

## COURSE STRUCTURE OF MCA

### SEMESTER 1

Sl. No.	Subject	Subtopics	Case Study	Live Project
1	Computer Organization & Architecture	1. Basics of Computer Systems 2. CPU Architecture 3. Memory Organization 4. Input/Output Systems 5. Instruction Set Architecture	<b>Case study individual for each subject</b>	<b>Live project individual for each subject</b>
2	Programming in C	1. Introduction to C 2. Operators and Expressions 3. Control Structures 4. Functions and Pointers 5. Structures and File Handling		
3	Discrete Mathematics	1. Set Theory 2. Combinatorics 3. Graph Theory 4. Relations and Functions 5. Boolean Algebra		
4	Data Structures	1. Arrays and Linked Lists 2. Stacks and Queues 3. Trees and Graphs 4. Hashing 5. Searching and Sorting Algorithms		



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5	Data Structures	<ol style="list-style-type: none"> <li>1. Arrays and Linked Lists</li> <li>2. Stacks and Queues</li> <li>3. Trees and Graphs</li> <li>4. Hashing</li> <li>5. Searching and Sorting Algorithms</li> </ol>		
6	Business Communication	<ol style="list-style-type: none"> <li>1. Communication Models</li> <li>2. Professional Writing</li> <li>3. Presentation Skills</li> <li>4. Team Collaboration</li> <li>5. Negotiation Skills</li> </ol>		
<b>SEMESTER 2</b>				
Sl. No.	Subject	Subtopics	Case Study	Live Project
1	Object-Oriented Programming	<ol style="list-style-type: none"> <li>1. Object-Oriented Principles</li> <li>2. Classes and Objects</li> <li>3. Inheritance</li> <li>4. Polymorphism</li> <li>5. Exception Handling</li> </ol>	<b>Case study individual for each subject</b>	<b>Live project individual for each subject</b>
2	Operating Systems	<ol style="list-style-type: none"> <li>1. OS Concepts</li> <li>2. Process Management</li> <li>3. Memory Management</li> <li>4. File Systems</li> <li>5. Synchronization and Deadlock</li> </ol>		
3	Computer Networks	<ol style="list-style-type: none"> <li>1. Network Models</li> <li>2. OSI and TCP/IP Models</li> <li>3. Routing Protocols</li> <li>4. Network Devices</li> <li>5. Network Security and Protocols</li> </ol>		
4	Software Engineering	<ol style="list-style-type: none"> <li>1. Software Development Life Cycle (SDLC)</li> <li>2. Requirement Analysis</li> <li>3. Design Patterns</li> <li>4. Software Testing</li> <li>5. Project Management</li> </ol>		



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5	Financial Management	- 1. Time Value of Money 2. Capital Budgeting 3. Risk & Return 4. Financial Analysis Techniques 5. Cost of Capital		
6	Research Methodology	- 1. Research Design 2. Data Collection Methods 3. Data Analysis Techniques 4. Report Writing 5. Academic Writing and Citations		
<b>SEMESTER 3</b>				
Sl. No.	Subject	Subtopics	Case Study	Live Project
1	Theory of Computation	- 1. Automata Theory 2. Turing Machines 3. Computability and Decidability 4. Regular Expressions 5. Formal Languages and Grammars		
2	Design and Analysis of Algorithms	- 1. Algorithm Design Techniques 2. Sorting and Searching Algorithms 3. Dynamic Programming 4. Greedy Algorithms 5. Graph Algorithms	<b>Case study individual for each subject</b>	<b>Live project individual for each subject</b>
3	Operating System Concepts	- 1. Operating System Structure 2. Process Synchronization 3. Deadlock Detection 4. File System Implementation 5. Virtual Memory and Paging		
4	Software Testing	- 1. Testing Levels 2. Test Case Design 3. Types of Testing (Unit, Integration, System) 4. Debugging Techniques		



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		5. Automation Testing Tools (e.g., Selenium)		
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5	Mobile Application Development	- 1. Mobile App Development Frameworks (Android, iOS) 2. Mobile UI Design Principles 3. Mobile Databases 4. API Integration 5. App Security and Performance		
6	Mobile Application Development	- 1. Mobile App Development Frameworks (Android, iOS) 2. Mobile UI Design Principles 3. Mobile Databases 4. API Integration 5. App Security and Performance		
<b>SEMESTER 4</b>				
<b>Sl. No.</b>	<b>Subject</b>	<b>Subtopics</b>	<b>Case Study</b>	<b>Live Project</b>
1	Mobile Application Development	- 1. Mobile App Development Frameworks (Android, iOS) 2. Mobile UI Design Principles 3. Mobile Databases 4. API Integration 5. App Security and Performance		
2	Supply Chain Management	- 1. Introduction to Supply Chain 2. Supply Chain Models 3. Inventory Management 4. Distribution Channels 5. Logistics and Transportation		



