AMC ENGINEERING COLLEGE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

STATEMENTS

PROGRAM OUTCOMES (PO)

PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering 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.

PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Professional Skills: Ability to design, develop and evaluate innovative projects which meet the requirements of industry.
PSO2	Ability to do Research and Development using the modern computing technology for society.

Program Educational Objectives (PEOs) of Department

After course completion CSE graduates will be able to:

PEO 1	Graduates acquire advanced knowledge of Computer Science Engineering and excel in leadership roles to serve the society.
PEO 2	Graduates of the program will apply Computer Science and Engineering and excel in leadership computer science professional.
PEO 3	Graduates adapt Value-Based Proficiency in solving real time problems.

Course Title: Engineering Mathematics – III **Course Code: 15MAT31**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO231.1	Comprehend and use of analytical and numerical methods in different engineering fields
CO231.2	Apprehend and apply Fourier Series
CO231.3	Realize and use of Fourier transforms and Z-Transforms
CO231.4	Use of statistical methods in curve fitting applications

Course Title: Analog and Digital Electronics **Course Code: 15CS32**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO232.1	Recall and Recognize construction and characteristics of JFETs and MOSFETs and differentiate withBJT
CO232.2	Evolve and Analyze Operational Amplifier circuits and their applications
CO232.3	Describe, Illustrate and Analyze Combinational Logic circuits, Simplification of Algebraic Equations
CO232.4	Using Karnaugh Maps and Quine McClusky Techniques.
CO232.5	Describe and Design Decoders, Encoders, Digital multiplexers, Adders and Sub tractors, Binary. Explain and design registers and Counters, A/D and D/A converters

Course Title: Data Structures and Applications **Course Code: 15CS33**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO233.1	Explain fundamentals of data structures and their applications essential for programming/problem solving
CO233.2	Illustrate linear representation of data structures: Stack, Queues, Lists
CO233.3	Illustrate linear representation of data structures: Trees, Graphs
CO233.4	Demonstrate sorting and searching algorithms
CO233.5	Find suitable data structure during application development/Problem Solving

Course Title: Computer Organization **Course Code: 15CS34**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO234.1	Explain the basic sub systems of a computer, their organization, structure and operation.
CO234.2	Illustrate the concept of programs as sequences of machine instructions.
CO234.3	Demonstrate different ways of communicating with I/O devices and standard I/O interfaces.
CO234.4	Describe memory hierarchy and concept of virtual memory.
CO234.5	Describe arithmetic and logical operations with integer and floating-point operands.

Course Title: Unix and Shell Programming **Course Code: 15CS35**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO235.1	Illustrate the UNIX system architecture and use of basic Commands.
CO235.2	Use of editors and networking commands.
CO235.3	Demonstrate writing shell scripts.
CO235.4	Categorize, compare and make use of UNIX system calls.

Course Title: Discrete Mathematical Structures **Course Code: 15CS36**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO236.1	Provide theoretical foundations of computer science to perceive other courses in the programme.
CO236.2	Illustrate applications of discrete structures: logic, relations, functions, set theory and counting.
CO236.3	Describe different mathematical proof techniques,
CO236.4	Illustrate the use of graph theory in computer science.

Course Title: Analog and Digital Electronics Laboratory **Course Code: 15CSL3**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO237.1	Analog components and circuits including Operational Amplifier, Timer, etc.
CO237.2	Combinational logic circuits.
CO237.3	Flip - Flops and their operations
CO237.4	Counters and registers using flip-flops.

Course Title: Data Structures Laboratory **Course Code: 15CSL38**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO238.1	Asymptotic performance of algorithms.
CO238.2	Linear data structures and their applications such as stacks, queues and lists
CO238.3	Non-Linear data structures and their applications such as trees and graphs
CO238.4	Sorting and searching algorithms

Course Title: Engineering Mathematics - IV **Course Code: 15MAT41**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO241.1	Formulate, solve and analyze engineering problems.
CO241.2	Apply numerical methods to solve ordinary differential equations.
CO241.3	Apply finite difference method to solve partial differential equations.
CO241.4	Perform complex analysis.

Course Title: Software Engineering **Course Code: 15CS 42**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO242.1.	Outline software engineering principles and activities involved in building large software programs
CO242.2	Identify ethical and professional issues and explain why they are of concern to software engineers
CO242.3	Describe the process of requirements gathering, requirements classification, requirements specification and requirements validation.
CO242.4	Differentiate system models, use UML diagrams and apply design patterns.

Course Title: Design and Analysis of Algorithms **Course Code: 15CS43**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO243.1.	Explain various computational problem solving techniques.
CO243.2	Apply appropriate method to solve a given problem.
CO243.3	Describe various methods of algorithm analysis.

Course Title: Microprocessors and Microcontrollers **Course Code: 15CS 44**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO244.1	Make familiar with importance and applications of microprocessors and microcontrollers
CO244.2	Expose architecture of 8086 microprocessor and ARM processor
CO244.3	Familiarize instruction set of ARM processor

Course Title: Object Oriented Concepts **Course Code: 15CS45**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO245.1	Learn fundamental features of object oriented language and JAVA
CO245.2	Set up Java JDK environment to create, debug and run simple Java programs.
CO245.3	Create multi-threaded programs and event handling mechanisms.
CO245.4	Introduce event driven Graphical User Interface (GUI) programming using applets and

Course Title: Data Communication **Course Code: 15CS46**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO246.1	Comprehend the transmission technique of digital data between two or more computers and a computer network that allows computers to exchange data.
CO246.2	Explain with the basics of data communication and various types of computer networks;
CO246.3	Illustrate TCP/IP protocol suite and switching criteria.
CO246.4	Demonstrate Medium Access Control protocols for reliable and noisy channels

Course Title: Design and Analysis of Algorithm **Course Code: 15CSL47**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO247.1	Design and implement various algorithms in JAVA
CO247.2	Employ various design strategies for problem solving.
CO247.3	Measure and compare the performance of different algorithms.

Course Title: Microprocessors Laboratory **Course Code: 15CSL48**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO248.1	To provide practical exposure to the students on microprocessors, design and coding knowledge on 80x86 family/ARM. To give the knowledge and practical exposure on connectivity and execute of interfacing devices with 8086/ARM kit like LED displays, Keyboards, DAC/ADC, and various other devices.

Course Title: Management and Entrepreneurship for IT Industry **Course Code: 15CS51**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO351.1	Explain the principles of management, organization and entrepreneur.
CO351.2	Discuss on planning, staffing, ERP and their importance
CO351.3	Infer the importance of intellectual property rights and relate the institutional support
CO351.4	Explain the principles of management, organization and entrepreneur.

Course Title: Computer Networks **Course Code: 15CS52**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO352.1	Demonstration of application layer protocols
CO352.2	Discuss transport layer services and understand UDP and TCP protocols
CO352.3	Explain routers, IP and Routing Algorithms in network layer
CO352.4	Disseminate the Wireless and Mobile Networks covering IEEE 802.11 Standard

Course Title: Database Management System **Course Code: 15CS53**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO353.1	Provide a strong foundation in database concepts, technology, and practice.
CO353.2	Practice SQL programming through a variety of database problems.
CO353.3	Demonstrate the use of concurrency and transactions in database
CO353.4	Design and build database applications for real world problems.

Course Title: Automata theory and Computability **Course Code: 15CS54**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO354.1	Introduce core concepts in Automata and Theory of Computation
CO354.2	Identify different Formal language Classes and their Relationships
CO354.3	Design Grammars and Recognizers for different formal languages
CO354.4	Prove or disprove theorems in automata theory using their properties

Course Title: Advanced JAVA and J2EE **Course Code:** 15CS553

CO.No.	OUTCOMES After completing the course the student will be able to:
CO355.1	Identify the need for advanced Java concepts like Enumerations and Collections
CO355.2	· Construct client-server applications using Java socket API
CO355.3	· Make use of JDBC to access database through Java Programs
CO355.4	· Adapt servlets to build server side programs

Course Title: Computer Network Laboratory **Course Code: 15CSL57**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO357.1	Demonstrate operation of network and its management commands
CO357.2	· Simulate and demonstrate the performance of GSM and CDMA
CO357.3	· Implement data link layer and transport layer protocols.

Course Title: DBMS Laboratory with mini project **Course Code: 15CSL58**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO358.1	Foundation knowledge in database concepts, technology and practice to groom
CO358.2	students into well-informed database application developers.
CO358.3	· Strong practice in SQL programming through a variety of database problems.
CO358.4	· Develop database applications using front-end tools and back-end DBMS.

Course Title: Cryptography, Network Security and Cyber Law **Course Code: 15CS61**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO361.1	Explain the concepts of Cyber security
CO361.2	· Illustrate key management issues and solutions.
CO361.3	· Familiarize with Cryptography and very essential algorithms
CO361.4	Introduce cyber Law and ethics to be followed.

Course Title: Computer Graphics and Visualizatio **Course Code: 15CS62**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO362.1	Explain hardware, software and OpenGL Graphics Primitives.
CO362.2	· Illustrate interactive computer graphic using the OpenGL.
CO362.3	· Design and implementation of algorithms for 2D graphics Primitives and attributes.
CO362.4	· Demonstrate Geometric transformations, viewing on both 2D and 3D objects

Course Title: System Software and Compiler Design **Course Code: 15CS63**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO363.1	Explain hardware, software and OpenGL Graphics Primitives.
CO363.2	· Illustrate interactive computer graphic using the OpenGL.
CO363.3	· Design and implementation of algorithms for 2D graphics Primitives and attributes.
CO363.4	· Demonstrate Geometric transformations, viewing on both 2D and 3D objects

Course Title: Operating Systems **Course Code: 15CS64**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO364.1	Introduce concepts and terminology used in OS
CO364.2	Explain threading and multithreaded systems
CO364.3	Illustrate process synchronization and concept of Deadlock
CO364.4	Introduce Memory and Virtual memory management, File system and storage

Course Title: Data Mining and Data Warehousing **Course Code:** 15CS651

CO.No.	OUTCOMES After completing the course the student will be able to:
CO365.1	Define multi-dimensional data models.
CO365.2	Explain rules related to association, classification and clustering analysis.
CO365.3	Compare and contrast between different classification and clustering algorithms
CO365.4	Define multi-dimensional data models.

Course Title: Python Application Programming **Course Code:** 15CS664

CO.No.	OUTCOMES After completing the course the student will be able to:
CO366.1	Learn Syntax and Semantics and create Functions in Python.
CO366.2	· Handle Strings and Files in Python.
CO366.3	· Understand Lists, Dictionaries and Regular expressions in Python.
CO366.4	· Implement Object Oriented Programming concepts in Python

Course Title: System Software and Operating System Laboratory **Course Code: 15CSL67**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO367.1	To make students familiar with Lexical Analysis and Syntax Analysis phases of
CO367.2	Compiler Design and implement programs on these phases using LEX & YACC tools
CO367.3	and/or C/C++/Java
CO367.4	To enable students to learn different types of CPU scheduling algorithms used in

Course Title: Computer Graphics Laboratory with mini project **Course Code: 15CSL68**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO368.1	Demonstrate simple algorithms using OpenGL Graphics Primitives and attributes.
CO368.2	· Implementation of line drawing and clipping algorithms using OpenGL functions
CO368.3	· Design and implementation of algorithms Geometric transformations on both 2D and 3D objects

Course Title: Web Technology and its applications **Course Code:** 15CS71

CO.No.	OUTCOMES After completing the course the student will be able to:
CO471.1	Illustrate the Semantic Structure of HTML and CSS
CO471.2	· Compose forms and tables using HTML and CSS
CO471.3	· Design Client-Side programs using JavaScript and Server-Side programs using PHP
CO471.4	· Infer Object Oriented Programming capabilities of PHP

Course Title: Advanced Computer Architectures **Course Code:** 15CS72

CO.No.	OUTCOMES After completing the course the student will be able to:
CO472.1	Describe computer architecture.
CO472.2	Measure the performance of architectures in terms of right parameters.
CO472.1	Summarize parallel architecture and the software used for them.

Course Title: Machine Learning **Course Code:** 15CS73

CO.No.	OUTCOMES After completing the course the student will be able to:
CO473.1	Define machine learning and problems relevant to machine learning.
CO473.2	Differentiate supervised, unsupervised and reinforcement learning
CO473.2	Apply neural networks, Bayes classifier and k nearest neighbor, for problems appear in
CO473.3	Perform statistical analysis of machine learning techniques

Course Title: Unix System Programming **Course Code:** 15CS744

CO.No.	OUTCOMES After completing the course the student will be able to:
CO474.1	Explain the fundamental design of the unix operating system
CO474.2	· Familiarize with the systems calls provided in the unix environment
CO474.3	Design and build an application/service over the unix operating system

Course Title: Storage Area Networks **Course Code:** 15CS754

CO.No.	OUTCOMES After completing the course the student will be able to:
CO475.1	Evaluate storage architectures,
CO475.2	· Define backup, recovery, disaster recovery, business continuity, and replication
CO475.3	· Examine emerging technologies including IP-SAN

Course Title: Machine Learning Laboratory **Course Code:** 15CSL76

CO.No.	OUTCOMES After completing the course the student will be able to:
CO476.1	Make use of Data sets in implementing the machine learning algorithms
CO476.2	Implement the machine learning concepts and algorithms in any suitable language of

Course Title: Web Technology Laboratory with mini project **Course Code:** 15CSL77

CO.No.	OUTCOMES After completing the course the student will be able to:
CO4061.1	Design and develop static and dynamic web pages.
CO4061.2	Familiarize with Client-Side Programming, Server-Side Programming, Active server Pages.

Course Title: Internet of Things and Applications **Course Code:** 15CS81

CO.No.	OUTCOMES After completing the course the student will be able to:
CO481.1	Assess the genesis and impact of IoT applications, architectures in real world.
CO481.2	Illustrate diverse methods of deploying smart objects and connect them to network.
CO481.3	Compare different Application protocols for IoT.

Course Title: Big Data Analytics **Course Code:** 15CS82

CO.No.	OUTCOMES After completing the course the student will be able to:
CO482.1	Understand Hadoop Distributed File system and examine MapReduce Programming
CO482.2	Explore Hadoop tools and manage Hadoop with Ambari.
CO482.3	Appraise the role of Business intelligence and its applications across industries

Course Title: User Interface Design **Course Code:** 15CS832

CO.No.	OUTCOMES After completing the course the student will be able to:
CO483.1	To study the concept of menus, windows, interfaces
CO483.2	To study about business functions
CO483.3	To study the characteristics and components of windows and the various controls for

AMC ENGINEERING COLLEGE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MTech

STATEMENTS

PROGRAM OUTCOMES (PO)	
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
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PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
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PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Professional Skills: Ability to design, develop and evaluate innovative projects which meet the requirements of industry.
PSO2	Ability to do Research and Development using the modern computing technology for society.

Program Educational Objectives (PEOs) of Department

After course completion CSE graduates will be able to:

PEO 1	Graduates acquire advanced knowledge of Computer Science Engineering and excel in leadership roles to serve the society.
PEO 2	Graduates of the program will apply Computer Science and Engineering and excel in leadership computer science professional.
PEO 3	Graduates adapt Value-Based Proficiency in solving real time problems.

Course Title: Advanced Digital Design **Course Code:** 16SCE11

CO.No.	OUTCOMES After completing the course the student will be able to:
C101.1	Explain various IC technology options
C101..2	Demonstrate Logic simulation, Design verification, Verilog.
C101..3	Illustrate behavioral modeling, Boolean-Equation, Flip-Flops and Latches; multiplexers,
C101.4	Demonstrate combinational logic; three-state devices and bus interfaces; Registered logic; registers and counters; Resets; Divide and conquer: Partitioning a design

Course Title: Cloud Computing **Course Code:** 16SCE12

CO.No.	OUTCOMES After completing the course the student will be able to:
C102.1	Define and Cloud, models and Services.
C102.2	Compare and contrast programming for cloud and their applications
C102.3	Explain virtuaization, Task Scheduling algorithms.
C102.4	Apply ZooKeeper, Map-Reduce concept to applications
C102.5	Define and Cloud, models and Services.

Course Title: EMBEDDED COMPUTING SYSTEMS **Course Code:** 16SCE13

CO.No.	OUTCOMES After completing the course the student will be able to:
C103.1	Explain a general overview of Embedded Systems
C103.2	Show current statistics of Embedded Systems
C104.3	Examine a complete microprocessor-based hardware system
C104.4	Design, code, compile, and test real-time software
C104.5	Integrate a fully functional system including hardware and software

Course Title: Managing Big Data **Course Code:** 16SCS21

CO.No.	OUTCOMES After completing the course the student will be able to:
C201.1	Define big data for business intelligence
C201.2	Analyze business case studies for big data analytics
C201.3	Explain managing of Big data Without SQL
C201.4	Develop map-reduce analytics using Hadoop and related tools

Course Title: Advances In Computer Networks **Course Code:** 16SCS23

CO.No.	OUTCOMES After completing the course the student will be able to:
C202.1	Discuss with the basics of Computer Networks.
C202.2	Compare various Network architectures.
C202.3	Discuss fundamental protocols.
C202.4	Define and analyze network traffic, congestion, controlling and resource allocation

Course Title: Advanced Algorithms **Course Code:** 16SCS23

CO.No.	OUTCOMES After completing the course the student will be able to:
C203.1	Define the graph search algorithms.
C203.2	Explain network flow and linear programming problems.
C203.3	Interpret hill climbing and dynamic programming design techniques.
C203.4	Develop recursive backtracking algorithms

	AMC ENGINEERING COLLEGE **DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING** **2017-2018**

STATEMENTS	
PROGRAM OUTCOMES (PO)	
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering 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.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	**Professional Skills:** Ability of using mathematical methodologies for analysis of computing concepts, data structure, computer hardware, layered technologies and suitable algorithm which in turn helps students to model, design and implement a system to meet specific requirement
PSO2	**Software Skills:** Ability to grasp the software development lifecycle and methodologies of software systems and to build software engineering system of varying complexity

PROGRAM EDUCATION OBJECTIVES (PEOS)	
PEO 1	Excel as Information Science Engineers with ability to solve wide range of computational problems in IT industry, Government or other work environments.
PEO 2	Pursue higher studies with profound knowledge enriched with academia and industrial skill sets.
PEO 3	Exhibit adaptive skills to develop computing systems using modern tools and technologies in multidisciplinary areas to meet technical and managerial challenges, which meet societal requirements.
PEO 4	Possess the ability to collaborate as a team member and leader with professional ethics to make a positive impact on society.

Course Title: Analog and Digital Electronics

Course Code: 17CS32

CO. No.	OUTCOMES After completing the course the student will be able to:
C232.1	Explain the operation of JFETs and MOSFETs , Operational Amplifier circuits and their application
C232.2	Explain Combinational Logic, Simplification Techniques using Karnaugh Maps, Quine McClusky technique
C232.3	Demonstrate Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors, working of Latches, Flip-Flops, Designing Registers, Counters, A/D and D/A Converters
C232.4	Design of Counters, Registers and A/D & D/A converters

Course Title: Data Structures and Applications

Course Code: 17CS33

CO. No.	OUTCOMES After completing the course the student will be ableto:
C233.1	Explain different types of data structures, operations and algorithms
C233.2	Apply searching and sorting operations on files
C233.3	Make use of stack, Queue, Lists, Trees and Graphs in problem solving.
C233.4	Develop all data structures in a high-level language for problem solving.

Course Title: Computer Organization

Course Code: 17CS34

CO. No.	OUTCOMES After completing the course the student will be ableto:
C234.1	Explain the basic organization of a computer system.
C234.2	Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
C234.3	Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems.
C234.4	Build simple arithmetic and logical units.

