

ATSS's
Institute of Industrial & Computer Management & Research
Nigdi Pune-44

Criterion II Teaching-Learning and Evaluation

Key Indicator: Student Performance and Learning Outcome

Program Outcomes for MCA (2019 Pattern)

PO1 Ability to design and implement software solutions to meet stakeholder needs within realistic constraints such as safety, security and applicability.

PO2 Ability to apply knowledge of mathematics, computer science and management in practice.

PO3 Skills to analyze a problem, and identify and define the logical modeling of solutions.

PO4 Ability to use appropriate techniques, skills, and tools necessary for developing end-to-end solutions.

PO5 Ability to apply design , development & management principles in the construction of software systems of varying complexity.

PO6 Ability to devise and conduct experiments, interpret data and provide well informed conclusions.

PO7 Ability to function professionally with legal and ethical responsibility as an individual as well as in teams in multidisciplinary domain with a positive outlook.

PO8 Ability to effectively combine understanding of technology and entrepreneurship in a cross-disciplinary fashion to identify and develop attractive opportunities within ones field of experience

Course Outcomes for MCA (2019 Pattern)

Course	Subject	Outcome
SEMESTER I		
CO1	Problem Solving using C++	CO1.1: Use the algorithm paradigms for problem solving. Apply CO1.2: Develop programs with features of the C++ programming language. Apply CO1.3: Develop simple applications using C++ Apply CO1.4: Develop programs in the UNIX/Linux programming environment. Apply
CO2	Software Engineering using UML	CO2.1: Distinguish different process model for a software development. CO2.2: Design software requirements specification solution for a given problem definitions of a software system. CO2.3: Apply software engineering analysis/design knowledge to suggest solutions for simulated problems CO2.4: Recognize and describe current trends in software engineering
CO3	Database Management System	CO3.1: Describe the basic concepts of DBMS and various databases used in real applications. CO3.2: Design relational database using E-R model and normalization CO3.3: Demonstrate nonprocedural structural query languages for various database applications CO3.4: Apply concepts of Object Based Database, XML database and non-relational databases. CO3.5: Explain transaction management and recovery management for real applications
CO4	Essentials of Operating System	CO4.1: Understand structure of OS, process management and synchronization. CO4.2: Analyze and design Memory Management. CO4.3: Interpret the mechanisms adopted for file sharing in distributed Applications CO4.4: Conceptualize the components and can do Shell Programming. CO4.5: Know Basic Linux System Administration and Kernel Administration.
CO5	Business Process Domain	CO5.1: describe major bases for marketing mix in business CO5.2: describe various functionalities of human resource process CO5.3: Identify existing e-commerce model and payment system , CO5.4: Apply knowledge to evaluate and manage an effective supply chain. CO5.5: Understand how customer relations are related to business functions and its importance to success of Business entity. CO5.6: use various banking and insurance process for business development.
CO6	Open Subject 1	CO6.1: Describe the basic concepts of SQL SERVER and various databases used in real applications. CO6.2: Design relational database using normalization. CO6.3: Demonstrate nonprocedural structural query languages for various database applications CO6.4: Apply concepts of Indexing, Joins, Views for databases

