SADHU VASWANI INSTITUTE OF MANAGEMENT STUDIES FOR GIRLS
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Certified by ISO 9001:2015, SPPU Code: IMMP016030 D.T.E. Institute Code: 6614

# PO's & CO's of MCA Program 2020 Pattern

**MCA Programme Outcomes (POs):** At the end of the MCA programme the learner will possess the following Program Outcome:

**PO1: Generic and Domain Knowledge:** Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.

**PO2: Problem Analysis:** Identify, formulate, research literature, and solve complex Computing problems reaching substantiated conclusions using fundamental principles of Mathematics, Computing sciences, and relevant domain disciplines.

**PO3: Design /Development of Solutions:** Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

**PO4: Critical thinking/ conduct investigations of complex Computing problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

**PO5: Use of modern tools:** Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.

**PO6: Ethics:** Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice.

**PO7: Life-long Learning:** Recognize the need, and have the ability, to engage in independent learning for continual development as a Computing professional.

**PO8: Leadership skills:** Demonstrate knowledge and understanding of computing and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO9: Effective Communication:** Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.

**PO10: Societal and Environmental aspect:** Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.

**PO11: Team Work:**

Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.

**PO12: Entrepreneurship and Innovation** Identify a timely opportunity and using innovation to pursue that opportunity to create

value and wealth for the betterment of the individual and society at large.

SVIMS
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BELIEVE AND ACHIEVE
Dr. B. H. Nanwani
Director

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**MCA Course Outcomes (COs):** At the end of the every course the learner will possess the following Course Outcome:

| Sr. No | Course Code | Course Name | Course Objective | Course Outcome |
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| | | | **SEMESTER -I** | |
| 1 | IT-11 | Java Programming | 1. To familiarize students with the concepts of OOPs.<br>2. To enable the students to understand the core principles of the Java Language and use AWT tools to produce well designed, effective applications.<br>3. Students will be able to develop server-side applications with database handling using servlets, JSP, JDBC | CO1 Understand Basic Concepts of OOPs, Java, Inheritance, Package. (Understand)<br>CO2: Understand Exception handling, arrays and Strings and multi-threading in Java (Understand.)<br>CO3: Understand collection framework (Understand)<br>CO4: Develop GUI using Abstract Windows Toolkit (AWT) and event handling (Apply)<br>CO5: Develop Web application using JSP and Servlet, JDBC (Apply) |
| 2 | IT-12 | Data Structure and Algorithms | 1. To understand basics data structure and algorithms<br>*2.* To solve problems using data structures such as linked lists, stacks, queues, hash tables, trees, heaps and graphs<br>3. To understand various programming techniques such as brute force, greedy, dynamic programming, divide-conquer and backtracking | CO1: demonstrate linear data structures linked list, stack and queue (apply)<br>CO2: implement tree, graph, hash table and heap data structures (apply)<br>CO3: apply brute force and backtracking techniques (apply)<br>CO4: demonstrate greedy and divide-conquer approaches (apply)<br>CO5: implement dynamic programming technique (apply) |
| 3 | IT-13 | Object Oriented | 1. To study basic concepts of software engineering | CO1: Distinguish different process model for a software development. (Understand) |

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| | | Software Engineering | 2. To study phases of SDLC and different process models<br>3. To learn & understand the Requirement analysis and system Design.<br>4. To get acquainted with the agile software development methodology | CO2: Design software requirements specification solution for a given problem definitions of a software system. (Analyze)<br>CO3: Apply software engineering analysis/design knowledge to suggest solutions for simulated problems (Analyze)<br>CO4: Design user interface layout for different types of applications (Apply)<br>CO5: Recognize and describe current trends in software engineering (Understand) |
| 4 | IT-14 | Operating Systems Concepts | 1. To learn the fundamentals of Operating Systems and handle processes and threads and their communication<br>2. To learn the mechanisms involved in memory management in contemporary OS<br>3. To know the functionality of Multiprocessor OS and Mobile OS.<br>4. To gain knowledge on distributed operating system concepts.<br>5. To learn about Basics of Linux.<br>6. To learn programmatically to implement Linux OS mechanisms. | CO1: Understand structure of OS, process management and synchronization. (Understand)<br>CO2: Understand multicore and multiprocessing OS. (Understand)<br>CO3: explain Real-time and embedded OS (Understand)<br>CO4: understand Windows and Linux OS fundamentals and administration. (Understand)<br>CO5: solve shell scripting problems (Apply) |
| 5 | IT-15 | Network Technologies | 1. To understand various computer networks and technologies behind networks<br>2. To study TCP/IP protocol suite, IP addressing schemes and link layer communication<br>3. To study routing concept along with Routing protocols<br>4. To study application layer protocols | CO1: Understand the basic concepts of Computer Network, and principle of layering (Understand)<br>CO2: Apply the error detection and correction techniques used in data transmission (Apply)<br>CO3: Apply IP addressing schemes and sub netting (Apply)<br>CO4: Understand the concept of routing protocols, Application layer protocols and Network Security (Understand) |

