UNIVERSITY OF KOTA

M.SC. COMPUTER SCIENCE EXAM. – 2017-18

Duration: 2 years

Eligibility: Graduation in any stream (Under 10+2+3 Scheme) with Minimum of 50% marks (45% for candidates belonging to the reserved category SC/ST/OBC)

Selection: Common Entrance Test conducted by University of Kota.

Scheme of Examination and Course of Study

1. Number of papers and the maximum marks for each paper/practical are shown in the syllabus for the subject concerned. It will be necessary for a candidate to pass in the theory part as well as in the practical part (wherever prescribed) of a subject/Paper separately.
2. The candidate shall be declared as pass in a semester examination. If he/she secures (i) at least 36% marks in the aggregate of all the papers prescribed for the examination and (ii) at least 36% marks in practical's/wherever prescribed at the examination, provided that if a candidate fails to secure at least 25% marks in each individual paper work. Wherever prescribed, he/she shall be deemed to have failed at the examination not withstanding his/her having obtained the minimum %age of marks required in the aggregate for the examination. Division shall be awarded at the end of the Final Examination taken together, as noted below:

   First Division 60% (On the aggregate marks taken)

   Second Division 48% (On the aggregate marks taken)
3. If a candidate clears any papers(s)/practical prescribed at the Examination after a continuous period of three years, then for the purpose of working out his division the minimum pass marks only viz. 25% (36% in the case of Practical) shall be taken into account in respect of such paper(s)/Practical(s)
4. A candidate failing at any one semester may be provisionally admitted to the next semester class. Provided that he passes in at least 50% papers.
5. A candidate may be allowed grace marks in only one theory papers up to the extent of 1% of the Total marks prescribed for that examination.

Theory:

I. **Assignments:** 40% of the internal assessment marks for each theory paper will be awarded on the basis of performance in the assignments regularly given to the students, and its records.

II. **Internal Examination:** 40% of the total Internal Assessment marks for each theory paper will be awarded on the basis of performance in written examination conducted by the faculty, one at the end of fourth month and another at the end of eighth month.

III. **Seminar/Oral examination:** 10% of the total internal assessment marks for each paper will be awarded on the basis of performance either in a seminar or internal viva-voce.

IV. **Overall performance:** 10% of the total internal assessment marks will be awarded for each paper on the basis of performance and conduct in the classroom.

TEACHING AND EXAMINATION SCHEME FOR
M.Sc. Computer Science – 2017-18
(Applicable for students admitted in Session 2017-18)

MCS Semester- I

S. No.	Subject Code	Name of Paper	Credit	Contact Hrs.			Internal Marks	External Marks	Total Marks
				L*	T*	P*			
1.	MCS 101	Introduction to Computer and PC Software	4	4	0	0	30	70	100
2.	MCS 102	Programming with C	4	4	0	0	30	70	100
3.	MCS 103	Discrete Mathematics	4	4	0	0	30	70	100
4.	MCS 104	Database Management Systems	4	4	0	0	30	70	100
5.	MCS 105	Lab on MS Office, PC Software &'C' Programming	9	0	0	12	00	100 (50+50)	100
		Total Credit	25	Total Marks					500

L* = Lecture T* = Tutorial P* = Practical

MCS Semester- II

S. No.	Subject Code	Name of Paper	Credit	Contact Hrs.			Internal Marks	External Marks	Total Marks
				L*	T*	P*			
1.	MCS 201	Operating Systems	4	4	0	0	30	70	100
2.	MCS 202	Programming with Java	4	4	0	0	30	70	100
3.	MCS 203	Data Structures	4	4	0	0	30	70	100
4.	MCS 204	System Software	4	4	0	0	30	70	100
5.	MCS 205	Lab on Java & OS	9	0	0	12	00	100 (50+50)	100
		Total Credit	25	Total Marks					500

L* = Lecture T* = Tutorial P* = Practical

MCS Semester- III

S. No.	Subject Code	Name of Paper	Credit	Contact Hrs.			Internal Marks	External Marks	Total Marks
				L*	T*	P*			
1.	MCS 301	Advanced Database Management System	4	4	0	0	30	70	100
2.	MCS 302	Software Engineering	4	4	0	0	30	70	100
3.	MCS 303	Web Technology	4	4	0	0	30	70	100
4.	MCS 304	Computer Networks	4	4	0	0	30	70	100
5.	MCS 305	Lab on Oracle & HTML	9	0	0	12	00	100 (50+50)	100
		Total Credit	25	Total Marks					500

