SYLLABUS

MASTER OF COMPUTER APPLICATIONS (MCA)

First and Second Semester Examination, 2015
Third and Fourth Semester Examination, 2016
Fifth and Sixth Semester Examination, 2017

JAI NARAIN VYAS UNIVERSITY
JODHPUR

NOTIFICATION

In compliance to decision of the Hon'ble High Court all students are required to fulfil the 75% attendance in each subject and there must be 75% attendance of the student before he/she could be permitted to appear in the examination

REGISTRAR (ACADEMIC)

Contents

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MASTER OF COMPUTER APPLICATIONS (MCA)

General Information for Students

1. The course of study of Master of Computer Applications shall extend over a period of six semesters spread over three years. On satisfactory completion of the course and after passing the examinations including the project and seminars, a candidate will be awarded the MCA.

2. (a) The admission to the Master of Computer Applications shall be made by a common entrance test (RMCAAT) at state level strictly on merit basis.

(b) The candidate must posses (10+2) at school level with mathematics and Graduation (3 years duration) in any subject from any recognized University OR Graduation (10+2+3 years duration) in any subject with mathematics as one subject from any recognized University with at lease 50% marks in aggregate (45% marks in case of SC/ST and OBC candidates), without any approximation in the Graduate Examination.

3. (a) Every academic year shall be divided into two semesters.

(b) There shall be an examination at the end of each semester. The examination shall consist of written papers, practicals, sessionals and course work.

(c) The examination in the first year of MCA will be designated as first and second semesters examination at the end of each semester respectively.

(d) The examination conducted in the second year will be designated as third and fourth semester examination at the end of each semester respectively.

(e) The examination conducted in the third year will be designated as fifth and sixth semester examination at the end of each semester respectively.

4. The term of regular course of study means that a candidate shall have attended 70% of total number of lectures and course work (Tutorial) in each written paper and 70% of the course work (Practical and Sessional) as per teaching and examination scheme in each semester. Further he shall have completed his project and seminar. The attendance requirement shall be as per Ordinance of the University which is reproduced below:-

O. 78-A (i): For all regular candidates in the faculties of Arts, Education and Social Sciences, Science, Law, Commerce and Engineering the minimum attendance requirement shall be that a candidate should have attended at least 70% of the lectures delivered and the tutorials held taken together as well as 70% of the practicals and sessionals from the date of her/his admission.

(2) Condonation of shortage of attendance: The shortage of attendance up to the limits specified below may be condoned on valid reasons:

(i) Upto 6% in each subject plus 5 attendance in all aggregate of subject/papers may be condoned by the Vice-Chancellor on the recommendation of the Dean/Director/Principal for undergraduate students and on the recommendation of the Head of the Department for the Post-graduate classes.

(ii) The NCC/NSS cadets sent out to parades and camps and such students who are deputed by the University to take part in games, athletics or cultural activities may for purposes of attendance be treated as present for the days of these absence in connection with the aforesaid activities and that period shall be added to their subject wise attendance.

5. For a pass, a candidate should obtain 35% marks in each theory paper, 50% marks in each practical and sessional, 50% marks in each course lab work/seminar/project and 50% marks in the aggregate of the semester every year as per the teaching and examination scheme.

6. (a) A candidate who fails in the course / lab work of any subject in any semester will not be eligible to appear in that semester examination and shall have to repeat the whole semester as and when that semester course is run by the department.

(b) If a candidate, fails in not more than two units in each semester examination, and if obtain an aggregate of 50% marks in the grand total, he/she shall be allowed to be regular candidate in the next semester. For the purpose of this clause each theory paper and each practical shall be counted as a separate unit.

(c) (i) The make up examination shall be held along with the next corresponding regular semester examinations.

(ii) The regular semester examination shall be held on alternate days.

(iii) A special make up examination for V Semester shall be held along with the regular examination of even semesters (II & IV Semester).

(iv) A special make up examination for VI Semester shall be held after the declaration of the result of VI Semester Examination.

(d) Those candidates who appear and pass in the units at the make up examination shall be awarded the actual marks obtained. But in no case will be awarded more than 60% of maximum marks in the unit(s) irrespective of the marks secured by them in the unit(s).

7. Ex-students:

(a) If a student fails in more than two units of theory papers of the semester examination, but pass in all the practicals, he/she shall be allowed to appear as ex-student. The marks secured in the practicals and course work, laboratory sessionals of the last semester shall be carried over to the next examination.

(b) If a candidate fails in more than two units of theory/practicals at the semester examination, he/she shall appear as an ex-student at the next semester examination in all theory papers, practicals and sessionals.

8. Award of Division:

The division given below shall be awarded on the basis of the total marks obtained from first to sixth semester (all taken together) by the candidate for the degree of MCA.

(i)	Honours	75% or above
(ii)	First Division	65% or above
(iii)	Second Division	Below 65%

9. A candidate shall be allowed to appear at the first/second semester examination as a regular candidate and or as an ex-student for a maximum of two consecutive years. If the candidate is unable to pass the examination in two consecutive years, he will neither be allowed to continue his studies in MCA course nor to re-appear at the same examination.

10. (a) In no case will a candidate, who has not passed finally after six years from the date of enrolment be allowed to continue the course.

(b) Provided that the Vice-Chancellor in consultation with the Head of the Department may waive this limit of six years in the case of candidates who could not complete their MCA course in one stretch. The reason for granting exemption shall be recorded in writing. Such extension shall not exceed one year.

