Progressive Education Society's

Modern College of Engineering, Pune-5

MCA Department

Course Outcome List(2019 Pattern)

Course Name	Course Outcome(CO)	
MCA FY Ist Sem		
Discrete Mathematics TH-(310901) (2019 Course)	C101.1	Solve real world problems logically by using set and induction approaches.
	C101.2	Describe and implement relations and functions.
	C101.3	Apply logical reasoning to solve a variety of problems.
	C101.4	Use the basic properties of graphs and trees to model simple applications.
	C101.5	Analyze and synthesize the real world problems using Algebraic structures.
Data Structures TH(310902) (2019 Course)	C102.1	Explain applications of basic data structures Array & Linked List
	C102.2	Explain linear data structures such as stacks, queues.
	C102.3	Implement applications of trees and graph data structures
	C102.4	Describe different searching and sorting algorithms
Object Oriented Programming TH-(310903) (2019 Course)	C103.1	Explain the fundamentals of object oriented paradigms, classes, objects, and functions.
	C103.2	Describe OOP features like inheritance and polymorphism using real world computing problems.
	C103.3	Implement function templates and exception handling using C++.
	C103.4	Explain fundamentals of file handling using C++.
Principles of Programming TH-(310904) (2019 Course)	C104.1	Define fundamental concepts of computer languages along with syntax and semantics.
	C104.2	Describe structuring of Data and computations.
	C104.3	Explain general principles of computer programming such as simple loops , decision structures and functions
	C104.4	Design simple and complex algorithms and

		determine their time complexity
	C104.5	Analyze the concept of processing of array and apply them for searching, sorting techniques and understand business data processing.
Management Theory and Practices TH-(310905) (2019 Course)	C105.1	Describe the Functions and activities of the Management.
	C105.2	Explain the Organizational structure.
	C105.3	Describe the Leadership, Team Building Models and Managerial Ethics.
	C105.4	Elaborate the Conflict Management, Total Quality Management and Re-engineering Process.
	C105.5	Explain Management Information System, Customer Relationship Management and Supply Chain Management and ERP.
	C105.6	Elaborate Managerial Decision Making Models
Data Structures laboratory PR-(310906) (2019 Course)	C106.1	Implement elementary data structures such as Arrays, linked lists using C.
	C106.2	Demonstrate practical knowledge on the applications of stacks, queues, trees and graph.
	C106.3	Implement different searching and sorting algorithms.
Object oriented Programming Laboratory PR-(310907) (2019 Course)	C107.1	Implement fundamentals of object oriented paradigms like classes, objects, and functions along with basic programming features.
	C107.2	Implement Object Oriented Programming features like inheritance, polymorphism and virtual function using real world computing problems.
	C107.3	Implement function templates and exception handling using C++.
	C107.4	Implement file handling features using C++.
Programming Language Laboratory PR-(310908)(2019 Course)	C108.1	To learn and acquire art of computer programming
	C108.2	To learn to program in C
	C108.3	To study basic Linux/Unix commands
MCAFY IInd Sem		
Probability and Statistics TH-(310910) (2019 Course)	C201.1	Apply statistical concepts to solve basic problems.
	C201.2	Explain various Descriptive Statistical concepts
	C201.3	Solve the problems of Discrete Distributions and Continuous Distributions.
	C201.4	Describe Hypothesis and its estimates.
	C201.5	Analyze Categorical Data using Statistical

