

TEACHING AND EXAMINATION SCHEME
M. SC. COMPUTER SCIENCE
W.E.F. 2019-2020
Semester I

Paper Name (Theory)		Lec	Tut	Exam Hours	MAX MARKS	
					Sess- ional	Sem Exam
mcs-101	Computer Architecture	5	1	3	20	80
mcs-102	Programming with C	5	1	3	20	80
mcs-103	Electronic Data Processing	5	1	3	20	80
mcs-104	Computer Communications & Networks	5	1	3	20	80
Total of Theory (Sessional + Semester Exam Marks)						400

Paper Name (Practical)		Pract Hours	Exam Hours	Min Marks	Max Marks
mcs-106	C & MS-Access	4	3	50	
Total of Practical Marks					100
Total of Theory & Practical Marks					500

TEACHING AND EXAMINATION SCHEME
M. SC. COMPUTER SCIENCE
Semester II

Paper Name (Theory)	Lec	Tut	Exam Hours	MAX MARKS	
				Sess- ional	Sem Exam
mcs-201 Programming in .NET with C#	5	1	3	20	80
mcs-202 Operating Systems	5	1	3	20	80
mcs-203 Computer Graphics	5	1	3	20	80
mcs-204 Programming in Java	5	1	3	20	80
Total of Sessional & Semester Exam Marks					400

Paper Name (Practical)	Pract Hours	Exam Hours	Min Marks	Max Marks
mcs-205 .NET & C#, Computer Graphics		4	3	50
mcs-206 Linux, Shell Programming & Java		4	3	50
Total of Practical Marks				100
Total of Theory & Practical Marks				500

TEACHING AND EXAMINATION SCHEME
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Semester III

Paper Name (Theory)	Lec	Tut	Exam Hours	MAX MARKS	
				Sess- ional	Sem Exam
mcs-301 OOPS with C++ & Data Structures	5	1	3	20	80
mcs-302 Advance Database Management Systems	5	1	3	20	80
mcs-303 Software Engineering	5	1	3	20	80
mcs-304 Python Programming	5	1	3	20	80
Total of Sessional & Semester Exam Marks					400
Paper Name (Practical)	Pract Hours	Exam Hours	Min Marks	Max Marks	
mcs-305 C++, Software Engineering	4	3	20	50	
mcs-306 Python, Oracle	4	3	20	50	
Total of Practical Marks					100
Total of Theory & Practical Marks					500

TEACHING AND EXAMINATION SCHEME
M. SC. COMPUTER SCIENCE
Semester IV

Paper Name (Theory)		Lec	Tut	Exam Hours	MAX MARKS	
					Sess- ional	Sem Exam
mcs-401	Image Processing	5	1	3	20	80
mcs-402	Mobile App Development with Android	5	1	3	20	80
mcs-403	Data Warehouse & Data Mining	5	1	3	20	80
Optional:						
mcs-404a	Web Technology	5	1	3	20	80
mcs-404b	Spatial Database Management Systems					
Total of Sessional & Semester Exam Marks						400
Paper Name (Practical)		Pract Hours	Exam Hours	Min Marks	Max Marks	
mcs-405	Mobile App Development with Android& Data Mining	4	3	20	50	
mcs-406	Projects	6	3	40	100	
Optional:						
mcs-407a	Web Technology	4	3	20	50	
mcs-407b	ArcView/ArcGIS/GeoMedia					
Total of Practical Marks						200
Total of Theory & Practical Marks						600

Scheme of Examination (For M. Sc. Computer Science/Information Technology)

The question paper will be divided into 3 parts:

Part A:

1. 10 Question of 3 mark each – 30 marks
2. Answer should not exceed more than 50 words
3. All questions are compulsory

Part B:

1. 5 Questions of 5 marks each – 25 marks
2. Answer should not exceed more than 100 words
3. All questions are compulsory

Part C:

1. 3 Questions of 15 marks each – 45 marks.
There will be an internal choice in each question.
2. Answer should not exceed 400 words
3. All questions are compulsory.