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| | | | 5. To understand basics of cryptography and socket programming | CO5: Apply the socket programming basics to create a simple chat application (Apply) |
| 6 | IT-11L | Practical's | | CO1: Demonstrate Collection framework (Apply)<br>CO2: Develop GUI using awt and swing (Apply)<br>CO3: Develop Web application using JSP and Servlet, JDBC (Apply)<br>CO4: Apply Data Structure to solve problems using JavaScript (Apply) |
| 7 | ITC11 | Mini Project | | CO1: Create working project using tools and techniques learnt in this semester (Create) |
| **SEMESTER-II** | | | | |
| 8 | IT-21 | Python Programming | 1. To understand and use the basic of python.<br>2. To understand advance concepts of python and able to apply it for solving the complex problems.<br>3. To understand the reading and writing data through file handling.<br>4. To understand basic database concepts in python.<br>5. To develop the critical thinking and analytical approach by using python libraries. | CO1: Understand Demonstrate the concepts of python and modular programming. (Understand)<br>CO2: Apply the concepts of concurrency control in python (Apply)<br>CO3: Solve the real-life problems using object-oriented concepts and python libraries (Apply)<br>CO4: Demonstrate the concept of IO, Exception Handling, database (Apply)<br>CO5: Analyze the given dataset and apply the data analysis concepts and data visualization. (Analyze) |
| 9 | IT-22 | Software Project Management | 1. To learn process of Software Project Management.<br>2. To Study role of Project Manager in Project Management. | CO1: Understand the process of Software Project Management Framework and Apply estimation techniques. (Apply)<br>CO2: Learn the philosophy, principles and lifecycle of an agile project. (Understand) |

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| | | | 3. To learn Agile Project Management Framework.<br>4. To study various role of Agile Team and Tools.<br>5. To understand project planning and tracking. | CO3: Demonstrate Agile Teams and Tools and Apply agile project constraints and trade-offs for estimating project size and schedule (Apply)<br>CO4: Explain Project Tracking and Interpretation of Progress Report (Understand)<br>CO5: Analyze Problem statement and evaluate User Stories (Analyze) |
| 10 | MT-21 | Optimization Techniques | 1. To understand the role and principles of optimization techniques in business world.<br>2. To understand the process of problem statement formulation of the business scenario.<br>3. To understand the implementation of various decision-making techniques in the process of decision making.<br>4. To gain the techniques and skills on how to use optimization techniques to support the decision making in business world. | CO1: Understand the role and principles of optimization techniques in business world (Understand)<br>CO2: Demonstrate specific optimization technique for effective decision making (Apply)<br>CO3: Apply the optimization techniques in business environments (Apply)<br>CO4: Illustrate and infer for the business scenario (Analyze)<br>CO5: Analyze the optimization techniques in strategic planning for optimal gain. (Analyze) |
| 11 | IT-23 | Advanced Internet Technologies | 1. To impart the design, development and implementation of Dynamic Web Pages.<br>2. To implement the Latest properties of CSS3<br>3. To implement the Concept of NodeJS.<br>4. To develop programs for Web using Angular and SPA.<br>5. To design and implement dynamic websites with good sense of designing and latest technical aspects. | CO1: Outline the basic concepts of Advance Internet Technologies (Understand)<br>CO2: Design appropriate user interfaces and implements webpage based on given problem Statement (Apply)<br>CO3: Implement concepts and methods of NodeJS (Apply)<br>CO4: Implement concepts and methods of Angular (Apply)<br>CO5: Build Dynamic web pages using server-side PHP programming with Database<br>Connectivity (Apply) |

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| 12 | IT-24 | Advanced DBMS | 1. To understand core concepts of database management system and its types<br>2. To provide database design approaches using E-R model and normalization<br>3. To discuss transaction management and concurrency control<br>4. To gain an awareness of the structure of object-oriented database and its applications<br>5. To gain familiarization of Database crash, recovery concepts and security issues<br>*6.* To Demonstrate SQL, XML schema and NO SQL database | CO1: Describe the core concepts of DBMS and various databases used in real applications (Understand)<br>CO2: Design relational database using E-R model and normalization (Apply)<br>CO3: Demonstrate XML database and nonprocedural structural query languages for data access (Apply)<br>CO4: Explain concepts of Parallel, Distributed and Object-Oriented Databases and their applications (Understand)<br>CO5: Apply transaction management, recovery management, backup and security – privacy concepts for database applications (Apply) |
| 13 | IT-21L | Practical's | | CO1: implement python programming concepts for solving real life problems. (Apply)<br>CO2: Implement Advanced Internet Technologies (Apply) |
| 14 | ITC21 | Mini Project | | CO1: Create working project using tools and techniques learnt in this semester (Create) |
| **SEMESTER-III** | | | | |
| 15 | IT-31 | Mobile Application Development | 1. To understand the different mobile application Architectures.<br>2. To understand different types of widgets like buttons, views, layout etc.<br>3. To know the ways of application handling like intents, adapters, Notifications, Web Services and Web View. | CO1: Understand Various Mobile Application Architectures. (Understand)<br>CO2: Apply different types of widgets and Layouts. (Apply)<br>CO3: Describe Web Services and Web Views in mobile applications. (Understand)<br>CO4: Implement data storing and retrieval methods in android. (Apply) |