CO7	Open Subject 2	CO7.1: Apply Security of Database, Access controls , backup and recovery of databases. CO7.2: Explain Procedural Capabilities of SQL Functions ,procedures, Cursors, Triggers
CO8	Case Study on Requirement Gathering	CO8.1: Design fact finding techniques in Requirement Gathering (Apply) CO8.2: Group and determine functional and non-functional requirements (Apply)
CO9	Practical based on IT11	CO9.1 Understanding the problem CO9.2. Analyzing the problem CO9.3. Developing the solution and Logic CO9.4. Develop Coding and implementation.
CO10	Practical based on OS11 and OS12	CO10.1: Implement and apply SQL Server DBMS concepts for solving real life problems. (Apply) CO10.2: Implement Procedural Capabilities SQL (Apply)
CO11	Soft Skills - I	CO11.1 Deal with nerves and think more positively about public speaking. CO11.2 Understand ways of grabbing the listener's attention, holding their interest, and concluding strongly; CO11.3 Make use of slides and visual aids to make presentation effective. CO11.4 Learn how to deliver an enthusiastic and well-practiced presentation
SEMESTER II		
Course	Subject	Outcome
CO12	Data Structure and Algorithm	CO12.1: apply design principles and concepts for Data structure and algorithm CO12.2: summarize searching and sorting techniques CO12.3: describe stack, queue and linked list operation CO12.4: demonstrate the concepts of tree and graphs
CO13	Web Technology	CO13.1: Implement interactive web page(s) using HTML, CSS and JavaScript. CO13.2: Build Dynamic web site using server-side PHP Programming and Database connectivity. CO13.3: Design a responsive web site.
CO14	Business Statistics	CO14.1. explain basic statistical concepts such as statistical collection, species characteristics, statistical series, tabular and graphical representation of data, measures of central tendency, dispersion and asymmetry, correlation and regression analysis, time series analysis CO14.2. Students will be able to analyze and apply computer-generated statistical output to solve problems. CO14.3. independently calculate basic statistical parameters (mean, measures of dispersion, correlation coefficient, indexes) CO14.4. based on the acquired knowledge to interpret the meaning of the calculated statistical indicators CO14.5. choose a statistical method for solving practical problems in business world and statistically thinking and selecting data analysis techniques for decision-making under uncertainty.

CO15	Essentials of Networking	CO15.1: Understand the basic concepts of data communication including the key aspects of networking and their interrelationship CO15.2: Understand various protocols such as HTTP, SMTP, POP3, IMAP, FTP, DNS, DHCP and the basic structure of IPv4, IPv6 Address and concept of sub netting with numerical CO15.3: Understand routing concept and working of routing protocols such as RIP, OSPF and BGP CO15.4: Understand various encryption techniques
CO16	Principles and Practices of Management and Organizational Behavior	CO16.1 Describe various aspects of management. CO 16.2. Analyze the interactions between multiple aspects of management. CO 16.3. Justify the role of leadership qualities. CO 16.4. Evaluate the impact of changing external factors. CO16. 5. Analyze the role of planning and decision making. CO16. 6. Compare and contrast the controlling process.
CO17	Open Subject 3(Basics of Electronics)	CO17.1: Understand basic electronic components and circuits. CO17.2: Understand basics of diode and transistor circuits. CO17.3:Apply basic aspect of electronic communication systems.
CO18	Open Subject 4(Basics of Electronics)	CO18.1: Understand basic electronic components and circuits. CO18.2: Understand basics of diode and transistor circuits. CO18.3:Apply basic aspect of electronic communication systems.
CO19	Case Study on Feasibility Study and Analysis	CO19.1: Design Feasibility Report (Apply) CO19.2: Model a System through Diagrams (Apply)
CO20	Practical based on IT21	CO20.1. Writing an algorithm. CO20.2. Analyzing algorithm based on time complexity. CO20.3. Coding and implementation using C++ CO20.4. Analyzing program based on time complexity.
CO21	Practical based on OS21 and OS22	CO21.1: Implement basic electronic components and circuits through model making. CO17.3:Apply basic aspect of electronic communication systems.
CO22	Soft Skills - II	CO22.1 Prepare resumes & CV-Covering letter (effective usage of MSWord) CO22.2 Understand about Self introduction during interviews CO22.3 Know how to appear for technical and HR interviews.
SEMESTER III		
Course	Subject	Outcome
CO23	Java Programming	CO23.1: Understand Basic Concepts of Java and multi-threading.-Understand CO23.2: Demonstrate Collection framework -Apply CO23.3: Develop GUI using AWT and Swing -Apply CO23.4: Develop Java Applications using Socket, RMI –Apply CO23.5: Develop Web application using JSP and Servlet, JDBC with MVC --Apply