Course Title: UNIX and Shell Programming

Course Code: 17CS35

CO. No.	OUTCOMES After completing the course the student will be ableto:
C235.1	Explain UNIX system and use different commands.
C235.2	Compile Shell scripts for certain functions on different subsystems.
C235.3	Demonstrate use of editors and Perl script writing

Course Title: Discrete Mathematical Structures

Course Code: 17CS36

CO. No.	OUTCOMES After completing the course the student will be ableto:
C236.1	Make use of propositional and predicate logic in knowledge representation and truth verification.
C236.2	Demonstrate the application of discrete structures in different fields of computer science.
C236.3	Solve problems using recurrence relations and generating functions.
C236.4	Apply different mathematical proofs, techniques in proving theorems.
C236.5	Compare graphs, trees and their applications.

Course Title: Analog and Digital Electronics Laboratory

Course Code: 17CSL37

CO. No.	OUTCOMES After completing the course the student will be ableto:
C237.1	Demonstrate various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital Trainer Kit, Multimeters and components like Resistors, Capacitors, Op amp and Integrated Circuit.
C237.2	Design and demonstrate various combinational logic circuits.
C237.3	Design and demonstrate various types of counters and Registers using Flip-flops
C237.4	Make use of simulation package to design circuits.
C237.5	Infer the working and implementation of ALU.

Course Title: Data Structures Laboratory

Course Code: 15CSL38

CO. No.	OUTCOMES After completing the course the student will be able to:
C238.1	Analyze and Compare various linear and non-linear data structures
C238.2	Demonstrate the working nature of different types of data structures and their applications
C238.3	Develop, analyze and evaluate the searching and sorting algorithms
C238.4	Choose the appropriate data structure for solving real world problems

Course Title: Object Oriented Concepts
Course Code: 17CS42

CO. No.	OUTCOMES After completing the course the student will be able to:
C245.1	Explain the object-oriented concepts and JAVA.
C245.2	Develop computer programs to solve real world problems in Java.
C245.3	Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using Applets and swings.

Course Title: Design and Analysis of Algorithms

Course Code: 17CS43

CO. No.	OUTCOMES After completing the course the student will be able to:
C243.1	Describe computational solution to well known problems like searching, sorting etc.
C243.2	Estimate the computational complexity of different algorithms.
C243.3	Devise an algorithm using appropriate design strategies for problem solving.

Course Title: Microprocessors and Microcontrollers

Course Code: 17CS44

CO. No.	OUTCOMES After completing the course the student will be able to:
C244.1	Differentiate between microprocessors and microcontrollers
C244.2	Design and develop assembly language code to solve problems
C244.3	Explain interfacing various devices to x86 family and ARM processor
C244.4	Demonstrate design of interrupt routines for interfacing devices

Course Title: Software Engineering

Course Code: 17CS45

CO. No.	OUTCOMES After completing the course the student will be ableto:
C242.1	Design a software system, component, or process to meet desired needs within realistic constraints.
C242.2	Assess professional and ethical responsibility
C242.3	Function on multi-disciplinary teams
C242.4	Make use of techniques, skills, and modern engineering tools necessary for engineering practice
C242.5	Comprehend software systems or parts of software systems.

Course Title: Data Communication

Course Code: 17CS46

CO. No.	OUTCOMES After completing the course the student will be ableto:
C243.1	Describe computational solution to well known problems like searching, sorting etc.
C243.2	Estimate the computational complexity of different algorithms.
C243.3	Devise an algorithm using appropriate design strategies for problem solving.

Course Title: Design and Analysis of Algorithm Laboratory

Course Code: 17CSL47

CO. No.	OUTCOMES After completing the course the student will be ableto:
C247.1	Design algorithms using appropriate design techniques (brute-force, greedy, dynamic Programming, etc.)
C247.2	Develop variety of algorithms such as sorting, graph related, combinatorial, etc., in a high Level language.
C247.3	Analyze and compare the performance of algorithms using language features.
C247.4	Apply and implement learned algorithm design techniques and data structures to solve real world problems.

Course Title: Microprocessor and Microcontroller Laboratory

Course Code: 17CSL48

CO. No.	OUTCOMES After completing the course the student will be ableto:
C248.1	Summarize 80x86 instruction sets and comprehend the knowledge of how assembly language works.
C248.2	Design and develop assembly programs written in 80x86 assembly language instructions
C248.3	Infer functioning of hardware devices and interfacing them to x86 family
C248.4	Choose processors for various kinds of applications.

Course Title: Management, Entrepreneurship for IT industry

Course Code: 17CS51

CO. No.	OUTCOMES After completing the course the student will be ableto:
C351.1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
C351.2	Utilize the resources available effectively through ERP
C351.3	Make use of IPRs and institutional support in entrepreneurship

Course Title: Computer Networks

Course Code: 17CS52

CO. No.	OUTCOMES After completing the course the student will be ableto:
C352.1	Explain principles of application layer protocols
C352.2	Outline transport layer services and infer UDP and TCP protocols
C352.3	Classify routers, IP and Routing Algorithms in network layer
C352.4	Explain the Wireless and Mobile Networks covering IEEE 802.11 Standard
C352.5	Define Multimedia Networking and Network Management

Course Title: Database Management System

Course Code: 15CS53

CO. No.	OUTCOMES After completing the course the student will be ableto:
C353.1	Summarize the concepts of database objects; enforce integrity constraints on a database using RDBMS
C353.2	Use Structured Query Language (SQL) for database manipulation.
C353.3	Design simple database systems
C353.4	Design code for some application to interact with databases.

Course Title: Automata theory and Computability

Course Code: 17CS54

CO. No.	OUTCOMES After completing the course the student will be ableto:
C354.1	Tell the core concepts in automata theory and Theory of Computation
C354.2	Explain how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
C354.3	Interpret Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
C354.4	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
C354.5	Classify a problem with respect to different models of Computation.

Course Title: Object Oriented Modeling and Design

Course Code: 17CS551

CO. No.	**OUTCOMES** After completing the course the student will be ableto:
C3551.1	Describe the concepts of object-oriented and basic class modelling.
C3551.2	Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.
C3551.3	Choose and apply a befitting design pattern for the given problem.

Course Title: Social Network Analysis

Course Code: 17IS552

CO. No.	**OUTCOMES** After completing the course the student will be ableto:
C352.1	Define notation and terminology used in network science.
C352.2	Demonstrate, summarize and compare networks.
C352.3	Explain basic principles behind network analysis algorithms.
C352.4	Analyze real world network.

Course Title: Advanced JAVA and J2EE

Course Code: 15CS553

CO. No.	OUTCOMES After completing the course the student will be ableto:
C3553.1	Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
C3553.2	Build client-server applications and TCP/IP socket programs
C3553.3	Illustrate database access and details for managing information using the JDBC API
C3553.4	Describe how servlets fit into Java-based web application architecture
C3553.5	Develop reusable software components using Java Beans

Course Title: Programming Languages

Course Code: 17IS554

CO. No.	OUTCOMES After completing the course the student will be ableto:
C3554.1	Select appropriate languages for given applications
C3554.2	Compare and contrast the strengths and weaknesses of different languages

Course Title: Programming in JAVA

Course Code: 17IS561

CO. No.	**OUTCOMES** After completing the course the student will be ableto:
C3561.1	Explain the object-oriented concepts and JAVA.
C3561.2	Develop computer programs to solve real world problems in Java.
C3561.3	Develop simple GUI interfaces for a computer program to interact with users

Course Title: Artificial Intelligence

Course Code: 17CS562

CO. No.	**OUTCOMES** After completing the course the student will be ableto:
C3562.1	Identify the AI based problems
C3562.2	Apply techniques to solve the AI problems
C3562.3	Define learning and explain various learning techniques
C3562.4	Discuss expert systems

Course Title: Embedded Systems

Course Code: 17CS563

CO. No.	**OUTCOMES** After completing the course the student will be ableto:
C3563.1	Distinguish the characteristics of embedded computer systems.
C3563.2	Identify the various vulnerabilities of embedded computer systems.
C3563.3	Design and develop modules using RTOS.
C3563.4	Explain RPC, threads and tasks

Course Title: DOT NET Framework for Application Development

Course Code: 17CS564

CO. No.	**OUTCOMES** After completing the course the student will be ableto:
C3564.1	Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#
C3564.2	Demonstrate Object Oriented Programming concepts in C# programming language
C3564.3	Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications.
C3564.4	Illustrate the use of generics and collections in C#
C3564.5	Compose queries to query in-memory data and define own operator behaviour

Course Title: Cloud Computing

Course Code: 17CS565

CO. No.	OUTCOMES After completing the course the student will be able to:
C3565.1	Explain the concepts and terminologies of cloud computing
C3565.2	Demonstrate cloud frameworks and technologies
C3565.3	Define data intensive computing
C3565.4	Demonstrate cloud applications

Course Title: Computer Network Laboratory

Course Code: 17CSL57

CO. No.	OUTCOMES After completing the course the student will be able to:
C357.1	Analyze and Compare various networking protocols.
C357.2	Demonstrate the working of different concepts of networking.
C357.3	Implement and analyze networking protocols in NS2 / NS3

Course Title: DBMS Laboratory with Mini Project

Course Code: 17CSL58

CO. No.	OUTCOMES After completing the course the student will be able to:
C358.1	Use Structured Query Language (SQL) for database Creation and manipulation.
C358.2	Demonstrate the working of different concepts of DBMS
C358.3	Implement and test the project developed for an application.

Course Title: Cryptography, Network Security and Cyber Law

Course Code: 17CS61

CO. No.	OUTCOMES After completing the course the student will be ableto:
C361.1	Discuss cryptography and its need to various applications
C361.2	Design and develop simple cryptography algorithms
C361.3	Understand cyber security and need cyber Law

Course Title: File Structures

Course Code: 17IS62

CO. No.	OUTCOMES After completing the course the student will be ableto:
C362.1	Discuss appropriate file structure for storage representation.
C362.2	Illustrate a suitable sorting technique to arrange the data.
C362.3	Explain indexing and hashing techniques for better performance to a given problem.

Course Title: Software Testing **Course Code: 17IS63**

CO. No.	OUTCOMES After completing the course the student will be ableto:
C363.1	Discuss test cases for any given problem
C363.2	Compare the different testing techniques
C363.3	Illustrate the problem into suitable testing model
C363.4	Understand the appropriate technique for the design of flow graph.
C363.5	Design and Develop appropriate document for the software artefact.

Course Title: Operating Systems **Course Code: 17CS64**

CO. No.	OUTCOMES After completing the course the student will be ableto:
C364.1	Demonstrate need for OS and different types of OS
C364.2	Discuss suitable techniques for management of different resources
C364.3	Illustrate processor, memory, storage and file system commands
C364.3	Explain the different concepts of OS in platform of usage through case studies

Course Title: Data Mining and Data Warehousing

Course Code: 17CS651

CO. No.	OUTCOMES After completing the course the student will be ableto:
C3651.1	Understand data mining problems and implement the data warehouse
C3651.2	Demonstrate association rules for a given data pattern.
C3651.3	Discuss between classification and clustering solution.

Course Title: System Software **Course Code: 17IS652**

CO. No.	OUTCOMES After completing the course the student will be ableto:
C3652.1	Explain system software such as assemblers, loaders, linkers and macro processors
C3652.2	Design and develop lexical analyzers, parsers and code generators
C3652.3	Understand lex and yacc tools for implementing different concepts of system software

Course Title: Operations Research

Course Code: 17CS653

CO. No.	OUTCOMES After completing the course the student will be ableto:
C3653.1	Explain optimization techniques for various problems.
C3653.2	Understand the given problem as transportation and assignment problem and solve.
C3653.3	Illustrate game theory for decision support system.

Course Title: Distributed Computing System **Course Code: 17CS654**

CO. No.	OUTCOMES After completing the course the student will be ableto:
C3654.1	Explain the characteristics of a distributed system along with its and design challenges
C3654.2	Illustrate the mechanism of IPC between distributed objects
C3654.3	Describe the distributed file service architecture and the important characteristics of SUN NFS.
C3654.3	Discuss concurrency control algorithms applied in distributed transactions

Course Title: Mobile Application Development **Course Code: 17CS661**

CO. No.	OUTCOMES After completing the course the student will be ableto:
C3661.1	Design and Develop Android application by setting up Android development environment
C3661.2	Implement adaptive, responsive user interfaces that work across a wide range of devices.
C3661.3	Explain long running tasks and background work in Android applications
C3661.4	Demonstrate methods in storing, sharing and retrieving data in Android applications
C3661.5	Discuss performance of android applications and understand the role of permissions and security

Course Title: Big Data Analytics

Course Code: 17CS662

CO. No.	OUTCOMES After completing the course the student will be ableto:
C3662.1	Explain the importance of data and data analysis
C3662.2	Interpret the probabilistic models for data
C3662.3	Illustrate hypothesis, uncertainty principle
C3662.4	Demonstrate regression analysis

Course Title: Wireless Networks and Mobile Computing

Course Code: 17CS663

CO. No.	OUTCOMES After completing the course the student will be ableto:
C3663.1	Understand various mobile communication systems.
C3663.2	Describe various multiplexing systems used in mobile computing.
C3663.3	Explain the use and importance of data synchronization in mobile computing

Course Title: Python Application Programming

Course Code: 17CS664

CO. No.	OUTCOMES After completing the course the student will be ableto:
C3664.1	Understand Python syntax and semantics and be fluent in the use of Python flow control and functions.
C3664.2	Demonstrate proficiency in handling Strings and File Systems.
C3664.3	Implement Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
C3664.4	Interpret the concepts of Object-Oriented Programming as used in Python.
C3664.5	Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

Course Title: Service Oriented Architecture

Course Code: 17CS665

CO. No.	OUTCOMES After completing the course the student will be ableto:
C3665.1	Understand the different IT architecture
C3665.2	Explain SOA based applications
C3665.3	Illustrate of web service and realization of SOA
C3665.4	Discuss REST ful services

Course Title: Multi-Core Architecture and Programming

Course Code: 17CS666

CO. No.	OUTCOMES After completing the course the student will be ableto:
C3666.1	Identify the issues involved in multicore architectures
C3666.2	Explain fundamental concepts of parallel programming and its design issues
C3666.3	Solve the issues related to multiprocessing and suggest solutions
C3666.4	Discuss the salient features of different multi core architectures and how they exploit parallelism
C3666.5	Illustrate Open MP and programming concept

Course Title: SOFTWARE TESTING LABORATORY

Course Code: 17ISL67

CO. No.	OUTCOMES After completing the course the student will be ableto:
C367.1	Understand requirements for the given problem
C367.2	Design and implement the solution for given problem in any programming language(C,C++,JAVA)
C367.3	Discuss test cases for any given problem
C367.3	Apply the appropriate technique for the design of flow graph.
C367.4	Create appropriate document for the software artefact.

Course Title: File Structures Laboratory with Mini Project

Course Code: 17ISL68

CO. No.	OUTCOMES After completing the course the student will be ableto:
C367.1	Implement operations related to files
C367.2	Apply the concepts of file system to produce the given application.
C367.3	Evaluate performance of various file systems on given parameters.

Course Title: WEB Technology and Its Applications

Course Code: 17CS71

CO. No.	OUTCOMES After completing the course the student will be ableto:
C371.1	Define HTML and CSS syntax and semantics to build web pages.
C371.2	Understand the concepts of Construct , visually format tables and forms using HTML using CSS
C371.3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
C371.4	List the principles of object oriented development using PHP
C371.5	Illustrate JavaScript frameworks like j Query and Backbone which facilitates developer to focus on core features.

Course Title: Software Architecture and Design Patterns

Course Code: 17IS72

CO. No.	OUTCOMES After completing the course the student will be able to:
C472.1	Design and implement codes with higher performance and lower complexity
C472.2	Illustrate the code qualities needed to keep code flexible
C472.3	Define core design principles and understand the importance to assess the quality of a design with respect to these principles.
C472.4	Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary.
C472.5	Recall the suitable select and apply patterns in specific contexts

Course Title: Machine Learning

Course Code: 17CS73

CO. No.	OUTCOMES After completing the course the student will be able to:
C473.1	Recall the problems for machine learning. And select the either supervised, unsupervised or reinforcement learning.
C473.2	Understand theory of probability and statistics related to machine learning
C473.3	Illustrate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,

Course Title: Natural Language Processing

Course Code: 17CS741

CO. No.	OUTCOMES After completing the course the student will be able to:
C4741.1	Analyze the natural language text.
C4741.2	Define the importance of natural language.
C4741.3	Understand the concepts Text mining.
C4741.4	Illustrate information retrieval techniques.

Course Title: Cloud Computing and Its Applications

Course Code: 15CS742

CO. No.	OUTCOMES After completing the course the student will be ableto:
C4742.1	Understand the concepts of cloud computing, virtualization and classify services of cloud computing
C4742.2	Illustrate architecture and programming in cloud
C4742.3	Define the platforms for development of cloud applications and List the application of cloud.

Course Title: Information and Network Security

Course Code: 17CS743

CO. No.	**OUTCOMES** After completing the course the student will be ableto:
C4743.1	Analyze the Digitals security lapses
C4743.2	Illustrate the need of key management

Course Title: UNIX System Programming **Course Code: 15CS744**

CO. No.	**OUTCOMES** After completing the course the student will be able to:
C4744.1	Understand the working of Unix Systems
C4744.2	Illustrate the application/service over a UNIX system.

Course Title: Soft and Evolutionary Computing **Course Code: 15CS751**

CO. No.	**OUTCOMES** After completing the course the student will be able to:
C4751.1	Familiarize with the basic concept of soft computing and intelligent systems
C4751.2	Compare with various intelligent systems
C4751.3	Analyze the various soft computing techniques

Course Title: Computer Vision and Robotics

Course Code: 17CS752

CO. No.	**OUTCOMES** After completing the course the student will be able to:
C4752.1	Implement fundamental image processing techniques required for computer vision
C4752.2	Perform shape analysis
C4752.3	Implement boundary tracking techniques
C4752.4	Apply chain codes and other region descriptors
C4752.5	Apply Hough Transform for line, circle, and ellipse detections.
C4752.6	Apply 3D vision techniques
C4752.7	Implement motion related techniques.
C4752.8	Develop applications using computer vision techniques.

Course Title: Information Management System **Course Code: 17IS753**

CO. No.	**OUTCOMES** After completing the course the student will be able to:
C4753.1	Understand the role of information technology and information systems in business
C4753.2	Illustrate the current issues of information technology and relate those issues to the firm
C4753.3	Interpret how to use information technology to solve business problems

Course Title: Storage Area Networks

Course Code: 17CS754

CO. No.	**OUTCOMES** After completing the course the student will be able to:
C4754.1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization
C4754.2	Explain components and the implementation of NAS
C4754.3	Describe CAS architecture and types of archives and forms of virtualization
C4754.4	Illustrate the storage infrastructure and management activities

Course Title: Machine Learning Laboratory

Course Code: 17CSL76

CO. No.	**OUTCOMES** After completing the course the student will be able to:
C476.1	Understand the implementation procedures for the machine learning algorithms.
C476.2	Design Java/Python programs for various Learning algorithms.
C476.3	Apply appropriate data sets to the Machine Learning algorithms.
C476.4	Identify and apply Machine Learning algorithms to solve real world problems.

