

First Year M.C.A. Semester II (Master in Computer Application) (CBCS)

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Code	Theory / Practical	Teaching scheme (Hours / Week)			Credits	Examination Scheme					
		Th	Pract	Total		Duration in hrs.	Max. Marks		Total Marks	Minimum Passing Marks	
							External Marks	Internal Ass		Th	Pract
Paper 1 Core	2T1 C# and ASP .NET	4	-	4	4	3	80	20	100	40	-
Paper 2 Core	2T2 Cloud Computing	4	-	4	4	3	80	20	100	40	-
Paper 3 Core	2T3 Computer Graphics	4	-	4	4	3	80	20	100	40	-
Paper 4 Core Elective 1	2T4 CE1-1 Computer Architecture and OrganizationC E1-2 Operation Research CE1-3 Cyber Forensics	4	-	4	4	3	80	20	100	40	-
Paper 5 Core	2T5 Android Programming	4	-	4	4	3	80	20	100	40	-
Practical 1	2P1 based on 2T1, 2T2 and 2T3	-	6	6	4	3	100	-	100	-	40
Practical 2	2P2 based on 2T4 and 2T5	-	6	6	4	3	100	-	100	-	40
Project	Project	-	3	3	4	30 minutes	100	-	100	-	40
	TOTAL	20	15	35	32		700	100	800	400	

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Paper 5 Core	2T5 Android Programming	4	-	4	4	3	80	20	100	40	-
Practical 1	2P1 based on 2T1, 2T2 and 2T3	-	6	6	4	3	100	-	100	-	40
Practical 2	2P2 based on 2T4 and 2T5	-	6	6	4	3	100	-	100	-	40
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	TOTAL	20	15	35	32		700	100	800	400	

Books :

1. Software Engineering, A practitioner's Approach, Roger S. Pressman, McGrawHill International Edition.
2. Software Engineering, Sommerville, Pearson education.
3. Software Engineering principles and practice, Waman S Jawadekar, McGraw-Hill.

First Year M.C.A. Semester II (CBCS)**Core****Paper 1 - 2T1****Credits: 4****C# and ASP .NET****Unit 1:**

Introduction to .NET, the origins of .NET, .NET framework overviews (a common substrate for all development, key design goals, Mega Data, Multiple language integration and support, Name spaces), .NET framework Base classes, User and program interfaces (userInterface, Windows Forms, Web Forms, Console application), Program interface, Web Services

Introduction to Common Language Runtime (CLR) Requirement of .NET application (Assembly, Module, Type), common type systems (Custom types, Boxing & Unboxing value types), Metadata (Attributes, Custom Attributes), Managed Data (Managed Heap, Garbage collector), Garbage collector, optimization, pinning objects.

Unit 2:

Introduction to C Sharp, Value type, Default Constructor, Struct type, Enumeration type, Reference type, Class Type, Object Type, String Type, Interface type, Array type, Delegate type, Predefined types, Concept of Boxing & Unboxing, Array types, Variables & Parameters, Operands, Statements. Expression, operators, C Sharp Objects, Classes and Methods, Inheritance, Garbage collector, Class library and Name Space, Method overloading, statements and control. Struct types, Struct declaration, Struct modifier, Struct Interface, Enums, Enumerator Base type, Enum modifiers, Enum Members, Enum values and operations, String operations, converting objects to string, String builder, File and folder operations, reading and writing text files, reading and writing binary files,

Unit 3:

Introduction to ASP .NET - About ASP .NET, Basic difference between C# and VB .NET,

Understanding Namespaces and Assemblies - Importing Namespaces, Assemblies.

Web Server and user - Installing IIS. IIS Manager - Creating a virtual Directory, Virtual Directories and Applications, Folder Settings, Adding virtual directory to your Neighborhood.

Installing ASP .NET. ASP.NET Applications - ASP .NET file Types, The bin directory, Code-Behind, The Global.asax Code-Behind, Understanding ASP. Net Classes, ASP .NET

Configuration, **Web Form Fundamentals** - A Simple Applets, Improving the Currency Converter, HTML Control classes, Page Class, Assessing HTML Server Controls. **Web Controls** - Basic Web Control classes, AutoPostBack and Web Control Events, A Web page Applets. **Validation and Rich Controls.**

UNIT 4:

State Management Tracing, Logging and Error Handling -Common errors, .NET Exception Object, Handling Exceptions, Throwing your own Exceptions, Logging Exceptions, Error pages, Page tracing. **Advanced ASP. NET -Component-Based Programming** - Components Jargon, Creating Simple Component, Properties and State, Database Components, Using COM Components. Custom Controls-User Controls, Deriving Custom controls. **Caching and Performance tuning** - Designing for scalability, Profiling, Caching, output Caching, Data caching. Implementing Security-Determining Security Requirements, The ASP .NET Security Model, Forms Authentication, Windows Authentication, Impersonation.