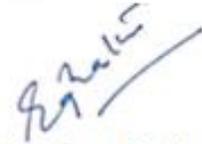
CO24	Data Warehousing & Data Mining	CO24.1: learn and understand techniques of preprocessing various kinds of data -Understand CO24.2: Understand Data warehouse concepts. - Understand CO24.3: Apply association Mining Techniques on large Data Sets. - Apply CO24.4: Apply classification and clustering Techniques on large Data Sets. - Analyze CO24.5: Understand other approaches of Data mining techniques. - Understand
CO25	Testing & Quality Assurance	CO25.1: Understand the role of software quality assurance in contributing to the efficient delivery of software solutions – Understand CO25.2: Demonstrate specific software tests with well-defined objectives and targets –Apply CO25.3: Apply the software testing techniques in commercial environments –Apply CO25.4: Construct test strategies and plans for software testing –Analyze CO25.5: Understand the usage of software testing tools for test effectiveness, efficiency and coverage – Understand
CO26	Probability and Combinatorics	CO26.1: Apply counting principles to solve the problems –Apply CO26.2: Apply various mathematical tools to solve problems. –Apply CO26.3: Understand and apply basic probability principles. –Apply CO26.4: Demonstrate the concept of univariate and bivariate random variable – Apply CO26.5: Understand and illustrate the probability distributions.-Analyze
CO27	Cloud Computing	CO27.1: Describe the concepts of Cloud Computing and its Service Models & Deployment Models – Understand. CO27.2: Classify the types of Virtualization – Understand. CO27.3: Describe the Cloud Management and relate Cloud to SOA – Understand. CO27.4: Interpret Moving application s to of Cloud – Apply. CO27.5: Demonstrate practical implementation of Cloud computing – Apply.
CO28	Open Subject 5(tableau)	Student will be able to CO16.1: Describe Basic Visualisations (Understand) CO16.2: Demonstrate Tableau Desktop UI, Connecting to Data, Filtering and Sorting Data, Date Functionality. (Apply) CO16.3: Explain concepts of Mapping, Heat Map and Highlight Table, Histogram, Dashboards and Actions. (Understand)
CO29	Open Subject 6(tableau)	Student will be able to CO29.1: Describe Basic Visualisations (Understand) CO29.2: Demonstrate Tableau Desktop UI, Connecting to Data, Filtering and Sorting Data, Date Functionality. (Apply) CO29.3: Explain concepts of Mapping, Heat Map and Highlight Table, Histogram, Dashboards and Actions. (Understand)
CO30	Case Study on Design	CO30.1: Demonstrate a System Architectural Design (Apply) CO30.2: Model a System logical Design through Diagrams (Apply)
CO31	Practical based on IT31	CO31.1: Create Web application using JSP and Servlet, JDBC with MVC
CO32	Practical based on OS31 and OS32	CO32.1: Implement concepts such as Tableau Desktop UI, Connecting to Data, Filtering and Sorting Data, Date Functionality. CO32.2: apply Dashboards and Actions. CO32.3 Student will able to understand overview of SQL. CO32.4:Student will able to analyze Data Preparation using Tableau Prep. CO32.5:Students will able to create various Data Connection with Tableau Desktop. CO32.6:Students will able to anlyze Basic Visual Analytics

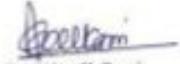
CO33	Soft Skills - III	CO33.1 Apply GD etiquettes in real life scenarios CO33.2 Speak in public with confidence
SEMESTER IV		
Course	Subject	Outcome
CO34	Python Programming	CO34.1: Understand concepts of python.-Understand CO34.2: Demonstrate the concepts modular programming -Apply CO34.3: Apply the concepts of concurrency control in python -Apply CO34.4: Solve the real life problems using object oriented concepts and python libraries –Apply CO34.5: Demonstrate the concept of IO, Exception Handling, database --Apply
CO35	Information System and Security Audit	CO35.1: Interpret the threats and vulnerabilities from IT system of business software applications. - Apply CO35.2: Understand Information Security Management System (ISMS) for IT system of business -Understand CO35.3: Apply information security policies and standards for business IT System-Apply CO35.4: Discuss various IS controls for Business Continuity and Disaster Recovery of business IT system. -Understand CO35.5: Describe information security audit and understand information security IT governance framework. – Understand
CO36	Optimization Techniques	CO36.1: Understand the role and principles of optimization techniques in business world -Understand CO36.2: Demonstrate specific optimization technique for effective decision making -Apply CO36.3: Apply the optimization techniques in business environments -Apply CO36.4: -Illustrate and infer for the business scenario- Analyze CO36.5: analyze the optimization techniques in strategic planning for optimal gain. - Analyze
CO37	Essentials of Architectural framework	CO37.1: Understand Basics Fundamentals of Architecture and Framework. (Understand) CO37.2: Understand appropriate Architecture Framework design. (Understand) CO37.3: Select appropriate technical and industry specific frameworks. (Understand) CO37.4: Apply the software development process (Apply) CO37.5: Apply the quality of Architecture (Apply)
CO38	Knowledge Representation & Artificial Intelligence	CO38.1: Develop a basic understanding of AI building blocks presented in intelligent agents- Develop. CO38.2: Choose an appropriate problem solving method and knowledge representation technique – Choose. CO38.3: Apply the different Propositional Logic concepts for knowledge representation-Apply. CO38.4: Analyze and understand the models for reasoning with uncertainty and different planning and learning approaches in the field of Artificial Intelligence – Analyze and understand. CO38.5: Demonstrate awareness and a fundamental understanding of various applications of AI – Demonstrate.
CO39	Open Subject 7	As it is elective subject outcome changes.Course
CO40	Open Subject 8	As it is elective subject outcome changes.Course
CO41	Practical based on IT41	CO1: Implement Python programs with conditionals and loops. (Apply) CO2: Develop Python programs step-wise by defining functions and calling them. (Apply) CO3: Apply Python lists, tuples, dictionaries for representing compound data. (Apply)