L* = Lecture T* = Tutorial P* = Practical

MCS Semester- IV

S. No.	Subject Code	Name of Paper	Credit	Contact Hrs.			Internal Marks	External Marks	Total Marks
				L*	T*	P*			
1.	MCS 401	Elective – I	4	4	0	0	30	70	100
2.	MCS 402	Elective – II	4	4	0	0	30	70	100
3.	MCS 403	Major Project*	12	4	0	0	200	100	300
		Total Credit	20	Total Marks					500

L* = Lecture T* = Tutorial P* = Practical

List of Elective - I

401. 1. Client Server Computing
401. 2. Cloud Computing
401. 3. Real Time System

List of Elective - II

402. 1. Wireless Technology
402. 2. System Testing
402. 3. Natural Language Processing

Note: Student have to elect one elective paper from each list**.**

***** Major Project can be a group activity. Group of maximum 03 students can complete the project and it will be evaluated by 01 internal examiner and a panel of external examiners appointed by the university.

M.Sc. Computer Science

M.SC. 101 INTRODUCTION TO COMPUTER AND PC SOFTWARES

Duration : 3 Hrs. **Min marks: 36** **Max. Marks: 100**

Unit – I

Basic computer Organization : Arithmetic, logic, control and memory units, Internal representation of information, characters and codes, memory access, input and output units conversational devices, basic architecture of a CPU, Instruction format. Fetch and execute cycle.
Addressing modes. Control unit architecture.

Unit – II

I/O Architectures: Characteristics of simple I/O devices and their controllers. Transfer of information among I/O devices, CPU and memory. Program controlled and interrupt controlled information transfers. Introduction to DMA and I/O channels.

Memory Organization: Random access, serial access and direct access memories. Basic memory organization. Introductory concepts of virtual memory system.

Unit – III

Introduction to GUI based OS: concept of GUI, desktop, program, accessories, control panel, printers management, windows explorer, my documents, recycle bin, icons, shortcuts, files & folders, running applications under MS Windows.

Introduction to Word Processing software : creating, editing, viewing, formatting and Printing documents, tools, tables, mail merge, spell checker and features of Word processing software such as MS-Word, WordPad etc.

Unit – IV

Introduction to Worksheet : creating worksheets, editing, formatting work sheets, working with cell range, formulas and functions, graphs, data handing, format and tools.
Introduction to Presentation software: creating, editing slides, viewing slides, inserting slides and frames, tools and slide shows, OLE.

Unit – V

E-Governance: An Indian perspective, Digilocker, attendance.gov.in, mygov.in, Swachh Bharat Mission, E-Hospital, National Scholarship Portal, E-Sampark, UID, various modes of digital payment of Govt of India. Development of Super Computers in India "PARAM": History, Characteristics, Strength, Weakness and basic Architecture.

Text / Reference Books

1. Office 2000 for Everyone, Sanjay Saxena, Vikas Publications.
2. P.K. Sinha, Computer Fundamentals, BPB Publication.
3. First computer courses, Sanjay Saxena, Vikas Publications.
4. Fundamentals of IT, Leon and Leon, Vikas Publications.
5. Computer Architecture and Organization, Hayes, Tata McGraw Hill.
6. Computer Architecture and Logic Design, Thomas C, Tata McGraw Hill.

MCS 102 PROGRAMMING WITH C

Duration : 3 Hrs. **Min marks: 36** **Max. Marks: 100**

Unit I

Concept of good program, problems to programs, Introduction to 'C' Language, History of 'C', 'C' character Set, Identifiers and Keywords, Data types, Constants and Variables, declarations, statement, symbolic constants, Operators and expressions, precedence and order evaluating, formatted and unformatted input and output functions, All types of Control Statements.

Unit-II

Functions and Program Structure: Basics of functions, parameter passing, recursion, the C-pre-processor, and command line arguments.

Unit-III

Pointers and Arrays: concepts of Pointers, pointers and arrays, address arithmetic, pointers and functions, pointer to functions, Concept of dynamic memory allocation.

Unit-IV

Structures: Basics, structures and functions, array of structures, pointers to structures, self referential structures, table look up fields, union and typedef.