Note:

1. **Lec:** Lectures **Tut:** Tutorials per week per hour
2. There will be sessional (internal assessment) of 20 marks conducted by the college.
3. One Practical exam shall be conducted by one internal and one external examiner of a batch of 20 students in day.
4. **Project Work:** 6 hours per student
5. Duration of Practical exam is 3 hours.
6. A Laboratory Exercise File should be prepared by each student for each practical paper and should be submitted during practical examinations.
7. Practical of 50 marks distribution is as under:
 - a. 30 marks for practical examination exercise for 3 questions
 - b. 10 marks for Viva-voce
 - c. 10 marks for Laboratory Exercise File
8. Eligibility: Graduate from any discipline with 50% marks in aggregate. As regards admission on reserved category seats government rules will be applicable.

Scheme of Examination (For M. Sc. Computer Science/Information Technology)

Reg. 17 (a)

The examination for the M. Sc. Computer Science/Information Technology will consist of 4 semesters. The examination shall consist of (a) Theory papers (b) Laboratory / Practical work and project work. Candidates will be required to pursue a regular, full time course of study at the University department for a period of two academic years in order to be eligible for appearing in the examination.

1. Eligibility for M. Sc. Computer Science/Information Technology: 50% marks in any graduation scheme.
2. Examination:
 - i. There shall be 25 papers (4 theory, 2 practical in each semester and 1 project as practical in the fourth semester) of 2100 marks (first to fourth semester). Theory paper shall be of 3 hours duration having 100 marks. Out of 100 marks 20 marks shall be considered as internal assessment based on internal test and seminars and 80 marks will be of examination at the end of each semester as determined by the University. The practical shall be of 50 marks assessed by external examiner and the project work shall be of 100 marks based on project presentation and viva-voce, assessed by external examiner.
 - ii. To pass a semester a candidate shall have to score 25% marks in each subject (theory and practical) separately and also 36% marks in aggregate of all the papers prescribed for the examination.
 - iii. Due paper(s) will be applicable if a candidate obtains 36% marks in aggregate and fails in not more than two (2) papers (theory). Due paper(s) of first semester will be held along with the third semester and the due paper(s) of second semester will be held along with the fourth semester. The third and fourth semester due paper(s) will be held in the first and second semester respectively of the next year. The chance of due paper(s) will be given only thrice in each semester.
 - iv. Wherever a candidate appears at for a due paper examination he/she will do so according to the syllabus in force.
 - v. A candidate not appearing at any examination/absent in any paper of term end examination shall be deemed as fail.
3. A candidate for a pass in the examination 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 the practical(s) wherever prescribed at the examination, provided that if a candidate fails to secure at least 25% marks in each individual paper at the examination notwithstanding his having obtained the minimum percentage of marks required in the aggregate for that examination.

No Division will be awarded in the first, second and third semester examinations. Division shall be awarded at the end of the fourth semester Examination on the combined marks obtained at the first, second third and fourth semester taken together as noted below:

Passed with First Division	60% of the aggregate marks taken together of all the four semester examinations
Passed with second division	48%

All the rest will be declared to have passed the examination.

Provided that if a candidate clears any paper after a continuous period of two years since he/she was admitted to the M. Sc. Computer Science/Information Technology then for the passing marks, i.e. 25% marks, shall be taken into account in the case of such course(s).

4. The grace marks shall be given up to 1% of the total aggregate marks of theory and practical of that semester in maximum one paper.
5. Candidates reappearing at an examination in a subsequent year shall be examined in accordance with the scheme and syllabi in force and shall be entitled to the award of the degree of year in which they clear the last failing/unclear paper.

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Duration: 3 hours	Max Marks: 80
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mcs-101 Computer Architecture

Number system, Logic Gates, Boolean Algebra, K-Map, combinational circuit, flip-flop, sequential circuit, encoder, decoder, multiplexer, shift register, fixed-point representation, floating-point representation.

Register transfer language, inter-register transfer, arithmetic micro operation, logic and shift micro operation, instruction codes, timing and control, input/output and interrupts.

Processor bus organization, arithmetic logic unit, stack organization, instruction format, addressing mode, data transfer and manipulation, program control, control memory, addressing sequence, micro program sequencer, micro instruction formats.

Block diagram of 8085 and pin configuration, 8086/8088 instruction set, data transfer instructions, arithmetic, logical, shift, rotate, flag, compare, jump instruction, subroutine, loop, addressing modes, memory hierarchy, associative memory, memory addressing, virtual memory, cache memory, cache coherence.

mcs-102 Programming with C

Overview of C Language: History of C, Character set, C tokens, Identifiers, Keywords, Data types, Variables, Constants, Symbolic Constants, Operators in C, Hierarchy of Operators, Expressions, Type Conversions and Library Functions.