Course Title: Web Technology Laboratory with Mini Project Course Code: 17CSL77

CO. No.	OUTCOMES After completing the course the student will be able to:
C477.1	Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.
C477.2	Understand the concepts of Web Application Terminologies, Internet Tools other web services.
C477.3	Recall how to link and publish web sites

Course Title: Internet of Things Technology Course Code: 17CS81

CO. No.	OUTCOMES After completing the course the student will be able to:
C481.1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.
C481.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
C481.3	Appraise the role of IoT protocols for efficient network communication.
C481.4	Elaborate the need for Data Analytics and Security in IoT.
C481.5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

Course Title: Big Data Analytics

Course Code: 17CS82

CO. No.	OUTCOMES After completing the course the student will be able to:
C482.1	Explain the concepts of HDFS and MapReduce framework
C482.2	Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
C482.3	Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
C482.4	Infer the importance of core data mining techniques for data analytics
C482.5	Compare and contrast different Text Mining Techniques

Course Title: High Performance Computing

Course Code: 17CS831

CO. No.	OUTCOMES After completing the course the student will be able to:
C4831.1	Illustrate the key factors affecting performance of CSE applications
C4831.2	Infer mapping of applications to high-performance computing systems
C4831.2	Apply hardware/software co-design for achieving performance on real-world applications

Course Title: User Interface Design

Course Code: 17CS832

CO. No.	OUTCOMES After completing the course the student will be able to:
C4832.1	Design the user interface, menu creation and windows creation and connection between menu and windows
C4832.2	Describe and explain the user interface design process

Course Title: Virtual Reality

Course Code: 17IS833

CO. No.	OUTCOMES After completing the course the student will be able to:
C4833.1	Illustrate technology, underlying principles, its potential and limits and to learn about the criteria for defining useful applications.
C4833.2	Explain process of creating virtual environments

Course Title: System Modelling and Simulation

Course Code: 17CS834

CO. No.	OUTCOMES After completing the course the student will be able to:
C4834.1	Explain the system concept and apply functional modeling method to model the activities of a static system
C4834.2	Describe the behavior of a dynamic system and create an analogous model for a dynamic system
C4834.3	Illustrate the operation of a dynamic system and make improvement according to the simulation results

Course Title: Internship / Professional Practice

Course Code: 17IS84

CO. No.	OUTCOMES After completing the course the student will be able to:
C484.1	Adapt easily to the industry environment
C484.2	Take part in team work
C484.3	Make use of modern tools
C484.4	Decide upon project planning and financing.
C484.5	Adapt ethical values.
C484.6	Motivate for lifelong learning

Course Title: Project Work Phase II

Course Code: 15ISP85

CO. No.	OUTCOMES After completing the course the student will be able to:
C485.1	Identify a issue and derive problem related to society, environment, economics, energy and technology
C485.2	Formulate and Analyze the problem and determine the scope of the solution chosen
C485.3	Determine , dissect, and estimate the parameters, required in the solution.
C485.4	Evaluate the solution by considering the standard data / Objective function and by using appropriate performance metrics.
C485.5	Compile the report and take part in present / publishing the finding in a reputed conference / publications
C485.6	Attempt to obtain ownership of the solution / product developed

Course Title: Seminar

Course Code: 15ISS86

CO. No.	**OUTCOMES** After completing the course the student will be able to:
C486.1	Survey the changes in the technologies relevant to the topic selected
C486.2	Discuss the technology and interpret the impact on the society, environment and domain.
C486.3	Compile report of the study and present to the audience, following the ethics

AMC ENGINEERING COLLEGE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

STATEMENTS

INSTITUTE VISION

To be a leader in imparting value based Technical Education and Research for the benefit of society.

INSTITUTE MISSION

- To provide state of the art Infrastructure facilities.
- To implement modern pedagogical methods in delivering the academic programs with experienced and committed faculty.
- To create a vibrant ambience that promotes Learning, Research, Invention and Innovation.
- To undertake manpower and skill development programmes for Academic Institutions and Industries.
- To enhance Institute Industry Interface through Collaborative Research and Consultancy
- To generate and disseminate knowledge through training programme/workshops/seminars/conferences/publications.
- To be a more comprehensive college in terms of the number of programs offered.
- To relentlessly pursue professional excellence with ethical and moral values.

DEPARTMENT VISION

To develop outstanding Electronics and Communication Engineers to meet the ever changing Social and Technological needs of the Society.

DEPARTMENT MISSION

MoD1	To provide State-of-the-Art infrastructure in Electronics and Communication Engineering.
MoD2	To disseminate strong theoretical and practical exposure to meet the emerging trends in the industry.
MoD3	To promote a free thinking environment with innovative teaching-learning pedagogy.
MoD4	To develop value based socially responsible professionals for the betterment of the Society.

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

PEO1	Develop and excel in their chosen profession on technical front and/or progress towards advanced continuing education, Inter-disciplinary Research and Entrepreneurship.
PEO2	Become reputed and innovative solution provider to complex system design problems or challenges relevant to Electronics and Communication.
PEO3	Progress as effective team members and achieve a leadership position with trust, mutual respect and professional ethics.
PEO4	Become responsible and pro-active citizens for the overall welfare and progress of the Society.

PROGRAM OUTCOMES (PO)

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering 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.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Develop the components for analog and digital systems, communication systems, control and signal processing systems using acquired knowledge of basic skills and various design tools.
PSO2	Formulate the solution for interdisciplinary problems through acquired programming knowledge in the respective domain by complying real-time constraints.

Year: 2017 – 18

Course Title: Basic Electronics **Course Code: 17ELN15**

COURSE OUTCOMEs

CO.No.	OUTCOMES After completing the course the student will be able to:
C105.1	Explain the operation and applications of basic analog/digital devices.
C105.2	Apply knowledge of number systems, Boolean algebra and different building blocks of digital electronics to implement given logical expressions and vice versa.
C105.3	Illustrate the principles and operation of Microcontroller, based systems, signal transducers and broadcast analog modulation techniques.
C105.4	Obtain the different performance indices for simple analog circuits and analog modulation techniques based on the data given in the problem statements.
C105.5	Prepare presentations on assigned self-study topics based on the significance and scope of electronics in providing solutions for needs of society and multiple disciplines of engineering.

Course Title: Analog Electronics **Course Code:15EC32**

CO.No.	OUTCOMES After completing the course the student will be able to:
C202.1	Explain the importance of BJT, FET, Feedback, oscillators and power amplifiers.
C202.2	Calculate the design parameters for JFET and BJT based amplifiers given the constraints.
C202.3	Apply the knowledge of electronic components, inductors, capacitors, transformers, resistors, BJTs and FETs to obtain different types of oscillators, power amplifiers and regulators.
C202.4	Analyze characteristics of BJTs and FETs to obtain frequency response and classify power amplifiers given the constraints.
C202.5	Design different types of RF and AF oscillators and Regulators for different voltage ranges.

Course Title: Digital Electronics **Course Code:15EC33**

CO.No.	OUTCOMES After completing the course the student will be able to:
C203.1	Discuss the basic principles of the digital circuits and their significance.
C203.2	Apply the knowledge of simplification techniques, combinational circuits and flip-flops to get the optimized digital circuits.
C203.3	Classify the different types of combinational and sequential circuits.
C203.4	Analyze different types of combinational and sequential circuits based on the given application with the given specifications.
C203.5	Chose the correct answer for the given questions by applying the concepts of digital electronics.

Course Title: Network Analysis **Course Code:15EC34**

CO.No.	OUTCOMES After completing the course the student will be able to:
C204.1	Describe the basic concepts of source transformation, network reduction using loop, node analysis and resonant circuits.
C204.2	Apply the knowledge of basic circuit law and simplify the network using reduction techniques.
C204.3	Apply the knowledge of Network Theorems and Laplace transforms for network solutions.
C204.4	Analyze the AC and DC steady state and Transient responses and two port parameters of the network.
C204.5	Comprehend the concepts of network theorems, Laplace transforms, Transient analysis, and network parameters through self study and write a short quiz.

Course Title: Electronics Instrumentation **Course Code:15EC35**

CO.No.	OUTCOMES After completing the course the student will be able to:
C205.1	Describe the operations of measuring instruments.
C205.2	Apply the concepts of ammeters and voltmeters for current and voltage measurements.
C205.3	Utilize AC and DC bridges for passive component measurement.
C205.4	Analyze transducers for measuring temperature, pressure, distance and intensity.
C205.5	Develop independent learning on latest electronics instruments.

Course Title: Engineering Electromagnetics **Course Code:15EC36**

CO.No.	OUTCOMES After completing the course the student will be able to:
C206.1	Explain several basic laws and principles of electric field, magnetic field, their properties, electromagnetic field and wave propagation.
C206.2	Solve problems analytically and numerically for energy, potential along with concepts of current and conductors using vector calculus.
C206.3	Apply Maxwell's equations for wave propagation.
C206.4	Analyze wave propagation using Maxwell's equations.
C206.5	Analyze the nature of electromagnetic wave propagation and the way it helps in developing the higher electronics and communication systems

Course Title: Analog Electronics Lab **Course Code:15ECL37**

CO.No.	OUTCOMES After completing the course the student will be able to:
C207.1	Demonstrate the working of simple passive components, Rectifiers, Voltage Regulator Circuits, Amplifiers and Oscillator circuits
C207.2	Analyze the output and transfer characteristics of BJT, JFET and MOSFET devices from experimental readings
C207.3	Evaluate the performance of BJT amplifiers in CE and CC configurations practically
C207.4	Analyze various performance parameters for rectifiers, voltage regulators and amplifier circuits
C207.5	Test the operation of simple electronic circuits using appropriate design and assembly techniques.

Course Title: Digital Electronics Lab **Course Code: 15ECL38**

CO.No.	OUTCOMES After completing the course the student will be able to:
C208.1	Demonstrate the truth table of given expressions using logic gates.
C208.2	Design Synchronous and Asynchronous Counters for the given data.
C208.3	Develop the Combinational Circuits for the given specification.
C208.4	Apply the concepts of counters and adders to simulatethe same by using Multisim software .
C208.5	Apply the concepts of the given digital circuits to simulatethe same by using Multisim software.

Course Title: Microprocessors **Course Code: 15EC42**

COURSE OUTCOMES (CO)-PO/PSO Mapping

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C210.1	Explain the various addressing modes and instruction set of 8086.
C210.2	Apply the concept of assembly language programming in 8086 using various instruction sets.
C210.3	Apply DOS 21H interrupts, function calls, procedures and macros for modular programming.
C210.4	Experiment an assembly language program by interfacing microprocessor to various devices for simple applications by effectively utilizing microprocessor peripherals.
C210.5	Explain various interdisciplinary applications of microprocessors along with the advancement in the field of processors.

Course Title: Control Systems **Course Code: 15EC43**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C211.1	Explain the concepts of mathematic model and transfer function of electrical, mechanical and electromechanical systems.
C211.2	Develop the transfer function of a given control system using block diagram reduction techniques and signal flow graph method.
C211.3	Determine the time domain response for first and second order systems and steady state errors.
C211.4	Analyze the stability of the system, state variables and model of digital control system.
C211.5	Conduct survey on recent trends and technology on control systems as an individual.

Course Title: Signals & Systems **Course Code:** 15EC44

CO.No.	OUTCOMES After completing the course the student will be able to:
C212.1	Describe the mathematical models, convolution tool, Fourier and Z transformation techniques forcharacterizing signals and systems.
C212.2	Apply the mathematical tool of convolution, concepts of Fourier and Z transforms to find the response of both Discrete and Continuous time systems.
C212.3	Analyze the system response and system behavior based on the impulse response, input output equations and transform techniques.
C212.4	Select appropriate methods for basic signal processing applications.
C212.5	Comprehend the applications of the concepts of signals and systems in communication, control and signal processing are as through self study and write as hort quiz.

Course Title: Principles Of Communication Systems **Course Code: 15EC45**

CO.No.	OUTCOMES After completing the course the student will be able to:
C213.1	Discuss generation and detection of AM signals, FM signals, the concepts of random process, various types of noise ,its effects, pulse modulation and sampling techniques
C213.2	Apply fundamentals of modulation techniques to compute various performance parameters.
C213.3	Apply the concepts of random process and various types of noise& its effects in communication systems.
C213.4	Analyze AM, FM, pulse modulation, sampling techniques and effects of noise over these systems.
C213.5	Conduct research on assigned topics, related to practical broadcast communication systems utilizing the knowledge of analog and digital communication to present a report as part of a small team.

Course Title: Linear Integrated Circuits **Course Code: 15EC46**

CO.No.	OUTCOMES After studying this course, Student will have the ability to
C214.1	Discuss the various parameters, characteristics and specifications of OpAmp and related Circuits.
C214.2	Apply the various electrical laws to obtain voltage /current/waveform in Linear integrated circuits
C214.3	Analyze linear integrated circuits and its applications based on OpAmp
C214.4	Explain fundamental applications of OpAmp and related integrated circuits
C214.5	Design and demonstrate various linear integrated circuits Applications

Course Title: Microprocessors Lab **Course Code: 15ECL47**

CO.No.	OUTCOMES After studying this course, Student will have the ability to
C215.1	Build assembly level language Programs to perform arithmetic, logical and data transfer applications on 8086 Microprocessor.
C215.2	Examine assembler directives, DOS Interrupts, branch and loop operations.
C215.3	Write assembly level language to Interface a microprocessor to various devices for simple applications.
C215.4	Test effectively to utilize microprocessor peripherals and their interfacing components to find its application in the real world.
C215.5	Develop a project to solve a practical problem on 8086 Microprocessor in a team.

Course Title: LIC & Communication LAB **Course Code: 15ECL48**

CO.No.	OUTCOMES After completing the course the student will be able to:
C216.1	Design a second order LPF, HPF for a given frequency.
C216.2	Design a Schmitt trigger, astable and monostable multivibrators using IC555.
C216.3	Demonstrate Frequency synthesis using PLL and IF amplifier. R-2R DAC, DSBSC generation using balance modulator.
C216.4	Demonstrate modulation and demodulation of AM, FM, PAM, PWM and PPM schemes.
C216.5	Demonstrate Schmitt trigger circuit using op-amp.

Course Title: Management And Entrepreneurship **Course Code: 15EC51**

CO.No.	OUTCOMES After completing the course the student will be able to:
C301.1	Describe the basic principles and concepts of management.
C301.2	Distinguish different plans and list steps in planning.
C301.3	Report the concepts of organizing, staffing, directing and controlling.
C301.4	Demonstrate the meaning, functions, types and roles of an entrepreneur and institutional support.
C301.5	Survey on small scale industries and prepare the project report.

Course Title: Digital Signal Processing **Course Code: 15EC52**

CO.No.	OUTCOMES After completing the course the student will be able to:
C302.1	Explain the importance of Discrete Fourier Transform.
C302.2	Apply the Discrete Fourier Transform and Fast Fourier Transform algorithm and their properties for solving problem.
C302.3	Analyze the FFT and to arrive at suitable Conclusion
C302.4	Design the digital filter for the given specifications for specific applications.
C302.5	Design the digital filter and simulate using Matlab.

Course Title: Verilog HDL **Course Code: 15EC53**

CO.No.	OUTCOMES After completing the course the student will be able to:
C303.1	Describe the typical design flow, importance of HDLs, four levels of abstraction, components required for the simulation of a digital design.
C303.2	Apply the knowledge of Lexical conventions , data types ,system tasks and compiler directives to write VHDL programs.
C303.3	Draw the circuit diagrams and Write Verilog description for the circuit.
C303.4	Explain code for digital function in Verilog HDL.
C303.5	Write and simulate a program for given digital circuits and demonstrate the same.

Course Title: Information Theory And Coding **Course Code:15EC54**

CO.No.	OUTCOMES After completing the course the student will be able to:
C304.1	Explain the concept of information theory by using probability.
C304.2	Apply source encoding algorithms to ensure transmission of information of a discrete message source using minimum number of bits.
C304.3	Apply various channel coding techniques to compute the capacity and efficiency of discrete and continuous time channels in presence and absence of added noise.
C304.4	Analyze linear block codes , cyclic code , convolutional codes for error detection and correction ,BCHcodes, RS code.
C304.5	Comprehend an article on various coding techniques for source and channel performance improvement.

Course Title: Operating System **Course Code:15EC553**

CO. No.	OUTCOMES After completing the course the student will be able to:
C305_3.1	Discuss the features of fundamental OS classes based on the concepts and techniques of design goals.
C305_3.2	Explain the overhead of OS with the help of process, thread concepts, memory management and IOCS techniques while executing the program.
C305_3.3	Explain the significance of different message passing arrangements and policies related to deadlock handling approaches.
C305_3.4	Analyze the performance and operations of various scheduling policies to meet the goals of OS.
C305_3.5	Collect information about the up gradation of operating system to meet the specified real time application.

Course Title: Object Oriented Programming Using C++ Course Code:15EC562

CO.No.	OUTCOMES After completing the course the student will be able to:
C306_2.1	Explain the basic concepts in object oriented programming.
C306_2.2	Build C++ programs with object oriented concepts of Inheritance, polymorphism and operator overloading.
C306_2.3	Analyze C++ programs involving different OOPS concepts.
C306_2.4	Compile C++ programs on Linux platform(Raspberry Pi) in a team.

Course Title:8051 Microcontroller Course Code:15EC563

CO.No.	OUTCOMES After completing the course the student will be able to:
C306_3.1	Discuss the concepts of microcontroller& microprocessor architectures,8051 instructions and addressing modes.
C306_3.2	Write the assembly language programs using appropriate 8051 instructions.
C306_3.3	Analyze the interrupt, timer, serial communication and on-chip peripherals concepts for the microcontroller based applications.
C306_3.4	Apply the appropriate microcontroller based interfacing concepts for different applications.
C306_3.5	Investigate programming solutions by analyzing and comprehending the given codes of 8051 microcontroller.

Course Title: DSP Lab **Course Code:15EC57**

CO.No.	OUTCOMES After completing the course the student will be able to:
C307.1	Apply the sampling theorem on continuous signal in time and frequency domain.
C307.2	Apply DFT and IDFT for an N-point signal , linear, circular convolution, auto and cross correlation and its properties for the signals.
C307.3	Analyze the impulse response of a filter.
C307.4	Design IIR, FIR filters, first and second order system.
C307.5	Analyze the filters used for image enhancement.

Course Title: HDL Lab **Course Code:15EC58**

CO.No.	OUTCOMES After completing the course the student will be able to:
C308.1	Illustrate basic knowledge of HDL.
C308.2	Interpret and apply VHDL and Verilog code in modelling combinational and test it on FPGA board
C308.3	Interpret and apply VHDL and Verilog code in simulating Sequential circuit and test it on FPGA board
C308.4	Analyze the Verilog code to interface the hardware to the programmable chip to obtain the required output.
C308.5	Analyze the given Verilog code and Justify with the help of Xilinx tool.

Course Title: Digital Communication **Course Code: 15EC61**

CO.No.	OUTCOMES After completing the course the student will be able to:
C309.1	Describe mathematical representation of signal, symbol, noise and channels, concepts of spread spectrum.
C309.2	Apply the concept of spread spectrum technologies to digital communication, signal conversion to symbols and signal processing to symbols in transmitter and receiver and channel blocks.
C309.3	Compute performance parameters and transfer rates for low pass and band pass symbol under ideal and corrupted band limited and non band limited channels.
C309.4	Analyze the performance of the signals in a digital communication system both in the time and frequency domain, baseband and pass band digital communication system in terms of error rate and spectral efficiency.
C309.5	Write MATLAB codes for generating PSD of a given sequence, Digital modulation techniques- BPSK, QPSK, and BFSK Simulate and tabulate the results.

Course Title: ARM microcontroller and embedded system **Course Code: 15EC62**

CO.No.	OUTCOMES After completing the course the student will be able to:
C310.1	Explain the background of the ARM architecture, instruction set, interrupt handling, embedded system components and the basics of operating system for embedded system.
C310.2	Apply the embedded system components and their interfacing with the I/O subsystems of an embedded system.
C310.3	Analyze different computational model design used in embedded systems, features of RTOS and debugging techniques.
C310.4	Classify embedded systems, major applications and purpose of Embedded system.
C310.5	Survey on embedded system components and RTOS.