Unit-V

File Structure: Concept of Record, file operations: storing, creating, retrieving, updating, deleting, text and library files, File handling, file pointers, file accessing function, low level I/O, Error handling.

Text/Reference Books

1. The C Programming Language by Brian W. Kernighan, Dennis M. Ritchie, Prentice Hall Software Series, 2nd Edition.
2. Let us C by Y.Kanetkar, BPB Publications.
3. Mastering C by Vijay Prasad, TMH.
4. Programming with C, Balaguruswamy, Tata McGraw-Hill.
5. How to Solve it by Computers, Dromey, PHI.

MCS 103 : Discrete Mathematics

Duration : 3 Hrs. **Min marks: 36** **Max. Marks: 100**

UNIT - I

Number System, LCD & GCD, Fibonacci numbers, Sequences and series : AP, GP and HP, Sum of n terms, arithmetic–geometric- harmonic means between two numbers (excluding arithmetic- geometric series).
Logarithms: definition, Laws regarding product, quotient, exponent and change of base.

UNIT – II

SETS: Sets, subsets, equal sets, null set, universal set, finite & infinite sets, open & closed sets etc., operations on sets, partition of sets, Cartesian product.

UNIT - III

RELATIONS AND FUNCTIONS : relation, properties of relations, equivalence relation, equivalence relation with partition , partial order relation, maximal and minimal points, pigeonhole principle, function, domain and range, onto, into and one-to-one functions, composite functions, inverse functions, introduction of algebraic, trigonometrically, logarithmic, exponential, hyperbolic functions, zeros of functions.

UNIT – IV

DIFFERENTIATION: Derivative, derivatives of sum, differences, product & quotients, derivatives of composite functions, logarithmic differentiation, mean value theorem, expansion of functions, (Maclaurin's & Taylor's.), indeterminate forms, L'Hospitals rule, maxima & minima, concavity, asymptote, singular points, curve tracing, successive differentiation & Leibnitz theorem.

UNIT - V

Basic concepts of Graph Theory: Vertices, edges, degree, paths, circuits, cycles, complete graphs and trees. Multi-graphs, weighted graphs and directed graphs, Adjacency matrix of a graphs. Connected and disconnected graphs.
Permutations (Simple and under restrictions), combinations (selections with and without replacement).

Text / Reference Books

1. C. L. Liu.: Elements of Discrete Mathematics, Tata Mc-Graw Hill.
2. Thomas, G.B. and R. L. Finney: Addison-Wesley , 9th edition.
3. Chandrika Prasad : Mathematics for Engineers, Prasad Mudranalaya, Allahabad, 19th edition
4. Shanti Narayan: Differential Calculus, S. Chand & Co.
5. Shanti Narayan: Integral Calculus, S. Chand & Co.

MCS 104: DATABASE MANAGEMENT SYSTEMS

Duration : 3 Hrs. **Min marks: 36** **Max. Marks: 100**

Unit – I

Introduction to Databases and Transactions, What is database system, purpose of database system, view of data, relational databases, database architecture, transaction management, Data Models , importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction.

Unit-II

Database Design , ER-Diagram, Database design and ER Model: overview, ER-Model, Constraints, weak entity sets, Codd's rules, Relational Schemas, Logical view of data, keys, integrity rules. Relational Database design: features of good relational database design, atomic domain and Normalization (1NF, 2NF, 3NF, BCNF).

Unit- III

Relational algebra: introduction, Selection and projection, set operations, renaming, Joins, Division, syntax, semantics. Operators, grouping and ungrouping, relational comparison. Calculus: Tuple relational calculus, Domain relational Calculus, calculus vs algebra, computational capabilities.

Unit- IV

Constraints, Views and SQL, types of constrains, Integrity constraints, Views: Introduction to views, data independence, security, updates on views, comparison between tables and views, SQL: data definition, aggregate function, Null Values, nested sub queries, Triggers.

Unit-V

Transaction management and Concurrency control ,Transaction management: ACID properties, serializability and concurrency control, Lock based concurrency control ,Time stamping methods, optimistic methods, database recovery management.

Text / Reference Books

1. Database Management Systems, Korth, Tata McGraw Hill.
2. Database Systems, Catherine Ricardo, Maxwell & Macmillan
3. SQL Complete Reference, Leon and Leon, Tata McGraw Hill.
4. Data Base System : Concept C.J. Date.
5. Data Base Management System, Navathe, Pearson Education Asia.

