Provided that if a candidate clears any paper after a continuous period of three years since he/she was admitted to the M. C. A. then for the passing marks, i.e. 40% marks, shall be taken into account in the case of such course(s).

    Provided further that in case where a candidate requires more than 40% marks in order to reach the requisite minimum aggregate i.e. 50% marks, as many marks, out of those actually secured by him/her will be taken into account as would enable him/her to make up the deficiency in the requisite minimum aggregate marks.

4. The grace marks shall be given up to 1% of the total aggregate marks of theory and practical of that semester in maximum one paper.

5. Candidates reappearing at an examination in a subsequent year shall be examined in accordance with the scheme and syllabi in force and shall be entitled to the award of the degree of year in which they clear the last failing/unclear paper.

MCA – 101 COMPUTER ORGANIZATION

Number system, Logic Gates, Boolean Algebra, K-Map, combinational circuit, flip-flop, sequential circuit, encoder, decoder, multiplexer, shift register, fixed-point representation, floating-point representation.

Register transfer language, inter-register transfer, arithmetic micro operation, logic and shift micro operation, instruction codes, timing and control, input/output and interrupts.

Processor bus organization, arithmetic logic unit, stack organization, instruction format, addressing mode, data transfer and manipulation, program control, control memory, addressing sequence, micro program sequencer, micro instruction formats.

Block diagram of 8085 and pin configuration, 8086/8088 instruction set, data transfer instructions, arithmetic, logical, shift, rotate, flag, compare, jump instruction, subroutine, loop, addressing modes, memory hierarchy, associative memory, memory addressing, virtual memory, cache memory, cache coherence.

MCA – 102 INTRODUCTION TO PROGRAMMING

C Language: Types, Operators and Expressions, variable names, data types and sizes, constants, declarations, operator, expressions and type conversions.
Control flow: Statements and blocks, selection and loops structures, break, continue, branching and labels.

Functions and program structure: Basics, functions and their arguments, external variables and static variables, scope rules, register variables, block structures, initialization, recursion.

Pointers and Arrays: Pointers and addresses, pointers and function arguments, pointers and arrays, address arithmetic, character pointers and functions, multi-dimensional arrays, pointers arrays, pointer to functions, 2D string and string functions.

Structures: Basics, structures and functions, arrays of structures, pointers to structures, table look up fields, typedef, file, stack, single linked list, double linked list, circular linked list, prefix, postfix, infix, queue, d-queue.

MCA – 103 OPEN SOURCE TECHNOLOGY & OPERATING SYSTEMS

Introduction to Operating Systems, goals of OS, operation of OS, resource allocater and related functions, classes of OS, batch processing, multi-processing, time sharing, distributed, real time systems, system calls, system programs, structure of OS, layer design of DOS, Unix, virtual machine OS, kernel based OS, micro-kernel based OS, architecture of Window 2000.

Process concept, interacting process, threads, fundamental of scheduling, scheduling criteria, long medium short term scheduling, scheduling algorithms , structure of concurrent system, critical section, critical region, inter-process communication, monitor and semaphores, implementation and uses.

Logical versus physical address, swapping, contiguous allocation, segmentation, paging, segmentation with paging, kernel memory allocation, page replacement algorithm, virtual memory, virtual memory with paging, demand paging, dead lock, characterization, methods for handling dead locks, prevention, avoidance, thrashing, allocation of frame, virtual memory using segmentation,

Architecture of Distributed system, inter-process communication protocol, network OS, issues in distributed design, issues of distributed file system, network structure, distributed system structure, file system, coordination.

History of Linux, Linux architecture, Linux file System, file naming, types of files, directory command, file command, vi editor, locating files in Linux, filter pipe, shell variables, local and global variables, command substitution, if, while, for, shift, tar, basic networking commands in Linux.

MCA – 104 COMPUTER NETWORKS

Introduction to Data communications and networking, protocols, standards and architecture, topology, transmission mode, OSI model, analog and digital signals, periodic and aperiodic signals, time and frequency domain

Encoding digital to digital conversion, analog to digital conversion, digital to analog conversion, analog to analog conversion, transmission of digital data, DTE-DCE interface, EIA-232, , X.21, modem, cable modem, guided and unguided, transmission media

Multiplexing, TDM, FDM, WDM, DSL, HDLC, Asynchronous transfer mode, protocol architecture, ATM cells, ATM layers, switches, circuit switching network and concepts, routing, packet switching, X.25, virtual circuit approach, point-to-point layers, link control protocol, network control protocol.

MCA – 105 DATABASE MANAGEMENT SYSTEMS

Information system, classification, conventional file system, object of database systems, data abstraction, data definition language, data manipulation language, database administrator. Database design stages, database model, database system architecture.

Centralized and client/server architecture in DBMS, entity relationship model, entities and entity sets their relationship, mapping constraints, generalization, aggregation, use of ER model for the design of databases, sequential, random, index sequential file organization, introduction and history of relational database, system relational algebra, normalization up to DKNF.