LIST OF TEACHING STAFF

ASSOCIATE PROFESSOR

1. Dr. N.C. Barwar B.E., ME, Ph.D., MISTE, MIE
2. Dr. Rajesh Purohit (HEAD) B.E., ME, Ph.D., MISTE, MIE
3. Dr. Anil Gupta BE (Hons), M.Tech., Ph.D., MCSI, MISTE

ASSISTANT PROFESSOR

1. Shri Shrwan Ram B.E., M.E.
2. Dr. (Mrs.) Rachna MCA, Ph.D.
3. Dr. Alok Singh Gahlot B.E. MS, Ph.D.

MASTER OF COMPUTER APPLICATIONS
TEACHING AND EXAMINATION SCHEME, 2015

FIRST SEMESTER

A. Theory Paper	L	T/P	Exam Hours	Course/ Lab Work	Max. Marks
CSE 511A - Numerical & Statistical Methods (M)	3	1	3	20	100
CSE 512A - Digital Logic (M)	3	1	3	20	100
CSE 513A - C++ Programming (M)	3	1	3	20	100
CSE 514A - Introduction to Internet Technology (M)	3	1	3	20	100
CSE 515A - Discrete Mathematical Structures (M)	3	1	3	20	100
Total (A)	15	5		100	500
B. Practical and Sessionals:					
CSE 511B - Numerical & Statistical Methods Laboratory (M)	-	2		25	75
CSE 512B - Digital Logic Laboratory (M)	-	2		25	75
CSE 513B - C++ Programming Laboratory (M)	-	2		25	75
CSE 514B – Internet Technology Laboratory (M)	-	2		25	75
Total (B)	-	8		100	300
Grand Total (A+B)	15	13		200	800

Total Marks: 1000

CSE 511A – NUMERICAL AND STATISTICAL METHODS (M)

3L, 1T 3 Hours, 100 Marks

Numerical Methods

Numerical Solution Algebraic and Transcendental equations: Bisection Methods, Method of false position, Iteration Method, Newton-Raphson Method and Bairstow's Methods (convergence of these methods without proof).

Linear Systems of Equation: Consistent, independent and ill condition equations; Gauss elimination method, Gauss-Seidel Method.

Numerical Solution of Ordinary Differential Equation: Taylor's series method, Euler and Euler modified methods, Runge-kutta second and fourth order methods.

Interpolation: Forward and Backward differences, Newton's formulae for interpolation, Gauss's Central Difference formulae, Stirling's formula. Newton divided difference formula and Lagrange's formula.

Curve fitting and Approximation: Least square curve fitting procedures for polynomial, exponential, power and logarithmic curves.

Statistical Methods

Treatment of data: Classification, frequency distribution, Measure of central tendency, Measure of dispersion, moments, Measure of Skewness & Kurtosis.

Probability: Classical & Axiomatic approach of probability, Additive theorem conditional probability, multiplication theorem, independent events, Baye's theorem.

Basic concept of Random variable and their probability distribution: Binomial, Poisson & Normal distribution.

Testing of hypothesis: Type I and II error. Large sample tests, application of t and χ^2 sampliing distribution in testing.

Note: The teaching approach shall be algorithmic.

CSE 512A – DIGITAL LOGIC (M)

3L, 1T 3 Hours, 100 Marks

Number systems, binary, octal, decimal, hexadecimal, conversion between various radix, arithmetic operations, gray code, excess-3 code, self complementary code.

Boolean algebra, simplification of boolean expressions, k-map, tabulation method. Implementation of boolean functions with logic gates, universal gates, combinational circuits, half adder, full adder, BCD adder, comparator, multiplexer, demultiplexer, encoder, decoder, priority encoder.

Sequential logic, flip-flops, registers, up/down counters, BCD/Binary counters, Analysis and design of synchronous sequential systems, state assignment, races and hazards. Introduction to threshold logic & relay circuits.

Introduction to switching devices. Positive and Negative logic of OR, AND, NOR, NAND. Exclusive OR and Exclusive NOR gates. RTL, DTL, DCTL, TTL, RCTL, ECL, HTL, MOS and CMOS logic circuit and their realization. Speed and delay in logic circuit and their realization. Fan-in, Fan-out, wired-or, wired-and, and noise immunity.

CSE 513A – C++ PROGRAMMING (M)

3L, 1T 3 Hours, 100 Marks

Introductory idea of C Programming.

Basic concept of Object Oriented Programming, concept of class, object, inheritance, encapsulation, polymorphism.

Structure of C++ program, token and identifier, data types, operator, type conversion and type cast operators. Console I/O cin and cout. Control statements, if, loops, break, continue, goto.

Functions- Declaration, definition, parameter passing, reference variable, overloaded functions, inline functions, default arguments, return by reference.

Classes and objects, class definition, object declaration, constructors and destructors, dynamic initilization of objects, copy constructors.

Operator overloading, unary, binary operator, data and type conversions, conversion among objects, basic types and different classes.

Derived classes and base classes, protected access specifier, derived class constructors, abstract base class, inheritance – public and private inheritance, multiple inheritance, member function, constructor, ambiguity in inheritance.

Pointers, addresses, pointers and strings, memory management using new and delete operator.
Virtual functions, friend function, static function, dynamic binding.

File handling, File Operation functions and attributes.

Introduction to streams, templates and exception handling.

CSE 514A - INTRODUCTION TO INTERNET TECHNOLOGY (M)

3L, 1T 3 Hours, 100 Marks

Introduction – basic computer communication, modems, type of Networks-LAN, MAN, WAN Network topologies.