		Quality Control techniques.
Systems Programming & Operating System TH-(310911) (2019 Course)	C202.1	Define the structure and design of various system softwares like assembler, linker, loader and compiler
	C202.2	Implement various CPU scheduling algorithms.
	C202.3	Explain concurrency control and deadlock in operating system.
	C202.4	Apply various memory management algorithms.
	C202.5	Analyze the structure and organization of file system & disk management.
Database Management System TH- (310912) (2019 Course)	C203.1	Design E-R model for real world applications based on basic concepts of D.B.M.S.
	C203.2	Implement various Sql and PL / Sql commands.
	C203.3	Apply normalization concepts to design relational database schema.
	C203.4	Explain various database architecture.
	C203.5	Develop object oriented database and XML scripts.
	C203.6	Describe concepts of non-relational databases.
Java Programming TH-(310913) (2019 Course)	C204.1	Explain the fundaments of OOP are using Java.
	C204.2	Implement multithreading and exception handling in Java.
	C204.3	Describe file handling in Java
	C204.4	Develop applications using Graphics and JDBC in Java.
Computer Organization TH-(310914) (2019 Course)	C205.1	Define function and characteristics of computer system and different logic gates.
	C205.2	Analyze functions of various units of digital computer.
	C205.3	Describe memory management Concepts.
	C205.4	Explain the concept of CPU Organization.
	C205.5	Elaborate the concept of pipelining in various operations.
	C205.6	
	C205.6	Demonstrate the concept of parallel processing.
Database Management System Laboratory PR-(310915) (2019 Course)	C206.1	Implement Sql and PL/Sql concepts for real world applications.
	C206.2	Apply concepts of large scale database using Mongo DB.
	C206.3	Analyze concepts of relational database

		for small applications.
SPOS Laboratory PR-(310916) (2019 Course)	C207.1	Implement various phases of assembler using suitable data structure.
	C207.2	Implement various phases of compiler.
	C207.3	Implement various CPU scheduling algorithms.
	C207.4	Implement various system calls of Unix.
	C207.5	Implement various paging algorithms.
Java Programming Laboratory PR-(310917) (2019 Course)	C208.1	Implement Object Oriented Programming in Java
	C208.2	Demonstrate practical knowledge on the applications of Multithreading , Exception Handling & Graphics programming in Java
	C208.3	Design applications using JDBC in Java.
	C208.4	Implement File Handling in Java
Project Based Learning-I(310918) (2019 Course)	C209.1	Develop team building skills
	C209.2	Apply software development life cycle to real life projects
	C209.3	Apply technologies learnt during program to real life projects
MCA SY IIIrd Sem		
Web Programming 410901 (2019 Course)	C301.1	Develop static web application using HTML, CSS, XML, JSON.
	C301.2	Implement web application using suitable client side technology.
	C301.3	Perform web based application using suitable server side technology.
	C301.4	Describe Client and server side framework.
	C301.5	Explain the role of web services and content Management
Banking and Finance 410902 (2019 Course)	C302.1	Use the concepts of banking domain
	C302.2	Implement the basic Accounting concepts in the banking and financial applications
	C302.3	Apply the basic concepts of cost accounting in real world problem
	C302.4	Implement the working capital concepts
Computer Networks 410903 (2019 Course)	C303.1	Study of physical layer using various networking devices along with their standard and appropriate encoding techniques.
	C303.2	Understand design issues and channel allocation in data link layer by studying various protocols.

	C303.3	Study network layer services and routing protocols.
	C303.4	Study transport layer services for wire and wireless communication.
	C303.5	Understand client server paradigm of application layer by using various protocols.
Python Programming 410904 (2019 Course)	C304.1	Interpret the fundamental Python syntax and semantics.
	C304.2	CO2: Write programs in Python using Decision Control statements.
	C304.3	CO3: Express proficiency in the handling of functions, strings and lists in Python.
	C304.4	CO4: Determine the methods to create and manipulate Python programs by utilizing the data structures like dictionaries, tuples and sets.
	C304.5	CO5: Describe the commonly used operations involving file systems and regular expressions.
	C304.6	CO6: Explain the Object-Oriented Programming concepts and different Operating System Interface modules in Python.
Management Information System 410905 (2019 Course)	C305.1	Understand and apply the fundamental concepts of Management information systems.
	C305.2	Develop the knowledge about management of information systems and business process
	C305.3	Describe the role of information systems for decision making in business.
	C305.4	Utilize project management concept to generate project plans.
	C305.5	Develop the Conceptual design of the information systems.
	C305.6	Understand the design principles for developing Information Systems.
Computer Network Lab 410906 (2019 Course)	C306.1	Demonstrate LAN and WAN protocol behavior using Modern Tools.
	C306.2	Demonstrate basic configuration of switches and routers.
	C306.3	Analyze data flow between peer to peer in an IP network using Application, Transport and Network Layer Protocols.
	C306.4	Develop Client-Server architectures and prototypes by the means of correct standards and technology.
Web Technology Lab 410907 (2019 Course)	C307.1	Understand the process of installation and configuration of web application server.
	C307.2	Design static web pages using HTML, CSS, XML.

