School of Mathematical & Computer Sciences

Department of Computer Sciences

Course Scheme & Syllabus

For

Master of Computer Applications (MCA) – M.Sc. Computer Science

For the year

2016, 2017 & 2018.

BABA GHULAM SHAH BADSHAH UNIVERSITY, RAJOURI,

J&K-185234

Website: www.bgsbuniversity.org

COURSE SCHEME & SYLLABUS FOR MCA-M.Sc. COMPUTER SCIENCE

FOR THE YEAR

2016, 2017, 2018

MCA - M.Sc. Computer Science – SEMESTER-II

Core Courses

Course Code	Course Title	Credits	Scheme of Examination				
			Duration	Marks			
			Hours	IA	UE	Total	
MC-241	Software Engineering	4	3	40	60	100	
MC-242	Computer System Architecture	4	3	40	60	100	
MC-243	Data and File Structures using C++	4	3	40	60	100	
	Choice Based Open Elective	4	3	40	60	100	
MC-271	Lab 3: C++	4	3	50	50	100	
MC-272	Lab 4: Data and File Structures using C++	4	3	50	50	100	
Total Marks				**260**	**340**	**600**	

Choice Based Open Electives*						
1.	Fundamentals of Arabic Language					
2.	Fundamentals of English					
3.	Mysteries of Green Plants : The corner Stone of Life	4	3	40	60	100
4.	Botany in Rural Development					
5.	Fundamentals of Biotechnology					
6.	Mathematics in Real World					
7.	Information Technology Essentials					
8.	Fundamentals of Management					
9.	Business Communication					
10.	Basics of Tourism					
11.	Tourism Resources in J&K					

Note:
 * Students will choose one of the above courses.

Course Code: MC-241	Maximum Marks : 100
Course Title : Software Engineering.	University Examination: 60
Credits: 4	Internal Assessment: 40
	Duration of Examination:3 Hours

Objective:

This paper aims to help students to comprehend the role and scope of software engineering and equip them with the ability to apply Software Engineering practices.

Unit I
Basic Concepts of System Analysis and Design: System Concept, Characteristics and Elements of System, Types of System, System Development Life Cycle, Role of System Analyst, Information Gathering Techniques, Feasibility Study, Feasibility Considerations, Feasibility Report.
Introduction to Software Engineering: Software Myths, Software Characteristics, Software Engineering Challenges (Scale, Quality Productivity, Consistency and Repeatability, Change).

Unit II
Software Process Management: Characteristics of Software Process, Introduction to Software Process Models: Waterfall model, Prototyping model, Iterative model, Spiral Model; Planning: Cost Estimation, Uncertainties in Cost Estimation, COCOMO Model for Cost Estimation; Project Scheduling: Average Duration Estimation, Project Scheduling and milestones; Introduction to Staffing.

Unit III
System Analysis: Introduction to Software Requirement Analysis and Specification, Software Requirements: Need for SRS, Requirement Process, Problem Analysis: Analysis Issues, Informal Approach, Structured Analysis (Data Flow Modeling), Object Oriented Modeling, Prototyping, Requirement Specification (Characteristics, Components), Metrics (Size & Quality).

Unit IV
Software Design-I: Function Oriented Design: Design Principles (Problem Partitioning and Hierarchy, Abstraction, Modularity, Top-Down and Bottom-Up Approaches), Module level Concepts (Coupling and Cohesion), Design Notations & Specifications (Structured Charts, Specification), Structured Design Methodology.

Unit V
Software Design-II: Object Oriented Design: OO Analysis and OO Design, Concepts of OOAD: Encapsulation, Abstraction, Inheritance and Polymorphism. Design Concepts. Design Notations & Specifications, Design Methodology: Dynamic Modeling, Functional Modeling, Defining Internal Classes and Operations.
Introduction to Software Testing: Testing Fundamentals: Error, Fault and Failure, Test Oracles, Test Cases and Criteria, Psychology of Testing. Test Strategies for Conventional Software testing (Unit Testing, Integration Testing)

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will include 10 compulsory objective-cum-short answer type questions from each unit, each carrying 1 mark. **Section B** will have ten (10) long answer questions, two from each unit. The student will have to attempt one (01) question from each unit. Each question will carry 10 marks.

Textbooks:

1. **Pressman, R S (2006), "**Software Engineering – A Practitioner's Approach", Sixth edition, **TMH.**
2. **Jalote, P(2005),** "An Integrated Approach to Software Engineering", 3Rd Edition, **Narosa Publication.**

References:

1. **SCHAUM'S Outlines(2005),** "Software Engineering", **TMH**.
2. **Sommmerville(2000)**, "Software Engineering", **Addison Wesley**.