MS Access: create database, table, lookup field, setting a primary key, input mask to field, viewing and navigating and formatting datasheets, sorting and multilevel sorting in a table, filtering records, searching in table. creating relationships between tables. designing and modifying queries. Passing parameter to queries. importing and exporting tables. Designing forms, reports and summary report

TEACHING AND EXAMINATION SCHEME FOR
MASTER OF COMPUTER APPLICATIONS

SEMESTER – II

Paper Name (Theory)	Lec	Tut	Exam Hours	Max Marks	
				Sess Marks	Sem Exam Marks
Computer Oriented Numerical Methods	5	1	3	20	80
Data Structures , Algorithm & Analysis	5	1	3	20	80
Object Oriented Programming	5	1	3	20	80
Visual Programming	5	1	3	20	80
Web Programming	5	1	3	20	80
Total of Theory (Sess Marks + Sem Exam Marks)					500

Paper Name (Practical)	Prac Hours	Exam Hours	Max Marks
'C++' Programming and CONM Lab	4	3	50
Data Structures Lab	4	3	50
Visual Programming Lab	4	3	50
Web Programming Lab	4	3	50
Total of Practical			200
Grand Total (Theory + Practical)			**700**

Note:

Part A:

4. 10 Question of 1 mark each – 10 marks
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6. All questions are compulsory

Part B:

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c. 10 marks for Laboratory Exercise File

MCA – 201 COMPUTER ORIENTED NUMERICAL METHODS

Characteristics of Numerical Computation, Approximation, Significant Digit, Errors, Introduction to Matrix, Types of Matrix, Square, Row, Column, Diagonal, Unit, Null, Upper Triangular, Lower Triangular, Symmetric, Skew Symmetric, operation of matrix, trace, transpose, addition, subtraction, multiplication, determinant, inverse, Introduction to Linear Equations,

Bisection method, method of successive approximation, method of false position, Newton's iteration method, Newton Raphson method, Horner's method

Gauss Jordan method, Gauss Elimination method, Iterative methods, Jacobi method of iteration, Gauss Seidel Iteration method

Gregory Newton Forward and Backward interpolation Formula

MCA – 202 DATA STRUCTURES & ALGORITHM ANALYSIS

Definitions of Data Structure and Algorithm – Time and Space complexity- Algorithm notations.

Brute force and greedy algorithms, Divide and Conquer Strategy: Merge sort, quick sort, integer multiplication, matrix multiplication, exponentiation problem, convex hull problem, dynamic programming,

Complexity theory: Decidability of problems: Halting problem, NP-class of problem, P class of problem, NP=P question, Polynomial reduction problem, Cook's theorem, NP hardness and NP completeness.

Control structures- Variables – Data types- Arrays- String processing – Sorting and Searching- Insertion-Selection-Merge- Radix-Binary Search- Linear Search-Hashing

Binary tree- Representation – Traversing – Threaded Binary tree- Binary Search tree- Insertion deletion into a binary search tree- Heap sort

Graph- Representation of Graph- Shortest path – Operation on Graphs- Traversing a Graph- Topological Sorting – Files

MCA – 203 OBJECT ORIENTED PROGRAMMING

Data types, operator, input-output, control statements, loops, arrays, strings and string functions, functions, structure and union, Introduction to OOPS, object oriented analysis and design, class, declaring object, member function, data hiding, parameter passing, friend function and class, empty static, overloading, constructor, type of constructor, destructor, recursive constructor, calling constructor and destructor, overloading unary operator, binary operator with friend function, rule of overloading.

Inheritance, derive and base class, overriding, base and derive constructor, type of inheritance, virtual base class, abstract class, qualifier class and inheritance, pointer, pointer to class, pointer to object, pointer to derived class and base class, pointer to member, pointer to array, accessing private member and direct access to private member, new delete operator, dynamic memory,

Binding in C++, virtual function, rule for virtual function, pointer to derive class object, pure virtual function, constructor and virtual functions, polymorphism, file, file operator and commands, use in C++, templates.

Single linked lists, double linked list, circular list, sparse table, stack, queue, d-queue list, priority queue, graph, prefix, postfix, infix, sorting, insertion, selection, bubble, algorithm of quick, merge

MCA – 204 VISUAL PROGRAMMING

Introduction to Visual Basic .NET IDE and its features, .NET framework, CLR Language basics: data type, operators, control statements: branching and looping

.NET Controls Forms, text boxes, labels, command button, radio button, option buttons, check boxes, list boxes and combo boxes, introduction to ActiveX controls

Strings and Arrays Working with Arrays, array resizing, System.Array class, manipulation of string, string functions for comparison, concatenation, copy, replace, substring, length

Working with Classes Classes, properties and methods, attaching a class with a form Inheritance: derived from existing classes, overriding methods from base class

Exception Handling Types of errors, structured and unstructured exceptions

Tracing Errors: breakpoints, watch, quickWatch, autos, locals, call stack.

Database Access ADO.NET and it's Components, datasets, data adapters, server explorer, binding controls to database

MCA – 205 WEB PROGRAMMING

Cascading Style Sheets, introduction, levels of style sheets, style specification formats, selector forms, property value forms, font properties, list properties, color, alignment of text, the box model, background images, the and tags, conflict resolution.

Overview of JavaScript, object orientation and JavaScript, syntactic characteristics, primitives, operations, and expressions, screen output and keyboard input, control statements, object creation and modification, arrays, functions, constructors, pattern matching using regular expressions, errors in scripts.

JavaScript execution environment, the Document Object Model, elements access in JavaScript, events and event handling, handling events from body elements, handling events from text box and password elements, the DOM2 event model, the navigator object, DOM tree traversal and modification, positioning elements, moving elements, element visibility, changing colors and fonts, dynamic content, stacking elements, locating the mouse cursor, reacting to a mouse click, slow movement of elements, dragging and dropping elements.

Browser Management and Media Management, classes, constructors, object-oriented techniques in JavaScript, object constructor and prototyping, sub classes and super classes –JSON – jQuery and AJAX.