Course Title: VLSI Design **Course Code: 15EC63**

CO. No.	OUTCOMES After completing the course the student will be able to:
C311.1	Explain the characteristics of different types of devices in MOS family and related circuits
C311.2	Apply the concepts of Lambda Based design rules to obtain stick diagrams and Layout diagrams of different types of MOS logic
C311.3	Apply the concepts of Series and parallel connection of nMOS and pMOS to obtain different types of MOS logic and to calculate resistance and capacitance values
C311.4	Analyze ALU Subsystem Design, Adders and Multipliers, parity generator, multiplexer, PLA and related BJT and FET Circuits
C311.5	Design of an inverter, buffer and transmission gate using Mentor Graphics Tool in Linux environment.

Course Title: Computer Communication Networks **Course Code: 15EC64**

CO.No.	OUTCOMES After completing the course the student will be able to:
C312.1	Describe the basic concepts of computer communication and the TCP-IP reference model.
C312.2	Choose the appropriate IEEE standards for wired & wireless LAN and Bluetooth.
C312.3	Analyze the functions of protocols specified in the data link layer, network layer and transport layer.
C312.4	Select the suitable connecting devices for various computer networks.
C312.5	Survey on the future of computer networks in the next five years.

Course Title: Cellular Mobile Communication **Course Code: 15EC651**

CO. NO	OUTCOMES After completing the course the student will be able to:
C313_1.1	Understand the evolution and basics of cellular communication systems.
C313_1.2	Apply the understanding of statistical characterization of urban mobile channels to compute the performance for simple modulation schemes.
C313_1.3	Examine the call processing protocols, limitations of GSM, GPRS and CDMA to meet high data rate requirements and improve quality of service.
C313_1.4	Analyze the voice and data call flow handling for various scenarios in GSM and CDMA systems for national and international interworking situations.
C313_1.5	Survey on “Recent Trend’s in Mobile Communication and Wireless Sensor Networks”.

Course Title: Artificial Neural Network **Course Code: 15EC653**

CO.No.	OUTCOMES After completing the course the student will be able to:
C313_3.1	Describe the concepts and techniques of various neural network models, architecture and learning algorithms
C313_3.2	Apply neural networks to particular application
C313_3.3	Analyze the neural network to know how to improve the performance of neural network
C313_3.4	Analyze whether neural networks are appropriate to a particular application.
C313_3.5	Write a program for different application of neural networks

Course Title: Digital Switching system **Course Code: 15EC654**

CO. No.	OUTCOMES After completing the course the student will be able to:
C313_4.1	Describe the evolution and basics of Tele-communication networks and digital transmission of data.
C313_4.2	Analyze the fundamentals of tele-communication of probability to form models for telecommunication traffic and its measurements.
C313_4.3	Apply knowledge of networks and computer organization to understand Digital Switching system software.
C313_4.4	Analyze multi stage switching structures involving time and space switching stages.
C313_4.5	Comprehend and write assignment from the given article effectively as an individual..

Course Title: Digital System design using VERILOG **Course Code: 15EC663**

CO.No.	OUTCOMES After completing the course the student will be able to:
C314_3.1	Explain the design approach based on programmable logic for system design.
C314_3.2	Explain the principles of combinational and sequential design using verilog.
C314_3.3	Analyze the concept of memory and integrated circuits and its fabrication methodology.
C314_3.4	Analyze the different interfacing and design methodology for the optimized design of the given digital system.
C314_3.5	Design the optimized digital circuits with the help of Xilinx tool by referring IEEE paper.

Course Title: Embedded Controller Lab **Course Code: 15ECL67**

CO.No.	OUTCOMES After completing the course the student will be able to:
C315.1	Write the basic programs using embedded C.
C315.2	Apply the interfacing concepts using GPIO to interface Displays, keyboard, Motors.
C315.3	Apply the interfacing concepts to DAC and ADC with FRARM cortex M3.
C315.4	Experiment the interrupts, serial communication and timer concepts in Arm cortex M3.
C315.5	Demonstrate inter processor communication using arm cortex M3.

Course Title: Computer Network Lab **Course Code: 15ECL68**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C316.1.	Simulate linking of nodes, agents and to connect application protocol on them using NCTUNS tool.
C316.2	Develop Ethernet LAN using node using NCTUNS tool.
C316.3	Develop wired, wireless topology, link state algorithm using NCTUNS tool.
C316.4	Develop different networking protocols.
C316.5	Develop a C/C++ code to perform network security.

Course Title:Computer Communication Networks **Course Code**:10EC71

CO. No.	OUTCOMES After completing the course the student will be able to
C401.1	Explain computer communication network concepts
C401.2	Determine the scalability, availability, security and manageability network requirements.
C401.3	Interpret the OSI layers and protocols.
C401.4	Analyze the wireless networking system and network connecting devices.
C401.5	Design the network topology and simulate by using NS-2 simulator demonstrate.

Course Title: Optical Fiber Communication **Course Code:**10EC72

CO.No.	OUTCOMES After completing the course the student will be able to:
C402.1	Understand the Basic operational techniques in optical Fiber communication system.
C402.2	Illustrate design of optical sources, Detectors, Connectors and Couplers in optical networks.
C402.3	Apply the concepts and principles of WDM to advanced devices and several categories of optical communication networks.
C402.4	Evaluate the performance of Optical Receivers, Analog and Digital links.
C402.5	demonstrate the OFC concepts through laboratory experiments quiz, test, high performance receivers

Course Title: Power Electronics **Course Code:**10EC73

CO.No.	OUTCOMES After studying this course the student will be able to
C403.1	Describe basic concepts of Power Electronics, their applications & classification of power electronic circuits.
C403.2	Sketch the input, output, transfer and switching characteristics of power transistors and thyristors.
C403.3	Explain the principle of operation of controlled rectifiers, AC voltage controllers, choppers and inverters.
C403.4	Analyze various power converter circuits like controlled rectifiers, inverters, choppers, AC voltage controllers and thyristor triggering, commutation circuits.
C403.5	Simulate different configurations of controlled rectifiers and inverters using modern tool and make a report of it.

Course Title: DSP Algorithm and Architecture **Course Code:**10EC751

CO. No.	OUTCOMES After studying this course the student will be able to to
C405_1.1	Discuss the Basic Principles of DSP, Basic Architectural features of DSP devices, interfacing devices and applications
C405_1.2	Apply basic DSP algorithms using DSP processor to understand the concept of advanced DSP algorithms
C405_1.3	Analyze the architectural details of TMS320C54xx processor
C405_1.4	Analyze Addressing modes, instruction sets and the memory considerations of TMS320C54xx processor
C405_1.5	Simulate DSP Algorithms using MATLAB.

Course Title: Image Processing **Course Code:**10EC763

CO.No.	OUTCOMES After studying this course the student will be able to to
C406_3.1	Explain the fundamental concepts of digital image processing.
C406_3.2	Apply the mathematical principles of transforms on image.
C406_3.3	Apply enhancement techniques to gray and color images.
C406_3.4	Analyze the image enhancement techniques in spatial and frequency domain.
C406_3.5	Design and implement the image processing techniques using MATLAB tool as a member in a team and give effective presentation.

Course Title:VLSI LAB **Course Code:**10ECL77

CO.No.	OUTCOMES After studying this course the student will be able to to
C407.1	Write a verilog code for digital circuits using mentor graphics tool.
C407.2	Analyze the digital circuits by simulation and synthesis.
C407.3	Design schematic and layout of analog circuits.
C407.4	Analyze the DC, AC and transient analysis, DRC, PEX, LVS, time optimization, power and area to the given constraint for analog circuits.
C407.5	Analyze the synthesis and simulation of BCD adder.

Course Title:Power Electronics Lab Course Code:10ECL78

CO.No.	OUTCOMES After completing the course the student will be to:
C408.1	Construct a power converter using SCR,MOSFET, IGBT.
C408.2	Construct a suitable circuit using SCR and TRIAC for speed control of AC/DC motors
C408.3	Analyze inverters, choppers, AC voltage controller and Single phase Controlled rectifier.
C408.4	Design suitable circuits to conduct switching, transfer, output characteristics of SCR, TRIAC, DIAC and MOSFET.
C408.5	Create awareness on Industrial applications and its safety measures.

Course Title: Wireless Communication **Course Code:**10EC81

CO.No.	OUTCOMES After completing the course the student will be to:
C409.1	Distinguish the major cellular communication standards (1G/2G/3G/4G) and common cellular system components.
C409.2	Calculate the tradeoff among frequency reuse, signal to interference ratio, capacity and spectral efficiency.
C409.3	Compare the different multiple access methods and different networks like LAN,MAN and PAN.
C409.4	Analyze the wireless communication systems and standard TDMA,CDMA,GSM and IS-95.
C409.5	Survey of different system used in the latest network.

Course Title: Digital Switching system. **Course Code:**10EC82

CO. No.	OUTCOMES After completing the course the student will be to:
C410.1	Discuss the evolution and working principles of different switching systems.
C410.2	Apply fundamentals of probability to form models for telecommunication traffic.
C410.3	Apply knowledge of networks and computer organization to understand Digital Switching system software.
C410.4	Analyze multi-stage switching structures involving time and space switching stages.
C410.5	Comprehend and write assignment from the given article effectively as an individual..

Course Title: Network Security **Course Code:**10EC832

CO.No.	OUTCOMES After completing the course the student will be to:
C411-2.1	Perceive the N/w security model.
C411-2.2	Apply the different Symmetric and Asymmetric encryption and decryption techniques for given message.
C411-2.3	Apply the digital signature techniques to obtain the confidentiality, authenticity, integrity of the message.
C411-2.4	Analyze the intrusion technique, firewalls, malicious software attacks, countermeasures and E-commerce and E-communication.
C411-2.5	Evaluate the case study on real time security disaster.

Course Title: Global System For Mobile Communication **Course Code:**10EC843

CO. No.	OUTCOMES After completing the course the student will be to:
C412_3.1	Understand the basic concepts of GSM architecture and interfaces.
C412_3.2	Apply the concepts of typical call flows, future techniques, and work items to reduce intruder, interference and management of GSM networks.
C412_3.3	Analysis of logical channels, attributes of Speech coding methods and speech codecs.
C412_3.4	Choose the mechanisms and models to achieve security and planning of GSM Networks.
C412_3.5	Read and comprehend the emerging technologies and research challenge for 5G wireless networks, research articles related to GSM .

Course Title: Adhoc Wireless Network **Course Code:** 10EC844

CO. No.	OUTCOMES After completing the course the student will be to:
C412_4.1	Explain fundamental principles and need of Ad-hoc Networks.
C412_4.2	Analyze the protocols used in network layer, transport layer, MAC layer supported for Adhoc network.
C412_4.3	Compare protocols used in Adhoc wireless network for Network layer, Transport Layer and MAC layer with that used in centralized network.
C412_4.4	Simulate Adhoc network using network simulator 2 in a team.

Course Title: Project Work **Course Code10ECP85**

CO. No.	**OUTCOMES** After completing the course the student will be to:
C408.1	Examine related papers to identify a suitable project by making use of the technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society.
C408.2	Survey and substantiate complex engineering problems related to selected project.
C408.3	Select the methodology and modern tools required for the implementation of the project.
C408.4	Construct a team; distribute the work and commit to professional ethics and responsibilities as a member in a team and individual.
C408.5	Design & Demonstrate the proposed work in module wise with proper time allocation and finance management.
C408.6	Assess the post analysis implementation and identify its future scope, issues and impact.
C408.7	Communicate technical and general information by means of oral as well as written presentation skills with professionalism.

Course Title: Technical Seminar **Course Code:**10ECS86

CO. No.	OUTCOMES After completing the course the student will be to:
C414.1	Identify the emerging technical field by applying the engineering concepts from the research repository.
C414.2	Survey the related literature for better understanding
C414.3	Analyze the methodology used in the identified paper
C414.4	Prepare the power point presentation and documentation by applying ethical principles with committed professional responsibilities as an individual.
C414.5	Discuss the issues and future scope for available technology.

STATEMENTS	
PROGRAM OUTCOMES (PO)	
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering 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.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Develop the knowledge and competency in areas of Digital Electronics and Communication, analog and digital systems, communication systems, control and signal processing systems using acquired knowledge of basic skills and various design tools.
PSO2	Formulate solutions for interdisciplinary problems through acquired programming knowledge in the respective domains complying with real-time constraints.

SEMESTER-1

Course Title: ADVANCED ENGINEERING MATHEMATICS **Course Code: 16ELD11**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C101.1	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
C101.2	Apply the technique of singular value decomposition for data compression, least square approximation in solving inconsistent linear systems.
C101.3	Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
C101.4	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications.
C101.5	Analyze random process through parameter-dependent variables in various random processes.

Course Title: ANTENNA THEORY AND DESIGN **Course Code: 16ECS12**

CO.No.	**OUTCOMES** After completing the course the student will be ableto:
C102.1	Describe the different types of antennas
C102.2	Illustrate various types of array antenna
C102.3	Compare antennas like Yagi-Uda, Helical antennas and other broad band antennas
C102.4	Analyze different antenna synthesis methods
C102.5	Apply methods like MOM

Course Title: ADVANCED EMBEDDED SYSTEM **Course Code: 16EVE13**

CO.No.	OUTCOMES After completing the course the student will be ableto:
C103.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C103.2	Explain the hardware software co-design and firmware design approaches
C103.3	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32 bit microcontroller including memory map, interrupts and exceptions
C103.4	Apply the knowledge gained for Programming ARM CORTEX M3 for different applications.
C103.5	Understand the suitability of the instruction sets of ARM processors to design of embedded systems.

Course Title: ADVANCED DIGITAL COMMUNICATIONS Course Code: 16ECS14

CO.No.	OUTCOMES After completing the course the student will be ableto:
C104.1	Apply knowledge of application and practical implementation of various Digital communication techniques
C104.2	Explain Inter symbol interference (ISI) and its channel modeling and different filtering algorithms for the ISI elimination
C104.3	Explain different types spread spectrum system
C104.4	Identify the effect of signal characteristics on the choice of a channel model
C104.5	Analyse the performance of digital modulation techniques, different filtering algorithms and spread spectrum communication system.

Course Title: ADVANCED COMPUTER NETWORKS **Course Code: 16ECS151**

CO.No.	OUTCOMES After completing the course the student will be ableto:
C105.1	Choose appropriate Network Infrastructure and Networking Architectures which suits current practice in networking
C105.2	Identify the suitable random-access methods which suits wireless networks
C105.3	Identify IP configuration for the network with suitable routing mechanisms
C105.4	Analyze and develop various network traffic management and control techniques
C105.5	Analyze and develop various congestion and flow control

Course Title: ADVANCED COMMUNICATION LAB **Course Code: 16ECSL16**

CO.No.	OUTCOMES After completing the course the student will be ableto:
C106.1	Plot the radiation pattern of some antennas using Matlab and wave guide setup
C106.2	Obtain the S-parameters of Magic tee and directional couplers.
C106.3	Test the IC CD4051 for modulation techniques.
C106.4	Study multiplexing techniques using OFC kit.

Course Title: SEMINAR **Course Code:16ECS17**

CO.No.	OUTCOMES After completing the course the student will be able to:
C107.1	Identify the emerging technical field by applying the engineering concepts from the research repository
C107.2	Survey the related literature for better understanding.
C107.3	Analyze the methodology used in the identified paper.
C107.4	Prepare the power point presentation and documentation by applying ethical principles with committed professional responsibilities as an individual.
C107.5	Discuss the issues and future scope for available technology.

SEMESTER-2

Course Title: ADVANCED DIGITAL SIGNAL PROCESSING Course Code: 16ECS21

CO.No.	**OUTCOMES** After completing the course the student will be ableto:
C108.1	Filter design.
C108.2	Filter Realization
C108.3	Signal Manipulations
C108.4	Wavelet Transforms
C108.5	Estimating PSD using various techniques

Course Title: ERROR CONTROL CODING **Course Code: 16ECS22**

CO.No.	**OUTCOMES** After completing the course the student will be ableto:
C109.1	Analyse a discrete memoryless channel, given the source and transition probabilities.
C109.2	Apply the concept of modern linear algebra for the error control coding technique.
C109.3	Construct and Implement efficient LBC, Cyclic codes etc encoder and decoders.
C109.4	Apply decoding algorithms for efficient decoding of Block codes and Convolutional codes.
C109.5	Give a seminar on latest solutions developed for society and environment using the error control techniques.

Course Title: Wireless Communication **Course Code: 16ECS23**

CO.No.	OUTCOMES After completing the course the student will be ableto:
C110.1	Understand the need of coding, diversity, interleaving link techniques and multiple radio access techniques for mobile/wireless communication network
C110.2	Apply statistical models of multipath fading
C110.3	Apply receiver and transmitter diversity techniques
C110.4	Analyze and identify modern techniques for high-rate wireless communication, using MIMO transmission
C110.5	Conduct survey on recent trends and technology on wireless communication as an individual

Course Title: RF and Microwave circuit Design **Course Code: 16ECS24**

CO.No.	OUTCOMES After completing the course the student will be able to:
C111.1	Understand waves propagating in networks
C111.2	Use the smith chart for various applications
C111.3	Understand the basic considerations in active networks
C111.4	Design active networks
C111.5	Understand RF/MW frequency mixer and phase shifter design

Course Title: Micro Electro Mechanical Systems **Course Code: 16ECS253**

CO.No.	OUTCOMES After completing the course the student will be able to:
C112.1	Appreciate the technologies related to micro electro mechanical systems
C112.2	Understand design and fabrication processes involved with MEMS devices
C112.3	Analyze the MEMS devices and develop suitable mathematical models
C112.4	Know various applications area for MEMS device
C112.5	Seminar on latest advancements in MEMS

Course Title: ADVANCED DIGITAL SIGNAL PROCESSING LAB
Course Code: 16ECSL26

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C113.1	Filter design.
C113.2	Filter Realization
C113.3	Signal Manipulations
C113.4	Wavelet Transforms
C113.5	Estimating PSD using various techniques

Course Title: SEMINAR **Course Code:16ECS27**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C114.1	Identify the emerging technical field by applying the engineering concepts from the research repository
C114.2	Analyze the methodology used in the identified paper
C114.3	Compare the identified method and existing
C114.4	Prepare the power point presentation and documentation by applying ethical principles with committed professional responsibilities as an individual.
C114.5	Discuss the issues and future scope for available technology.

SEMESTER-3

Course Title: SEMINAR/Presentation in Internship **Course Code: 16ECS31**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C201.1	Survey and substantiate complex Engineering problem related to selected subject of interest.
C201.2	Select the methodology and modern tool required for the implementation
C201.3	Communicate technically and general information by means of oral/written presentation skills with professionalism.

Course Title: REPORT ON INTERNSHIP **Course Code: 16ECS32**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C202.1	Survey and substantiate complex Engineering problem related to selected subject of interest.
C202.2	Design and demonstrate proposed work within the proper time allocation and management
C202.3	Communicate technically and general information by means of oral/written presentation skills with professionalism.

Course Title: Evaluation and viva voce of Internship **Course Code: 16ECS33**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C203.1	Survey and substantiate complex Engineering problem related to selected subject of interest.
C203.2	Select the methodology and modern tool required for the implementation of the topic.
C203.3	Commit to professional ethics and responsibilities as a member in team/individual.

C203.4	Design and demonstrate proposed work within the proper time allocation and management.
C203.5	Communicate technically and general information by means of oral/written presentation skills with professionalism.

Course Title: Evaluation of project phase-I **Course Code: 16ECS34**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C204.1	Choose problems with technical importance and social, identify and survey the relevant literature for getting exposed to related solutions.
C204.2	Build project plans with feasible requirements
C204.3	Analyze an adaptable and reusable solutions
C204.4	Implement, test solutions as a team to trace against the user requirements, prepare the report and present.
C204.5	Deploy the solutions for better manageability and provide scope for improvability.

