SCHEME OF EXAMINATION

AND

SYLLABUS

FACULTY OF COMPUTER

M.Sc. Computer Science

Syllabus for M.Sc. Computer Science
Session 2019-21
(Examination 2020 – 2021)

महाराजा गंगा सिंह विश्वविद्यालय बीकानेर
Maharaja Ganga Singh University, Bikaner

ELIGIBILITY FOR ADMISSION
Graduates possessing 50% marks in any faculty of any statutory university shall be eligible for admission to the M.Sc. Computer Science Course Admission to the course will be given as per Government/University Rules.

PASS CRITERIA
For a pass in the examination, a candidate is required to obtain at least 25% in each paper and 36% marks in the total aggregate in theory at the Previous and Final Examination separately and 36% marks in practical separately.

CLASSIFICATION OF SUCCESSFUL CANDIDATE

(As per university norms)

BACKLOG
Two theory Papers can be carried to the next year.

. Teaching and Examination scheme for
M.Sc. (Previous) Computer Science
Session 2019-20
Examination 2020

Paper Code	Paper Name	Lecture per week	Tut.	Exam Hours	Max. Marks	Minimum Passing Marks
Theory Papers						
MCS 101	Computer Organization	3	1	3	50	13
MCS 102	Object Oriented Programming	3	1	3	50	13
MCS 103	Database Management	3	1	3	50	13
MCS 104	Operating Systems	3	1	3	50	13
MCS 105	Software Engineering and Internet Programming	3	1	3	50	13
MCS 106	Mathematics for Computer Science	3	1	3	50	13
Total of Theory Papers					**300**	**108** (aggregate)
Practical Papers						
MCS 107	OOPs Lab	3		3	50	18
MCS 108	Linux and Database Management Lab	3		3	50	18
MCS 109	Internet Programming Lab	3		3	50	18
Total of Practical					**150**	
Grand Total (Theory + Practical)					**450**	

Teaching and Examination scheme for
M.Sc. (Final) Computer Science
Session 2020-21
Examination 2021

Paper Code	Paper Name	Lec. per week	Tut.	Exam Hours	Max Marks	Minimum Passing Marks
Theory Papers						
MCS 201	DCN	3	1	3	50	13
MCS 202	Data Structure	3	1	3	50	13
MCS 203	PHP	3	1	3	50	13
MCS 204(A)	Computer Graphics & Multimedia	3	1	3	50	13
MCS 204(B)	Web App Programming	3	1	3	50	13
MCS 204(C)	Android Programming	3	1	3	50	13
MCS 205(A)	Data Warehouses & Data Mining	3	1	3	50	13
MCS 205(B)	Artificial Intelligence	3	1	3	50	13
MCS 205(C)	Cloud Computing	3	1	3	50	13
MCS 206	Project	3	1	3	50	13
Total of Theory					**300**	**108 (aggregate)**
Practical Papers						
MCS 207	DS Lab	3		3	50	18
MCS 209	PHP Lab	3		3	50	18
MCS 210	CG/Web App/Android Lab	3		3	50	18
Total of Practical					**150**	
Grand Total(Theory+ Practical)					**450**	

Note:
1. **Instructions to Paper Setters**
   The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).
   The word limit of part A, B and C are 50, 200 and 500 respectively.
2. Student has option to choose one paper from MCS 204(A), MCS 204(B), and MCS 204(C) and one paper from MCS 205(A), MCS 205(B), and MCS 205(C) in M.Sc. Computer Science final.
3. Each practical exam is to be conducted by two examiners one External and one Internal. External examiner should be senior lecturer from jurisdiction of other universities. External examiner will prepare question paper of Practical Examination. Students have to perform exercise on computer. Exercise must be written in answer books in proper documentation. Marks distribution for Practical of 50 marks is as under
   a) Three Exercises of 10 marks each   30 Marks

(Logic 06, Execution 05, Documentation 04)

  b) Viva-Voce   10 Marks
  c) Laboratory Exercise File   10 marks
 4. Marks distribution for paper MCS-206 of 50 marks is as under
  a) Project/ Dissertation   30 Marks
  b) Presentation   10 Marks
  b) External Viva Voce   10 Marks

* An Academic/ Industrial Tour shall be organized by the college in every session. A Tour Report shall be prepared and submitted by the students after a study tour to industries/academic institutions of repute.

Duration: 3 Hours
Maximum Marks: 50
Minimum Passing Marks: 13

MCS-101 Computer Organization

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).
The word limit of part A, B and C are 50, 200 and 500 respectively.

Note: Non-Scientific Calculator is allowed to be used in examination.

Unit I

Components of a Computer: Processor, Memory, Input-Output Unit, Difference between Organization and Architecture, Hardware Software Interaction. **Number System:** Concept of Bit and Byte, types and conversion. **Complements:** 1's complement, 2's complement. **Binary Arithmetic:** Addition, overflow, subtraction, multiplication (booth's algorithm) and division algorithm.