Concept of switching, circuit, message and packet. Internetworking devices, repeater, bridge, router, gateways. Basic idea of client/server computing, naming computers and domain names. Concept of File Transfer Protocol, Remote Login, E-mail, WWW and their working. Introduction to search engines.

Hypertext Markup Language, Forms, Frames, Plugins, CGI-programs using Perl. Introduction to DHTML. CSS. Introduction to AJAX. Practice of website design and the necessary tools for website designs.

JAVA Script : Output Statements, Comments, Variables and Data Types, Objects, Functions, Operators, Comparisons, Conditions, Switch, Looping, Breaks, Errors, Validation, Objects, Number, String, Date, Array, Boolean, Math, RegExp, JS Window, Screen, Location, History, Navigator, PopupAlert, Timing, Cookies, Libraries, jQuery, Prototype, HTML DOM Objects.

CSE 515 A - DISCRETE MATHEMATICAL STRUCTURES (M)

3L, 1T 3 Hours, 100 Marks

Introduction to Discrete Mathematical Structures, Formal Methods: Induction and Analogy, Abstraction.

Sets, sequences, empty set, power set, operations on sets, Venn diagram, ordered pair, principle of inclusion and exclusion. Counting and Combinatorics.

Introduction to mathematical logic, statements and notations, well-formed formulas, tautologies, tautological implications, normal forms, the theory of Inference for statement calculus, predicate logic.

Graph Terminology, Degrees of Nodes, Isomorphic Graphs, Dijkstra's Shortest Path Algorithm, Planar Graphs, Eulerian Graphs, Hamiltonian Graphs, Traveling Salesman Problem.

Trees, Introduction, Rooted and Other Trees, Representation of Prefix Codes, representation of Arithmetic Expression, Representation of Prefix Codes, Spanning Trees, Traversing Binary Trees, Binary Search Trees.

Relations, matrix and graph representation of relation, properties of relations, partitions. Equivalence Relations, Compatibility Relations, Composition of Binary Relations, Transitive and symmetric closures, partially ordered set, lattices. Recurrence relations.

Functions, Matrix representation of functions, composition of function, inverse function.

Algebraic Structures, General properties of algebraic systems, groupoids, semigroup, monoids, group, rings. Applications of algebra to control structure of a program. Homomorphism, congruences, admissible partitions. Groups and their graphs.

MASTER OF COMPUTER APPLICATIONS
TEACHING AND EXAMINATION SCHEME, 2015

SECOND SEMESTER

A. Theory Paper	L	T/P	Exam Hours	Course/ Lab Work	Max. Marks
CSE 521A - Computer Organisation & Architecutre (M)	3	1	3	20	100
CSE 522A - Java Programming(M)	3	1	3	20	100
CSE 523A - Data Structures (M)	3	1	3	20	100
CSE 524A - Database Management Systems (M)	3	1	3	20	100
CSE 525A - Computer Graphics (M)	3	1	3	20	100
Total (A)	15	5		100	500
B. Practical and Sessionals:					
CSE 521B - Computer Architecture Laboratory (M)	-	2		25	75
CSE 522B - Java Programming Laboratory (M)	-	2		25	75
CSE 523B - Data Structure Laboratory (M)	-	2		25	75
CSE 524B - Data Base Management Laboratory (M)	-	2		25	75
CSE 525B - Computer Graphics Laboratory (M)	-	2		25	75
Total (B)	-	10		125	375
Grand Total (A + B)	15	15		225	875

Total Marks : 1100

CSE 521A - COMPUTER ORGANISATION AND ARCHITECTURE (M)

3L, 1T 3 Hours, 100 Marks

Representations of positive and negative, integer, fixed point and floating point numbers. Arithmetic Operation with normalized floating point numbers, precision and range of representation, IEEE 754 standard floating point format, Character Codes (ASCII & EBCDIC)

Memory device characteristics, Random Access Memory Organisation, static RAM, dynamic RAM, dimension of memory access, ROM, PROM, EPROM, EEPROM. Hierarchy of memories, associative memory, cache memories.. Serial Access Memories, Magnetic Tape, Direct Access Memories, Magnetic Disk and Optical Memory.

Construction & Working of Video Display unit, Line Printer, Chain/Band printer, Dot matrix, Daisy Wheel, Laser Printer and Inkjet printer, Plotter.

Basic Processor organization, instructions and addressing modes. Concept of control units, execution of instructions, Hardwired and Microprogrammed control, ALU concept, array multiplier, Booth multiplication algorithm, division by multiplication.

Interconnection of computer components, buses, bus formats and operations, Control of data transfer, handshaking, bus scheduling, standard bus interfaces. Data transfer, status checking, DMA, Interrupt, Nested Interrupts.

CSE 522 A - JAVA PROGRAMMING (M)

3L, 1T 3 Hours, 100 Marks

Overview of object oriented concepts in JAVA.

Introduction – Java & internet, java applets and its applications, Java features like – security, portability, byte code, java virtual Machine, object oriented, robust, multi threading, architectural neutral, distributed & dynamic.

Data types and control structures, operators, arrays, Java methods and classes.

Inheritance of procedures and data, Packages and interface, exception handling, multi-threaded programming – thread priorities, synchronization, messaging, creating and controlling of threads. IO and applets.

String handling and various string functions.

Java utilities like java.lang, java.util and their uses, java.io, basics of networking using Java.

Java applets and their use, event handling, AWT and working with windows.

Introductory study of Java Beans, Servelets and JDBC.

