

UNIVERSITY OF KOTA

M.Sc. COMPUTER SCIENCE EXAM. – 2016-17

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: Based on Merit in Qualifying examination.

Scheme of Examination and Courses of Study :

1. The number of papers and maximum marks for each paper/ practical are shown in the syllabus. It will be necessary for a candidate to pass in the theory part as well as in the practical separately.
2. A Candidate for a pass at each of the Previous and the Final Examinations shall be required to obtain (i) at least 36% marks in the aggregate of all the papers prescribed for the examination and (ii) at least 36% marks in practicals, provided that if a candidate fails to secure at least 25% marks in each individual theory paper at the examination and also in the project report. He/She shall be deemed to have failed at the examination, notwithstanding his/her having obtained the minimum percentage of marks required in the aggregate for the examination. No division will be awarded at the previous examination. Division shall be awarded at the end of the final examination on the combined marks obtained in the previous and the final examination taken together, as noted below :

First Division	60%	of the aggregate marks taken.
Second Division	48%	together the Prev. & Final Examination
3. If a candidate clears any paper(s)/ practical(s)/ project prescribed at the previous and/ or final 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)/Project which are cleared after the expiry of the aforesaid period of three years, provided that in case where a candidate requires more than 25% marks in order to reach the minimum aggregate, as many marks out of those actually secured by him will be taken in to account as would enable him to make up the requisite minimum aggregate.
4. The seminar and project report work shall be assessed by one internal and one external examiners only.
5. A candidate failing at M.Sc. Final Previous examination may be provisionally admitted to the M.Sc. Final class. Provided that he/she passes in atleast 50% papers as per Provisions of 0.235 (i)
6. A candidate may be allowed grace marks in only one theory papers upto 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. Previous Computer Science -2016-17

Paper Code	Name (Theory)	Lec.	Tut.	Exam. Hours	Max. Marks
MCS 101	Introduction to Computer and PC Softwares	3	1	3	100
MCS 102	Programming in C	3	1	3	100
MCS 103	Electronic Data Processing	3	1	3	100
MCS 104	Database Management Systems	3	1	3	100
MCS 105	Operating Systems	3	1	3	100
MCS 106	Programming with Java	3	1	3	100
			Total of Theory		600
	Paper Name (Practicals)				
MCS 107	M. S. Office, PC Software			3	50
MCS 108	‘C’ Programming			3	50
MCS 109	ORACLE			3	50
MCS 110	Java			3	50
			Total of Practical		200
		Grand Total (Theory + Practicals)			800

TEACHING AND EXAMINATION SCHEME FOR

M.Sc. Final Computer Science – 2015-16

Paper Code	Name (Theory)	Lec.	Tut.	Exam. Hours	Max. Marks
MCS 201	Data Structures	3	1	3	100
MCS 202	System Software	3	1	3	100
MCS 203	Data Communications & Computer Networking	3	1	3	100
MCS 204	Software Engineering	3	1	3	100
MCS 205	Computer Graphics	3	1	3	100
MCS 206	a) Web Technology	3	1	3	100
	OR				
MCS 207	b) Spatial Database Management Systems	3	1	3	100
			Total of Theory		600

Paper Name (Practical)

Paper Code	Paper Name	Exam. Hours	Max. Marks
MCS 208	C++ and data structures	3	50
MCS 209	Computer Graphics	3	50
MCS 210	Seminar	3	50
MCS 211	Project (Report, Viva-Voce)	3	150
		Total of Theory	600
		Total of Practical	150
		Total of Project	150
	Grand Total (Theory + Practical + Project)		900
	Total Marks of M.Sc. Computer Science:		1700 (800 + 900)

M.Sc. Previous Computer Science -2016-17

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 MS Windows, 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 MS Word, creating, editing, viewing, formatting and Printing documents, tools, tables, mail merge, spell checker and features of MS Word.

Unit – IV

Introduction to MS Excel, creating worksheets, editing, formatting work sheets, working with cell range, formulas and functions, graphs, data handing, format and tools.

Unit – V

Introduction to MS PowerPoint, creating, editing slides, viewing slides, inserting slides and frames, tools and slide shows, OLE.

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 IN C

Duration : 3 Hrs.

Min marks: 36

Max. Marks: 100

Unit I

Concept of good program, steps 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. Programing with C, Balaguruswamy, Tata McGraw-Hill.
5. How to Solve it by Computers, Dromey, PHI.

MCS 103 ELECTRONIC DATA PROCESSING

Duration : 3 Hrs.

Min marks: 36

Max. Marks: 100

Unit – I

Object of database systems, data abstraction, data definition language, data manipulation language, database manager, database administrator. Trade offs between utilities of data and control of data.