Unit II

Logic gates: Boolean Algebra, Map Simplification. **Combinational circuits**: Half Adder, Full Adder, Decoders, Multiplexers. **Sequential circuits:** Flip Flops- SR, JK, D, T Flip-Flop, Excitation Tables, State Diagram, State Table, Registers, Counters.

Unit III

Input Output Organization: Peripheral devices, I/O Interface, Asynchronous Data Transfer, Modes of Data Transfer, Priority Interrupt, Direct Memory Access, I/O Processor.

Unit IV

Memory Organization: Types and capacity of Memory, Memory Hierarchy, Associative Memory, Buffer, Cache Memory, Virtual Memory.

Unit V

Intel 8085 Microprocessor: Introduction, ALU, Timing and Control Unit, Register Set, Data and Address Bus, Addressing modes, Complete Intel 8085 Instruction set, Instruction format, Opcode and Operand, Word Size, Instruction Cycle, Pin Configuration, Intel 8085 programs.

Suggested Readings:

1. Computer System Architecture, By M. Morris Mano (Pearson, Prentice Hall)
2. Carter Nicholas, "Computer Architecture", Schaun outline Sevies , Tata McGraw-Hill.
3. J.P. Hayes, "Computer Architecture & Organization", Tata McGraw Hill
4. Digital Computer Fundamentals By Thomas C. Batree (McGraw Hill)
5. Microprocessor Architecture, Programming, and Application With the 8085 By Ramesh Gaonkar (PENRAM)
6. Fundamentals of Microprocessor and Microcomputes By B.Ram (Danpat Rai Publications)

Duration: 3 Hours

<div align="right">Maximum Marks: 50
Minimum Passing Marks: 13</div>

MCS-102 Object Oriented Programming (OOP)

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).
The word limit of part A, B and C are 50, 200 and 500 respectively.

Unit I

Object Oriented Programming: Introduction, Encapsulation Information Hiding, Classes, Objects, Methods, Delegation, Inheritance, Overloading, Overriding, Polymorphism, Abstraction: Abstract classes, Template, Generic Components, Interfaces.

Unit II

Introduction to C++: Character Set, Tokens, Data Types, Enumeration, Operators, Expressions, Operator Precedence and Associatively, Conditional Statements, iterations and Break statements. Scope of Variables, Type Conversion, Arrays: advantage, One and Two Dimensional Arrays, Functions – advantage, types, Passing By Value And Reference, Overloading, Array and Functions. Passing and Returning Array to Function, Pointers: Introduction, advantage and disadvantage.

Unit III

Class and Objects, declaring class members, objects. Calling functions, Passing and returning objects in a member function. Inline Function, Friend Functions, Abstract Class, Overriding. Constructor and Destructor- Need, Types, Pointer to Objects and Members, Static Data Members and Methods. Inheritance – Need, Types, implementation. Operator Overloading: Need and Rules, Overloading Through Member Function and Friend Function. Virtual Function and virtual class. String Class.

Unit IV

Java Basics : History, Characteristics, JAVA Virtual machine, Data Types, Token: Variables and its scope, Operators, Control Statements. Arrays; Classes, Constructors, this keyword, Garbage collection, finalize method. Inheritance, Method Overriding, Abstract class, Arrays, String Handling.

Unit V

Packages and Interfaces, Exception Handling, Multithreading programming, String Buffer, Utility Classes, Vector and Wrapper Classes. Applet : Building Applet Code, Applet Life Cycle, Adding Applet to HTML file, Passing parameter to Applet, Getting input from user.

Suggested Readings
1. Object Oriented Analysis and Design by Grady Booch, Addison Wesley
2. An Introduction to Object Oriented Programming by Timothy Budd, Addison Wesley
3. Object Oriented Programming in C++ by Robert Lafore, Sams Publishing
4. The Complete reference Java 2 By Patrick Naughton, Herbert Schildt (Tata McGraw Hill)
5. Programming in JAVA By E. Balagurusamy (TMH)
6. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)
7. Object Oriented Programming With C++ By E. Balagurusamy (Tata Mcgraw Hill)
8. C++ The Complete Reference By Herbert Sehildt (Tata Mcgraw Hill)
9. Object Oriented Programming With C++ By Schaum Series (Tata Mcgraw Hill)

Duration: 3 Hours   Maximum Marks: 50
                                                                     Minimum Passing Marks: 13

MCS-103 Database Management
                        Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).
The word limit of part A, B and C are 50, 200 and 500 respectively.

Unit I

Introduction: Characteristics of database approach, Advantages, Database system architecture, Overview of different types of Data Models and data independence, Schemas and instances, Database languages and interfaces; E-R Model : Entities, Attributes, keys, Relationships, Roles, Dependencies, E-R Diagram.