CSE 523 A - DATA STRUCTURES (M)

3L, 1T 3 Hours,100 Marks

Introduction to primitive and composite data structures.

Linear data structure, Array, stack, queue, their applications and implementation using sequential and linked storage representation.

Linear linked list, doubly linked list, circular linear linked list and generalised lists and applications.

Concept of non-linear data structures, Tree, graph, set and their representation, Binary Tree, different techniques of tree traversal, applications of tree and graph such as Polish notation, concept of heap.

Sorting, searching algorithms and comparative study of different searching and sorting techniques such as selection sort, heap sort, bubble sort, quick sort,insetion sort, merge sort and radix sort. Linear search and binary search, hashing, external sorting. Time and Space complexity, Asymptotic notations (Big-O,θ,Ω, and small-o).

CSE 524 A - DATABASE MANAGEMENT SYSTEMS (M)

3L, 1T 3 Hours, 100 Marks

Purpose of data base system, data abstraction, data models, data independence, data definition language, data manipulation language, data base manager, data base administrator, data base users, overall system structure.

E-R Models, entities and entity sets, relationships and relationship sets, attributes, mapping constaraints, keys, E-R diagrams, reducing E-R diagrams to tables, generation, aggregation, design of an E-R data base scheme

Basic concept of object oriented model, New database applications, object structure, class hierarchy, multiple inheritance, object identity, object containment, physical organization, object oriented queries, scheme modification.

File and system structure, overall system structure, file organization, logical and physical file organization, sequential, random, hierarchical, inverted, multilist, Indexing and hashing, B-tree index files

Introduction to distributed database. Introduction to SQL Query and SQL joins.

CSE 525 A - COMPUTER GRAPHICS (M)

3L, 1T 3 Hours, 100 Marks

Introduction to computer graphics. Application areas of graphics. Display devices, frame buffer, display file, color display. Points, line, circle generation algorithms.

Representation of polygons. filling polygon, scan line algorithm, seed fill algorithm. 2-D Transformations, primitive and composite transformations., viewing transformation, clipping algorithm for line using Sutherland and Cohen, polygon clipping, text clipping.

Interactive computer graphics, user dialogue, Input modes, Interactive picture construction technique, Curves and curved surface, interpolation and approximation curve, continuity of curve.

Concept of 3-D, representation of 3-D object, 3-D display device, 3-D transformation. Parallel, perspective, isometric projections. 3-D clipping Sutherland and Cohen algorithm. Hidden lines and surfaces removal technique using Z-buffer, Painter algorithm.

MASTER OF COMPUTER APPLICATIONS
TEACHING AND EXAMINATION SCHEME, 2016

THIRD SEMESTER

A. Theory Paper	L	T/P	Exam Hours	Course / Lab Work	Max. Marks
CSE 611A - Microprocessors (M)	3	1	3	20	100
CSE 612A - RDBMS (M)	3	1	3	20	100
CSE 613A - Advanced Java (M)	3	1	3	20	100
CSE 614A - Visual Programming (M) Languages (M)	3	1	3	20	100
CSE 615A - System Software and Operating System (M)	3	1	3	20	100
Total (A)	15	5		100	500
B. Practical and Sessionals:					
CSE 611B Microprocessor Laboratory(M)	-	2	-	25	75
CSE 612B RDBMS Laboratory (M)	-	2	-	25	75
CSE 613B Advanced Java Laboratory (M)	-	2	-	25	75
CSE 614B Visual Programming Laboratory (M)	-	2	-	25	75
CSE 615B System Software & Operating System Laboratory (M)	-	2	-	25	75
Total (B)	-	8		125	375
Grand Total (A+B)	15	13		225	875

Total Marks: 1100

CSE 611A - MICROPROCESSORS (M)

3L, 1T 3 Hours, 100 Marks

Evolution of microprocessors, architecture of 8085 microprocessor, addressing modes, instruction format, instruction set and timing, stack and subroutines, hardware and software interrupts, serial and parallel communication through 8085.

Interfacing with memory, memory maps, memory mapped I/O, I/O mapped I/O. Programable peripheral devices 8255, 8155, I/O programming, interfacing with peripherals like keyboard, display.

Architecture of 8086 microprocessor, concept of segments, internal operation, addressing modes, instruction formats and Instruction set, Assembler directives.

CSE 612 A - RDBMS (M)

3L, 1T 3 Hours, 100 Marks

RDBMS concepts, relations, domains, attributes, schema, keys relational algebra, tuple relational calculus, domain relational calculus.

Domain constraints, referential integrity, functional dependencies. Normalization, first, second, third, BCNF, fourth and fifth normal forms.

Oracle RDBMS, architecture, kernel, system global area (SGA), database writer, log writer, process monitor, system monitor, archiver. Database files, control files, redo log files, oracle utilities.

SQL: Commands & data types, data definition language commands, data manipulation language commands, data query language commands, transaction control language commands, data control language commands.

Joins, equi-joins, non equi-joins, self joins, outer joins, aggregate functions, math functions, string functions, GROUP BY clause, data functions and concepts of null values, subqueries, views.

PL/SQL: Basics of PL/SQL, data types, control structures, database access with PL/SQL, database connection, transaction management, database locking, cursor management, implicit & explicit cursor, error handling, predefined & user defined exceptions, procedures & functions and their overloading, stored procedures & functions, database triggers, package.

CSE 613A - ADVANCED JAVA (M)

3L, IT 3 Hours, 100 Marks

J2EE and J2SE. The birth of J2EE databases. The maturing of Java, Java Beans and Java Message Service.