MCS 201: OPERATING SYSTEMS

Duration : 3 Hrs. **Min marks: 36 Max.** **Marks: 100**

Unit – I

Introduction to Operating Systems, Types of OS : time sharing, Single user and multiuser OS, parallel, distributed, real time systems, multi programming and multi processing systems, system calls, system programs, process concept, process scheduling, CPU scheduling.

Unit – II

Deadlock, characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance, memory management, paging, virtual memory, page replacement, algorithms.

Unit – III

Disk structure, disk scheduling, disk management, security, distributed system structure, Network operating systems, distributed operating systems, semaphores, monitors.

Unit – IV

Unix: History, programmer interface, file manipulation, process control, kernel, signals, file system, block and inodes, stream editor, character transliteration, VI editor.

Unit – V

Shell script variables, file name expansion, shell commands, looping and making decision.

Text / Reference Books

1. Advance Unix-A Programmer's Guide, Prata, SAMS
2. Operating System Concepts, Galvin, Addison Wesley
3. Operating System, Ritchie, BPB Publications.
4. Unix System V Primer, Prata, BPB Publications.

MCS 202: Programming with JAVA

Max Marks: 100 Min. Marks: 36

Unit – I

Introduction to Java, history, characteristics, Object oriented programming, data types, variables, arrays.

Unit – II

Control Statement: selection, iteration, jump statement, operators

Unit – III

Introduction to classes: class fundamentals, constructor, methods, stack class, inheritance, creating multilevel hierarchy, method over riding.

Unit – IV

Packages and interfaces, exception handling, multi- threaded programming. I/O applets.

Unit – V

Java Library, string handing, string comparison, string buffer, utility classes, vector stack dictionary, applet class, introduction to AWT, working with frame windows.

Text / Reference Books

1. Introduction to Java Programming, V. Daniel Liang, PHI.
2. The Java Handbook, Patrick Naught on, Tata McGraw Hill.
3. Introduction to Java programming, E Balagurusamy, PHI.
4. Programming Java, Decker & Hartsfield, Vikas Publications.

MCS 203- Data Structures

Duration : 3 Hrs. **Min marks: 36** **Max. Marks: 100**

Unit – I

Object Oriented Programming concepts, encapsulation, inheritance, polymorphism, class Object, complexity, analysis, Big O notation.

Unit – II

Constants, variables, Data types, Operators, expression, managing I/O, operators, decision making and branching, loop, arrays.

Unit – III

Strings, functions, structure, pointers, virtual functions, constructors, destructors, recursion.

Unit – IV

Single linked lists, doubly linked list, circular linked list, sparse table, stack, queue , dqueue, priority queue, graph, spanning tree, shortest path, hashing.

Unit – V

Tree, Binary Tree, Binary search tree, tree traversal, breadth – first, depth- first, insertion, deletion, AVL tree, B tree sorting, insertion, selection, bubble, decision tree, heap, shall, heap, quick, merge, sort, Radix sort.

Text / Reference Books

1. An Introduction to Data Structures with Applications, Tremblay & Sorensons, Tata Mcgraw hills publications.
2. Data structure and algorithms, Aho., Alfred V., Pearson Education.
3. Fundamentals of Data structure in C, Horowitz, Ellis, Galgotia publication.
4. Introduction to Data Structure and algorithms with C++ , Rowe, Glenn W., Prentice , Hall
5. Data structures using C and C++ , Langsun , Augenstein , Tenenbaum Aaron M, Prentice Hall

MCS 204: SYSTEM SOFTWARE

Duration : 3 Hrs. **Min marks: 36** **Max. Marks: 100**

Unit – I

Evolution of the components of a programming system, machine language, assembly language, design of assembler, statement of problem, format of databases, table processing searching, sorting.

Unit – II

Macro instructions, features of macro facility, algorithms, macro calls, instruction for definition, two pass and single pass algorithms.

Unit – III

Introduction to compiler, structure of compiler, role of the lexical analyzer, design of lexical analyzers, regular expressions, context free grammar, parse tree.

Unit – IV

Parsers, shift reduce, operators, pre-cascade, LR parser, constructing SLR grammar, parse tree.

Unit – V

Intermediate code, parse tree, syntax tree, tree address code, quadruples and triples, translation of assignment statements, symbol table.

Text / Reference Books

1. System Programming Donovan JJ.
2. System Software and Operating Systems, D M Dhamdhare