Unit II

Introduction to Relational model, Constraints: Domain ,Key, Entity integrity, Referential integrity; Keys: Primary, Super, Candidate, Foreign; Relational algebra: select, project, union, intersection, minus, cross product, different types of join , division operations; aggregate functions and grouping.

Unit III

SQL: Data Types, statements: select, insert, update, delete, create, alter, drop; views, SQL algebraic operations, nested queries; Stored procedures: Advantages, Variables, creating and calling procedures, if and case statements, loops, Cursors, Functions, Triggers.

Unit IV

Normalization: Definition, Functional dependencies and inference rules, 1NF, 2NF, 3NF and BCNF; Transactions processing: Definition , desirable properties of transactions, serial and non-serial schedules ,concept of serializability , conflict-serializable schedules.

Unit V

Concurrency Control: Two-phase locking techniques, dealing with Deadlock and starvation, deadlock prevention protocols, basic timestamp ordering algorithm; Overview of database recovery techniques; concept of data warehousing.

Suggested Readings:
1. Fundamentals of Database Systems, Ramez A. Elmasri, Shamkant Navathe,5th Ed(Pearson)
2. Database System Concepts By Korth, Silberschatz, Sudarshan (Mcgraw Hill)
3. An Introduction to Database Systems By Bipin C. Desai (Galgotia Publication.)
4. SQL, PL/SQL Programming By Ivan Bayross (BPB)
5. Commercial Application Development Using Oracle Developer 2000 By Ivan Bayross (BPB)
Web Resources:
1. http://www.mysqltutorial.org/mysql-stored-procedure-tutorial.aspx

Duration: 3 Hours

Maximum Marks: 50
Minimum Passing Marks: 13

MCS-104 Operating Systems

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).

The word limit of part A, B and C are 50, 200 and 500 respectively.

Unit I

Introduction to Operating System, layered Structure, Functions, Types; Process: Concept, Process States, PCB; Threads,concept of multithreading, System calls; Process Scheduling: types of schedulers, context switch.

Unit II

CPU Scheduling, Pre-Emptive Scheduling, Scheduling Criteria- CPU Utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling Algorithms- FCFS, SJF, Priority Scheduling, Round Robin Scheduling, MLQ Scheduling, MLQ With Feedback.

Unit III

Synchronization: Critical Section Problem, Requirements for a solution to the critical section problem; Semaphores,simple solution to Readers-Writers Problem. Deadlock: Characterization, Prevention, Avoidance, Banker's Algorithm, Recovery from Deadlock.

Unit IV

Memory Management: Physical and virtual address space, Paging, Overview of Segmentation;Virtual Memory Management: Concept,Page Replacement techniques- FIFO, LRU, Optimal. Linux: features of Linux, steps of Installation, Shell and kernel, Directory structure.

Unit V

Linux: Users and groups,file permissions, commands- ls, cat, cd, pwd, chmod, mkdir, rm, rmdir, mv, cp, man, apt, cal, uname, history etc. ; Installing packages; Shell scripts: writing and executing a shell script,shell variables, read and expr, decision making (if else,case), for and while loops.

Suggested Readings:

1. Operating System Principals By Abraham Silberschatz, Peter Baer Galvin (John Wiley And Sons Inc.)
2. Operating System Concepts And Design By Milan Milen Kovic (Tata McGraw Hill)
3. Modern Operating System Andrew S. Tanenbaum, Herbert Bos
4. Linux in easy steps, Mike McGrath, in easy steps limited
5. Unix concepts and applications , TMH, Sumitabha Das

Duration: 3 Hours   Maximum Marks: 50
                                                                Minimum Passing Marks: 13
MCS-105 Software Engineering & Internet Programming

Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).
The word limit of part A, B and C are 50, 200 and 500 respectively.

Note: Scientific Calculator is allowed to be used in examination.

Unit I
Software: Software Characteristics, Software Process, Process Characteristics, **Software Process Model :** Linear Sequential Model, Prototyping Model, Spiral Model, Software Quality, McCall's Quality Factors, **Software Requirement Analysis and Specification (SRS) :** Need Characteristics and Components. **Planning a Software Project:** COCOMO Model, Project Monitoring Plan and Risk Management.

Unit II
Design Principle: Abstraction, Modularity, Cohesion and Coupling, **Software Management**: Size Oriented Matrices, Function Oriented Matrices. **Testing :** Testing Fundamental, Functional Testing (Black Box), Structural Testing (White Box), Alpha And Beta Testing, **Testing Process :** Comparison of Different Testing, Level of Testing.