J2EE multi-tier architecture. Distributed systems, real time transmission, software objects webservices. The tier clients resources and components accessing services.

J2EE multi-tier architecture. Client tier implementation.

Enterprise Java Beans tier implementation. Enterprise information system tier implementation. Enterprise Application strategy. The enterprise application clients, client presentation, client expert validation, client control, duplicate client requests.

Session management, client–side session state, server-side session state.

WebTier and Java Server pages, presentation and processing, the inclusion strategy, style sheets, simplify Error Handling.

Enterprise Java Beans Tier. Entity to enterprise Javabeans relationship, efficient data exchange, eneterprise Java Beans performance. The model view controller (MVC).

Interfaces and inheritance, potential problems with inheritance, maintainable classes, performance enhancements.

J2EE Database Concepts, Data, Database tables, Database schemas, identifying information, decomposing attributes to data, decomposing by example defining data, the art of choosing a name normalizing data, the normalization process grouping data, creating primary keys, functional dependendcy, transitive dependencies, foreign key, referential integrity, art of indexing, an index in motion, drawbacks using an index clustered keys, derived keys selective, exact matches and partial matches searching for phonetic matches.

JDBC objects, JDBC and embedded SQL, Java and XML, Java Servelets, Java server pages, Eneterprise Java Beans.

CSE 614A - VISUAL PROGRAMMING LANGUAGES (M)

3L, 1T 3 Hours, 100 Marks

Dot NET framework overview, the common language runtime, assemblies, events. Use of assemblies, global assemblies, name spaces and DLLs.

Creation of console applications and windows applications:

VB.NET: Control structures, procedures, class fundamentals, properties, adding menus to programs, Inheritance, Interface, Delegates, Arrays, lists, collections, exception handling, files, directories, multithreading, working with Files and Directories.

VC #.NET: Language fundamentals, data and value types, classes and objects, static and overloading methods, working with strings, handling delegates and events.
Interfaces, Arrays, System.Collections, Stacks and queues, Inheritance, Abstract class, nesting classes, Threads.

File system I/O & streams: Directories & file classes, Stream reader and Stream writer.

Database programming: Basic idea of ADO.NET Architecture, Accessing data, Data Grids, Datasets and Data Adapters.

CSE 615A – SYSTEM SOFTWARE AND OPERATING SYSTEM (M)

3L, 1T 3 Hours, 100 Marks

Concept of concurrency, precedence graph. Review of process concept, hierarchy of processes, critical section problem, semaphores, classical process coordination problem and interprocess communication.

Assembelers, introduction to general design procedure, data structure, format of Database, algorithm, modularity, table processing.

Macro language and macro processor, features - macro instruction, arguments, conditional macro expansion, macro calls within macros, instructions for definition of macros. Implementation of a restricted facility - two pass algorithm, single pass algorithm.

Loaders, loader schemes – 'Compile - and - Go' loaders, general loader, scheme, absolute loaders, subroutine linkages, reloacting loaders, direct-linking loaders. Design of Direct Linking Loader. specification of data structures,Format of databases, algorithm

Functions of Operating System, operating system concepts, process, files, systems calls. CPU Scheduling: scheduling concepts, algorithms.

Memory management, contiguous allocation, swapping, multiple partitions, paging, segmentation, combination of paging and segmentation.

Virtual memory management, demand paging, page replacement and virtual memory concepts. Page replacement and allocation algorithms.

Note: Platform for laboratory shall be Linux OS.

MASTER OF COMPUTER APPLICATIONS
TEACHING AND EXAMINATION SCHEME, 2016

FOURTH SEMESTER

A. Theory Paper	L	T/P	Exam Hours	Course/ Lab Work	Max. Marks
CSE 621A - Computer Networks (M)	3	1	3	20	100
CSE 622A – Compiler Design (M)	3	1	3	20	100
CSE 623A - Artificial Intelligence (M)	3	1	3	20	100
CSE 624A - Software Engineering (M)	3	1	3	20	100
CSE 625A - Linux Operating System (M)	3	1	3	20	100
Total (A)	15	5		100	500
B. Practical and Sessionals:					
CSE 621B - Computer Networking Laboratory (M)	-	2		25	75
CSE 622B - Compiler Design Laboratory (M)	-	2		25	75
CSE 623B - Artificial Intelligence Laboratory (M)	-	2		25	75
CSE 624B - Software Engineering Laboratory (M)	-	2		25	75
CSE 625B - Linux Operating System Laboratory (M)	-	2		25	75
Total (B)	-	10		125	375
Grand Total (A+B)	15	15		225	875

Total Marks : 1100

CSE 621 A - COMPUTER NETWORKS (M)

3L, 1T 3 Hours, 100 Marks

Network architecture, ISO-OSI architecture, IBM SNA architecture, their functions, and implementation. Data communication concepts. Types of signals encoding and decoding techniques, signal bandwidth requirements, signal formats used in LAN, switching and broadcast techniques.

Error detecting and correcting code, Hamming code, parity generation and detection, single error detection and correction, single error correction and double error detection code.

Transmission media, twisted pair, coaxial cable, optical fibre. LAN topologies: bus, ring, and star etc.

Queuing theory, queuing models, and Poisson statistics.

LAN access techniques: ALOHA, CSMA, CSMA/CD, token-ring and token-bus.

Network interconnection issues, internetworking, bridges, routers, introduction to TCP/IP protocol family. Issues related to network reliability and security.