Course Code: MC-242   **Maximum Marks : 100**
Course Title : Computer System Architecture   **University Examination: 60**
Credits: 4   **Internal Assessment: 40**
                                                                   Duration of Examination:3 Hours

Objective:

This paper aims to specify the relationship between different hardware components of a computer system and its working. The course is basic and will help the students to learn the basic concepts of Computer Architecture and Organization.

Unit-I
Basic architecture of computer: Functional units, Operational concepts, Bus structures, Von Neumann Concept.
Basic Processing: Instruction code, Instruction set, Instruction sequencing, Instruction cycle, Addressing modes, Micro instruction & Micro program,   Control Unit: Hardwired controlled unit, Micro programmed controlled unit.

Unit-II
Design of ALU: Binary Arithmetic,: Addition , Subtraction , Multiplication ,Division of signed numbers, Floating point number representation : Big Endian & Little Endian.

Unit-III
Memory Hierarchy: Main Memory: Technology, Design, Types (Static &Dynamic).Auxiliary Memory: Magnetic Disks: Technology, Design, Types. Cache Memory: Hit Miss Ratio, Mapping Functions.
Virtual Memory: Concept, Design Issues, Page Replacement.

Unit-IV
Input-Output Interface: Device Driver, Device Controller and I/O bus.
Address Specifications: Isolated versus Memory-Mapped I/O.
Data Transfer: Synchronous and Asynchronous (Strobe Control, Handshaking). Modes of transfer: Programmed I/O, Interrupt-Driven I/O, and Direct Memory Access (DMA).

Unit-V
Parallel Processing: Pipelining:, General considerations of Pipelining, Arithmetic Pipeline, Instruction pipeline, Pipelining Hazards:(Data dependency, Branch handling). Vector Processing: Principle & Considerations, vector Instructions. Memory Interleaving. Array Processors, Attached Array Processors.

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will include 10 compulsory objective-cum-short answer type questions from each unit, each carrying 1 mark. **Section B** will have ten (10) long answer questions, two from each unit. The student will have to attempt one (01) question from each unit. Each question will carry 10 marks.

Text Books:

1. **M. Mano**, Computer System Architecture, 3rd Ed., **PHI.**

References:

1. **C. Hamacher**, Computer Organization, 5th Edition,
2. **W. Stallings,** Computer Organization and Architecture, 7th Edition.

Course Code: MC-243   **Maximum Marks : 100**
Course Title: Data & File Structures using C++.   **University Examination: 60**
Credits: 4   **Internal Assessment: 40**
                                              Duration of Examination:3 Hours

Objective:

The objective of the course is to introduce implementation, evaluation and analysis of the fundamental data structures for representing and manipulating data. The implementation of the same is carried out using C++.

Unit-I

Introduction to Data Structure: Concept, Basic Terminology, Elementary Data Structures, Abstract Data Type, Arrays & its representation, Operations on Arrays, Sparse Arrays, Pointers, Linked List (Singly, Double & Circular), Operations on Linked List (Traversing, Insertion, Deletion etc.), Introduction to Garbage Collection.

Unit-II
Stacks and Queues: Basic Concept, implementation, Applications: Recursion (Fibonacci Series, Factorial & Tower of Hanoi problem), Polish Expressions and their Compilations (Infix, Prefix, Postfix), Queues and their implementation, De-Queues, Priority Queues.

Unit III
Trees: Concept, Binary Trees, Tree Traversal Techniques (Preorder, Post order, In order), Complete Binary Trees, Binary Search Tree & Operations on Binary Search Tree (Searching, Insertion & Deletion), Height Balance and Concept of AVL Trees and purpose of B-Trees.

Unit IV
Graphs: Concept, Directed Graphs, Graph Representation (Adjacency Matrix and Linked Representation), Dijkstra's shortest Path Algorithm, Graph Traversal Techniques (Breadth First Search & Depth First Search).
Searching and Sorting: Linear & Binary Search, Merge Sort, Heap Sort, Quick sort.

Unit-V
Files: Basic terminology Attributes of a File, Classification of Files.
File Organizations: Sequential File Organization, Relative File Organization, Indexed Sequential File Organization (Primary, Clustering and Secondary).
Hashing: Basic concept, Hash Table, Hash Function.