	C307.3	Develop client side web applications.
	C307.4	Implement Web based application using server side technology.
	C307.5	Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management.
Python Programming Lab 410908 (2019 Course)	C308.1	Implement the basics of Python like control flow statements, operators etc
	C308.2	Implement the Decision Control statements in Python
	C308.3	Implement the handling of functions, strings and Lists in Python
	C308.4	Write the Python programs by utilizing the data structures like dictionaries, tuples and sets.
	C308.5	Implement Python file systems and regular expressions
	C308.6	Implement the Object-Oriented Programming concepts and Operating System Interface used in Python.
Soft Skills Laboratory 410909 (2019 Course)	C309.1	Apply business communication strategies and principles to prepare effective communication for domestic and international business situations
	C309.2	Identify ethical, legal, cultural, and global issues affecting business communication
	C309.3	Utilize analytical and problem solving skills appropriate to business communication
	C309.4	Participate in team activities using collaborative work skills.
	C309.5	Select appropriate organizational formats and channels used in developing and presenting Business messages.
	C309.6	Communicate via electronic mail, Internet, and other technologies
	C309.7	Deliver an effective oral business presentation
Seminar and Technical Communication Skills-I 410910 (2019 Course)	C310.1	Be familiar with basic technical writing concepts and terms
	C310.2	Improve skills to read, understand, and interpret documentation on technology.
	C310.3	Improve communication and writing skills
MCA IVth Sem		
Software Engineering & Project Management 410912 (2019 Course)	C401.1	Describe life cycle model of software development.
	C401.2	Create Software Requirement Specification.
	C401.3	Explain Agile Development Process
	C401.4	Elaborate product process and project metrics.

	C401.5	Discuss Project planning using various techniques
	C401.6	Examine Project management tools and techniques.
Mobile Computing 410913 (2019 Course)	C402.1	Describe the concept and technique of Wireless telephony.
	C402.2	Describe data management issue of mobile network.
	C402.3	Describe data management issue of mobile network.
	C402.4	Describe the knowledge of GSM architecture and services
	C402.5	Design and create mobile application.
	C402.6	Explain recent trends and emerging technologies.
Data Science with R 410914 (2019 Course)	C403.1	Describe flow process for data science problems(Remembering)
	C403.2	Classify data science problems into standard typology(Comprehension)
	C403.3	Develop R codes for data science solutions(Application)
	C403.4	Correlate results to the solution approach followed(Analysis)
	C403.5	Assess the solution approach (Evaluation) .
	C403.6	Construct use cases to validate approach and identify modifications required(Creating)
Object Oriented Modeling and Design 410915 (2019 Course)	C404.1	Analyze software requirements for real world applications
	C404.2	Design software applications using UML
	C404.3	Describe software Architecture
	C404.4	Explain various software design patterns
ELE - I: Artificial Intelligence 410916 (2019 Course)	C404A.1	Identify and apply suitable intelligent agents for various AI applications.
	C404A.2	Design smart system using different informed search / uninformed search or heuristic approaches.
	C404A.3	Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem.
	C404A.4	Apply the suitable algorithms to solve AI problems.
ELE - II: Information Security 410916 (2019 Course)	C404B.1	Gauge the security protections and limitations provided by today's technology.
	C404B.2	Identify information security and cyber security