SEMESTER-4

Course Title: Wireless Broadband Communication **Course Code: 16ECS41**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C205.1	Explain the system architecture of LTE and E-UTRAN as per the standards
C205.2	Understand the multiple access process incorporated in the radio physical layer.
C205.3	Associate MAC of LTE radio interface protocols to set up, reconfigure and release the Radio Bearer and for transferring to the EPS bearer.
C205.4	Explain the mobility principles and procedures in the idle and active state.
C205.5	Analyse the main factors affecting LTE performance including mobile speed and transmission bandwidth.

Course Title: Advances in Image processing **Course Code: 16ECS422**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C206.1	Understand the representation of the digital image and its properties
C206.2	Apply pre-processing techniques required to enhance the image for its further analysis
C206.3	Utilize segmentation techniques to select the region of interest in the image for analysis
C206.4	Identify the image based on its shape and edge information
C206.5	Discover the objects present in the image based on its properties and structure.

Course Title: Evaluation of project phase-II **Course Code: 16ECS43**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C207.1	Choose problems with technical importance and social, identify and survey the relevant literature for getting exposed to related solutions.
C207.2	Build project plans with feasible requirements
C207.3	Analyze an adaptable and reusable solutions
C207.4	Implement, test solutions as a team to trace against the user requirements, prepare the report and present.
C207.5	Deploy the solutions for better manageability and provide scope for improvability.

Course Title: Evaluation of project and Viva-voce **Course Code: 16ECS44**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C208.1	Choose problems with technical importance and social, identify and survey the relevant literature for getting exposed to related solutions.
C208.2	Build project plans with feasible requirements
C208.3	Analyze an adaptable and reusable solutions
C208.4	Implement, test solutions as a team to trace against the user requirements, prepare the report and present.
C208.5	Deploy the solutions for better manageability and provide scope for improvability.

AMC ENGINEERING COLLEGE

Department of Electronics and Communication
M.Tech in Digital Electronics and Communication

STATEMENTS	
PROGRAM OUTCOMES (PO)	
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9	**Individual and team work**: Function effectively as an individual, and as a member or leaderin diverse teams, and in multidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering 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.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Develop the knowledge and competency in areas of VLSI and Embedded Systems, IC Fabrication, Design, Testing, Verification and prototype development focusing on applications.
PSO2	Formulate solutions for interdisciplinary problems through acquired programming knowledge in the respective domains complying with real-time constraints.

Course Title: ADVANCED ENGINEERING MATHEMATICS

Course Code: 16ELD11

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO101.1	Understand vector spaces, basis, linear transformations and the process of obtaining Matrix of linear transformations arising in magnification and rotation of images.
CO101.2	Apply the technique of singular value decomposition for data compression, least Square approximation in solving inconsistent linear systems.
CO101.3	Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital Circuits.
CO101.4	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and System communications.
CO101.5	Analyze random process through parameter-dependent variables in various random Processes.

Course Title: Digital VLSI Design **Course Code: 16EVE12**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO102.1	Analyse issues of On-chip interconnect Modelling and Interconnect delay calculation.
CO102.2	Analyse the Switching Characteristics in Digital Integrated Circuits.
CO102.3	Use the Dynamic Logic circuits in state-of-the-art VLSI chips.
CO102.4	Study critical issues such as ESD protection, Clock distribution, Clock buffering, and Latch phenomenon
CO102.5	Use Bipolar and Bi-CMOS circuits in very high-speed design

Course Title: ADVANCED EMBEDDED SYSTEM **Course Code: 16EVE13**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO103.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
CO103.2	Explain the hardware software co-design and firmware design approaches
CO103.3	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32 bit microcontroller including memory map, interrupts and exceptions
CO103.4	Apply the knowledge gained for Programming ARM CORTEX M3 for different applications.
CO103.5	Design an embedded system for different applications

Course Title: LOW POWER VLSI DESIGN **Course Code: 16EVE14**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO104.1	Identify the sources of power dissipation in CMOS circuits.
CO104.2	Perform power analysis using simulation-based approaches and probabilistic analysis.
CO104.3	Use optimization and trade-off techniques that involve power dissipation of digital circuits.
CO104.4	Make the power design a reality by making power dimension an integral part of the design.
CO104.5	Use practical low power design techniques and their analysis at various levels of design abstraction and analyse how these are being captured in the latest design automation environments

Course Title: DIGITAL SYSTEM DESIGN USING VERILOG

Course Code: 16EVE151

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO105_1.1	Design embedded systems, using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores.
CO105_1.2	Design constructs the combinational circuits using discrete gates and programmable logic devices.
CO105_1.3	Describe Verilog model for sequential circuits and test pattern generation
CO105_1.4	Explore the different types of semiconductor memories and their usage for specific chip design
CO105_1.5	Synthesis different types of processor and I/O controllers that are used in embedded system design

Course Title: VLSI & ES Lab-1 **Course Code: 16EVEL16**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO106.1	Develop Verilog code for the design of digital circuits
CO106.2	Use FPGA/CPLD board and Logic Analyzer or Chipscope to verify the results
CO106.3	Develop Assembly language programs for different applications using ARM Cortex M3 Kit and Keiluvision-4 tool.
CO106.4	Analyse physical design
CO106.5	Develop Assembly language programs and C language programs for different applications using ARM Cortex M3 Kit and Keil uVision-4 tool.

Course Title: **SEMINAR ON ADVANCED TOPICS FROM REFEREED JOURNALS**
Course Code: 16EVEL17

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO107.1	Identify the emerging technical field by applying the engineering concepts from research repository
CO107.2	Analyze the methodology used in the identified paper
CO107.3	Compare the identified method and existing methods.
CO107.4	Prepare the power point presentation and documentation by applying ethical principles with committed professional responsibilities as an individual.
CO107.5	Discuss the issue and future scope for available technology

Course Title: DESIGN OF ANALOG AND MIXED MODE VLSI CIRCUITS

Course Code: 16EVE21

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO108.1	Use efficient analytical tools for quantifying the behavior of basic circuits by inspection.
CO108.2	Design high-performance, stable operational amplifiers with the tradeoffs between speeds, precision and power dissipation.
CO108.3	Design and study the behavior of phase-locked-loops for the applications.
CO108.4	Identify the critical parameters that affect the analog and mixed-signal VLSI circuits' performance
CO108.5	Perform calculations in the digital or discrete time domain, more sophisticated data converters to translate the digital data to and from inherently analog world.

Course Title: VLSI TESTING **Course Code: 16EVE22**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO109.1	Analyze the need for fault modeling and testing of digital circuits
CO109.2	Generate fault lists for digital circuits and compress the tests for efficiency
CO109.3	Create tests for digital memories and analyze failures in them
CO109.4	Apply boundary scan technique to validate the performance of digital circuits
CO109.5	Design built-in-self-tests for complex digital circuits

Course Title: ADVANCES IN VLSI DESIGN **Course Code: 16EVE23**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO110.1	Apply design automation for complex circuits using the different implementation methodology like custom versus semi-custom, hardwired versus fixed, regular array versus ad-hoc.
CO110.2	Use the approaches to minimize the impact of interconnect parasitic on performance, power dissipation and circuit reliability
CO110.3	Impose the ordering of the switching events to meet the desired timing constraints using synchronous, clocked approach.
CO110.4	Infer the reliability of the memory.
CO110.5	Understand the role of peripheral circuitry and control circuitry in the design of reliable and fast memories.

Course Title: REAL TIME OPERATING SYSTEM **Course Code: 16EVE24**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO111.1	Develop programs for real time services, firmware and RTOS, using the fundamentals of Real Time Embedded System, real time service utilities, debugging methodologies and optimization techniques.
CO111.2	Select the appropriate system resources (CPU, I/O, Memory, Cache, ECC Memory, Microcontroller/FPGA/ASIC to improve the system performance.
CO111.3	Apply priority based static and dynamic real time scheduling techniques for the given specifications. Deadlock conditions, shared memory problem, critical section problem, missed deadlines, availability, reliability and QoS.
CO111.4	Develop programs for multithreaded applications using suitable techniques and data structure
CO111.5	Seminar on Real time Operating System

Course Title: Micro Electro Mechanical Systems **Course Code: 16ELD253**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO112_3.1	Appreciate the technologies related to Micro Electro Mechanical systems.
CO112_3.2	Understand design and fabrication processes involved with MEMS devices
CO112_3.3	Analyze the MEMS devices and develop suitable mathematical models
CO112_3.4	Know various application areas for MEMS device
CO112_3.5	Seminar on latest advancements in MEMS

Course Title: VLSI & ES Lab-2 **Course Code: 16EVEL26**

CO.No.	OUTCOMES After completing the course the student will be able to:
CO113.1	Design, implement and analyze analog, digital and mixed mode circuits Implement different techniques of message passing and Inter task communication.
CO113.2	Learn the various issues in Mixed signal design basically data converters.
CO113.3	Acquire hands-on skills of using CAD tools in VLSI design.
CO113.4	Appreciate the design process in VLSI through a mini-project on the design of a CMOS sub-system.
CO113.5	Select a suitable task switching technique in a multithreaded application.
CO113.6	Implement different techniques of message passing and Inter task communication.
CO113.7	Implement different data structures such as pipes, queues and buffers in multithreaded programming.

Course Title: **SEMINAR ON ADVANCED TOPICS FROM REFEREED JOURNALS**
Course Code: 16EVEL27

CO.No.	OUTCOMES After completing the course the student will be able to:
CO114.1	Identify the emerging technical field by applying the engineering concepts from research repository
CO114.2	Analyze the methodology used in the identified paper
CO114.3	Compare the identified method and existing methods.
CO114.4	Prepare the power point presentation and documentation by applying ethical principles with committed professional responsibilities as an individual.
CO114.5	Discuss the issue and future scope for available technology

Course Title: **SEMINAR /PRESENTATION ON INTERNSHIP Course Code: 16EVE31**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO201.1	Survey and Substantiate complex Engineering problem related to selected subject of interest.
CO201.2	Select the methodology and modern tool required for the implementation of the topic
CO201.3	Communicate technically and general information by means of oral/written presentation skills with professionalism.

Course Title: **REPORT ON INTERNSHIP Course Code: 16EVE32**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO202.1	Survey and Substantiate complex Engineering problem related to selected subject of interest.
CO202.2	Design and demonstrate proposed work within the proper time allocation and management.
CO202.3	Communicate technically and general information by means of oral/written presentation skills with professionalism.

Course Title: **EVALUATION AND VIVA-VOCE OF INTERNSHIP**
Course Code: 16EVE33

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO203.1	Survey and Substantiate complex Engineering problem related to selected subject of interest
CO203.2	Select the methodology and modern tool required for the implementation of the topic
CO203.3	Commit to professional ethics and responsibilities as a member in team/individual.
CO203.4	Design and demonstrate proposed work within the proper time allocation and management.
CO203.5	Communicate technically and general information by means of oral/written presentation skills with professionalism

Course Title: **EVALUATION OF PROJECT PHASE-1** **Course Code: 16EVE34**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO204.1	Choose problems with technical importance and societal, Identify and survey the relevant literature for getting exposed to related solutions
CO204.2	Build project plans with feasible requirements
CO204.3	Analyze an adaptable and reusable solutions
CO204.4	Implement, test solutions as a team to trace against the user requirements, prepare the report and present
CO204.5	Deploy the solutions for better manageability and provide scope for improvability

Course Title: **SYNTHESIS AND OPTIMIZATION OF DIGITAL CIRCUITS**
Course Code: 16ELD41

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO205.1	Understand the need for optimization and dimensions of optimization for digital circuits.
CO205.2	Understand basic optimization techniques used in circuits design
CO205.3	Understand advanced tools and techniques in digital systems design including Hardware Modeling and Compilation Techniques
CO205.4	Explain details of Logic-Level synthesis and optimization techniques for combinational and sequential circuits.
CO205.5	Explain the concept of scheduling and resource binding for optimization

Course Title: **ADVANCES IN IMAGE PROCESSING** **Course Code: 16ECS422**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO206_2.1	Understand the representation of the digital image and its properties.
CO206_2.2	Apply pre-processing techniques required to enhance the image for its further analysis.
CO206_2.3	Utilize segmentation techniques to select the region of interest in the image for analysis
CO206_2.4	Identify the image based on its shape and edge information
CO206_2.5	Discover the objects present in the image based on its properties and structure.

Course Title: **EVALUATION OF PROJECT PHASE-2** **Course Code: 16EVE43**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO207.1	Choose problems with technical importance and societal, Identify and survey the relevant literature for getting exposed to related solutions
CO207.2	Build project plans with feasible requirements
CO207.3	Analyze an adaptable and reusable solutions
CO207.4	Implement, test solutions as a team to trace against the user requirements, prepare the report and present
CO207.5	Deploy the solutions for better manageability and provide scope for improvability

Course Title: **EVALUATION OF PROJECT AND VIVA-VOCE**
Course Code: 16EVE44

CO.No.	**OUTCOMES** After completing the course the student will be able to:
CO208.1	Choose problems with technical importance and societal, Identify and survey the relevant literature for getting exposed to related solutions
CO208.2	Build project plans with feasible requirements
CO208.3	Analyze an adaptable and reusable solutions
CO208.4	Implement, test solutions as a team to trace against the user requirements, prepare the report and present
CO208.5	Deploy the solutions for better manageability and provide scope for improvability

AMC ENGINEERING COLLEGE

DEPARTMENT OF MECHANICAL ENGINEERING

PROGRAM OUTCOMES (PO)	
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering 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.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Graduates are able to analyze, design and manufacture mechanical systems with latest available technologies
PSO2	Graduates are able to work on interdisciplinary projects in their research and development activities, along with the skills and adequate knowledge in managerial capability and entrepreneurship.
PROGRAM EDUCATIONAL OBJECTIVES (PEO)	
PEO 1 (Knowledge)	Graduates of Mechanical Engineering shall Develop Strong Academic Foundation in science and mechanical engineering to pursue a diverse range of careers as engineers, consultants and entrepreneurs.
PEO 2 (Skills)	Emerging as skilled engineers mastered in diversified interdisciplinary technologies as a concrete competent innovators in Industries and Academics.
PEO 3 (Attitude)	Graduates of Mechanical Engineering will inculcate skills to identify real time needs and provide solutions based on social, environmental, ethical and cultural values through interdisciplinary team approach.

Course Title: Computer Aided Engineering Drawing **Course Code: 17CED14**

CO. No.	OUTCOMES After completing the course the student will be able to:
C114.1	Students will be able to demonstrate the usage of CAD software.
C114.2	Students will be able to visualize and draw Orthographic projections, Sections of solids and Isometric views of solids.
C114.3	Students are evaluated for their ability in applying various concepts to solve practical problems related to engineering drawing.

Course Title: Elements of Mechanical Engineering **Course Code: 17EME14**

CO. No.	OUTCOMES After completing the course the student will be able to:
C114.1	Various Energy sources, Boilers, Prime movers such as turbines and IC engines, refrigeration and air-conditioning systems
C114.2	Metal removal process using Lathe, drilling, Milling Robotics and Automation.
C114.3	Fair understanding of application and usage of various engineering materials.

Course Title: Computer Aided Engineering Drawing **Course Code: 15CED24**

CO. No.	OUTCOMES After completing the course the student will be able to:
C224.1	Students will be able to demonstrate the usage of CAD software.
C254.2	Students will be able to visualize and draw Orthographic projections, Sections of solids and Isometric views of solids.
C254.3	Students are evaluated for their ability in applying various concepts to solve practical problems related to engineering drawing.

Course Title: Elements of Mechanical Engineering **Course Code: 17EME24**

CO. No.	OUTCOMES After completing the course the student will be able to:
C225.1	Various Energy sources, Boilers, Prime movers such as turbines and IC engines, refrigeration and air-conditioning systems
C225.2	Metal removal process using Lathe, drilling, Milling Robotics and Automation.
C225.3	Fair understanding of application and usage of various engineering materials.

Course Title: Engineering Mathematics-III **Course Code: 15MAT31**

CO. No.	OUTCOMES After completing the course the student will be able to:
C231.1	Use of periodic signals and Fourier series to analyze circuits
C231.2	Explain the general linear system theory for continuous-time signals and systems using the Fourier Transform
C231.3	Analyze discrete-time systems using convolution and the z-transform
C231.4	Use appropriate numerical methods to solve algebraic and transcendental equations and also to calculate a definite integral
C231.5	Use curl and divergence of a vector function in three dimensions, as well as apply the Green's Theorem, Divergence Theorem and Stokes' theorem in various applications
C231.6	Solve the simple problem of the calculus of variations

Course Title: Material Science **Course Code: 15ME32**

CO. No.	OUTCOMES After completing the course the student will be able to:
C232.1	Describe the mechanical properties of metals, their alloys and various modes of failure.
C232.2	Understand the microstructures of ferrous and non-ferrous materials to mechanical properties.
C232.3	Explain the processes of heat treatment of various alloys.
C232.4	Understand the properties and potentialities of various materials available and material selection procedures.
C232.5	Know about composite materials and their processing as well as applications.

Course Title: Basic Thermodynamics **Course Code: 15ME33**

CO. No.	OUTCOMES After completing the course the student will be able to:
C233.1	Explain thermodynamic systems, properties, Zeroth law of thermodynamics, temperature scales and energy interactions.
C233.2	Determine heat, work, internal energy, enthalpy for flow & non-flow process using First and Second Law of Thermodynamics
C233.3	Interpret behavior of pure substances and its applications to practical problems.
C233.4	Determine change in internal energy, change in enthalpy and change in entropy using TD relations for ideal gases.
C233.5	Calculate Thermodynamics properties of real gases at all ranges of pressure, temperatures using modified equation of state including Vander Waals equation, Redlich Wong equation and Beattie-Bridgeman equation.

Course Title: Mechanics of Materials **Course Code: 15ME34**

CO. No.	OUTCOMES After completing the course the student will be able to:
C234.1	Understand simple, compound, thermal stresses and strains their relations, Poisson's ratio, Hooke's law, mechanical properties including elastic constants and their relations
C234.2	Determine stresses, strains and deformations in bars with varying circular and rectangular cross-sections subjected to normal and temperature loads
C234.3	Determine plane stress, principal stress, maximum shear stress and their orientations using analytical method and Mohr's circle
C234.4	Determine the dimensions of structural members including beams, bars and rods using Energy methods and also stress distribution in thick and thin cylinders
C234.5	Draw SFD and BMD for different beams including cantilever beams, simply supported beams and overhanging beams subjected to UDL, UVL, Point loads and couples
C234.6	Determine dimensions, bending stress, shear stress and its distribution in beams of circular, rectangular, symmetrical I and T sections subjected to point loads and UDL
C234.7	Determine slopes and deflections at various points on beams subjected to UDL, UVL, Point loads and couples
C234.8	Determine the dimensions of shafts based on torsional strength, rigidity and flexibility and also elastic stability of columns using Rankin's and Euler's theory

Course Title: Metal Casting And Welding **Course Code: 15ME35A**

CO. No.	OUTCOMES After completing the course the student will be able to:
C235.1	Describe the casting process, preparation of Green, Core, dry sand molds and Sweep, Shell, Investment and plaster molds.
C235.2	Explain the Pattern, Core, Gating, Riser system and Jolt, Squeeze, Sand Slinger Molding Machines.
C235.3	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces.
C235.4	Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mold castings.
C235.5	Explain the Solidification process and Casting of Non-Ferrous Metals.
C235.6	Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes used in manufacturing.
C235.7	Explain the Resistance spot, Seam, Butt , Projection, Friction, Explosive, Thermit, Laser and Electron Beam Special type of welding process used in manufacturing.
C235.8	Describe the Metallurgical aspects in Welding and inspection methods for the quality assurance of components made of casting and joining process.