Unit III
Research Methodology: Meaning of Research, Objective of Research, Types of Research, Research Approaches, Significance of research, Research Methods versus Methodology, Research Process, Criteria of Good Research, What is Research Problem, Selecting the problem, Necessity of defining the problem, Technique involved in defining a problem.

Unit IV
Internet Basics: Evolution of Internet, Basic internet terms and applications. Anatomy of an e-mail Message, basic of sending and receiving, E-mail Protocol; Introduction to World Wide Web: Working of Web Browsers, Its functions, category, Hyper Text Transfer Protocol (HTTP); Component of Web Publishing, Domain Name Registration, Space on Host Server for Web Site,

Unit V
HTML: Elements of HTML & Syntax, Backgrounds, Formatting tags, Images, Hyperlinks, div tag, List Type and its Tags, Table Layout, Use of Forms in Web Pages. CSS**:** Elements of Style Sheets, Embedded Style Sheets and Linked Style Sheets, Inline Style Sheets, using Id and Classes.

Suggested Readings:
1. Software Engineering: A Practitioner's Approach By Roger S. Pressman, McGraw Hill.
2. Software Engineering: A Precise Approach by Pankaj Jalote, Wiley Precise textbook Series
3. HTML & CSS Design and Build websites by Jon Duckett, publisher John Wiley & Sons
4. HTML & CSS: The Complete Reference by Thomas Powell
5. Research Methodology Methods and Techniques by C. R. Kothari, New Age International Publisher

Duration: 3 Hours   Maximum Marks: 50
                                                      Minimum Passing Marks: 13

MCS-106 Mathematics for Computer Science
Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).
The word limit of part A, B and C are 50, 200 and 500 respectively.

Note: Non-Scientific Calculator is allowed to be used in examination.

Unit-I
Vectors: Concept of Vector Addition and subtraction of vector, Resolution of a Vector Scalar or Dot product of two vector, Vector or cross product of two vectors.

Unit-II
Co-Ordinates System: Rectangular Co-Ordinates in a Plane, Distance Between Two Points, Rectangular Co-Ordinates in Space, Elementary Co-Ordinate Geometry, The Straight Line, General equation of a Circle, Standard equation of a Circle

Unit-III
Graph Theory, Graphs and Multi Graphs, Sub Graphs, Isomorphic and Homeomorphism Graphs, Paths, Connectivity, Various Type of Graphs, Graph Coloring, Representation of Graph in Computer Memory, Shortest Path Algorithm, Graph Traversal Algorithm (Depth First Search, Breadth First Search).

Unit-IV
Order Sets: Properties, Hasse Diagram, Consistent Enumeration, Supremum and Infimum, Isomorphic Order Sets, Well Order Sets.

Unit-V
Counting: Basic Counting Principle, Factorial Notations, Binomial Coefficients Pascals's Triangle, Binomial Theorem, Permutations, Combinations, Pigeonhole Principle, Ordered and Unordered Partitions.

Suggested Readings:
- Discrete Mathematics, Schaum's Series By Seymour LipSchutz, Marc Lipson, (Tata McGraw Hill)
- Discrete Mathematics By Vinay Kumar (BPB)
- Discrete Mathematics and its applications by K.H. Rosen, seventh edition
- Discrete Mathematical Structure By Dr. K.C.Jain, Dr. M.L. Rawat (College Book Centre)
- Mathematics Volume I By R.D. Sharma (Danpat Rai Publication)
- Mathematics Volume II By R.D. Sharma (Danpat Rai Publication)
- Engineering Mathematics Volume I By S.S. Sastry (Prentice-Hall Of India)

M.Sc. (Final) Computer Science
Examination 2019

Duration: 3 Hours
Maximum Marks: 50
Minimum Passing Marks: 13

MCS-201 DCN

Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).
The word limit of part A, B and C are 50, 200 and 500 respectively.

Unit - I
Data Communication and Networking: Overview, Network Types, LAN Technologies, Topologies, Models- OSI Model, TCP/IP Stack, Security

Unit - II
Physical Layer: Introduction, Impariments, Performance, Digital Transmission, modes, digital to digital, analog to digital, Analog Transmission, digital to analog, analog to analog, Transmission media, Wireless Transmission, Multiplexing, FDM, TDM, CDM, WDM,
Switching techniques: Circuit Switching, Packet switching, Datagram, Virtual circuit and Permanent Virtual Circuit, Connectionless and connection oriented communication, Message switching,

Unit - III
Data Link Layer: Introduction, Error detection and Correction, Data Link Control: Line Discipline- Enq/Ack, Poll/Select, **Flow Control** : Stop And Wait, Sliding Window, **Error Control :** ARQ, Stop and Wait ARQ, Sliding Window ARQ.