Network Security, encryption algorithms RSA, DES TDES, AES, protocols HTTPS, BGP, Firewalls, Digital signature and checksum.

CSE 622A – COMPILER DESIGN (M)

3L, 1T 3 Hours, 100 Marks

Introduction to phases and passes of compiler. Regular expression, regular grammer, context.

Lexical analyzer , input buffering, specification and recognition of tokens, introduction to finite automata, regular expressions to NFA, minimizaton of DFA , keywords and reserve word policies.

Syntax analyzer , context free grammars , top down parsing, recursive descent parser, LL(1) parser. Bottom up parsing.

Syntax directed translation schemes, dependency graph, construction of syntax trees.

Errors, lexical phase errors, syntactic phase errors.

Intermediate languages, postfix notation, three address code- quadruples, triples and indirect triples.

Translation of assignment statements, boolean expressions, statements that alter flow of control, array references.

Symbol tables, operation on symbol tables, symbol table organisation.

Run time storage management, storage allocation and referencing data in block structured languages.

Code optimization, sources of optimization, loop optimization, DAG and optimization of basic blocks.

Code generation, a machine model, next use information, register allocation and assignment, a simple code generator.

CSE 623 A - ARTIFICIAL INTELLIGENCE (M)

3L, 1T 3 Hours, 100 Marks

Concept of intelligence. Artificial intelligence, definition, Turing test, areas of application.

Search techniques, state space, Production rules, problem characrtristics, production system characteristic, depth first, breadth first search methods and their analysis, Heuristic search method, generate and test, hill climbing, best first method, graph search, AND OR search methods, constraint satisfication , backtracking.

PROLOG, objects & relationships, domains, predicates, clauses, goals, rules, controlling program flow, backtracking and place markers, conjunction and disjunction of goals, unification, cut and fail

Introduction to list and string processing and dynamic databases Concept of knowledge, characteristics and representation schemes, Logic, propositional and predicate calculus, resolution,semantic nets, frames, conceptual dependency, scripts. Monotonic reasoning, logical reasoning, induction, natural deduction.

Nonmonotonic reasoning- default reasoning, minimalist reasoning, statistical reasoning - Baye's theorem, certainty factors, dempster shafer theory, Fuzzy logic.

Concept of learning, inductive and deductive. Knowledge acquisition, rote learning, discovery, analogy.

Concept of Expert system, need for an expert system, Component and categories of an Expert system. Stages in the development of an expert system.

CSE 624 A - SOFTWARE ENGINEERING (M)

3L, 1T 3 Hours, 100 Marks

Introduction, Software Engineering Challenges, Software Quality – Internal Qualities, External Qualities, Software Quality Assurance. Software Process, Characteristics of Software Process, Development Process Models- waterfall, prototyping, iterative, spiral.

Project Management Process, Inspection Process, Software Configuration Management process, Requirement Change Management process**.**

Analysis tools – DFD, Decision Table, Software Requirement Analysis, Software Requirement Specification (SRS), Role of SRS, Component and Qualities of SRS.

Process Planning, Effort Estimation – uncertainties, COCOMO model, Project Scheduling, Team Structure, Quality Plan, Risk Management, Project Monitoring Plan.

Software Architecture, Role views, Function oriented design – Top down and Bottom up strategies. Coupling, Cohesion. Concept of Object Oriented Analysis and Design, Unified Modeling Language (UML).

Detailed Design, Process Design Language, Logic/Algorithm Design, Design verification – walkthroughs, review.

Coding, Programming principle & guidelines, coding standards, Incremental Coding, Pair Programming, Refactoring.

Software testing, Fundamentals of testing, Black Box, White Box testing, Testing Process – level of testing, test plan, test case, defect logging and tracking.

Software Metrics, role, metrics in various phases – function points, quality metrics, stability metrics, cyclomatic complexity cohesion metric.

CSE 625 A - LINUX OPERATING SYSTEM (M)

3L, 1T 3 Hours, 100 Marks

Introduction to Linux, Architecture of Linux Operating System, booting, login, Shell - programming, X-windows.

File system :-descriptors, Sharing, type, Access permission, ownership, sticky bit, size, truncation symbolic link, directories, system calls for file processing like ,open, create, close, lseek, read, write, stat, fstat, chmod, chown, link, unlink.

Process management, creation, identification, termination, Zombie process, process, attributes, user identification, states and priorities. System calls like fork, exec, wait, nice, exit.

Signals, signal handling, sending, receiving, blocking, system calls like signal, kill, sleep, sigsetjump and siglongjump. Interprocess communication, pipes, FIFOs, sockets, socket addressing interface and programming

System Administration, root login, super user, configuration files and log files, GUI and command line modules for system administration, hardware configurations, file system, monitor of system performance. Creating users and groups and user managements. Startup and shut downs. Linux security issues.

Internet and web service tools, E-Mail, Remote Login and FTP. Linux networks and server setup, LAN, connection with internet, setting up routers, proxy servers, print servers, file server, mail server, FTP server, web server and news server. DHCP and NIS, database server. Introduction to Python.