Books:

1. C#(CSharp) Programming, V. K. Jain, Dreamtech Press, New Delhi.
2. Programming in C# ,Balguruswamy, Tata McGraw Hill.
3. Introduction to DOT NET (.NET), James Conardet. Al., Shroff Publisher
4. Introducing Microsoft Dot Net , David Platt, PHI Publication.
5. C # (C Sharp) Complete Reference ,Schildt, Tata McGraw Hill
6. The Complete Reference-ASP .NET , Matthew MacDonald, Tata McGraw- Hill.
7. ASP .NET 4.5(Covers C# and VB codes), Black Book, dreamtech Publication

First Year M.C.A. Semester II (CBCS)

Core

Paper 2 - 2T2

Credits: 4

Cloud Computing

Unit 1 :

Origins and Influences, Basic Concepts and Terminology, Goals and Benefits, Risks and Challenges, Roles and Boundaries, Cloud Characteristics, Cloud Delivery Models, Cloud Deployment Models, Federated Cloud/Intercloud, Types of Clouds. Cloud-Enabling Technology: Broadband Networks and Internet Architecture, Data Center Technology, Virtualization Technology, Web Technology, Multitenant Technology, Service Technology. Implementation Levels of Virtualization, Virtualization Structures/Tools and Mechanisms, Types of Hypervisors, Virtualization of CPU, Memory, and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data-Center Automation.

Unit 2 :

Common Standards: The Open Cloud Consortium, Open Virtualization Format, Standards for Application Developers: Browsers (Ajax), Data (XML, JSON), Solution Stacks (LAMP and LAPP), Syndication (Atom, Atom Publishing Protocol, and RSS), Standards for Security Features of Cloud and Grid Platforms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments, Understanding Core OpenStack Ecosystem. Applications: Moving application to cloud, Microsoft Cloud Services, Google Cloud Applications, Amazon Cloud Services, Cloud Applications (Social Networking, E-mail, Office Services, Google Apps, Customer Relationship Management).

Unit 3 :

Basic Terms and Concepts, Threat Agents, Cloud Security Threats and Attacks, Additional Considerations. Cloud Security Mechanisms: Encryption, Hashing, Digital Signature, Public Key Infrastructure (PKI), Identity and Access Management (IAM), Single Sign-On (SSO), Hardened Virtual Server Images.

Cloud Issues: Stability, Partner Quality, Longevity, Business Continuity, Service-Level Agreements, Agreeing on the Service of Clouds, Solving Problems, Quality of Service, Regulatory Issues and Accountability. Cloud Trends in Supporting Ubiquitous Computing, Performance of Distributed Systems and the Cloud.

Unit 4 :

Enabling Technologies for the Internet of Things (RFID, Sensor Networks and ZigBee Technology, GPS), Innovative Applications of the Internet of Things (Smart Buildings and Smart Power Grid, Retailing and Supply-Chain Management, Cyber-Physical System), Online Social and Professional Networking.

How the Cloud Will Change Operating Systems, Location-Aware Applications, Intelligent Fabrics, Paints, and More, The Future of Cloud TV, Future of Cloud-Based Smart Devices, Faster Time to Market for Software Applications, Home-Based Cloud Computing, Mobile Cloud, Autonomic Cloud Engine, Multimedia Cloud, Energy Aware Cloud Computing, Jungle Computing. Docker at a Glance: Process Simplification, Broad Support and Adoption, Architecture, Getting the Most from Docker, The Docker Workflow.