		CO4: Apply file handling function in Python. (Apply) CO5: Apply NumPy, pandas, matplotlib modules. (Apply)
CO42	Practical based on OS41 and OS42	As it is elective subject outcome changes.Course
CO43	Case Study on Development	CO43.1 Determine Program Logic for developing a Software (Apply) CO43.2 Articulate a System through Code Specification (Apply)
CO44	Soft Skills - IV	CO44.1 Inculcate Positive Attitude & Self Confidence. CO44.2 Developing personality, enhancing motivation skills.
SEMESTER V		
Course	Subject	Outcome
CO45	Social Media and Digital Marketing	CO45.1:Explain use of Social Media in Marketing(Understand) CO45.2:Demonstrate Digital Marketing Strategy (Apply) CO45.3:Summarize various tools of Social Media and Digital Marketing (Understand) CO45.4:Make use of SEO techniques for websites(Apply) CO45.5:Interpret SEM tools and techniques(Understand
CO46	Mobile Application Development	CO46.1:Understand Various Mobile Application Architectures CO46.2: Use different types of widgets and Layouts CO46.3:Describe Web Services and Web Views in mobile applications CO46.4: Implement data storing and retrieval methods in android CO46.5:Demonstrate Hybrid Mobile App Framework
CO47	Software Project Management	CO47.1: Understand the process of Software Project Management Framework and Apply estimation techniques. CO47.2: Learn the philosophy, principles and lifecycle of an Agile project. CO47.3: Demonstrate Agile Teams and Tools. CO47.4: Apply Agile project constraints and trade-offs for estimating project size and schedule. CO47.5: Explain Project Tracking and Interpretation of Progress Report.
CO48	Mini Project	CO48.1: planning a solution to a programming problem (Apply) CO48.2: Apply data storing and retrieval methods in android (Apply) CO48.3:Creating and applying mobile applications (Apply)
CO48	Open Subject 9	As it is elective subject outcome changes.Course
CO49	Open Subject 10	As it is elective subject outcome changes.Course
CO50	Case Study on Implementation and Testing	CO50.1: Apply the knowledge, techniques, and testing skills in the development and maintenance of a software product.
CO51	Practical based on IT51	CO47.1: Create android user interface. (Apply) CO47.2:Creating and applying mobile applications (Apply)

CO52	Practical based on OS51 and OS52	As it is elective subject outcome changes.Course (Apply)
CO53	Soft Skills- V	CO53.1 Adoption of employability skills. (Apply) CO53.2 Setting career goals. (Apply)
SEMESTER VI		
Course	Subject	Outcome
CO54	Open Subject 11	As it is elective subject outcome changes.Course
CO55	Project	CO55.1 Develop quality software using the concepts of Software Engineering from requirements elicitation to deployment of software within stipulated time as per the estimated cost. (Apply) CO55.2 Demonstrate their understanding of all subjects pertaining to programming, database, quality assurance, networking and project management. (Apply) CO55.3 Work as an individual and as part of a multidisciplinary team to develop and deliver quality software (Apply)


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