Unit – II

Entity relationship model; entities and entity sets their relationship, mapping constraints, generalization, aggregation, use of ER model for the design of databases, implantations trade offs of sequential, random, index sequential file organization, introduction and history of relational database, system relational algebra, normalization up to BCNF.

Unit – III

Introduction to Visual FoxPro: Managing data, searching the database, sorting the database, editing and modifying databases, creating and printing formatted reports, managing numbers in a database.

Unit – IV

Managing multiple data files, combining and summarizing databases, memory variables, creating command files, making decisions, program design and development, a mailing list system, debugging techniques setting up screen displays.

Unit – V

Application development using Visual FoxPro for for Payroll and Inventory.

Text / Reference Books

1. Visual FoxPro, Programming Basics, Tom steams, Tata McGraw
2. Mastering Visual FoxPro – 3, Siegel BPB Publications.
3. Database Management System, Korth, Tata McGraw Hill.
4. Data base system Concept, C.J. Date.
5. Data Base Management system, Navathe, Pearson Education Asia.

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 105 OPERATING SYSTEMS

Duration : 3 Hrs.

Min marks: 36 Max.

Marks: 100

Unit – I

Introduction to Operating Systems, 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

Dead lock, characterization, methods for handling dead locks, deadlock prevention, deadlock avoidance, memory management, paging, virtual memory, page replacement, algorithms.

Unit – III

Disk structure, disk scheduling, disk management, security, distributed system structure, Netware 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 106 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, static class, inheritance, creating multilevel hierarchy, method overriding.

Unit – IV

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

Unit – V

Java Library, string handling, 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 Naughton, Tata McGraw Hill.
3. Introduction to Java programming, E Balagurusamy, PHI.
4. Programming Java, Decker & Hartsfield, Vikas Publications.

M.SC. COMPUTER SCIENCE (FINAL) EXAM – 2017-18

MCS 201- Data Structures with C++

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 & Sorensens, 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 202 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, 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 Softwares and Operating Systems, D M Dhamdhare

MCS 203 DATA COMMUNICATION & COMPUTER NETWORKING

Duration : 3 Hrs.

Min marks: 36

Max. Marks: 100

Unit – 1

Introduction to computer networks, advantage of networking, network architecture & strategies. Data transmission concept and terminology (data and signal), Analog and digital data transmission, transmission impairments.

Unit – II

Transmission media : guided v/s unguided transmission media, multiplexing : TDM, FDM, SDM & WDM types of network : LAN (Star, Ethernet, BUS, token ring, FDDI), VLAN, MAN, WAN : Configuration, topology, network hardware (hub, bridge, switch, gateway and router).

Unit – III

Principles and purpose of layered approach, ISO-OSI model, concepts of the standards and protocols, protocol architecture, different layers and their functions of OSI model, TCP and IP protocols.

Unit – IV

Network technologies : ATM, Frame relay network, DSL, cable modem system, ISDN, SONET / SDH.

Unit – V

Network Management – SNMP, Internetworking, concept of DNS and URL, RMON. Issues related to network, reliability and security, SSL, Firewalls, encryption / decryption and data compression, concept of cyber laws.

Text / Reference Books

1. Stallings William Data and Computer communication, Prentice Hall of India.
2. Tanenbaum, A.S. Computer Networks.
3. Forouzan, A. Behforooz, Data communication and networking, McGraw hill.

MCS 204 SOFTWARE ENGINEERING

Duration : 3 Hrs.

Min marks: 36

Max. Marks: 100

Unit – I

Concepts of Software Engineering, Software Characteristics, S/w components & applications, software Metrics and Models, process and product Metrics, Size metric, Complexity metric. McCabe's Cyclometric Complexity. Function Point Analysis.

Unit – II

System Development Life Cycle (SDLC) Steps, water fall model, prototypes, spiral mode, planning and software project: Cost Estimation, Project Scheduling, Quality Assurance Plans, project Mentoring Plans.

Unit – III

Software Development & Software Design: system design, detailed design, function oriented design, object oriented design user Interface design, Design level metrics: Phases, Process Models, Role of Management, Role of Metrics and Measurement, Software Quality factors.

Unit – IV

Coding and Testing: Programming Practices, verification, Monitoring and Control, Testing level metrics Software quality and reliability Clean room approach, software reengineering.

Unit – V

Testing & Reliability: Testing Fundamentals, Test case design, Functional Testing, Fundamentals, Test case design, Functional Testing, Structural Testing, Test Plan activities during testing, unit testing, system testing, Integration Testing, Concept of Software Reliability, Software Repair and Availability, Software Errors and Faults Reliability Models (JM,GO, MUSA Markov), Limitations of Reliability Models.