Managing Input and Output Operation: Formatted and Unformatted I/O Functions, Decision making, branching and looping: Decision Making Statements - if Statement, if-else statement, nesting of if-else statements, else-if ladder, switch statement, ?: operator

Looping - while, do-while, for loop, Nested loop, break, continue, and goto statements. Functions: Function Definition, prototyping, types of functions, passing arguments to functions, Nested Functions, Recursive functions.

Arrays: Declaring and Initializing, One Dimensional Arrays, Two Dimensional Arrays, Multi-Dimensional Arrays - Passing arrays to functions. Strings: Declaring and Initializing strings, Operations on strings, Arrays of strings, passing strings to functions. Storage Classes - Automatic, External, Static and Register Variables.

Structures-Declaring and Initializing, Nested structure, Array of Structure, Passing Structures to functions, Unions, typedef, enum, Bit fields. Pointers – Declarations, Pointer arithmetic, Pointers and functions, Call by value, Call by reference, Pointers and Arrays, Arrays of Pointers, Pointers and Structures. Meaning of static and dynamic memory allocation, Memory allocation functions file, stack, single linked list, double linked list, circular linked list, prefix, postfix, infix, queue, d-queue.

mcs-103 Electronic Data Processing

Concept of system, type of decision, information system, classification, conventional file system, object of database systems, data abstraction, data definition language, data manipulation language, database administrator. Database design stages, database model, database system architecture.

Centralized and client/server architecture in DBMS, entity relationship model, entities and entity sets their relationship, mapping constraints, generalization, aggregation, use of ER model for the design of databases, sequential, random, index sequential file organization, introduction and history of relational database, system relational algebra, normalization up to DKNF.

MS-Access: Create a Table in MS Access -Data Types, Field Properties, Fieldsnames, types, properties, default values, format, caption, validationrules Data Entry Add record delete recode and edit text Sort, find/replace,filter/select, re-arrange columns, freeze columns. Edit a Tables- copy, delete, import, modify table structure find replace.

Setting up Relationships- Define relationships, add a relationship, set a rule for Referential Integrity, change the join type, delete a relationship, save relationship Queries & Filter –difference between queries and filter,filter using multiple fields AND,OR,advance filter Queries create Query with one table,fiend record with select query, find duplicate record with query,find unmatched record with query, run query,save and change query.

Introduction to Forms Types of Basic Forms: Columnar, Tabular, Datasheet, Main/Subforms, add headers and footers, add fields to form, add text to form use label option button, check box,combo box, list box Forms Wizard, Create Template.

Introduction to Reports, Types of Basic Reports: Single Column, Tabular Report Groups/Total, single table report multi table report preview report print report, Creating Reports and Labels, Wizard

mcs-104 Computer Communications & Networks

Introduction to Data communications and networking, protocols, standards and architecture, topology, transmission mode, OSI model, analog and digital signals, periodic and aperiodic signals, time and frequency domain

Encoding digital to digital conversion, analog to digital conversion, digital to analog conversion, analog to analog conversion, transmission of digital data, DTE-DCE interface, EIA-232, , X.21, modem, cable modem, guided and unguided, transmission media

Multiplexing, TDM, FDM, WDM, DSL, HDLC, Asynchronous transfer mode, protocol architecture, ATM cells, ATM layers, switches, circuit switching network and concepts, routing, packet switching, X.25, virtual circuit approach, point-to-point layers, link control protocol, network control protocol.

mcs-201 Programming in .NET with C#

Introduction to .NET, .NET Framework features & architecture, CLR, Common Type System, MSIL, Assemblies and class libraries. Introduction to visual studio, Project basics, types of project in .Net, IDE of VB.NET- Menu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser. The environment: Editor tab, format tab, general tab, docking tab. visual development.

Variables -Declaring variables, Data Types, Forcing variables declarations, Scope & lifetime of a variable, Control flow statements: conditional statement, loop statement. Constants, Arrays, types of arrays, Collections.

Subroutines, Functions, Passing variable number of arguments, Optional Arguments, Returning value from function, MsgBox&Inputbox.Class , overloading ,constructor ,inheritance,overriding,interfaces.

