Syllabus and Course Scheme
Academic year 2014-15

M.Sc. – Computer Science
UNIVERSITY OF KOTA
MBS Marg, Swami Vivekanand Nagar,
Kota - 324 005, Rajasthan, India
Website: uok.ac.in

UNIVERSITY OF KOTA

M.SC. COMPUTER SCINCE EXAM. – 2015

Duration: 2 years

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

Selection: Common Entrance Test conducted by University of Kota.

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, not withstanding 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 pervious 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 -2015

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

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	Project (Report, Viva-Voce)				
MCS 207	a) Web technology	3	1	3	100
	OR				
MCS 208	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 209	C++ and data structures	3	50
MCS 210	Computer Graphics	3	50
MCS 211	Seminar	3	50
MCS 212	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. COMPUTER SCEINCE (FINAL) EXAM. – 2015

MCS 201- 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, AUL tree, Btree 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 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. Principles of complier design, Alfred V Aho & Jeffrey D Ullman, Addison Wesley.
2. System Programming Donovan JJ.
3. 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 modern 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. Tanenbaurm, A.S. Computer Networks.
3. Forouzan, A. Behforooz, Data communication and networking, McGraw hill.

MCS 204 SOFTWRE ENGINEERING

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

Unit – I

Concepts of Software Engineering, Software Characteristics, 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 system, 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 Fundamentals, Ali Behforooz, oxford Univ. Press.
2. Software Engineering Pressman, R.S. Pressman & Associates.
3. Software Engineering Summerville, 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 are, 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 207 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. Web programming Kris Jamsa, Frank Bros & Co.
6. Enterprise Java Beans, O' Reilly.
7. JDBC Developers resources, PHI.
8. Business Websites, Adams, BPB Publication.
9. CGI Programming with Pert. Tec media.

MCS 208 SPATIAL DATABASE MANAGEMENT SYSTEM

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

Unit – I

Introduction go GIS, history, definition, hardware and software, raster bases 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 Are View, creating maps, adding tabular data, choosing map projection, attribute, features, aggregating data, creating and editing spatial data.

Unit – IV

Introduction to Are Avenue, data types, string, numbers, geo-coking, 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 Arclnfo, Michael Zeiler, Onward Press.
5. Inside Maplifp Professionals, Larry Daniel, Onward Press.
6. Principle of GIS, Peter and McDonald, Longman.

Innovations and Employability in the area of Computer Science

Innovations

Computer Science is the most creative and diverse field of all the technology fields. If you can imagine an outcome, this major will provide you the tools to create it. In addition to providing a solid grounding in all the most significant areas of computer science, The syllabus is designed for students considering their individual needs, who want to study a broad computer science curriculum with an emphasis on combining both the theory and practice of computer science. Then the syllabus will be able to develop computer professionals with a good grasp of how to design and build high quality systems for industry that are usable in real world socio-technical contexts.

The overall aim to develop this syllabus of Computer Science course is to deliver a broad but rigorous Computer Science education coupled with direct exposure to cutting edge research. Graduates and Post Graduate of this programme are intended to continue directly into careers involving innovative thinking and problem solving, as part of an advanced research, development or other applied field of computer science.

Employability

Selection to study the Computer Science opens up many avenues for future career prospects.
Almost every major challenge in the world turns to the use of computer science to solve problems; from medical research, education, supporting aid work in disaster areas, helping to create a sustainable environment, the logistics of moving products around the world, to the world of business and securing and managing the vast levels of data through visualisation, security and transmission; not to mention the world of media.

Being a successful Computer professional is not just about solving technical problems, but also collaboration, leadership, and teamwork; which is why our degree courses encourage you to gain these interdisciplinary and interpersonal skills in addition too.

- Computers and computing technology lies at the heart of organisations across all industrial sectors; and our graduates are equipped to support and develop these systems.

- Computer Technology is the fastest developing technology in the world, and the requirement for graduates with the skills to work in this field is continuing to grow, whilst the actual supply of graduates with the skills is dropping worldwide.

Computer Science will fulfill the growing market demand in government and private sectors both for expertise in following:

Databases
Communication Networking
Image processing
Animation
Software development ..... etc

JOB OPPORTUNITIES FOR UNDERGRADUATE STUDENTS

A. [MCA/M.Sc.(CS/IT)]: Post graduate can work as a

1. Programmer
2. Sr. Technical Assistant
3. Systems Analyst/System Engineer
4. Software Engineer
5. Database Administrator
6. System Architect
7. Software Project Managers
8. Work As a Faculty Member
9. Research Scientist
10. Web Master / Web Developers
11. Network Engineering/ Analyst