Text / Reference Books

1. Software Engineering Pressman, R.S. Pressman & Associates.
2. Software Engineering Fundamentals, Ali Behforooz, oxford Univ. Press.
3. Software Engineering Sommerville, Addison Wesley.

MCS 205 Computer Graphics

Duration : 3 Hrs.

Min marks: 36

Max. Marks: 100

Unit – I

Interactive graphics, passive graphics, advantage of interactive graphics, classification of application, hardware and software requirement of computer graphics, scan, converting point, line, circle, ellipse, filling, polygons, ellipse arc, pattern clipping lines, circle, ellipse, polygon.

Unit –II

2D transformation, matrix representation of 2D, window to view port transformation, matrix representation of 2D transformation, display technologies.

Unit –III

Geometric models, project, attributes and 3D view, planar geometric projection and implementation, coordinate system, polygon meshes, cubic transformation in 3D, 3D clipping.

Unit –IV

Perspective depth buffer algorithm, scan-line coherence algorithm, area coherence algorithm, priority algorithm, Boolean set operations for solid modeling, primitive instances, boundary representation.

Unit –V

Shading modeling shading model for polygons, surface, shadow, transparency, inter – object reflections, image processing, advanced raster graphic architecture, advance graphic, advance geometric and raster algorithms.

Text / Reference Books

1. Principles of Interactive computer Graphics, Newman and Sproull, Tata McGraw Hill.
2. Computer Graphics, Plastok and Gordon Kalley, McGraw Hill.
3. Computer Graphics, Cornel Pokorny, BPB Publication.

ELECTIVE PAPER-

MCS 206 WEB TECHNOLOGY

Duration : 3 Hrs.

Min marks: 36

Max. Marks: 100

Unit – I

Internet current state, hardware and software requirement, ISP an internet account, web home page, URL, browser, security on web, searching tools, search engines, FTP, Gopher, Telnet, emails, TFTP.

Unit – II

Web browser architecture, webpage and multimedia, static, dynamic and active web page Simple network management protocol, hypertext transfer protocol.

Unit – III

HTML, Crating web page, Methods of Linking publishing, HTML, “Text formatting and alignment, Font Control, Arranging text in lists, Images on a web page, Background and Color Control Interactive Layout with Frames”.

Unit – IV

JavaScript, comment types, JavaScript reserved words, identifiers, events, primitive data types, escape sequences, data type conversion functions and methods, operators, control structures and statements objects, applet fundamentals, applet life cycle, local and remote applet applications, tags, creating and passing parameters to applets, exception handling.

Unit – V

Java beans, beans architecture, AWT components, advantage of Java beans serialization, JDBC, class and methods, API components, JDBC components, driver, connectivity to database, processing result and interfaces, RMI, comparison of distributed and non-distributed Java programs, interfaces, RMI architecture layer, ODBC, CORBA, CORBA services and products, CGI, structure of CGI.

Text / Reference Books

1. HTML 4 Unleashed, Darnell, BPB Publication.
2. Practical HTML 4, Philips, PHI.
3. JavaScript, Don Gosselin, Vikas Publication.
4. Principles of Web Design, Joel Sklar, Vikas Publication.
5. Enterprise Java Beans, O’ Reilly.
6. JDBC Developers resources, PHI.
7. CGI Programming with Pert. Tec media.

MCS 207 SPATIAL DATABASE MANAGEMENT SYSTEM

Duration : 3 Hrs.

Min marks: 36

Max. Marks: 100

Unit – I

Introduction to GIS, history, definition, hardware and software, raster based GIS, data acquisition, nature of spatial data, geo-referencing.

Unit – II

GIS functionality, data models, raster, vector, object oriented coordinate system and geo-coding, data structures.

Unit – III

Introduction to Arc View, creating maps, adding tabular data, choosing map projection, attribute, features, aggregating data, creating and editing spatial data.

Unit – IV

Introduction to Arc Avenue, data types, string, numbers, geo-coding, script, writing loops, interacting with views and themes, graphics, creating layout.

Unit – V

Introduction to ARCINFO, file menu, edit, object menu, query menu, table menu, window menu, browse menu, map menu, graph menu, layout menu, main toolbar, feature and function, case studies based on planning.

Reference Books

1. ARC Macro Language – Developing Arc info Menus, Macros with AML, Longman, ESRI.
2. Geographical Information System, Tor Bernhardsen, Longman.
3. Computer Vision and Image processing Scott E Umbaugh, PHI
4. Inside ArcInfo, Michael Zeiler, Onward Press.
5. Inside Mapliff Professionals, Larry Daniel, Onward Press.
6. Principle of GIS, Peter and McDonald, Longman.