Books:

1. Jack J. Dongarra, Kai Hwang, Geoffrey C. Fox, Distributed and Cloud Computing: From Parallel Processing to the Internet of Things, Elsevier, ISBN :9789381269237, 9381269238, 1st Edition.
2. Thomas Erl, Zaigham Mahmood and Ricardo Puttini, Cloud Computing: Concepts, Technology & Architecture, Pearson, ISBN :978 9332535923, 9332535922, 1st Edition.
3. Srinivasan, J. Suresh, Cloud Computing: A practical approach for learning and implementation, Pearson, ISBN :9788131776513.
4. Brian J.S. Chee and Curtis Franklin, Jr., Cloud Computing: Technologies and Strategies of the Ubiquitous Data Center, CRC Press, ISBN :9781439806128.
5. Kris Jamsa, Cloud Computing: Saas, Paas, Iaas, Virtualization, Business Models, Mobile, Security, and More, Jones and Bartlett, ISBN :9789380853772.
6. John W. Rittinghouse, James F. Ransome, Cloud Computing Implementation, Management, and Security, CRC Press, ISBN : 978 1439806807, 1439806802.

First Year M.C.A. Semester II (CBCS)

Core

Paper 3- 2T3

Credits: 4

Computer Graphics

Unit 1 :

Introduction of computer Graphics and its applications, Overview of Graphics systems, Video display devices, Raster scan display, Raster scan systems, video controller, Raster scan display processor, Random scan display, random scan systems, color CRT monitor, Flat panel display, Interactive input devices, Logical classification of input devices, Keyboard, mouse, Trackball and spaceball, Joysticks, Image scanner, Light pens, Graphics software, Coordinates representations, Graphics functions.

Unit 2 :

Line drawing algorithms, DDA, Bresenham's, Circle generating, Mid-point circle algorithm, Ellipse generating, Polygon, Scan-line polygon fill, Boundary fill.

Unit 3 :

Basic transformation's, Translation, Rotation, Scaling, Matrix representation's & homogeneous coordinates, Composite transformation's, Reflection, Two dimensional viewing, Two dimensional clipping, Line, Polygon, Curve, Text. 3D-transformation, Projection, Viewing, Clipping. Spline representation, Cubic spline, Bezier curve, Bezier surfaces, Beta spline, B-spline surfaces, B-spline curve, Hidden surfaces, Hidden lines, Z-buffer.

Unit 4 :

Fractal's geometry Fractal generation procedure, Classification of Fractal, Fractal dimension, Fractal construction methods. Color models, XYZ, RGB, YIQ, CMY & HSV, Shading algorithms, Shading model, Illumination model, Gouraud shading, Phong shading.

Books :

1. Computer Graphics ,M. Pauline Baker, Donald Hearn, PHI.
2. Mathematical Element for Computer Graphics , David F. Roger, J. Alan Adams, Tata McGHill.
- 3.Computer Graphics ,Apuva Desai , PHI

First Year M.C.A. Semester II (CBCS)

Core Elective 1(CE1-1)

Paper 4 - 2T4

Credits: 4

Computer Architecture and Organization

Unit 1:

Organization of the CPU and main memory of the IAS computer, Structure of the IBM System/360.

Design Methodology: Design Process: Design problem, Computer aided design, Design levels, system hierarchy, **The Gate Level Design:** Four bit ripple carry adder, Four bit stream serial adder.

The Register Level Design: Data and Control, Design of a pipelined 4 bit stream serial adder, Design of a fixed point binary multiplier.

The Processor Level Design: Prototype structures, Performance measurement, Queueing models.

Unit 2:

Datapath Design: n-bit ripple carry adder, n-bit twos complement adder-subtractor, carry-lookahead adder, Booths multiplication algorithm, n-bit arithmetic logic unit.

Control Design: Processor configured to implement add operation, Implementation methods, Hardwired Control: Design methods, State tables, GCD processor, Classical method, One hot method, Microprogrammed control unit, Pipeline Control: m-stage, two-stage, four-stage, Superscalar processing.

Unit 3:

Memory Organization: Memory types, Performance and cost, Access modes, Memory retention, RAM organization, RAM design and examples, Optical memories, Multilevel memories, Locality of reference, Address translation, Translation look-aside buffer, Segments, Pages, Page size, **Cache Memory:** Features, Organization, Operation, Address mapping, Cache types.

Unit 4:

System Organization: Buses, Long distance communication, Computer networks, Interconnection structures, Bus control, Basic features, Bus interfacing, Timing, Bus arbitration, PCI Bus, signal of the PCI standard bus. **IO and System Control:** IO Control methods,

Programmed IO, Direct Memory Access, Interrupts: Selection, Vectored interrupts, PCI Interrupts, Pipeline interrupts. **IO Processor:** Instruction types, Organization, Cache coherence. **Fault Tolerance:** Redundancy, Redundant disk arrays, Reliability.

Book:

1. Computer Architecture and Organization , John P. Hayes, TMH
2. Structured Computer Organization ,Andrew S. Tanenbaum, PHI.