MASTER OF COMPUTER APPLICATIONS
TEACHING AND EXAMINATION SCHEME, 2017

FIFTH SEMESTER

A. Theory Paper	L	T/P	Exam Hours	Course/ Lab Work	Max. Marks
CSE 711A- Design and Analysis of Algorithms (M)	3	1	3	20	100
CSE 712A- Internet Programming (AMP) (M)	3	1	3	20	100
CSE 713A - Web Technologies (M)	3	1	3	20	100
CSE A- Elective-I	3	1	3	20	100
CSE A- Elective-II	3	1	3	20	100
Total (A)	15	5		100	500
B. Practical and Sessionals:					
CSE 712B- Internet Programming Laboratory (M)	-	2		25	75
CSE 713B- Web Technologies Laboratory (M)	-	2		25	75
CSE B Elective-I Laboratory	-	2		25	75
CSE B Elective-II Laboratory	-	2		25	75
CSE 739B Minor Project (M)	-	2		25	75
Total (B)	-	10		125	375
Grand Total (A+B)	15	15		225	875

Total Marks: 1100

Elective I & II:
1. CSE 731A – Distributed Database (M)
2. CSE 732A – Soft Computing (M)
3. CSE 733A – Network Management (M)
4. CSE 735A – Mobile Computing (M)
5. CSE 736A – Data Warehousing & Data Mining (M)
6. CSE 737A – Multimedia (M)
7. CSE 738A – Embedded Systems (M)
8. CSE 739A – Bioinformatics (M)

Elective I & II Laboratory:
1. CSE 731B – Distributed Database Laboratory (M)
2. CSE 732B – Soft Computing Laboratory (M)
3. CSE 733B – Network Management Laboratory (M)
4. CSE 735B – Mobile Computing Laboratory (M)
5. CSE 736B – Data Warehousing & Data Mining Laboratory (M)
6. CSE 737B – Multimedia Laboratory (M)
7. CSE 738B – Embedded Systems Laboratory (M)
8. CSE 739A – Bioinformatics Laboratory (M)

CSE 711 A - DESIGN AND ANALYSIS OF ALGORITHMS (M)

3L, 1T 3 Hours, 100 Marks

Introduction: Algorithm and its specification, performance analysis and Randomized Algorithms. Random access machines (RAM), computational complexity of RAM program. Time and Space complexity, Asymptotic notations (Big-O,θ,Ω, and small-o).

Design of Efficient Algorithms: Designing Methods. *Divide and conquer*: Binary Search, finding maximum and minimum, Merge Sort, Quick Sort. *Greedy methods*: Knapsack problem, tree vertex splitting, minimum cost spanning tree. *Dynamic programming:* Matrix Chain Multiplication, Longest Common Subsequence, Multi Stage Graph and 0/1 Knapsack Problem. *Branch and Bound:* Traveling Salesman Problem and Lower Bound Theory.

Sorting and Comparative study**:** Algorithms and comparisons of Radix sort, Heap sort, Merge sort and Quick sort. Order statistics and expected time for order statistics.

Matrix multiplication and related operations: Strassen's Matrix Multiplication Algorithm, inversion of matrices, LUP decomposition of matrices and its applications.

Advanced Trees: Definitions Operations on Weight Balanced Trees (Huffman Trees), 2-3 Trees and Red- Black Trees. Augmenting Red-Black Trees to Dynamic Order Statistics and Interval Tree Applications.

Graph Theory Algorithms: Algorithms for Connectedness, Finding all Spanning Trees in a Weighted Graph and Planarity Testing, Breadth First and Depth First Search, Vertex cover problem.

Problem Classes: NP, NP-Hard and NP-Complete. Decision Problems. Polynominal reductions. Introduction to Randomized Algorithms

CSE 712A – INTERNET PROGRAMMING (AMP) (M)

3L, 1T 3 Hours, 100 Marks

PHP Language structure, variables, data types, operators expressions. Control flow, switch, loops, Code blocks. Arrays, objects, string operations, Forms. Combining HTML and PHP Code. Mail, file uploads, handling cookies. Working with files and directories.

MySQL, data types, table creation. Commands: Insert, select, update, replace, delete etc. Using transactions and stored procedures. Interacting with MySQL using PHP. Managing single mailing list, discussion forums, cart mechanism.

Apache server, logging and monitoring web server Activity, Application Localization, environmental modifications, localized page structures.

CSE 713A – WEB TECHNOLOGIES (M)

3L, 1T 3 Hours, 100 Marks

Understanding Microsoft .NET Framework and ASP.NET, Creating components in Visual C#. CLR, Framework Class Library, Undocumented Types.

Programming the .NET Framework, Common Types, Math, Strings, Collections, Regular Expressions. Core Types, Serialization, Remoting, Graphics, Rich Client Applications, Globalization, Configuration, Advanced Component Services.

Multithreading, Thread Synchronization, Inter-thread Communication and Monitor. Delegates & Events. Validating User Input.

Creating a Connection to the Database, Displaying a DataSet, List-Bound Control, Paging and Selection, DataGrid Control, Accessing Data with DataReaders and SqlDataReader. Overview of Stored Procedures.

Managing State, State management, Application and Session Variables, Cookies and Cookieless Sessions. Configuring, Optimizing. Using the Cache object.

Reading and Writing XML Data, Overview of XML Architecture, DataSet Object, XML Web Server Control, Reading, Transforming, and Displaying XML, Nested Data. Creating an XML Web Service.

Securing a Microsoft ASP.NET Web Application, Web Application Security Overview, Windows-Based Authentication, Forms-Based Authentication, Passport Authentication, Registering New Users, Permitting Users to Sign Out.

AJAX.NET Architecture, Working with AJAX Pro and Controls, Accordion, Calendar, CascadingDropDown, CollapsiblePanel, Filtered TextBox, Numeric Up Down, Modal Popup, Popup Control. Page_Load Event and Click Event Procedure, Adding server controls to an ASP.NET Web Form basics, handling text and numbers.