Working with Forms : Loading, showing and hiding forms, controlling one form within another. Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, RadioButton, Panel, scroll bar, Timer, ListView, TreeView, toolbar, StatusBar.. OpenFileDialog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog.LinkLabel.Designing menus :ContextMenu, access & shortcut keys.

Database programming with ADO.NET – Overview of ADO, from ADO to ADO.NET, Accessing Data using Server Explorer. Creating Connection, Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Data on data bound controls, display data on data grid. Generating reports using CrystalReportViewer

Introduction to C#, variables, constants, identifiers, data types, expressions and operators, flow control and exception handling, control structures, properties, indexes, namespace, classes, objects, structures

Object oriented programming C#, pointers, delegates and events

mcs-202Operating Systems

Introduction to Operating Systems, goals of OS, operation of OS, resource allocator and related functions, classes of OS, batch processing, multi-processing, time sharing, distributed, real time systems, system calls, system programs, structure of OS, layer design of DOS, Unix.

Process concept, interacting process, threads, process, process scheduling, fundamental of scheduling, scheduling criteria, long medium short term scheduling, scheduling algorithms, critical section, critical region, inter-process communication, monitor and semaphores.

Logical versus physical address, swapping, contiguous allocation, segmentation, paging, segmentation with paging, kernel memory allocation, page replacement algorithm, virtual memory, virtual memory with paging, demand paging, dead lock, characterization, methods for handling dead locks, prevention, avoidance, thrashing, allocation of frame, virtual memory using segmentation

History of Linux, Linux architecture, Linux File System, file naming, types of files, directory command, file command, vi editor, locating files in Linux, filter, pipe, shell variables, local and global variables, command substitution, if, while, for, shift, tar, basic networking commands in Linux.

mcs-203Computer Graphics

Interactive graphics, passive graphics, advantage of interactive graphics, classification of application, hardware and software requirement of computer graphics

Point, line, DDA algorithm, Bresenham's line algorithm, circle, circle generating algorithm, midpoint circle algorithm, ellipse generating algorithm, midpoint ellipse algorithm, polynomial and spline curves, parallel curve algorithms, curve function, filled area primitives, line attributes, curve attributes, area fill attributes, clippings, clipping lines.

2D transformation, matrix representation of 2D, composite transformation, translation, rotation, scaling, general pivot-point rotation, general fix scaling, other transformations, reflection, shear, affine transformations and transformation functions, window-to-view port transformation, clipping operation, point, line, Cohen-Sutherland line clipping, polygon clipping.

3D display method, parallel projection, perspective projection, visible line identification, depth cueing, surface rendering, polygon surface, table, equation, meshes, splines, representation, cubic spline interpolation, Bezeir Curves and surfaces, B-spline and surfaces, Beta-spline, 3D transformation, rotation, scaling, composite transformation, 3D transformation function.

mcs-204 Programming in Java

Introduction to Java, characteristics, Object oriented programming, data types, variables, arrays
Control statements: selection, iteration, jump statements, operators, Introduction to classes, class fundamentals, constructor, methods, stack class, inheritance, creating multilevel hierarchy, method overriding, Packages and interfaces, exception handling, multi-threaded programming, I/O applets
Java Library, string handling, string comparison, string buffer

Servlet Structure, Servlet packaging, HTML building utilities, Lifecycle, Single Thread model interface, Handling Client Request: Form Data, Handling Client Request: HTTP Request Headers. Generating server Response: HTTP Status codes, Generating server Response: HTTP Response Headers, Handling Cookies, Session Tracking.

Overview of JSP Technology, Need of JSP, Benefits of JSP, Advantages of JSP, Basic syntax, invoking Java code with JSP scripting elements, creating Template Text, Invoking java code from JSP, Limiting java code in JSP, using JSP expressions, comparing servlets and JSP, writing scriptlets. Using Scriptlets to make parts of JSP conditional, using declarations, declaration example. Controlling the Structure of generated servlets: the JSP page directive, import attribute, session attribute, isElignore attribute, buffer and auto flush attributes, info attribute ,errorPage and is errorPage attributes, is Thread safe Attribute, extends attribute, language attribute, Including files and applets in JSP Pages, using java beans components in JSP documents

Java Beans & Annotations:Creating Packages, Interfaces, JAR files and Annotations. The core java API package, New Java Lang Sub package, Built-in Annotations.Working with Java Beans. Introspection, Customizers, creating java bean, manifest file, Bean Jar file, new bean, adding controls, Bean properties, Simple properties, Design Pattern events, creating bound properties, Bean Methods, Bean an Icon, Bean info class, Persistence ,Java Beans API.

mcs-301OOPS with C++ & Data Structures

Object Oriented Concepts, Tokens, Expressions and Control Structures Introduction: Basic Elements of Programming, Console I/O Operations.