Course Title: Computer Aided Machine Drawing **Course Code: 15ME36A**

CO. No.	OUTCOMES After completing the course the student will be able to:
C236.1	Sections of pyramids, prisms, cubes, cones and cylinders resting on their bases in 2D
C236.2	Orthographic views of machine parts with and without sectioning in 2D.
C236.3	Sectional views for threads with terminologies of ISO Metric, BSW, square and acme, sellers and American standard threads in 2D.
C236.4	Hexagonal and square headed bolt and nut with washer, stud bolts with nut and lock nut, flanged nut, slotted nut, taper and split pin for locking counter sunk head screw, grub screw, Allen screw assemblies in 2D
C236.5	Parallel key, Taper key, and Woodruff Key as per the ISO standards in 2D
C236.6	Single and double riveted lap joints, butt joints with single/double cover straps, cotter and knuckle joint for two rods in 2D

C236.7	Sketch split muff, protected type flanged, pin type flexible, Oldham's and universal couplings in 2D
C236.8	Assemblies from the part drawings with limits ,fits and tolerance given for Plummer block, Ram bottom safety valve, I.C. Engine connecting rod, Screw Jack, Tailstock of lathe, Machine Vice and Lathe square tool post in 2D and 3D

Course Title: Material Testing Lab **Course Code: 15ME37A**

CO. No.	**OUTCOMES** After completing the course the student will be able to:
C237.1	Acquire experimentation skills in the field of material testing.
C237.2	Develop theoretical understanding of the mechanical properties of materials by performing experiments.
C237.3	Apply the knowledge to analyze a material failure and determine the failure inducing agent/s.
C237.4	Apply the knowledge of testing methods in related areas.
C237.5	Know how to improve structure/behavior of materials for various industrial applications.

Course Title: Foundry And Forging Lab **Course Code: 15ME38A**

CO. No.	**OUTCOMES** After completing the course the student will be able to:
C238.1	Demonstrate various skills of sand preparation, molding.
C238.2	Demonstrate various skills of forging operations.
C238.3	Work as a team keeping up ethical principles.

Course Title: Engineering Mathematics-IV **Course Code: 15MAT41**

CO. No.	OUTCOMES After completing the course the student will be able to:
C241.1	Use appropriate numerical methods to solve first and second order ordinary differential equations.
C241.2	Use Bessel's and Legendre's function which often arises when a problem possesses axial and spherical symmetry, such as in quantum mechanics, electromagnetic theory, hydrodynamics and heat conduction.
C241.3	State and prove Cauchy's theorem and its consequences including Cauchy's integral formula.
C241.4	Compute residues and apply the residue theorem to evaluate integrals.
C241.5	Analyze, interpret, and evaluate scientific hypotheses and theories using rigorous statistical methods.

Course Title: Kinematics of Machines **Course Code: 15ME42**

CO. No.	OUTCOMES After completing the course the student will be able to:
C242.1	Identify mechanisms with basic understanding of motion.
C242.2	Comprehend motion analysis of planar mechanisms, gears, gear trains and cams.
C242.3	Carry out motion analysis of planar mechanisms, gears, gear trains and cams.

Course Title: Applied Thermodynamics **Course Code: 15ME43**

CO. No.	OUTCOMES After completing the course the student will be able to:
C243.1	Apply thermodynamic concepts to analyze the performance of gas power cycles including propulsion systems.
C243.2	Evaluate the performance of steam turbine components.
C243.3	Understand combustion of fuels and combustion processes in I C engines including alternate fuels and pollution effect on environment.
C243.4	Apply thermodynamic concepts to analyze turbo machines.
C243.5	Determine performance parameters of refrigeration and air-conditioning systems.
C243.6	Understand the principles and applications of refrigeration systems.
C243.7	Analyze air-conditioning processes using the principles of psychometry and Evaluate cooling and heating loads in an air-conditioning system.
C243.8	Understand the working, applications, relevance of air and identify methods for performance improvement.

Course Title: Fluid Mechanics **Course Code: 15ME44**

CO. No.	OUTCOMES After completing the course the student will be able to:
C244.1	Identify and calculate the key fluid properties used in the analysis of fluid behavior.
C244.2	Understand and apply the principles of pressure, buoyancy and floatation
C244.3	Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering.
C244.4	Understand and apply the principles of fluid kinematics and dynamics.
C244.5	Understand the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.
C244.6	Understand the basic concept of compressible flow and CFD

Course Title: Machine Tools and Operations **Course Code: 15ME45B**

CO. No.	OUTCOMES After completing the course the student will be able to:
C245.1	Explain the construction & specification of various machine tools.
C245.2	Describe various machining processes pertaining to relative motions between tool & work piece.
C245.3	Discuss different cutting tool materials, tool nomenclature & surface finish.
C245.4	Apply mechanics of machining process to evaluate machining time.
C245.5	Analyze tool wear mechanisms and equations to enhance tool life and minimize machining cost.

Course Title: Mechanical Measurements and Metrology **Course Code: 15ME46B**

CO. No.	OUTCOMES After completing the course the student will be able to:
C245.1	Understand the objectives of metrology, methods of measurement, selection of measuring instruments, standards of measurement and calibration of end bars.
C245.2	Describe slip gauges, wringing of slip gauges and building of slip gauges, angle measurement using sine bar, sine center, angle gauges, optical instruments and straightness measurement using Autocollimator.
C245.3	Understand the principle of Johnson Mikrokator, sigma comparator, dial indicator, LVDT, back pressure gauges, Solex comparators and Zeiss Ultra Optimeter
C245.4	Describe measurement of major diameter, minor diameter, pitch, angle and effective diameter of

	screw threads by 2 – wire, 3 – wire methods, screw thread gauges and tool maker's microscope.
C245.5	Explain measurement of tooth thickness using constant chord method, addendum comparator methods and base tangent method, composite error using gear roll tester and measurement of pitch, concentricity, run out and involute profile.
C245.6	Understand laser interferometers and Coordinate measuring machines.
C245.7	Explain measurement systems, transducers, intermediate modifying devices and terminating devices.
C245.8	Describe functioning of force, torque, pressure, strain and temperature measuring devices.

Course Title: Mechanical Measurements and Metrology Lab **Course Code: 15ME47B**

CO. No.	OUTCOMES After completing the course the student will be able to:
C247.1	To calibrate pressure gauge, thermocouple, LVDT, load cell, micrometer.
C247.2	To measure angle using Sine Center/ Sine Bar/ Bevel Protractor, alignment using Autocollimator/ Roller set.
C247.3	To demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats
C247.4	To measure cutting tool forces using Lathe/Drill tool dynamometer.
C247.5	To measure Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth vernier/Gear tooth micrometer.
C247.6	To measure surface roughness using Tally Surf/ Mechanical Comparator.

Course Title: Machine Shop **Course Code: 15ME48B**

CO. No.	OUTCOMES After completing the course the student will be able to:
C248.1	Perform turning , facing , knurling , thread cutting, tapering , eccentric turning and allied operations
C248.2	Perform keyways / slots , grooves etc using shaper
C248.3	Perform gear tooth cutting using milling machine
C248.4	Understand the formation of cutting tool parameters of single point cutting tool using bench grinder / tool and cutter grinder
C248.5	Understand Surface Milling/Slot Milling
C248.6	Demonstrate precautions and safety norms followed in Machine Shop
C248.7	Exhibit interpersonal skills towards working in a team

AMC ENGINEERING COLLEGE

DEPARTMENT OF MECHANICAL ENGINEERING (MACHINE DESIGN)

PROGRAM OUTCOMES (PO)	
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms

	of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering 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.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Graduates are able to analyze, design and manufacture mechanical systems with latest available technologies
PSO2	Graduates are able to work on interdisciplinary projects in their research and development activities, along with the skills and adequate knowledge in managerial capability and entrepreneurship.

PROGRAM EDUCATIONAL OBJECTIVES (PEO)	
PEO 1 (Knowledge)	Graduates of Mechanical Engineering shall Develop Strong Academic Foundation in science and mechanical engineering to pursue a diverse range of careers as engineers, consultants and entrepreneurs.
PEO 2 (Skills)	Emerging as skilled engineers mastered in diversified interdisciplinary technologies as a concrete competent innovators in Industries and Academics.
PEO 3 (Attitude)	Graduates of Mechanical Engineering will inculcate skills to identify real time needs and provide solutions based on social, environmental, ethical and cultural values through interdisciplinary team approach.

Course Title: Applied Mathematics **Course Code: 16MDE11**

CO. No.	OUTCOMES After completing the course the student will be able to:
C111.1	Model some simple mathematical models of physical Applications.
C111.2	Find the roots of polynomials in Science and Engineering problems.
C111.3	Differentiate and integrate a function for a given set of tabulated data, for Engineering Applications

Course Title: Finite Element Method **Course Code: 16MDE12**

CO. No.	OUTCOMES After completing the course the student will be able to:
C112.1	Knowledgeable about the FEM as a numerical method for the solution of solid mechanics, structural mechanics and thermal problems
C112.2	Developing skills required to use a commercial FEA software

Course Title: Continuum Mechanics **Course Code: 16CAE13**

CO. No.	OUTCOMES After completing the course the student will be able to:
C113.1	Continuum Mechanics background essential to mathematically model physical problems in Solid Mechanics

Course Title: Experimental Mechanics **Course Code: 16CAE16**

CO. No.	OUTCOMES After completing the course the student will be able to:
C116.1	Undertake experimental investigations to verify predictions by other methods.
C116.2	To acquire skills for experimental investigations an accompanying laboratory course is desirable

Course Title: Mechatronics System Design **Course Code: 16MDE153**

CO. No.	OUTCOMES After completing the course the student will be able to:
C11153.1	This course makes the student to appreciate multi-disciplinary nature of modern engineering systems. Specifically mechanical engineering students to collaborate with Electrical, Electronics, Instrumentation and Computer Engineering disciplines.

Course Title: Composite Materials Technology **Course Code: 16MST21**

CO. No.	OUTCOMES After completing the course the student will be able to:
C121.1	This course provides the background for the analysis, design, optimization and test simulation of advanced composite structures and Components.

Course Title: Advanced Machine Design **Course Code: 16MDE22**

CO. No.	OUTCOMES After completing the course the student will be able to:
C122.1	This course enriches the student with state of the art design methodology namely design by analysis and damage tolerant design.

Course Title: Dynamics And Mechanism Design **Course Code: 16MDE23**

CO. No.	OUTCOMES After completing the course the student will be able to:
C123.1	The knowledge of dynamics considerations in mechanism design is essential to use commercial multi body dynamics software in mechanical engineering design

Course Title: Advanced Theory Of Vibrations **Course Code: 16MDE24**

CO. No.	OUTCOMES After completing the course the student will be able to:
C124.1	Solve major and realistic vibration problems in mechanical engineering design that involves application of most of the course syllabus.

Course Title: Theory of Plasticity **Course Code: 16MDE252**

CO. No.	OUTCOMES After completing the course the student will be able to:
C1252.1	The students learn the theory of plasticity as a background for nonlinear analysis (Material nonlinearity) by the Finite element method.

Course Title: Tribology and Bearing Design **Course Code: 16MMD41**

CO. No.	OUTCOMES After completing the course the student will be able to:
C2341.1	Students develop skills to design and selection of bearings on Various tribological factors to be considered in moving and rotating parts.

Course Title: Fracture Mechanics **Course Code: 16CAE421**

CO. No.	OUTCOMES After completing the course the student will be able to:
C23421.1	Develop basic fundamental understanding of the effects of crack like defects on the performance of aerospace, civil, and mechanical Engineering structures.
C23421.2	Learn to select appropriate materials for engineering structures to insure damage tolerance.
C23421.3	Learn to employ modern numerical methods to determine critical crack sizes and fatigue crack propagation rates in engineering structures.
C23421.4	Gain an appreciation of the status of academic research in field of fracture mechanics.

AMC ENGINEERING COLLEGE

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

STATEMENTS	
PROGRAM OUTCOMES (PO)	
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering 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.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Graduate will be able to apply the knowledge acquired from strong fundamentals of mathematics, science and engineering subjects to identify, formulate, design and investigate complex engineering problems of electrical and electronics to pursue successful carrier/higher studies.
PSO2	Be a professional to apply appropriate techniques and modern engineering software tools to design and develop Electrical systems, also engage in lifelong learning and successfully acquire leadership qualities, communication skills, ethical attitudes, achieve competence excel individually, work efficiently in team and become entrepreneur.

Course Title: BASIC ELECTRICAL ENGINEERING **Course Code:** 17ELE13/17ELE23

CO.No.	OUTCOMES After completing the course the student will be able to:
C115.1	Analyze D.C and A.C circuits
C115.2	Explain the principle of operation and construction of single phase transformers
C115.3	Explain the principle of operation and construction of DC machines and synchronous machines.
C115.4	Explain the principle of operation and construction of three phase induction motors.
C115.5	Discuss concepts of electrical wiring, circuit protecting devices and earthing.

Course Title: BASIC ELECTRICAL ENGINEERING LABORATORY **Course Code:** 17ELEL17/17ELEL27

CO.No.	OUTCOMES After completing the course the student will be able to:
C117.1	To provide exposure to common electrical equipments such as resistors, inductors and capacitors, type of wires and measuring instruments.
C117.2	To measure power and power factor measurements of different types of lamps and three phase circuits.
C117.3	To measure impedances of R-L and R-C circuits.
C117.4	To determine power consumed in three phase loads.
C117.5	To determine earth resistance and methods of controlling a lamps from different positions

Course Title: Electric Circuit Analysis **Course Code:** 15EE32

CO.No.	OUTCOMES After completing the course the student will be able to:
C232.1	Apply Knowledge of mathematics, science and engineering to the analysis and design of electrical circuits.
C232.2	Identify ,formulate and solve engineering problems in the area circuits and systems
C232.3	Ability to analyze the transient response of circuits with dc and sinusoidal ac input.
C232.4	Apply the basic knowledge on network analysis using Laplace transforms.
C232.5	Analyze three phase systems and two port networks.

Course Title: Transformers and Generators **Course Code:** 15EE33

CO.No.	OUTCOMES After completing the course the student will be able to:
C233.1	Explain the construction and operation and performance of single phase and three phase transformers
C233.2	Explain the use of auto transformer, tap changing and tertiary winding transformer and need of operating transformers in parallel
C233.3	Explain the armature reaction and commutation and their effects in a DC generators
C233.4	Explain the construction, operation and performance of Synchronous machines
C233.5	To explain the requirement for the parallel operation of transformers and synchronous generators

Course Title: Analog Electronic Circuits **Course Code:** 15EE34

CO.No.	OUTCOMES After completing the course the student will be able to:
C234.1	Design & analyze diode circuits & various biasing circuits for transistor
C234.2	Design & analyze of transistor at low and high frequencies
C234.3	Design, analyze and test transistor circuitry as multistage & feedback amplifiers
C234.4	Design, analyze and test transistor circuitry as Power amplifiers and Oscillators
C234.5	Design & analyze various biasing circuits for MOSFET and JFET

Course Title: Digital System Design **Course Code:** 15EE35

CO.No.	OUTCOMES After completing the course the student will be able to:
C235.1	Understand and Analyze combinational and sequential circuits
C235.2	Design circuits like adder, subtractor, code converter etc.
C235.3	Design counters and sequence generator
C235.4	Construct the state diagrams
C235.5	Understand and Apply HDL

Course Title: Electrical and Electronic Measurements **Course Code:** 15EE36

CO.No.	OUTCOMES After completing the course the student will be able to:
C236.1	Measure resistance, inductance and capacitance using bridges and determine earth resistance.
C236.2	Explain the working of various meters used for measurement of Power & Energy
C236.3	Understand the adjustments, calibration & errors in energy meters and measurement of magnetic devices
C236.4	Explain the working of different electronic instruments.
C236.5	Explain the working of different display devices and recording mechanisms.

Course Title: Electrical Machines Laboratory -1 **Course Code:** 15EEL37

CO.No.	OUTCOMES After completing the course the student will be able to:
C237.1	Evaluate the performance of transformers from the test data obtained.
C237.2	Connect and operate two single phase transformers of different KVA rating in parallel.
C237.3	Connect single phase transformers for three phase operation and phase conversion.
C237.4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
C237.5	Evaluate the performance of synchronous generators from the test data

Course Title: Electronics Laboratory **Course Code:** 15EEL38

CO.No.	OUTCOMES After completing the course the student will be able to:
C238.1	Design and test rectifier circuits with and without capacitor filters.
C238.2	Determine h-parameter models of transistor for all modes.
C238.3	Design and test BJT and FET amplifier and oscillator circuits.
C238.4	Realize Boolean expressions, adders and subtractor using gates.
C238.5	Design and test Ring counter/Johnson counter, Sequence generator and 3 bit counters.

Course Title: Power Generation and Economics **Course Code:** 15EE42

CO.No.	OUTCOMES After completing the course the student will be able to:
C242.1	Describe the working of hydroelectric, steam, nuclear power plants and s
C242.2	Classify and explain the various substations and explain the importance of grounding.
C242.3	Understand the economic aspects of power system operation and its effects.
C242.4	Explain the importance of power factor improvement.
C242.5	Describe state functions of major equipment of the power plants

Course Title: Transmission and Distribution **Course Code:** 15EE43

CO.No.	OUTCOMES After completing the course the student will be able to:
C243.1	Understand the concepts of General layout of Power System with standard voltage and effect of Corona Loss.
C243.2	Construct structures of Over Head Transmission lines & Calculate the Sag.
C243.3	Evaluate the potential distribution over a string of suspension insulators and string Efficiency.
C243.4	Calculate the parameters of the transmission line for different configurations.
C243.5	Analyze the performance of the transmission line and study the use of Underground cables and distribution systems.

Course Title: Electric Motors **Course Code:** 15EE44

CO.No.	OUTCOMES After completing the course the student will be able to:
C244.1	Understand the types and Constructional features of Motors, select a suitable motor for specific application
C244.2	To conduct suitable tests and control the speed of motors by suitable methods
C244.3	Solve the problems on AC and DC motors
C244.4	Analyze the performance characteristics of motors
C244.5	Evaluate the different parameters of motors with respect to variables

Course Title: Electromagnetic Field Theory **Course Code:** 15EE45

CO.No.	OUTCOMES After completing the course the student will be able to:
C245.1	Use different coordinate systems to explain the concept of gradient, divergence and curl of a vector
C245.2	Use Coulomb's Law and Gauss Law for the evaluation of electric fields produced by different charge configurations.
C245.3	Calculate the energy and potential due to a system of charges and explain the behavior of electric field across a boundary between conductor and dielectrics.
C245.4	Explain the behavior of magnetic fields and magnetic materials.
C245.5	Assess time varying fields and propagation of waves in different media.

Course Title: Operational Amplifiers and Linear ICs **Course Code:** 15EE46

CO.No.	OUTCOMES After completing the course the student will be able to:
C246.1	The ability to understand the basics of Linear Ics such as op amps, regulators and timers
C246.2	The ability to analyze the amplifier as filters and regulators
C246.3	The ability to determine various signal generation and analysis of comparators, converters using IC
C246.4	The ability to Analyze various circuits for signal processing and converters
C246.5	The ability to Make use of ICs in hardware project applications such as phase locked loop and Timers

Course Title: Electrical Machines Laboratory -2 **Course Code:** 15EEL47

CO.No.	OUTCOMES After completing the course the student will be able to:
C247.1	Test dc machines to determine their characteristics
C247.2	Pre-determine the performance characteristics of dc machines by conducting suitable tests.
C247.3	Perform load test on single phase and three phase induction motor to assess its performance.
C247.4	Conduct test on induction motor to pre-determine the performance characteristics
C247.5	Conduct test on synchronous motor to draw the performance curves

Course Title: Op- amp and Linear ICs Laboratory **Course Code:** 15EEL48

CO.No.	OUTCOMES After completing the course the student will be able to:
C248.1	Conduct experiment to determine the characteristic parameters and frequency response of OP-Amp.
C248.2	Design the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator.
C248.3	Design the OP-Amp as Rectifier, Converters, oscillators and filters.
C248.4	Design the multivibrator and Voltage regulator for power supplies.
C248.5	Design the function generator.