ELECTIVE – I & II

CSE 731 A - DISTRIBUTED DATABASES (M)

3L,1T 3 Hours, 100 Marks

An overview of distributed databases, comparison with centralized databases.

Review of databases and computer networks.

Architecture for distributed database, types of data fragmentation, distribution transparency for Read Only and update applications, Integrity constraints in distributed database.

Distributed database design frameworks, the design of database fragmentation and allocation of fragments.

Equivalance transformation for queries, transforming global queries into fragment queries, distributed grouping and aggregate function evaluation, parametic queries.

A framework for query optimization, join queries and general queries.

Management of distributed transactions, atomicity and concurrency control for distributed transactions.

Foundation of distributed concurrency control based on timestamps.

Optimistic methods for distributed concurrency control

CSE 736A – DATA WAREHOUSING AND DATA MINING (M)

3L, 1T 3 Hours, 100 Marks

Expanding Universe of data, data mining v/s Query tools, and practical applications.

Self-learning computer system, machine learning and concept learning.

Introduction to data mining and data warehousing, Data mining tools and techniques, real life applications of data mining, data warehouse Design issues, architecture of data warehouse.

Object oriented data warehousing and their performance monitoring.

Decision support system, component of decision support, designing decision support system. Integration with data mining, cost justification.

Concept of multidimensional database technology.

Knowledge discovery process, data selection, cleaning, enrichment, coding, mining

Visualization techniques, likelihood and distance, K-nearest neighbor methods, association rules.

Neural networks and genetic algorithms applications in data mining.

Aspects learning algorithms, Learning compression of data sets, Information

Content of message, Noise and redundancy, significance of noise, fuzzy databases from Relation to tables, from keys to statistical dependencies.

Knowledge management system, definition, functionalities, search engine and data mining. Text mining, text analysis techniques. Web analysis, multimedia data mining. Future Prospectus.

CSE 737 A – MULTIMEDIA (M)

3L, 1T 3 Hours, 100 Marks

Introduction to multimedia and its applications, Basic requirements for multimedia, Multimedia building blocks – Text, Sound, Images, Animation, Video and related Tools.

Concepts of Hypertext/Hypermedia, Multimedia Applications, Authoring tools, Hardware, Image file formats their types and conversions. Sound file formats their types and conversions. MIDI Files, Generating sound. Virtual Reality and its industrial Aspects.

CD rendering standards for Text, Audio and Video. Basic idea of DVD technology.

Multimedia APIs, Waveform and Auxiliary audio, MIDI, Audio mixers, Media Control Interface (MCI), Multimedia File I/O, AVI File I/O, Joystick, Timers

3D Graphics fundamentals, real-time 3D, non-real-time 3D,
OPENGL: Introduction to the OpenGL API, Drawing shapes, Animation, double buffering. Drawing in 3D-space: Lines, Points and Polygons, Moving around in space:

Coordinate transformations, Color, Lighting, and material, Raster graphics in OpenGL. Texture mapping, 3D modeling and object composition. Visual effects: Blending and Fog. Basic idea of Interactive graphics.

CSE 738 A - EMBEDDED SYSTEMS (M)

3L, 1T 3 Hours, 100 Marks

An overview of Embedded system. Requirements, Challenges issues, and trends in software development.

Application market segments, control systems and industrial automation, Data communication, Networked Information Appliances, Telecommunications.

Hardware Architecture: Processor, Memory, Latches and buffers, ADC & DAC, Application specific control, Display units, Keypads, DSP.

Microcontrollers and their applications, Communication interfaces : Serial interface, IEEE 1394, USB, Infra red, Ethernet and PCI bus.

Embedded system development process: requirement, system architecture, operating system and processors. Development platform and tools, HLL support Cross compilers Linux and Windows CE based development Tools. Mobile/ handheld systems.

Basic idea of embedded system application like mobile networks, GPS, Real time systems, Database applications, Networked and JAVA-enabled information appliances, Mobile JAVA applications.

CSE 739A-BIOINFORMATICS (M)

3L, 1T 3 Hours, 100 Marks

Introduction to Molecular Biology and Biological chemistry: Genetic material, Gene structure and information content, protein structure and functions, nature of chemical bonds, molecular biology tools, genomic information content.

Data Searches and pair-wise alignments: Dot plots, Gaps, Dynamic Programming, database searches and family of algorithms –BLAST and FASTA.

Substitution patterns: Pattern substitution with in genes, estimating substitution numbers, variation of evolutionary rates between genes, molecular clocks.

Phylogenetics: Its history, phylogentic trees, distance matrix methods. Character-based methods – parsimony, ancestral sequences. Strategies for faster searches – branch and bound, heuristic. Consensus trees, parametric tests. The tree of life.

Genomics and gene Recognition: prokaryotic and eukaryotic genomes and their structures, open reading frames, gene expression.

Protein and RNA structure prediction: Amino-acids, polypeptide composition, structure. Algorithms for modeling protein folding, and reverse protein folding.

Information integration for life science discovery: Nature of biological data, data sources, challenges in information integration.

MASTER OF COMPUTER APPLICATIONS

TEACHING AND EXAMINATION SCHEME, 2017

SIXTH SEMESTER

		L	T/P	Exam Hours	Course/ Lab Work	Max. Marks
CSE 721 B	System Design Project (M)	-	-	-	100	200
CSE 722 B	Seminar (M)	-	-	-	25	75
	Total				125	275

Total Marks: 400
Grand Total of Marks for MCA: 5800