Control Structures: Control and Looping Statements. Function: Function Prototyping, Call and Return by Reference, Inline Function, Default and Const Arguments, Function Overloading, Arrays, Manipulators and Enumeration.

Classes and Object, Object Oriented Methodology: Basic Concepts/Characteristics of OOP. Advantages and Application of OOP's, Procedural Programming vs. OOP

Classes and Objects: Specifying a Class, Creating Objects, Private & Public Data Members and Member Functions, Defining Inline Member Functions, Static Data Members and Member Functions. Arrays within Class, Arrays of Objects, Objects as Function Arguments, Returning Objects.

Constructors, Destructors, Operators Overloading and Inheritance. Constructors and Destructors: Introduction, Parameterized Constructors, Multiple Constructors in A Class, Constructors With Default Arguments, Dynamic Initialization of Objects, Copy Constructors, Dynamic Constructors, Const Objects, Destructors Operators Overloading: Definition, Unary and Binary Overloading, Rules for Operator Overloading.

Inheritance: Defining Derived Classes, Types of Inheritance, Constructors and Destructors in Derived Classes.

Pointers Virtual & Friend functions and file handling Pointers: Pointer to Objects, this Pointer, New and Delete Operators, Virtual Function, Friend Functions. Opening, Closing a File, File Modes, File Pointers and their Manipulation, Sequential Input and Output Operations: Updating a File, Random Access, and Error Handling During File Operations, Command Line Arguments.

Single linked lists, double linked list, circular list, sparse table, stack, queue, d-queue list, priority queue, graph, prefix, postfix, infix, sorting, insertion, selection, bubble, algorithm of quick, merge

mcs-302 Advance Database Management Systems

Object Oriented modeling, class, different types of attributes, generalization, inheritance, aggregation, encapsulation, complex objects, object definition language, object query language, object technology in RDBMS, primary, secondary, multi-level files, dynamic multi-level index using B & B+ tree,

Distributed database design, architecture of distributed processing system, data communication concept, data placement, placement of DDBMS, and other components, concurrency control techniques, recovery, transaction management, need of recovery, recovery techniques, serializability, two-phase locking.

Query optimization and processing, algorithm for external sorting, select and join, object and set operations, heuristics in query optimization, temporal database concept, multi-media database,

SQL*PLUS Data types, Constraints, Operators, DDL, DML, PL/SQL syntax, Data types, PL/SQL functions, Error handling in PL/SQL, package functions, package procedures, Oracle transactions. Stored procedures & functions, creation and execution of procedures

Database Triggers: Introduction, Use & type of database Triggers, Triggers Vs. Declarative Integrity Constraints, BEFORE Vs. AFTER Trigger Combinations, Creating a Trigger, Dropping a Trigger.

Security and integrity of databases, security specifications in SQL, access control, flow control.

mcs-303 Software Engineering

Concepts of Software Engineering, Software Characteristics, components applications, software Metrics and Models; Process and Product Metrics, Size metric, Complexity metric, McCabe's Cyclometric Complexity, Halsted Theory, Function Point Analysis.

System Development Life Cycle (SDLC) Steps, Water fall model, Prototypes, Spiral model. Planning and Software Project: Cost Estimation, Project Scheduling, Quality Assurance Plans, Project Monitoring Plans.

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,

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

Testing : Testing Fundamentals, Test case design, Functional Testing, Structural Testing, Test Plan activities during testing, Unit System

mcs-304 Programming in Python

Programming basics and strings, numbers and operators, variables, making decisions

Functions, classes and objects, organizing programs, files and directories

Building modules, text processing,

Writing a GUI with Python, Accessing Databases

Python with XML, Network Programming, Programming with C, Numerical Programming,

Web Application and Web Services, Integrating Java with Python

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mcs-401 Image Processing

Image representation, bitmap representation, bitmap header, color map, 8 bit, 24 bit pixels, TIFF, PCX, JPEG format,.