Course Title: MANAGEMENT AND ENTERPRENEURSHIP **Course Code:** 15EE51

CO.No.	OUTCOMES After completing the course the student will be able to:
C351.1	Understand the nature of entrepreneurship.
C351.2	Understand the function of the entrepreneur in the successful, commercial application of innovations.
C351.3	Confirm an entrepreneurial business idea.
C351.4	Identify personal attributes that enable best use of entrepreneurial opportunities.
C351.5	Understand the nature of entrepreneurship.

Course Title: Microcontroller **Course Code:** 15EE52

CO.No.	OUTCOMES After completing the course the student will be able to:
C352.1	Explain internal architecture of 8051, classify 8051 addressing modes, accessing data and I/O port programming and various programs
C352.2	Develop 8051C programs for time delay, I/O operations, I/O bit manipulation, logic and arithmetic operations, data conversion and data serialization
C352.3	Classify the real-world devices such as LCDs and keyboards, ADC, DAC chips and sensors by interfacing programming
C352.4	Classify the interrupts and write interrupt handler programs
C352.5	Discuss the hardware connection of the 8051 chip, its timers, serial data communication, interrupts and its interfacing of 8051to the RS232

Course Title: Power Electronics **Course Code:** 10EE53

CO.No.	OUTCOMES After completing the course the student will be able to:
C353.1	The ability to define, understand the characteristics and applications of power semiconductor devices and its electromagnetic compatibility.
C353.2	The ability to Classify the operation and performance of choppers.
C353.3	The ability to Distinguish the commutation techniques and AC voltage controllers operating at different loads.
C353.4	The ability to Evaluate the various types of Three phase and single phase converters.
C353.5	The ability to Design and Analyze the circuits of Power transistors and Thyristors.

Course Title: SIGNALS AND SYSTEMS **Course Code:** 10EE54

CO.No.	OUTCOMES After completing the course the student will be able to:
C354.1	Classify and explain the signals and systems and properties of systems, Fourier transformer and Z-transformer
C354.2	Solve the problems for basic operations on signals, convolution, impulse response of a given LTI system
C354.3	Perform the analysis for the non-periodic continuous and discrete time Fourier transforms from the definition
C354.4	Distinguish and analyze the non-periodic continuous and discrete time Fourier transforms using properties
C354.5	Analyze the importance of Region Of Convergence for the stability analysis in Z-Transform

Course Title: 53-Estimating and Costing **Course Code:** 15EE55X

CO.No.	OUTCOMES After completing the course the student will be able to:
C355.1	Make use of market survey for preparation of tenders and comparative statements.
C355.2	Categorize different types of connections to adopt a suitable method of installation.
C355.3	Estimate lighting points, total load and its sub-circuits.
C355.4	Discuss the main components of a substation
C355.5	Discuss the preparation of single line diagram.

Course Title: 63-Renewable Energy Systems **Course Code:** 15EE56Y

CO.No.	OUTCOMES After completing the course the student will be able to:
C356.1	Explain Energy sources, its classification, conservation and Indian Energy Scenario(Analyze)
C356.2	Discuss Solar energy basics, Solar thermal systems and Solar electric systems energy storage(Understand)
C356.3	Discuss Wind Energy, its classification and Wind Energy Scenario(Understand)
C356.4	Discuss Biomass energy and Tidal energy and their programs in India(Understand)
C356.5	Describe the Emerging technologies (Understand)

Course Title: Microcontroller Laboratory **Course Code:** 15EEL57

CO.No.	OUTCOMES After completing the course the student will be able to:
C357.1	Understand and apply the fundamentals of assembly level programming of microcontroller
C357.2	Write ALP for data transfer and arithmetic operations
C357.3	Identify the code conversion and debug the programs
C357.4	Perform the interfacing of stepper motor and control of D C Motor
C357.5	Generate different waveforms using DAC interface

Course Title: Power Electronics Laboratory **Course Code:** 15EEL58

CO.No.	OUTCOMES After completing the course the student will be able to:
C358.1	Obtain static characteristics of semiconductor devices to discuss their performance
C358.2	Verify the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads
C358.3	Verify the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads.
C358.4	Control the speed of a dc motor, universal motor and stepper motors.
C358.5	Verify the performance of single phase full bridge inverter connected to resistive load.

Course Title: Control Systems **Course Code:** 15EE61

CO.No.	OUTCOMES After completing the course the student will be able to:
C361.1	Understand the concept of per unit system, one line diagram and its implementation in problems. (Understand)
C361.2	Derive the equations for short circuit analysis, stability on a synchronous machine, equal area criterion for the evaluation of stability of a simple system under different fault conditions. (Evaluate)
C361.3	Evaluate symmetrical components of voltages and currents in un-balanced three phase circuits. (Evaluate)
C361.4	Apply the concept of sequence impedance and sequence networks of power system in applications of power systems. (Apply)
C361.5	Analyze three phase synchronous machine and simple power systems for different unsymmetrical faults using symmetrical components. (Analyze)

Course Title: POWER SYSTEM ANALYSIS-1 **Course Code:** 15EE62

CO.No.	OUTCOMES After completing the course the student will be able to:
C362.1	Explain the basics of power system protection, construction and working principles of Relay.
C362.2	Analyze the Over Current and Distance Protection.
C362.3	Explain the pilot protection, Differential Protection and Protection for Generators, Transformers and Bus zone protection.
C362.4	Explain the principle of circuit interruption in different types of circuit breakers.
C362.5	Analyze the Over Voltage Protection and fuses and also explain about the Gas Insulated Substation (GIS).

Course Title: DIGITAL SIGNAL PROCESSING **Course Code:** 15EE63

CO.No.	OUTCOMES After completing the course the student will be able to:
C364.1	Compute the DFT and FFT of various signals using properties and linear filtering
C364.2	Apply fast and efficient algorithm for computing DFT, IDFT and FFT of a given sequence
C364.3	Design the impulse response Butterworth and Chebyshev digital filters using impulse invariant/bilinear transformation
C364.4	Realizing digital IIR and FIR filter by direct, cascade, parallel method
C364.5	Design of FIR filter using various windowing/frequency response technique

Course Title: Electrical Machine Design **Course Code:** 15EE64

CO.No.	OUTCOMES After completing the course the student will be able to:
C363.1	Analyze specifications ,design factors, limitations, and materials used in electrical machines.(Analyze)
C363.2	Develop the output equation of a given electrical machine to obtain the main dimensions and power rating.(Apply)
C363.3	Analyze the choice of specific electric and magnetic loadings of a given electrical machine.(Analyze)
C363.4	Design the requirements of the machine, data of conductors and insulation in view of specification.(Create)
C363.5	Construct an electrical machine and allowance required for the effective design of the machine.(Create)

Course Title: 51-Computer Aided Electrical Drawing

Course Code: 15EE65X

CO.No.	OUTCOMES After completing the course the student will be able to:
C365.1	Design and develop single line diagram of a given generating station or distribution substation using Auto cad tool.(Create)
C365.2	Design and develop the dc winding diagram for a given data, using auto cad tool.(Create)
C365.3	Design and develop the Ac winding diagram for a given data, using auto cad tool(Create)
C365.4	Design the single phase/3 phase transformer using auto cad tool.(Create)
C365.5	Develop the assembly diagram of AC/DC machines by identifying the various parts & analyzing the data using auto cad tool.(Create)

Course Title: 62-Sensors and Transducers **Course Code:** 15EE66Y

CO.No.	OUTCOMES After completing the course the student will be able to:
C366.1	The ability to List the need of transducers and their classification
C366.2	The ability to Outline the working of different types of transducers and sensors
C366.3	The ability to interpret the configuration of data acquisition system and various signal conditioning equipments
C366.4	The ability to Summarize the basics of Data transmission and telemetry
C366.5	The ability to Classify measurement of various non-electrical quantities

Course Title: Control System Laboratory **Course Code:** 15EEL67

CO.No.	OUTCOMES After completing the course the student will be able to:
C367.1	Use software package or discrete components in assessing the time and frequency domain reposes of a given second order system.
C367.2	Design and analyze Lead, Lag and Lag – Lead compensators for given specifications.
C367.3	Determine the performance characteristics of ac and dc servomotors and synchro-transmitter receiver pair used in control systems.
C367.4	Simulate the DC position and feedback control system to study the effect of P, PI, PD and PID controller and Lead compensator on the step response of the system.
C367.5	Write a script files to plot root locus, Bode plot, Nyquist plots to study the stability of the system using a software package.

Course Title: Digital Signal Processing Laboratory **Course Code:** 15EEL68

CO.No.	OUTCOMES After completing the course the student will be able to:
C368.1	Analyze the sampling theorem and the solution of difference equation and impulse response of a system
C368.2	Analyze the performance of convolution of a given sequences
C368.3	Analyze the computation of DFT and IDFT of a given sequence
C368.4	Design the IIR filters for the given specifications
C368.5	Design of FIR filters for the given specifications

Course Title: COMPUTER TECHNQUES IN POWER SYSTEM **Course Code:** 10EE71

CO.No.	OUTCOMES After completing the course the student will be able to:
C471.1	Formulate network matrices and models for solving load flow problems.
C471.2	Perform steady state power flow analysis of power systems using numerical iterative techniques.
C471.3	Discuss optimal scheduling for hydro-thermal system, power system security and reliability.
C471.4	Analyze short circuit faults in power system networks using bus impedance matrix.
C471.5	Perform numerical solution of swing equation for multi-machine stability

Course Title: ELECTRICAL POWER UTILIZATION **Course Code:** 10EE72

CO.No.	OUTCOMES After completing the course the student will be able to:
C472.1	Explain the types of heating/ welding scheme for a given application and electrolytic processes.
C472.2	Explain and discuss the Troubleshoot of various lamps and fittings in use.
C472.3	Explain the different schemes of traction schemes and its main components.
C472.4	Discuss a suitable scheme of speed control for the traction systems.
C472.5	Discuss the concepts of barking systems and also different types of vehicles and their performance.

Course Title: High Voltage Engineering **Course Code:** 10EE73

CO.No.	OUTCOMES After completing the course the student will be able to:
C473.1	The ability to Summarize the need for generation of high voltages and classify their applications
C473.2	The ability to Obtain voltage regulation, ripple for Impulse,HVAC and HVDC generation
C473.3	The ability to Explain high voltage testing techniques of Power apparatus and Insulation coordination in Power systems
C473.4	The ability to Distinguish the breakdown phenomena in various di-electric medium
C473.5	The ability to Evaluate the methods for the measurement of High voltages

Course Title: INDUSTRIAL DRIVES **Course Code:** 10EE74

CO.No.	OUTCOMES After completing the course the student will be able to:
C474.1	Understand the basic knowledge of Industrial Drives, design, characteristics, selection and its requirements.(Understand)
C474.2	Develop an electrical drive and can be able to study the transient and steady state analysis of AC&DC drives.(Apply)
C474.3	Identify various converter drives based on motor power rating and thermal models.(Understand)
C474.4	Analyze different methods of starting and braking mechanisms applied in electric drives.(Analyze)
C474.5	judge the safety and operational requirements of an Industrial mills to identify the technical requirements for a suitable drive.(Apply)

Course Title: TESTING & COMMISSIONG OF EQUIPMENTS **Course Code:** 10EE756

CO.No.	OUTCOMES After completing the course the student will be able to:
C475.1	describe the process to plan, control and implement commissioning of electrical equipments
C475.2	differentiate the performance specifications of transformer and induction motor
C475.3	demonstrate the routine tests for synchronous machine, induction motor, transformer and switchgears
C475.4	describe corrective and preventive maintenance of electrical equipments
C475.5	explain the operation of an electrical equipment such as isolators, circuit breakers, induction motor and synchronous machine

Course Title: POWER SYSTEM PLANNING **Course Code:** 10EE761

CO.No.	OUTCOMES After completing the course the student will be able to:
C476.1	The ability to Define various environmental and technological impacts for power system planning
C476.2	The ability to Explain the structure of power system and forecasting techniques
C476.3	The ability to Plan Generation, Transmission and Distribution required for power system
C476.4	The ability to Obtain reliability planning of a power system
C476.5	The ability to Analyze the optimization techniques of power system planning

Course Title: RELAY AND HIGH VOLTAGE LAB **Course Code:** 10EEL77

CO.No.	OUTCOMES After completing the course the student will be able to:
C477.1	Conduct experiment to determine the characteristics of negative sequence relay
C477.2	Able to Conduct experiment to determine the characteristics of over voltage, over current relay
C477.3	Able to Conduct experiment to determine the characteristics of electromagnetic and numerical relay
C477.4	Able to Conduct experiment to determine the characteristics of uniform field gap
C477.5	Able to Conduct experiment to determine the characteristics of non-uniform field gap and motor protection

Course Title: POWER SYSTEM SIMULATION LAB **Course Code:** 10EEL78

CO.No.	OUTCOMES After completing the course the student will be able to:
C478.1	Develop a program in MATLAB to assess the performance of medium and long transmission lines.
C478.2	Develop a program in MATLAB to obtain the power angle characteristics of salient and non-salient pole alternator.
C478.3	Develop a program in MATLAB to assess the transient stability under three phase fault at different locations in a of radial power systems.
C478.4	Develop programs in MATLAB to formulate bus admittance and bus impedance matrices of interconnected power systems.
C478.5	Use MI-Power package to solve power flow problem for simple power systems & optimal generation scheduling problems for thermal power plants

Course Title: DESIGN ESTIMATION AND COSTING **Course Code:** 10EE81

CO.No.	OUTCOMES After completing the course the student will be able to:
C481.1	Make use of market survey for preparation of tenders and comparative statements.
C481.2	Categorize different types of connections to adopt a suitable method of installation.
C481.3	Estimate lighting points, total load and its sub-circuits.
C481.4	Discuss the main components of a substation
C481.5	Discuss the preparation of single line diagram.

Course Title: POWER SYSTEM OPERATION AND CONTROL **Course Code:** 10EE82

CO.No.	OUTCOMES After completing the course the student will be able to:
C482.1	Explain and evaluate the problems on Area control error, Tie- line and frequency deviation, Parallel operation of generators.
C482.2	Explain Automatic voltage regulator- frequency control and able to design Turbine and Automatic controller.
C482.3	Express the importance of reactive power control by solving problems and evaluate the Unit commitment problems.
C482.4	Explain the operation of thermal plant, IPC, losses in the transmission line and B-coefficients.
C482.5	Explain the power system security and Power system contingency analysis.

Course Title: RENERWABLE ENERGY RESOURCES **Course Code:** 10EE836

CO.No.	OUTCOMES After completing the course the student will be able to:
C483.1	Explain Energy sources, its classification, conservation and Indian Energy Scenario(Analyze)
C483.2	Discuss Solar energy basics, Solar thermal systems and Solar electric systems energy storage(Understand)
C483.3	Discuss Wind Energy, its classification and Wind Energy Scenario(Understand)
C483.4	Discuss Biomass energy and Tidal energy and their programs in India(Understand)
C483.5	Describe the Emerging technologies (Understand)

Course Title: ENERGY AUDTING AND DSM **Course Code:** 10EE842

CO.No.	OUTCOMES After completing the course the student will be able to:
C484.1	The ability to List the energy scenario in the world and India and Outline the concept of electrical system optimization
C484.2	The ability to Perform Energy Economic Analysis
C484.3	The ability to Apply the concept of ABT,energy efficient motors and lighting basics
C484.4	The ability to Make use of the benefits of demand side management and energy conservation programs
C484.5	The ability to Determine the energy use profiles, energy measurements and hence the preparation of energy audit results

Course Title: PROJECT **Course Code:** 10EEP85

CO.No.	OUTCOMES After completing the course the student will be able to:
C485.1	Able to generate ,develop idea and information to carry out project work
C485.2	Able to Identify a real-life problems and adapt skills to communicate effectively
C485.3	Able to adapt collaborative skills to work in team
C485.4	Able to Implement a tangible solution using available resources
C485.5	Able to Analyze and interpret data and suggest a solution

Course Title: Seminar **Course Code:** 10EES86

CO.No.	OUTCOMES After completing the course the student will be able to:
C486.1	The students are able to develop communication skills and interpersonal skills
C486.2	The students are able to have exposure to latest technologies
C486.3	The students are able to develop self-learning skills.
C486.4	The students are able to acquire leadership abilities , ethics and social awareness
C486.5	The students are able to acquire the knowledge of modern tools.

AMC ENGINEERING COLLEGE

MTECH IN POWER SYSTEM ENGINEERING

STATEMENTS	
PROGRAM OUTCOMES (PO)	
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering 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.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Graduate will be able to apply the knowledge acquired from strong fundamentals of mathematics, science and engineering subjects to identify, formulate, design and investigate complex engineering problems of electrical and electronics to pursue successful carrier/higher studies.
PSO2	Be a professional to apply appropriate techniques and modern engineering software tools to design and develop Electrical systems, also engage in lifelong learning and successfully acquire leadership qualities, communication skills, ethical attitudes, achieve competence excel individually, work efficiently in team and become entrepreneur.

Course Title: MODELLING AND ANALYSIS OF ELECTRICAL MACHINES Course Code: 16EPS12

CO. No.	After completing the course the student will be able to:
C112.1	Explain the basic concepts of modeling. Develop mathematical models for DC motors for transient state analysis.
C112.2	Use reference frame theory to transform three phase to two phase. Develop dynamic model for three phase induction motor in stator ad rotor reference frames.
C112.3	Develop mathematical model of single phase transformers.
C112.4	Model synchronous machine using Park's transformation for the analysis of steady state operation.
C112.5	Model synchronous machine to perform dynamic analysis under different conditions.

Course Title: POWER SYSTEM DYNAMICS (STABILITY AND CONTROL)

Course Code: 16EPS13

CO NO	After completing the course the student will be able to:
C113.1	Explain states of operation, system security and dynamic problems Use model of power system to assess system stability
C113.2	Model synchronous machine transmission line and loads.
C113.3	Model excitation and prime mover's systems and static var systems. Use model to study the dynamics of a synchronous generator connected to infinite bus.
C113.4	Use models to analyze the single machine system connected to infinite bus. Discuss the use of power system stabilizers
C113.5	Use models of the multi machine system for the transient stability analysis.

Course Title: COMPUTER RELAYING FOR POWER SYSTEMS

Course Code: 16EPS14

CO NO	After completing the course the student will be able to:
C114.1	Explain advantages of computer relaying, its architecture and relaying practices used in power system.
C114.2	Provide mathematical basis for protective relaying algorithms. Explain digital filters used in computer relaying.
C114.3	Discuss transmission line relaying. Explain protection transformers, machines and buses
C114.4	Explain hardware organization for computer relaying, system relaying.
C114.5	Explain relaying applications for travelling waves. Explain adaptive relaying and WAMS based protection.

Course Title: POWER SYSTEM HARMONICS

Course Code: 16EPS15

CO NO	After completing the course the student will be able to:
C115.1	Explain the fundamental of harmonics
C115.2	Discuss the sources of harmonics in the power system
C115.3	Explain the effects of harmonic distortion on power system
C115.4	Explain the mitigation of harmonics in power system and the limits of harmonic distortion
C115.5	Model generator and transformers for harmonic studies. Model transmission system; transmission lines and cables for harmonic studies

Course Title: POWER SYSTEMS LABORATORY-1

Course Code: 16EPSL16

CO NO	After completing the course the student will be able to:
C116.1	Apply the knowledge of electrical engineering in conducting different experiment in the laboratory.
C116.2	Use suitable simulation software package for the conduction of experiments and analyze the results.