First Year M.C.A. Semester II (CBCS)

Core Elective 1(CE1-2)

Paper 4 - 2T4

Credits: 4

Operation Research

Unit 1:

Introduction to Operation Research (OR) - Origin and Development of OR, Nature of OR, Characteristics of OR, Classification of Problems in OR, Models in OR, Phases of OR, uses and Limitations of OR, Methodologies in OR, Applications in OR. **Linear Programming** - Concept of Linear Programming Model, Mathematical Linear Programming, Formulation of the Simplex Method.

Unit 2:

Transportation Problem - Mathematical Model for Transportation Problem, Types of transportation Problem. **Assignment Problem** - Zero-One programming model for assignment Problem, Types of assignment Problem, Hungarian Method, Branch and Bound technique for Assignment Problem. **Game Theory** - Terminologies of Game Theory, Two person Zero-Sum Games, The Maximin-Minimax Principle, Games without Saddle Points Mixed Strategies, Graphical Solution of $2 \times n$ and $m \times 2$ Games, Dominance Property.

Unit 3:

Decision Theory –Introduction, Decision under Certainty, Decision under Risk, Decision Under Uncertainty, Decision Tree. **Network Scheduling By CPM/PERT** – Introduction, Basic Concept, Constraints in Network, Critical Path Methods (CPM), PERT Network, PERT Calculation, Time-Cost-Trade-Off Aspects in Network Technique, Advantage of Network.

Inventory Control -Introduction, Inventory Control, Selective Control Techniques, Types of Inventory, Economic Lot Size Problem, Problem of EOQ with shortage, Inventory Control Techniques-Uncertainty Demand, Inventory Control Techniques-Stochastic Problem, Inventory Control with Price Breaks.

Unit 4:

Queuing Theory - Introduction, Terminologies of Queuing System, Characteristics of Queuing System, Poisson Process and Exponential Distribution, Classification of Queues, Definition of Transient and steady States, Poisson Queues, Non-Poisson Queuing Systems, Cost-Profit Models in Queuing, Queuing Control.

Books:

1. Operation Research ,Kanti Swarup, P.K.Gupta, Man Mohan Sultan.
2. Operation Research ,Hira Gupta.
3. Operation Research ,R. Panneerselvam [PHI].
4. Operation Research Problems & Solutions , Sharma J.K., Macmillan
5. Operation Research Theory & Application , Sharma J,K, MacMillan

First Year M.C.A. Semester II (CBCS)

Core Elective 1 (CE1-3)

Paper 4 - 2T4

Credits: 4

Cyber Forensics

Unit 1 :

Systems Vulnerability Scanning Overview of vulnerability scanning, Open Port / Service Identification, Banner / Version Check, Traffic Probe, Vulnerability Probe, Vulnerability Examples, OpenVAS, Metasploit. Networks Vulnerability Scanning - Netcat, Socat, understanding Port and Services tools - Datapipe, Fpipe, WinRelay, Network Reconnaissance – Nmap, THC-Amap and System tools. Network Sniffers and Injection tools – Tcpdump and Windump, Wireshark, Ettercap, Hping Kismet

Unit 2 :

Network Defense tools Firewalls and Packet Filters: Firewall Basics, Packet Filter Vs Firewall, How a Firewall Protects a Network, Packet Characteristic to Filter, Stateless Vs Stateful Firewalls, Network Address Translation (NAT) and Port Forwarding, the basic of Virtual Private Networks, Linux Firewall, Windows Firewall, Snort: Introduction Detection System

Web Application Tools Scanning for web vulnerabilities tools: Nikto, W3af, HTTP utilities - Curl, OpenSSL and Stunnel, Application Inspection tools – Zed Attack Proxy, Sqlmap. DVWA, Webgoat, Password Cracking and Brute-Force Tools – John the Ripper, , HTC-Hydra

Unit 3 :

Introduction to Cyber Crime and law Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behavior, Clarification of Terms, Traditional Problems Associated with Computer Crime, Introduction to Incident Response, Digital Forensics, Computer Language, Network Language, Realms of the Cyber world, A Brief History of the Internet, Recognizing and Defining Computer Crime, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Indian IT ACT 2000.

Unit 4 :

Introduction to Cyber Crime Investigation Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Worms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks

Books:

1. Anti-Hacker Tool Kit (Indian Edition) , Mike Shema, Mc Graw Hill.
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives , Nina Godbole and SunitBelpure, Wiley
3. The Unofficial guide to Ethical Hacking, Ankit Fadia, LaxmiPubli.