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will include 10 compulsory objective-cum-short answer type questions from each unit, each carrying 1 mark. **Section B** will have ten (10) long answer questions, two from each unit. The student will have to attempt one (01) question from each unit. Each question will carry 10 marks.

Text Books:

1. **Baluja G. S**., "Data Structures Through C++", **Dhanpat Rai & Co.**
2. **Seymour Lipschutz**(SCHAUM'S ouTlines), "DATA STRUCTURES", **Tata McGraw Hill, 2006.**

References:

1. **R. Kruse,** "Data Structures & Program Design in C", **Pearson Education, 2004.**
2. **Dr. PrabhakarGupta,VineetAgarwal, Manish Varshney, "** Data Structure Using 'C', **FIREWALL MEDIA ,2007**
3. **Tanenbaum**, "Data Structures Using "C" & "C++"", 2nd Ed. **PHI Publication,2005.**

Course Code: **Maximum Marks : 100**
Course Title : Computer Applications &   **University Examination: 60**
          Operations   **Internal Assessment: 40**
                                       Duration of Examination:3 Hours

Credits: 4

Choice Based Open Elective

Objective:

The objective of this course is to acquaint students with the basic knowledge of computers and train them to understand the preliminary elements of computing and the corresponding tools that are used to handle routine tasks. The course is fundamental in nature and does not therefore, require any background of computers.

Unit-I
Basic Computing Elements
Information Types: Text, Audio, Video, and Image, storage formats.
Components: Operating System, Hardware and Software, firmware.
Devices: Computer, Mobile Phones, Tablet, Touch Screen, Scanner, Printer, Projector, smart boards.
Processor & Memory: Processor functions, speed, Memory types: RAM/ROM/HDD/ DVD-ROM/Flash drives.

Unit-II
Office Automation
Working with Files: Create New Documents, Open Existing Documents, Save Documents to different formats.
Working with Text: Formatting Text, Spelling and Grammar, paragraphs, indentation, margins.
Tables: Insert Tables, Nested Tables, Insert Rows and Columns, Table Properties.
Page Margins, Gutter Margins, Graphics, Print Documents.
Spreadsheet Basics: Adding and Renaming Worksheets, Modifying Worksheets, Moving through Cells, Adding Rows, Columns, and Cells, Selecting Cells, Moving and Copying Cells.
Formulas and Functions: Formulas, Linking Worksheets, Basic Functions, AutoSum.
Charting: Chart Types, drawing charts, Ranges, formatting charts.
Create a new presentation, AutoContent Wizard, Design Template, Blank Presentation, Screen Layout, Working with slides & Graphics, slide animation/transitions.

Unit-III
Internet Basics

Computer Network Types: LAN, PAN, CAN, MAN, WAN, Concept of Internet, Brief history, Browsing the Web, Hypertext and hyperlinks, browsers, Uniform resource locator.

Internet Resources: Email, Parts of email, Email address, Newsgroups/Forums, Chat rooms, Conferencing.

Protecting the Computer: Password protection, Viruses, Virus protection software, Updating the software.

Unit-IV
Communication Systems

Evolution of mobile communications, Applications of wireless Mobile Communication, Mobile Radio System around the world, Types of Wireless communication System, Comparison of Common wireless system, Second generation Cellular Networks, Third Generation (3G) Wireless Networks. Cell fundamentals, Concept of Handoff, Concept of coverage area, Introduction to Bluetooth, GPRS, Wi-Fi.

Unit-V
Internet Applications

Social Networking: Features, Social impact, emerging trends, issues.
Social Networking sites: Facebook, Twitter, linkedin.
Online Resources: Wikipedia, Blog, Job portals, C.V. writing.
e-learning: e-Books, e-Magazines, e-News papers.
OCW (open course wares): Sakshat (NPTEL) portal, MIT courseware.

Note for Paper Setting:

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Text Books:

1. **Sinha , P. K (2005)**,"Computer Fundamentals", BPB, **New Delhi.**

References:

1. **Theodore S. Rappaport**, "Wireless Communication Principles & Practice", 2nd Ed. **PHI, New Delhi.**
2. **TCI**, "**Introduction** to Computers and Application Software", Publisher: Jones & Bartlett Learning, 2010, ISBN: 1449609821, 9781449609825.
3. **June Jamrich Parsons, Dan Oja**, "Computer Concepts Illustrated series", Edition 5, Publisher Course Technology, 2005, ISBN 0619273550, 9780619273552.
4. **Basandra, Suresh K (2005)**, "Computers Today", Galgotia Publications.
5. **Saxena, S (2005)**, "MS Office for Everyone", Vikas Publications.