Image smoothing, zooming, transform operation, multi-spectral image enhancement, convolution techniques, formulation of discrete linear operators, inverse and Wiener filtering

Edge detection, segmentation, texture, motion detection, error criterion, lossy compression, methods of putting data on diet, trie-based codes, fractal image coding, subband coding of images

Fingerprints, face recognition, speaker recognition, digital watermarking for images, medical image processing.

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mcs-402 Mobile App Development with Android

Introduction to mobile communication and computing: Introduction to mobile computing, Novel applications, limitations and GSM architecture, Mobile services, System architecture, Radio interface, protocols, Handover and security. Smart phone operating systems and smart phones applications

Fundamentals of Android Development: Introduction to Android., The Android SDK, Understanding the Android Software Stack, Installing the Android SDK, Creating Android Virtual Devices, Creating the First Android Project, Using the Text View Control, Using the Android Emulator, The Android Debug Bridge (ADB), Basic Widgets Understanding the Role of Android Application Components, Event Handling , Displaying Messages Through Toast, Creating and Starting an Activity, Using the Edit ext Control.

The Android Debug Bridge (ADB), basic widgets understanding the role of Android Application Components, event handling, displaying messages through toast, creating and starting an activity, using the Edit ext Control Building Blocks for Android Application Design, Laying Out Controls in Containers, utilizing resources and media

Using Selection Widgets and Debugging Displaying and Fetching Information Using Dialogs and Fragments Advanced, Android Programming: Internet, Entertainment, and Services, Implementing drawing and animations, displaying web pages and maps, communicating with SMS and emails, creating and using content providers: creating and consuming services, publishing android applications

mcs-403 Data Warehouse & Data Mining

Data Warehouse:

Store, warehouses, mart, data warehouse architecture layer topologies, meta-data key and action of metadata, implementing the data warehouse, data warehouse technologies, Role and structure of data warehouse, cost of warehousing data, function of data warehouse

Data Mining:

Introduction to data mining, DM techniques, issues and challenges in Dm, Applications, association rules, Prior, Partition, Pincer-Search, Dynamic Itemset counting, FP-tree growth, Incremental, Boder Algorithm

Clustering Techniques, portioning, k-Medoid algorithm, Hierarchical, categorical clustering algorithm, Decision tree, best split, splitting indices and criteria, decision tree construction algorithm, CART, ID3, C4.5, CHAID, Decision tree construction with presorting, rain Forest, approximate methods, Boat, Pruning Technique

mcs-404aWeb Technology

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

Web browser architecture, web page and multimedia, static dynamic and active web page, simple mail transfer protocol, simple network management protocol, hypertext transfer protocol

Basics of PHP: Introduction to PHP, what does PHP do? ,history of PHP , language basics ,data types , variables , expressions and operators , flow control statements , including code , embedding PHP in web pages.

Functions & Strings: Calling a function, defining a function, variable scope, function parameters, return values, variable functions, anonymous functions. Strings: Accessing individual characters, cleaning strings, encoding and escaping, comparing strings, manipulating and searching strings, regular expressions.

Arrays & Objects: Indexed vs. associative arrays, identifying elements of an array, storing data in arrays, multidimensional arrays, extracting multiple values, converting between arrays and variables, traversing arrays, sorting. Objects: Creating an object, accessing properties and methods, declaring a class, introspection.

MySQL Overview: Introduction, connecting to and disconnecting from the server , Entering queries , Creating and using a database , Creating and selecting a database , creating a table , loading data into a table , Retrieving information from a table , selecting all data , selecting particular rows , selecting particular columns , sorting rows , date calculations , working with NULL values , pattern matching , counting rows , using more than one tables.MySQL databases in PHP: Introduction, connecting to a MySQL database, querying the database, Retrieving and displaying the results, modifying data, deleting data.

JavaScript - JavaScript Introduction , Variable, If-Else, Switch, Operators, Popups, Functions,Iterator functions, Loops, Forms, Events, and Event Handling, Try-Catch, Introduction to JavaScript Objects, JS Built-in Objects:Array,String , Date , window, document, navigator, status, history, location. Event handling .DOM, dynamically adding, removing and replacing DOM.

Duration: 3 hours	Max Marks: 80
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mcs-404b Spatial Database Management Systems

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

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

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

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