		threats.
	C404B.3	Analyze threats to protect or defend it in cyberspace from cyber-attacks.
	C404B.4	Build appropriate security solutions against cyber-attacks.
ELE - III: Animation and Gaming 410916 (2019 Course)	C404C.1	Explain concept of graphics and its algorithms.
	C404C.2	Describe the basics of types, techniques and principles required to develop animation.
	C404C.3	Describe basics, development platform, and development life cycle of gaming.
	C404C.4	Explain structure of game and core architecture using state controls in Java.
ELE - IV: Internet of Things 410916 (2019 Course)	C404D.1	Implement an architectural design for IoT for specified requirement
	C404D.2	Solve the given societal challenge using IoT
	C404D.3	Choose between available technologies and devices for stated IoT challenge
	C404D.4	Analyze various protocols for IoT
	C404D.5	Analyze applications of IoT in real time scenario
Mobile Computing Laboratory 410917 (2019 Course)	C405.1	Design successful mobile computing applications.
	C405.2	Design simulator using WML.
	C405.3	Describe the development techniques of mobile communication systems.
Object Oriented Modeling and Design Laboratory 410918 (2019 Course)	C406.1	Implement requirement analysis by designing Use Case Diagram using UML tool for real world application.
	C406.2	Design static structure of real world application using UML tool.
	C406.3	Design dynamic and behavioural structure of real world application using UML tool.
	C406.4	Implement design pattern with suitable object oriented language
Data Science with R Laboratory 410919 (2019 Course)	C407.1	Install R Studio
	C407.2	Write programs using the basic fundamentals of R programming language
	C407.3	Implement Modeling techniques using R programming.
	C407.4	Implement Mining techniques using R programming.
	C407.5	Implement data analysis using graphs in R
Project Based Learning II	C408.1	Identify the real life problem from societal need

410920 (2019 Course)		point of view
	C408.2	Choose and compare alternative approaches to select most feasible one
	C408.3	Analyze and synthesize the identified problem from technological perspective
	C408.4	Design the reliable and scalable solution to meet challenges
	C408.5	Inculcate the habit of lifelong learning.
	C408.6	Design and develop technical documentation
MCA Vth Sem		
Data Mining and Business Intelligence 510901 (2019 Course)	C501.1	Demonstrate an understanding of the importance of data mining and statistical description of data.
	C501.2	Prepare the data needed for data mining algorithms in terms of attributes and using different pre-processing methods.
	C501.3	Implement the appropriate association mining on large data sets.
	C501.4	Define and apply different classification and prediction methods.
	C501.5	Demonstrate an understanding of different clustering methods and outliers.
	C501.6	Explain Business Intelligence architecture and its applications.
Cloud Computing 510902 (2019 Course)	C502.1	Understand need of cloud computing in current scenario.
	C502.2	Learn and understand various security related issues in cloud environment.
	C502.3	Understand challenges for cloud computing.
	C502.4	Aware of upcoming trends in cloud computing.
	C502.5	Explain virtualization and implementation levels of virtualization.
	C502.6	Demonstrate Open Source Cloud Implementation and Administration.
Software Testing and Quality Assurance 510903 (2019 Course)	C503.1	Illustrate different approaches of quality management, assurance, and quality standard to software system.
	C503.2	Describe fundamental concepts in software testing such as manual testing and design & develop project test plan, test cases, test data, and conduct test operations.
	C503.3	Apply the concept of white box and block box testing techniques.
	C503.4	Showcase the use of various testing types.
	C503.5	Explore the test automation concepts and apply