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3	Financial Markets	- 1. Financial Markets Overview 2. Stock Markets 3. Bonds and Commodities 4. Derivatives and Futures 5. Foreign Exchange Markets	<b>Case study individual for each subject</b>	<b>Live project individual for each subject</b>
4	Project Management	- 1. Project Planning and Scheduling 2. Risk Management 3. Resource Allocation 4. Project Costing 5. Project Evaluation and Control		
5	Retail Marketing	- 1. Retailing Concepts 2. Store Layout and Design 3. Retail Pricing Strategies 4. Customer Service in Retail 5. E-commerce and Digital Retailing		
6	Corporate Governance	- 1. Introduction to Corporate Governance 2. Board of Directors 3. Ethical Issues in Governance 4. Regulatory Compliance 5. Shareholder Rights		
<b>SEMESTER 5</b>				
Sl. No.	Subject	Subtopics	Case Study	Live Project
1	Machine Learning	- 1. Introduction to Machine Learning 2. Supervised Learning 3. Unsupervised Learning 4. Regression and Classification 5. Model Evaluation Techniques		
2	Cryptography and Network Security	- 1. Basics of Cryptography 2. Symmetric and Asymmetric Encryption 3. Hash Functions 4. Digital Signatures 5. Network Security Protocols		



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3	Advanced Database Management Systems	- 1. Distributed Databases 2. NoSQL Databases (MongoDB, Cassandra) 3. Data Warehousing 4. Big Data Technologies 5. Query Optimization	<b>Case study individual for each subject</b>	<b>Live project individual for each subject</b>
4	Digital Image Processing	- 1. Image Representation 2. Image Enhancement 3. Image Segmentation 4. Edge Detection 5. Computer Vision Algorithms		
5	Artificial Neural Networks	- 1. Basics of Neural Networks 2. Perceptrons 3. Multi-layer Perceptrons 4. Backpropagation 5. Deep Learning and Applications		
6	Artificial Neural Networks	- 1. Basics of Neural Networks 2. Perceptrons 3. Multi-layer Perceptrons 4. Backpropagation 5. Deep Learning and Applications		

## SEMESTER 6

Sl. No.	Subject	Subtopics	Case Study	Live Project
1	Big Data Technologies	- 1. Introduction to Big Data 2. Hadoop Ecosystem 3. MapReduce 4. Data Warehousing and Mining for Big Data 5. NoSQL Databases	<b>Case study individual for each subject</b>	<b>Live project individual for each subject</b>
2	Cloud Computing Architecture	- 1. Cloud Service Models (IaaS, PaaS, SaaS) 2. Cloud Infrastructure 3. Cloud Storage and Computing 4. Cloud Security 5. Cloud Computing Platforms		
3	Advanced Web Technologies	1. Advanced JavaScript (ES6, Node.js) 2. Front-end Frameworks (React, Angular) 3. Back-end Development		



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		<ul style="list-style-type: none"> <li>4. Web Security</li> <li>5. Progressive Web Apps (PWA)</li> </ul>		
4	Advanced Java Programming	<ul style="list-style-type: none"> <li>- 1. Java 8 Features</li> <li>2. Lambda Expressions and Streams</li> <li>3. Concurrency and Multithreading</li> <li>4. Java Design Patterns</li> <li>5. Java EE and Spring Framework</li> </ul>		
5	IT Industry Practices	<ul style="list-style-type: none"> <li>1. IT Project Management</li> <li>2. IT Governance</li> <li>3. IT Service Management (ITIL)</li> <li>4. Quality Assurance</li> <li>5. Ethics and Legal Issues in IT</li> </ul>		
6	Seminar/Research Paper	<ul style="list-style-type: none"> <li>- 1. Research Methodology</li> <li>2. Data Analysis and Interpretation</li> <li>3. Academic Writing and Citations</li> <li>4. Research Paper Presentation</li> <li>5. Current Trends in IT</li> </ul>		

**Key Features:**

**Each subject includes 2 real-world case studies and 2 live projects per semester.**

**Industry-oriented approach combining theory + hands-on learning.**

**Each semester will end with a live panel presentation to assess student understanding and practical application.**

**Designed to prepare MCA students for roles in software development, data analytics, system architecture, cybersecurity, cloud computing, and IT consulting, combining advanced technical skills with real-world problem-solving and project-based learning.**



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