Unit - IV
Network Layer: Introduction, Network Addressing, Routing, Internetworking, Tunneling, Packet Fragmentation, Network Layer Protocols, ARP, ICMP, IPv4, IPv6
Transport Layer: Introduction, Function, End to end communication, Transmission Control Protocol, User Datagram Protocol
Application Layer: Introduction, Client-Server Model, Application Protocols, Network Services

Unit V
Cyber Security: definition, cybercrime and information security, cybercriminals, classification of cybercrime. Cyber offences: categories of cybercrime.
Tools and methods used in cybercrime: phishing, types of phishing, types and techniques of ID theft, password cracking, keyloggers and spywares, backdoors, steganography, DoS, SQL Injection .Indian ITA 2000.

Suggested Readings:
1. Cyber Security by Nina Godbole & sunit Belapure
2. Data Communication and Networking By Forozan (Tata McGraw Hill)
3. Data Communication and Computer Networks By Dr. Madhulika Jain, Satish Jain (BPB)
4. William Stallings, Data and Computer Communications, Pearson Education, 2008.
5. Rajneesh Agrawal and Bharat Bhushan Tiwari, Data Communication and Computer Networks, Vikas Publishing house Ltd., 2005.
6. Tomasi Wayne, Introduction to Data Communications and Networking, Pearson Education, 2007.
7. A. S. Tanenbaum, Computer Networks, Fourth Edition, Pearson Education.

MCS-202 Data Structures

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).

The word limit of part A, B and C are 50, 200 and 500 respectively.

Unit I

Algorithm: Efficiency & Analysis Algorithm: Time and Space complexity of Algorithm. **Abstract Data Type: Linked List-** Linear, Circular, Two Way List, Basic Operation on Linked Lists, Application of Linked List.

Unit II

Stack : primitive operations, stack Application- Infix, postfix, prefix and Recursion Array and Linked Representation of Stack. **Queue:** Primitive operation, Circular Queue, Priority Queue, D-queue, Array and Linked Representation of Queue.

Unit III

Searching : Linear Search, Binary Search; **Sorting:** Insertion Sort, Selection Sort, Quick Sort, Bubble Sort, Heap Sort, Shell Sort, Merge sort, Radix Sort, Comparison of sorting Methods.

Unit IV

Trees : Basic terminology, **Binary Tree** : Representation as Array and link List, Basic operation, **Tree Traversal** : Inorder, Preorder, Postorder, Application of Binary Tree. B-tree, Height Balance Tree(AVL Tree).

Unit V

Graph : Basic Terminology, Directed, Undirected, Weighted, Representation of Graphs, **Graph Traversal** : Depth First Traversal, Breadth First Search.

Suggested Readings:
1. Expert Data Strutcture with 'C' By R.B Patel (Khana Book Publishing Co.(P))
2. Data structure By Lipschutz (Tata McGraw Hill)
3. Data Structure By Yashvant Kanitkar (BPB)
4. An Introduction to Data Structures with Applications By Jean-Paul Tremblay, Paul G.Sarerson (Tata McGraw Hill)
5. Data Structure Using C and C++ By Yedidyah Langsam, Moshe J.Augenstein, Arora M. Tenenbaum (Prentice- Hall India)

Duration: 3 Hours   Maximum Marks: 50
                                                                    Minimum Passing Marks: 13

MCS-203 PHP

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).

The word limit of part A, B and C are 50, 200 and 500 respectively.

Unit – I

PHP: Installation of PHP. **Building Blocks of PHP:** Variables, data types, Operators & Expressions, Constants, Switching, Flow, Loops

Unit - II

Functions: Meaning, Calling, Defining a function. Return value from user defined function.
Arrays: Creating arrays, Array related functions. **Working with String, Date & Time:** Formatting String with PHP, Using Date and time Functions with PHP. Working with file and Directories.

Unit - III

Forms: Creating simple input Form. Accessing Form input with user defined arrays, HTML and PHP Code on a single page. Redirecting User. Working with File Upload. Uploading & Downloading.

Unit – IV

State management: Using query string(URL rewriting), Using Hidden field, Using cookies, Using session.
Exception Handling: Understanding Exception and error, Try, catch, throw

Unit - V

Connecting to the MYSQL: Selecting a database, Adding data to a table, Displaying returned data on Web pages, Inserting data, Deleting data, Entering and updating data, Executing multiple queries, executing stored procedures.

Suggested Readings:

1. Teach Yourself PHP, MYSQL &Apache ByMeloni, Pearson Education.
2. Open Source Development with LAMP: Using Linux, Apache, MySQL, Perl & PHP By James Lee, Pearson Education.
3. PHP: A Beginner's Guide ByVaswani, Vikram Tata Mc-Graw Hill.

Duration: 3 Hours   Maximum Marks: 50
                                                  Minimum Passing Marks: 13

MCS-204(A) Computer Graphics & Multimedia
Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).
The word limit of part A, B and C are 50, 200 and 500 respectively.