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| | | | 4. To learn and know about data storing, retrieval and sharing in android.<br>5. To explore cross platform mobile application development framework, React Native and Flutter. | CO5: Demonstrate Hybrid Mobile App Framework. (Apply) |
| 16 | IT-32 | Data Warehousing and Data Mining | 1. To introduce the concepts, techniques and applications of data warehousing and data mining.<br>2. To understand how to Pre-process, understand and analyze various kinds of data<br>3. To Study data warehouse Concepts, architectures, OLAP and the project planning aspects in building a data warehouse<br>4. To enable students to understand and implement various techniques of association, classification and clustering in data mining<br>5. To enable students to understand and implement the concepts of Web mining and Text Mining in data mining | CO1: Understand Data warehouse concepts, architecture and models (Understand)<br>CO2: Learn and understand techniques of pre-processing on various kinds of data (Understand)<br>CO3: Apply association Mining and Classification Techniques on Data Sets (Apply)<br>CO4: Apply Clustering Techniques and Web Mining on Data Sets (Apply)<br>CO5: Understand other approaches of Data mining (Understand) |
| 17 | IT-33 | Software Testing and Quality Assurance | 1. To understand the principles of software development emphasizing processes and activities of quality assurance<br>2. To study fundamental concepts in software testing, including software testing objectives, process, strategies and methods.<br>3. To understand test design techniques based on functionality and structure of software | CO1: Understand the role of software quality assurance in contributing to the efficient delivery of software solutions. (Understand)<br>CO2: Demonstrate specific software tests with well-defined objectives and targets. (Apply)<br>CO3: Apply the software testing techniques in commercial environments. (Apply) |

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| | | | 4. To understand test planning, monitoring and control process<br>5. To gain the techniques and skills on how to use software testing tools to support software testing activities | CO4: Construct test strategies and plans for software testing. (Analyze)<br>CO5: Demonstrate the usage of software testing tools for test effectiveness, efficiency and coverage (Apply) |
| 18 | IT-34 | Knowledge Representation and Artificial Intelligence: ML, DL | | CO1: Understand basic building block of Artificial Intelligence and Knowledge representation. (Understand)<br>CO2: Apply Propositional Logic for knowledge representation. (Apply)<br>CO3: Design various models based on Machine Learning methodology (Apply)<br>CO4: Design various models based on Deep Learning methodology (Apply)<br>CO5: Understand various hardware and software aspect used for AI and its application.(Understand) |
| 19 | IT-35 | Cloud Computing | 1. To introduce the fundamentals of cloud computing, its technologies, Challenges and Applications<br>2. To give Insights into the virtualization technologies and Architecture<br>3. To know the relationship between Cloud and SOA<br>4. To classify and evaluate Cloud Security Issues<br>5. To apply theory to practical knowledge through case Studies | CO1: Describe the concepts of Cloud Computing and its Service Models& Deployment Models. (Understand)<br>CO2: Classify the types of Virtualization. (Understand)<br>CO3: Describe the Cloud Management and relate Cloud to SOA. (Understand)<br>CO4: Interpret Architecture and Pharrell Programing of Cloud Computing. (Apply)<br>CO5: Demonstrate practical implementation of Cloud computing. (Apply) |
| 20 | IT-31L | Practical's | | CO1: Develop mobile application. (Apply)<br>CO2: Develop ML, DL models using Python (Apply) |

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| 21 | ITC31 | Mini Project | | CO1: Create working project using tools and techniques learnt in this semester (Create) |
| **SEMESTER-IV** | | | | |
| 22 | IT-41 | DevOps | | CO1: describe the evolution of technology & timeline (Understand)<br>CO2: explain Introduction to various Devops platforms (Remember)<br>CO3: demonstrate the building components / blocks of Devops and gain an insight of the Devops Architecture. (Understand)<br>CO4: apply the knowledge gain about Devops approach across various domains (Apply)<br>CO5: build DevOps application (Apply) |
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| 23 | BM-41 | PPM and OB | | CO1: Describe and analyze the interactions between multiple aspects of management. (Understand)<br>CO 2: Analyze the role of planning and decision making in Organization (Analyze)<br>CO 3: Justify the role of leadership qualities, Motivation and Team Building. (Analyze)<br>CO 4: Analyze stress management and conflict management (Analyze)<br>CO 5: Describe Personality and Individual Behavior (Understand) |
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| 24 | ITC-41 | Project | | CO1: Create working project using tools and techniques learnt in the programme (Create) |