First Year M.C.A. Semester II (CBCS)

Core

Paper 5 - 2T5

Credits: 4

Android Programming

Unit 1:

Getting an Overview of Android Introducing Android , Listing the Version History of Android Platform , Discussing Android APIs , Describing the Android Architecture, Application Framework Exploring the Features of Android , Discussing about Android Applications , The Application Components The Manifest File , Downloading and Installing Android , Downloading and Installing the Android SDK Setting up Android Virtual Device , Setting up Android Physical Device , Exploring the Development Environment , The Java Perspective Using Eclipse , The DDMS Perspective , The Command-Line Tools , Developing and Executing the First Android Application, Using Eclipse IDE to Create an Application , Running Your Application , Exploring the Application, Using Command-Line Tools

Unit 2:

Using Activities, Fragments, and Intents in Android

Working with Activities Creating an Activity , Starting an Activity , Managing the Lifecycle of an Activity, Applying Themes and Styles to an Activity , Displaying a Dialog in the Activity , Hiding the Title of the **Using Intents** Exploring Intent Objects, Exploring Intent Resolution, Exploring Intent Filters , Resolving Intent Filter Collision , Linking the Activities Using Intent, Obtaining Results from Intent , Passing Data Using an Intent Object , **Fragments** Fragment Implementation , Finding Fragments ,Adding, Removing, and Replacing Fragments , Finding Activity Using Fragment , Using the Intent Object to Invoke Built-in Application .

Unit 3:

Working with the User Interface Using Views and ViewGroups

Working with View Groups, The LinearLayout Layout , The RelativeLayout Layout ., The ScrollView Layout , The TableLayout Layout ,The FrameLayoutLayout,TheTabLayout Using the Action Bar , Working with Views , Using the TextView , Using the EditText View , Using the Button View , Using the RadioButton View , Using the CheckBox View ,Using the ImageButton View ,Using the ToggleButton View , Using the RatingBar View, Binding Data

with the AdapterView Class , Using the ListView Class Using the Spinner, Using the Gallery View ,Designing the AutoTextCompleteView ,Implementing Screen Orientation , Anchoring the Views of the Current Activity , Customizing the Size and Position of the Views , Designing the Views Programmatically , **Handling UI Events** Handling User Interaction with Activities, Handling User Interaction with the Views , **Specialized Fragments**ListFragment, DialogFragment , PreferenceFragment , **Creating Menus** The Options Menu , The Context Menu , The SubMenus, **Handling Pictures and Menus with Views**,**Working with Image Views** , Displaying Images in the Gallery View , Displaying Images in the Grid View , Using the ImageSwitcher View , Designing Context Menu for Image View , Using the AnalogClock and DigitalClock Views , Embedding Web Browser in an Activity , **Notifying the User** ,Creating the Toast Notification , Creating the Status Bar Notification , Creating the Dialog Notification

Unit 4:

Storing the Data Persistently, Introducing the Data Storage Options Using Preferences, **Using the Internal Storage**, Exploring the Methods Used for Internal Storage, Developing an Application to Save User Data Persistently in File, **Using the External Storage**, Exploring the Methods Used for External Storage, Developing Application to Save File in SD Card.

Using the SQLite Database, Creating the Database Helper Class, Creating the Layout and Main Activity Class, Creating the Layout and Activity for the Insert Operation, Creating the Layout and Activity to Search a Record, Creating the Activity Class to Fetch All Records, Creating the Layout and Activity for the Update Operation, Creating the Layout and Activity for the Delete Operation., Executing the Database Operations, **Working with Content Providers**, Exploring the android.provider Package, Creating User-Defined Content Provider,Consuming User-Defined Content Provider

Emailing and Networking in Android , Building an Application to Send Email **Networking in Android**, Getting an Overview of Networking Fundamentals , **Checking Network Availability**, Accessing Web Services Using HTTP Post,Accessing Web Services Using the GET Method , Working with Binary Data and Text Files, Consuming JSON Services , Sockets Programming

Book:

1. Android Application Development (with Kitkat Support) Black Book, Pradeep Kothari, DreamTech Press
2. Android Wireless Application Development Volume I: Android Essentials, Third edition, Lauren Darcey, Shane Conder, Pearson.
3. Android, Prasanna Kumar Dixit, Vikas Professional Master-Class Series.