Note: Non-Scientific Calculator is allowed to be used in examination.

Unit I
Basic elements of Computer Graphics, Graphics display devices, Applications of Computer Graphics, Raster and random scan; Color Models :RGB, CMY, HSV; Graphics Standard : openGL; Scan Conversion: DDA line algorithm, Mid-point circle Algorithm.
Unit II
2D Transformation: Translation, Rotation, Scaling, Homogenous Co-ordinates and Matrix Representation of 2D Transformation, Composite Transformation; 3D Graphics: Matrix Representation of 3D transformations, Translation, Rotation, Scaling, Composite Transformation.
Unit III
Overview of concepts: Clipping, projection, hidden surface removal, lighting , transparency, modelling and texturing, rendering ; Animations : Principles of animations ,keyframing,concept of 2D and 3D animation .
Unit IV
Blender: GUI Interface, Selecting,rotating and Translating Objects, Using Snap to move objects precisely, Creating mesh primitives and extrusions, Subdividing meshes, Creating a simple creature, Joining mesh objects and stitching vertices .
Unit V
Blender: Organizing a scene with layers, groups, and hierarchies, Assigning glossy and reflective materials to objects, Creating bump maps, Creating sky and ambient light, Understanding ambient occlusion, Adding motion blur and depth of field, Editing animation in the Graph Editor, Building and animating a simple character.

Suggested Readings:
1. Computer Graphics by D Hearn and P M Baker, Printice Hall of India (Indian Edition).
2. Computer Graphics (Principles and Practice) by Foley, van Dam, Feiner and Hughes, Addisen Wesley (Indian Edition)
3. Mathematical Elements for Computer Graphics by D F Roger.
4. Introduction to Computer Graphics By Krihsnamurthy N (Tata McGraw Hill
5. Theory and Problems of Computer Graphics (Schaum's Outline) By Zhigang X. and Plastock Ra. (Tata McGraw Hill)
Web Resources:
1. https://www.cs.duke.edu/brd/Teaching/Previous/Animation/animation.html
2. http://zikky.lecturer.pens.ac.id/Produksi 3D untuk Designer/Beginning Blender-book.pdf
3. http://www.blenderhd.com/wp-content/uploads/2015/08/BeginnersGuideToBlender.pdf
4. https://people.sc.fsu.edu/~gerlebacher/gd/blender/blender/blender_noob_to_pro.pdf
5. http://download.blender.org/documentation/pdf/John M Blain - An Introduction To Blender 3D - A Book For Beginners (2011).pdf

7. https://docs.blender.org/manual/en/dev/index.html

Duration: 3 Hours   Maximum Marks: 50
                                                              Minimum Passing Marks: 13

MCS- 204(B) Web App Programming
Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).
The word limit of part A, B and C are 50, 200 and 500 respectively.

Unit I
Basic of the .net framework: .NET Architecture, managed code, assemblies, clr, execution of assemblies code, il, jit, net framework class library, common type system, common language specification**.** Overview C#, similarities and differences from JAVA, Structure of C# program. Language features- Type system, boxing and Unboxing, flow controls.

Unit II
C#: Classes, Properties, Indexers, Constructors, Inheritance, Interfaces, Serialization, Delegates, Reflection.

Unit III
Understanding ASP.NET Controls: Web forms, Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box etc. Running a web Application, creating a multiform web project.

Unit IV
Form Validation Controls- Required Field, Compare, Range. Calendar Control, Ad Rotator Control, State Management-View State, Session State, Application State.

Unit V
Architecture Of ADO.NET, Connected and Disconnected Database, Create Connection Using ADO.NET Object Model, Connection Class, Command Class, DataReader Class, Data adapter Class, Dataset Class. Display Data on Bound Controls and Gridview. Database Accessing on Web Applications: Insert records in database, delete and update records from database, Display a particular record and all records on web form.

Suggested Readings:
1. ASP.NET 2.0 Black Book By RudrakshBatra, CharulShukla (Dream Tech Press)
2. ASP. NET Bible By MridulaParihar and et al. (Hungry Minds, New York)
3. Beginning C #   By Karli Watson (Wrox)
4. C# By Joseph Mayo (Techmedia)
5. Andrew Troelsen – "C# and the .Net Platform" – Apress – 2001.(Unit I and II)
6. David S. Platt – "Introducing .Net" – Microsoft Press – 2002.
7. Alex Homer et. al. – "Professional ASP .NET 1.1" – Wiley-dreamtech India Pvt. Ltd. – 2004.
8. ASP.NET Developer's Guide By G Buezek (TMH)
9. .NET Framework Essentials 3rd Edition (O'Reilly)

Duration: 3 Hours

Maximum Marks: 50
Minimum Passing Marks: 13

MCS-204 (C) Android Programming

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).
The word limit of part A, B and C are 50, 200 and 500 respectively.