		recent automation tools for various software testing..
Operations Research 510904 (2019 Course)	C504.1	Apply linear Programming Problem by Graphical and Analytical Method.
	C504.2	Solve various Transportation Problems.
	C504.3	Analyze the network and find the shortest path and the duration.
	C504.4	Apply decision making techniques in various situations.
	C504.5	Use random numbers for simulation purpose.
Elective II: Machine Learning 510905A (2019 Course)	C505A. 1	Explain the learning primitives.
	C505A. 2	Evaluate a given problem and apply appropriate machine learning technique to gain knowledge from the problem.
	C505A. 3	Tackle real world problems in the domain of Data Mining and Big Data Analytics, Information Retrieval, Computer vision, Linguistics and Bioinformatics.
	C505A. 4	Develop machine learning models for real time applications.
	C505A. 5	Build insights using the machine learning model.
	C505A. 6	Develop skills using recent machine learning techniques and solve practical problems.
Elective II- Big Data Analytics 510905B (2019 Course)	C505B. 1	Understand the key issues in big data management and its associated applications for business decisions and strategies.
	C505B. 2	Develop problem solving and critical thinking skills in fundamental enabling techniques like Hadoop, Map reduce and NoSQL in big data analytics.
	C505B. 3	Collect, manage, store, query and analyze various forms of Big Data.
	C505B. 4	Apply software tools for big data analytics.
	C505B. 5	Adapt adequate perspectives of big data analytics in various applications like recommender Systems, social media applications.
	C505B. 6	Solve complex real world problems in various applications like recommender systems, social Media applications.
Elective- II- Blockchain Technology	C505.1	Understand emerging abstract models for Block chain Technology.

510905C (2019 Course)	C505.2	Understand security models for Block chain Technology.
	C505.3	Analyze the concept of bit coin and mathematical background behind it.
	C505.4	Design, build, and deploy smart contracts and distributed applications.
	C505.5	Apply tools for understanding the background of crypto currencies.
	C505.6	Understand latest advances and applications of Block Chain Technology.
Seminar and Technical Communication 510906 (2019 Course)	C506.1	Familiar with basic technical writing concepts and terms, such as audience analysis, jargon, formats, visuals, and presentation.
	C506.2	Improve skills to read, understand, and interpret material on technology.
	C506.3	Improve communication and writing skills.
Data Mining & Business Intelligence Laboratory 510907 (2019 Course)	C507.1	Apply data pre-processing techniques.
	C507.2	Implement different Mining Techniques to find Associations, and Correlations.
	C507.3	Explore different Classification Techniques Prediction techniques.
	C507.4	Analyze the data using Clustering Techniques.
	C507.5	Identify and use BI tools and techniques.
	C507.6	Apply Data Mining Techniques to build real world applications.
Software Testing and Quality Assurance Laboratory 510908 (2019 Course)	C508.1	Illustrate different approaches of quality management, assurance, and quality standard to Software system.
	C508.2	Describe fundamental concepts in software testing such as manual testing and design and develop Project test plan, test cases, test data, and conduct test operations.
	C508.3	Apply the concepts of white box and block box testing techniques.
	C508.4	Showcase the use of various testing types.
	C508.5	Explore the test automation concepts and apply recent automation tools for software testing.
Project Stage I 510909 (2019 Course)	C509.1	Solve real life problems by applying knowledge gained.
	C509.2	Analyze alternative approaches, apply and use most appropriate one for feasible solution.
	C509.3	Write precise reports and technical documents in a nutshell.
	C509.4	Participate effectively in heterogeneous teams exhibiting team work, Inter- personal Relationships and leadership quality.

	C509.5	Apply communication skills effectively
Industrial Internship 510910 (2019 Course)	C510.1	Apply domain knowledge in proposing solution for IT problem.
	C510.2	Develop/implement the design with appropriate techniques and tools to deliver the solution.
	C510.3	Work in independently or in collaborative environment.
	C510.4	Develop project with communications skills, make presentations and prepare technical Document.
	C510.5	Adapt easily to the industry environment.
	C510.6	Motivate for lifelong learning.
MCA VIth Sem		
Project Stage II 510912 (2019 Course)	C601.1	Learn team work and professionalism.
	C601.2	Apply SDLC to develop the project.
	C601.3	Apply communication and presentation skills.
	C601.4	Recognize the importance of documentation.