Unit I

Java (Exception handling & Packages & interfaces & JVM & .jar file extension & Multi threading.
Database(DML&DDL) , What is Android & Setting up development environment & various editors.

Unit II

Application Structure (AndroidManifest.xml , uses-permission & uses-sdk , Resources & R.java , Assets & Layouts &Drawable Resources , Activities and Activity lifecycle.

Unit III

Eclipse editor :(Menu , Option menu , Context menu , Sub menu , menu from xml , menu by code). SQLite Programming , SQLiteOpenHelper , SQLiteDatabse.

Unit IV

Adapters and Widgtes (Adapters:- a. ArrayAdapters b. BaseAdapters , ListView and ListActivity , Custom listview , GridView using adapters , Gallery using adapters).

Unit V

Notifications (Broadcast Receivers , Services and notifications , Toast , Alarms). Advanced o Live Folders (Using sdcards , XML Parsing , JSON Parsing , Maps, GPS, Location based Services, Accessing Phone services :(Call, SMS, MMS)).

Suggested Readings-

1. Android Programming for Beginners by John Horton Publisher: Packt Publishing
2. Learn Java for Android Development (2nd edition) by Jeff Friesen Publisher: Apress
3. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.
4. Beginning Android Programming with Android Studio, Fourth Edition by Jerome F. DiMarzio Publisher: John Wiley & Sons
5. Android Programming: The Big Nerd Ranch Guide by Kristin Marsicano , Chris Stewart , Bill Phillips Publisher: Big Nerd Ranch Guides

Duration: 3 Hours   Maximum Marks: 50
                                                                 Minimum Passing Marks: 13

MCS-205 (A) Data Warehouses & Data Mining
Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).
The word limit of part A, B and C are 50, 200 and 500 respectively.

Note: Scientific Calculator is allowed to be used in examination.

Unit I
Compelling Need for data warehousing, Definition and Features, Data warehouses and data marts, overview of the components, metadata in the data warehouse; Dimensional modeling: Star and snowflake schema; OLAP.

Unit II
Data mining Introduction: Definition, Data mining tasks, Data mining as a step of Knowledge discovery process, Applications of Data mining; Data objects and types of attributes, Recalling mean, median ,mode and weighted arithmetic mean. Data quality , overview of data preprocessing.

Unit III
Classification analysis- definition, Overview of various classification techniques; Decision tree induction- working, examples ,specifying attribute test conditions , Measures of node impurity, measures for selecting best split. Evaluating the performance of a classifier- Holdout method, Random subsampling , cross-validation, Bootstrap.

Unit IV
Association analysis: support, confidence, association rules ,Frequent Item sets. Frequent itemset generation - Apriori principle , Apriori algorithm and examples, FP growth algorithm and examples.

Unit V
Closed and maximal frequent itemsets; Cluster analysis: Definition , basic clustering methods with focus on Density based method - DBSCAN.

Suggested books:

1. Fundamentals of Data Warehousing , by Paul Raj Poonia, , John Wiley & Sons.
2. Data Mining: Concepts and Techniques, 3rd edition, Jiawei Han and Micheline Kamber
3. Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Pearson Education.
4. Data Mining: A Tutorial Based Primer, Richard Roiger, Michael Geatz, Pearson Education 2003.
5. Introduction to Data Mining with Case Studies, G.K. Gupta, PHI 2006
6. Insight into Data mining: Theory and Practice, Soman K. P., DiwakarShyam, Ajay V., PHI 2006
7. Data Mining:: Practical Machine Learning Tools and Techniques (Morgan Kaufmann Series in Data Management Systems) by Witten, Frank, Hall

Duration: 3 Hours   Maximum Marks: 50
                                                                 Minimum Passing Marks: 13

MCS-205 (B) Artificial Intelligence
Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).
The word limit of part A, B and C are 50, 200 and 500 respectively.

Unit I
Definition, History, Agents and environment, Defining the problem as a state and space search, What is Intelligence? Types of Intelligence, Difference between Human and Machine Intelligence, The Structure of Intelligent Agents.

Unit II
Solving problems by searching: Uninformed search strategies- Brute-Force, Breadth-First, Uniform-cost search Depth-First, Depth-limited search, depth-first search, Bidirectional search.
    Informed (heuristic) search strategies- Greedy best-first search, A*, AO* Memory-bounded heuristic search. Heuristic functions, local search algorithms- Hill-climbing search, Simulated annealing, Local beam search.

Unit III
Knowledge Based System: Knowledge, Procedure V/S Declarative Knowledge, Knowledge Representation: Using Procedural and Predicate Logic, Inference in First order logic: Unification and Lifting, Forward Chaining, Backward Chaining, Resolution. Rule based System, Frames, Frames, Scripts, and Semantic Nets.

Unit IV
Probabilistic Reasoning, Probability and Byes Theorem, represent knowledge in uncertain domain, Certainty factors, Baysian Networks, Dempster–Shafer theory, introduction to Fuzzy logic. Learning: types of learning, decision trees

Unit V
Expert System: types, architecture. Introduction to Artificial Neural Networks, Reinforcement learning, Natural Language Processing, Pattern Recognition and Perception.

Suggested Readings
1. Artificial Intelligence By Rich And Knight (Tata McGraw Hill)
2. Introduction to Artificial Intelligence and Expert Systems By Patterson (Prentice-Hall India)
3. Artificial Intelligence A Modern Approach by Russell and Norvig, Prentice Hall

Duration: 3 Hours

Maximum Marks: 50
Minimum Passing Marks: 13

MCS-205 (C) Cloud Computing

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit syllabus).

The word limit of part A, B and C are 50, 200 and 500 respectively.

Unit I

Introduction to Cloud Computing, Services provided by cloud-SaaS, PaaS, IaaS, DaaS etc. Functioning of cloud computing, Advantages, Disadvantages, Applications, Cloud Service Providers- Amazon AWS, Google App Engine, Microsoft, VMware.

Unit II

Virtualization concepts, Objectives, Types of Virtualization & its benefits, Introduction to Various Virtualization OS (Hypervisor). Virtualization for Enterprises

Unit III

Designing and Implementing a Data Center-Based Cloud, Industry and International Standards for Cloud Implementation, Building private cloud using open source tools, Integration of Public and Private Cloud

Unit IV

Private, Public & Hybrid Clouds, their Advantages & Disadvantages, On Premises and Off Premises Cloud services, installing a Cloud service.

Unit V

Cloud Security issues - Infrastructure Security, Network level security, Host level security, Application level security, Data privacy and security Issues, Jurisdictional issues raised by Data location, Access Control, Trust, Reputation, Risk and Authentication in cloud computing

Suggested Readings:
1. Cloud Computing Concepts Technology and Architecture by Thomas Erl, Prentice Hall
2. Cloud Computing principles and paradigms by Rajkumar Buyya, James Broberg and Andrzej Goscinski, John Wiley and Sons, Inc. Publication
3. Cloud Computing Theory and Practice by Dan C. Marinescu, Morgon Kaufman Publication

MCS-206 PROJECT   Maximum Marks: 50
                                                                Minimum Passing Marks: 13

Practical Training and Project Work:
   1. Project Work may be done individually or in groups in case of bigger projects. However if project is done in group each student must be given a responsibility for a distinct module and care should be taken to monitor the individual student.
   2. Project Work can be carried out in the college or outside with prior permission of college.
   3. The Student must submit a synopsis of the project report to the college for approval. The Project Guide can accept the project or suggest modification for resubmission. Only on acceptance of draft project report the student should make the final copies.
   4. **The Project Report should be hand written**

Submission Copy:
The Student should submit spiral bound copy of the project report.

Format of the Project:
   (a) Paper:
         The Report shall be typed on White Paper of A4 size.
   (b) Final Submission:
         The Report to be submitted must be original.
   (c) Typing:
       Font:- Times New Roman
       Heading:- 16 pt., Bold
       Subheading:- 14 pt, Bold
       Content:- 12 pt.
       Line Spacing:- 1.5 line.
       Typing Side :-One Side
       Font Color:- Black.
   (d) Margins:
       The typing must be done in the following margin:
       Left : 0.75"
       Right: 0.75"
       Top: 1"
       Bottom: 1"
       Left Gutter: 0.5"
   (e) Binding:
       The report shall be Spiral Bound.
   (f) Title Cover:
       The Title cover should contain the following details:
       Top: Project Title in block capitals of 16pt.
       Centre: Name of project developer's and Guide name.
       Bottom: Name of the university, Year of submission all in block capitals of 14pt letters on separate lines with proper spacing and centering.
   (g) Blank sheets:
       At the beginning and end of the report, two white blank papers should be provided, one for the Purpose of Binding and other to be left blank.
   (h) Content:
       I). Acknowledgement
       II). Institute/College/Organization certificate where the project is being developed.
       III). Table of contents
       IV). A brief overview of project
       V). Profiles of problem assigned

VI). Study of Existing System
VII). System Requirement
VIII). Project plan
  o Team Structure
  o Development Schedule
  o Programming language and Development Tools
IX). Requirement Specification
X). Design
  o Detailed DFD's and Structure Diagram
  o Data structure, Database and File Specification

XI). Project Legacy
  o Current Status of project
  o Remaining Areas of concern
  o Technical and Managerial Lessons Learnt
  o Future Recommendations
XII). Nomenclature and Abbreviations.
XIII). Bibliography
XIV). Source Code.