Course Title: SEMINAR

Course Code: 16EPS17

CO NO	After completing the course the student will be able to:
C117.1	The students are able to develop communication skills and interpersonal skills
C117.2	The students are able to have exposure to latest techno.
C117.3	The students are able to develop self-learning skills.
C117.4	The students are able to acquire leadership abilities, ethics and social awareness.
C117.5	The students are able to acquire the knowledge of modern tools

Course Title: POWER ELECTRONIC CONVERTERS

Course Code: 16EPS21

CO NO	After completing the course the student will be able to:
C121.1	Explain the basic topology and analysis of PWM DC/ DC in both Continuous (CCM) and Discontinuous Current Mode (DCM).Discuss on loss mechanisms in the PWM DC/ DC converters.
C121.2	Describes circuits used to control power electronic systems, and their application. Explain analysis and control techniques of single-phase and three phase bridge DC/AC Converters
C121.3	Explain the operation, analysis and control techniques of uncontrolled, phase controlled and high power factor PWM AC/DC Converters. Describes single-phase and three-phase AC/AC voltage converters, direct and indirect frequency converters and matrix converters and their applications
C121.4	Describes different topologies of Resonant Converters and some control circuits used in resonant converters.
C121.5	Explain basic topologies of DC/DC and DC/AC multilevel converters and control techniques used.

Course Title: INSULATORS FOR POWER SYSTEM

Course Code: 16EPS22

CO NO	After completing the course the student will be able to:
C122.1	Define insulator and its terminology. Explain the classification and stresses on insulators
C122.2	Explain designing, manufacturing and testing standards of insulators.
C122.3	Suggest an insulator for a particular voltage. Explain physics of contamination and pollution flashover.
C122.4	Explain terminology of ice, its electrical characteristics, flashover process and icing test methods.
C122.5	Conduct tests on insulators.

Course Title: SWITCHING IN POWER SYSTEMS

Course Code: 16EPS23

CO NO	After completing the course the student will be able to:
C123.1	Explain switching, the phenomena governing the switching process, the switching arc and the transient recovery voltage (TRV).Discuss faults in power systems and the switching of fault currents
C123.2	Explain switching of loads, overhead lines, capacitor banks and shunt reactors operated under normal condition
C123.3	Calculate the switching transients. Explain the switching processes in gaseous media.
C123.4	Discuss different circuit-breakers. Discuss the switching in vacuum circuit breaker
C123.5	Explain special switching situations, the appropriate devices used and the switching over voltages in systems and their mitigation.

Course Title: FACTS CONTROLLERS

Course Code: 16EPS24

CO NO	After completing the course the student will be able to:
C124.1	Discuss the growth of complex electrical power networks, the lack of controllability of the active- and reactive-power flows in energized networks.
C124.2	Describe the conventional controlled systems and the basic operating principles of FACTS.
C124.3	Describe the various components of a general SVC, its control system, control characteristics and the design of the SVC voltage regulator. Explain the use of SVC in stability enhancement, damping sub synchronous oscillations, improvement of HVDC link performance
C124.4	Explain the concepts of series compensation, TCSC controller and its operation, characteristics, modeling and applications.
C124.5	Explain the operation of voltage source converter based FACTS

Course Title: POWER QUALITY PROBLEMS AND MITIGATION

Course Code: 16EPS25

CO NO	After completing the course the student will be able to:
C125.1	Explain causes, effects of PQ problems and classification of mitigation techniques for PQ problems. Explain PQ standards, terminology and monitoring requirements through numerical problems. Explain passive shunt and series compensation using lossless passive components.
C125.2	Explain the design, operation and modeling of active shunt compensation equipment.
C125.3	Explain the design, operation and modeling of active series compensation equipment.
C125.4	Explain the design operation and modeling of unified power quality compensators.
C125.5	Discuss mitigation of power quality problems due to nonlinear loads.

Course Title: POWER SYSTEM LABORATORY - 2

Course Code: 18EPSL26

CO NO	After completing the course the student will be able to:
C126.1	Model a power system to perform transient stability and small signal stability studies.
C126.2	Model automatic voltage regulator and governor to study their effect on stability.
C126.3	Explain dynamic var compensation, capacitor bank switching studies, voltage control and inrush current.
C126.4	Model the transmission line, lighting impulse and surge arrestor, CT and CVT using EMTP for transient analysis
C126.5	Model the circuit breaker to study the current chopping and suppression of over voltage using surge arrestor and RC network.

Course Title: TECHHNICAL SEMINAR

Course Code: 18EPS27

CO NO	After completing the course the student will be able to:
C127.1	Choose, preferably, a recent topic of his/her interest relevant to the Course of Specialization. Carryout literature survey, organize the Course topics in a systematic order.
C127.2	Prepare the report with own sentences.
C127.3	Type the matter to acquaint with the use of Micro-soft equation and drawing tools or any such facilities.
C127.4	Present the seminar topic orally and/or through power point slides.
C127.5	Answer the queries and involve in debate/discussion. Submit two copies of the typed report with a list of references.

Course Title: Internship / Professional Practice Course Code: 16EPS31

CO NO	After completing the course the student will be able to:
C231.1	Able to generate ,develop idea and information to carry out work
C231.2	Able to Identify a real-life problems
C231.3	Able to adapt skills to communicate effectively
C231.4	Able to adapt collaborative skills to work in team
C231.5	Able to Analyze and Implement a tangible solution using available resources

Course Title: Report on Internship Course Code: 16EPS32

CO NO	After completing the course the student will be able to:
C232.1	Gain practical experience within industry in which the internship is done. Acquire knowledge of the industry in which the internship is done
C232.2	Apply knowledge and skills learned to classroom work. Develop a greater understanding about career options while more clearly defining personal career goals.
C232.3	Experience the activities and functions of professionals. Develop and refine oral and written communication skills.
C232.4	Identify areas for future knowledge and skill development. Expand intellectual capacity, credibility, judgment, intuition
C232.5	Acquire the knowledge of administration, marketing, finance and economics.

Course Title: Evaluation and Viva-Voce of Internship Course Code: 16EPS33

CO NO	After completing the course the student will be able to:
C233.1	To put theory into practice.
C233.2	To expand thinking and broaden the knowledge and skills acquired through course work in the field
C233.3	To gain insight to professional communication including meetings, memos, reading, writing, public speaking, research, client interaction, input of ideas, and confidentiality.
C233.4	To identify personal strengths and weaknesses.
C233.5	To develop the initiative and motivation to be a self-starter and work independently.

Course Title: Evaluation of Project phase -1 Course Code: 16EPS34

CO NO	After completing the course the student will be able to:
C234.1	Able to generate ,develop idea and information to carry out project work
C234.2	Able to Identify a real-life problems and adapt skills to communicate effectively
C234.3	Able to adapt collaborative skills to work in team
C234.4	Able to Implement a tangible solution using available resources
C234.5	Able to analyze and interpret data and suggest a solution

Course Title: HVDC POWER TRANSMISSION Course Code: 16EPS41

CO NO	After completing the course the student will be able to:
C241.1	Explain importance of DC power transmission.
C241.2	Describe the basic components of a converter, the methods for compensating the reactive power demanded by the converter
C241.3	Explain the methods for simulation of HVDC systems and its control. Describe filters for eliminating harmonics and the characteristics of the system impedance resulting from AC filter designs
C241.4	Explain the design techniques for the main components of an HVDC system.
C241.5	Explain the protection of HVDC system and other converter configurations used for the HVDC transmission. Explain the recent trends for HVDC applications

Course Title: POWER SYSTEM RELIABILITY

Course Code: 16EPS42

CO NO	After completing the course the student will be able to:
C242.1	Define terminology of reliability. Explain probability concepts for generating capacity reliability evaluation
C242.2	Explain various concepts and evaluation techniques that can be used to assess operational risk
C242.3	Evaluate composite system reliability
C242.4	Evaluate the reliability of complex distribution systems.
C242.5	Perform power system analysis including different aspects such as need, availability, adequacy

Course Title: PROJECT WORK PHASE – 2

Course Code: 16EPS44

CO NO	After completing the course the student will be able to:
C243.1	Support independent learning. Guide to select and utilize adequate information from varied resources maintaining ethics.
C243.2	Guide to organize the work in the appropriate manner and present information (acknowledging the sources) clearly. Develop interactive, communication, organization, time management, and presentation skills.
C243.3	Impart flexibility and adaptability. Inspire independent and team working
C243.4	Expand intellectual capacity, credibility, judgement, intuition. Adhere to punctuality, setting and meeting deadlines.
C243.5	Instill responsibilities to oneself and others. Train students to present the topic of project work in a seminar without any fear, face audience confidently, enhance communication skill, involve in group discussion to present and exchange ideas.

Course Title: Evaluation of Project and Viva-Voce

Course Code: 16EPS44

CO NO	After completing the course the student will be able to:
C244.1	Present the project and be able to defend it.
C244.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task. Habituated to critical thinking and use problem solving skills
C244.3	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C244.4	Work in a team to achieve common goal.
C244.5	Learn on their own, reflect on their learning and take appropriate actions to improve it.

AMC ENGINEERING COLLEGE

DEPARTMENT OF CIVIL ENGINEERING

STATEMENTS	
PROGRAM OUTCOMES (PO)	
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering 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.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Graduates are able to analyse, design and construct Civil Engineering systems with state of the art technologies
PSO2	Graduates are able to work on interdisciplinary and multidisciplinary projects in Green Buildings Sustainable Technologies related research and development activities
PSO3	CIVIL Engineering Graduates are encouraged to hone their skills in Total Quality Management and Entrepreneurship

Course Title: STRENGTH OF MATERIALS **Course Code: 15CV32**

CO.No.	OUTCOMES After completing the course the student will be able to:
C202.1	To evaluate the strength of various structural elements internal forces such as compression, tension, shear, bending and torsion
C202.2	To suggest suitable material from among the available in the field of construction and manufacturing.
C202.3	To evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure concepts,
C202.4	To understand the basic concept of analysis and design of members subjected to torsion
C202.5	To understand the basic concept of analysis and design of structural elements such as columns and struts.

Course Title: FLUIDS MECHANICS **Course Code: 15CV33**

CO.No.	OUTCOMES After completing the course the student will be able to:
C203.1	Possess a sound knowledge of fundamental properties of fluids and fluid Continuum
C203.2	Compute and solve problems on hydrostatics, including practical applications
C203.3	Apply principles of mathematics to represent kinematic concepts related to fluid flow
C203.4	Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
C203.5	Compute the discharge through pipes and over notches and weirs

Course Title: BASIC SURVEYING **Course Code: 15CV34**

CO.No.	OUTCOMES After completing the course the student will be able to:
C204.1	Posses a sound knowledge of fundamental principles Geodetics
C204.2	Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.
C204.3	Capture geodetic data to process and perform analysis for survey problems
C204.4	Analyse the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours

Course Title: ENGINEERING GEOLOGY **Course Code: 15CV35**

CO.No.	OUTCOMES After completing the course the student will be able to:
C205.1	Students will able to apply the knowledge of geology and its role in Civil Engineering
C205.2	Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices.
C205.3	Analyze the natural disasters and their mitigation
C205.4	Assess various structural features and geological tools in ground water exploration, Natural resource estimation and solving civil engineering problems.
C205.5	Apply and asses use of building materials in construction and asses their properties

Course Title: Building Materials and Construction **Course Code: 15CV36**

CO.No.	OUTCOMES After completing the course the student will be able to:
C206.1	Select suitable materials for buildings and adopt suitable construction techniques.
C206.2	Adopt suitable repair and maintenance work to enhance durability of buildings

Course Title: BUILDING MATERIALS TESTING LABORATORY

Course Code: 15CVL37

CO.No.	OUTCOMES After completing the course the student will be able to:
C207.1	Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion.
C207.2	Identify, formulate and solve engineering problems of structural elements subjected to flexure.
C207.3	Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.

Course Title: BASIC SURVEYING PRACTICE

Course Code: 15CVL38

CO.No.	OUTCOMES After completing the course the student will be able to:
C208.1	Apply the basic principles of engineering surveying for linear and angular measurements
C208.2	Comprehend effectively field procedures required for a professional surveyor.
C208.3	Use techniques, skills and conventional surveying instruments necessary for engineering practice.

Course Title: Analysis of Determinate Structures **Course Code: 15CV42**

CO.No.	OUTCOMES After completing the course the student will be able to:
C210.1	Evaluate the forces in determinate trusses by method of joints and sections.
C210.2	Evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
C210.3	Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and bent frames.
C210.4	Determine the stress resultants in arches and cables.
C210.5	Understand the concept of influence lines and construct the ILD diagram for the moving loads

Course Title: Applied Hydraulics **Course Code: 15CV 43**

CO.No.	OUTCOMES After completing the course the student will be able to:
C211.1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters
C211.2	Design the open channels of various cross sections including economical channelsections
C211.3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation,
C211.4	Compute water surface profiles at different conditions
C211.5	Design turbines for the given data, and to know their operation characteristics under different operating conditions

Course Title: Concrete Technology **Course Code: 15CV44**

CO.No.	OUTCOMES After completing the course the student will be able to:
C212.1	Relate material characteristics and their influence on microstructure ofconcrete.
C212.2	Distinguish concrete behaviour based on its fresh and hardened properties.
C212.3	Illustrate proportioning of different types of concrete mixes for required freshand hardened properties using professional codes

Course Title: Basic Geotechnical Engineering **Course Code: 15CV45**

CO.No.	OUTCOMES After completing the course the student will be able to:
C213.1	Will acquire an understanding of the procedures to determine index properties ofany type of soil, classify the soil based on its index properties
C213.2	Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures
C213.3	Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire abilityto estimate seepage losses across hydraulic structure
C213.4	Will be able to estimate shear strength parameters of different types of soils usingthe data of different shear tests and comprehend Mohr-Coulomb failure theory.
C213.5	Ability to solve practical problems related to estimation of consolidation settlementof soil deposits also time required for the same

Course Title: Advanced Surveying **Course Code: 15CV46**

CO.No.	OUTCOMES After completing the course the student will be able to:
C214.1	Apply the knowledge of geometric principles to arrive at surveying problems
C214.2	Use modern instruments to obtain geo-spatial data and analyse the same to appropriate engineering problems.
C214.3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments;
C214.4	Design and implement the different types of curves for deviating type of alignments

Course Title: Fluid Mechanics and Hydraulic Machines Laboratory

Course Code: 15 CVL47

CO.No.	OUTCOMES After completing the course the student will be able to:
C215.1	Properties of fluids and the use of various instruments for fluid flow measurement.
C215.2	Working of hydraulic machines under various conditions of working and their characteristics

Course Title: Engineering Geology Laboratory **Course Code: 15CVL48**

CO.No.	OUTCOMES After completing the course the student will be able to:
C216.1	Identifying the minerals and rocks and utilize them effectively in Civil Engineering practices
C216.2	Understanding and interpreting the geological conditions of the area for the Implementation of civil engineering projects.
C216.3	Interpreting subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods
C216.4	Thetechniquesofdrawingthecurvesofelectricalresistivitydataanditsinterpretationfor Geotechnical and aquifer boundaries

Course Title: MANAGEMENT & ENTREPRENEURSHIP **Course Code: 10CVAL51**

CO.No.	OUTCOMES After completing the course the student will be able to:
C301.1	The students develop and can systematically apply an entrepreneurial way of thinking that will allow them to identify
C301.2	create business opportunities that may be commercialized successfully. Process
C301.3	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
C301.4	Owns professional and ethical responsibility

Course Title: ENVIRONMENTAL ENGINEERING-I **Course Code: 15CV52**

CO.No.	OUTCOMES After completing the course the student will be able to:
C302.1	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method
C302.2	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.
C302.3	Construct the bending moment diagram for beams and frames by Kani's method.
C302.4	Construct the bending moment diagram for beams and frames using flexibility method
C302.5	Analyze the beams and indeterminate frames by system stiffness method

Course Title: Applied Geotechnical Engineering **Course Code: 15CV53**

CO.No.	OUTCOMES After completing the course the student will be able to:
C303.1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
C303.2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils
C303.3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
C303.4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
C303.5	Capable of estimating load carrying capacity of single and group of piles

Course Title: Computer Aided Building Planning and Drawing

Course Code: 15CV54

CO.No.	OUTCOMES After completing the course the student will be able to:
C304.1	Gain a broad understanding of planning and designing of buildings
C304.2	Prepare, read and interpret the drawings in a professional set up.
C304.3	Know the procedures of submission of drawings and Develop working and submission drawings for building
C304.4	Plan and design a residential or public building as per the given requirements

Course Title: Air Pollution and Control **Course Code: 15CV551**

CO.No.	OUTCOMES After completing the course the student will be able to:
C305.1	Identify the major sources of air pollution and understand their effects on health and environment.
C305.2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
C305.3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.
C305.4	Choose and design control techniques for particulate and gaseous emissions

Course Title: Railways, Harbo ur, Tunneling and Airports

Course Code: 15CV552

CO.No.	OUTCOMES After completing the course the student will be able to:
C305.1	Acquires capability of choosing alignment and also design geometric aspects of railway system, runway, taxiway.
C305.2	Suggest and estimate the material quantity required for laying a railway track and also will be able to determine the hauling capacity of a locomotive.
C305.3	Develop layout plan of airport, harbor, dock and will be able relate the gained knowledge to identify required type of visual and/or navigational aids for the same.
C305.4	Apply the knowledge gained to conduct surveying, understand the tunneling activities

Course Title: Remote Sensing and GIS **Course Code: 15CV563**

CO.No.	OUTCOMES After completing the course the student will be able to:
C306.1	Collect data and delineate various elements from the satellite imagery using their spectral signature.
C306.2	Analyze different features of ground information to create raster or vector data.
C306.3	Perform digital classification and create different thematic maps for solving specific problems
C306.4	Make decision based on the GIS analysis on thematic maps

Course Title: Geotechnical Engineering Lab **Course Code: 15CVL57**

CO.No.	OUTCOMES After completing the course the student will be able to:
C307.1	Physical and index properties of the soil
C307.2	Classify based on index properties and field identification
C307.3	To determine OMC and MDD, plan and assess field compaction program
C307.4	Shear strength and consolidation parameters to assess strength and deformation characteristics
C307.5	In-situ shear strength characteristics (SPT- Demonstration)

Course Title: Concrete and Highway Materials Laboratory Course Code: 15CVL58

CO.No.	OUTCOMES After completing the course the student will be able to:
C308.1	Conduct appropriate laboratory experiments and interpret the results
C308.2	Determine the quality and suitability of cement
C308.3	Design appropriate concrete mix
C308.4	Determine strength and quality of concrete
C308.5	Test the road aggregates and bitumen for their suitability as road material.
C308.6	Test the soil for its suitability as sub grade soil for pavements

Course Title: CONSTRUCTION MANAGEMENT AND ENTREPRENEURSHIP

Course Code: 15CV61

CO.No.	OUTCOMES After completing the course the student will be able to:
C309.1	Understand the construction management process.
C309.2	Understand and solve variety of issues that are encountered by every professional indischarging professional duties.
C309.3	Fulfill the professional obligations effectively with global outlook
C309.4	Understand the construction management process.

Course Title: DESIGN OF STEEL STRUCTURAL ELEMENTS

Course Code: 15CV62

CO.No.	OUTCOMES After completing the course the student will be able to:
C310.1	Possess a knowledge of Steel Structures Advantages and Disadvantages of Steelstructures, steel code provisions and plastic behaviour of structural steel
C310.2	Understand the Concept of Bolted and Welded connections
C310.3	Understand the Concept of Design of compression members, built-up columnsand columns splices.
C310.4	Understand the Concept of Design of tension members, simple slab base andgusseted base.
C310.5	Understand the Concept of Design of laterally supported and un-supported steelbeams.

Course Title: HIGHWAY ENGINEERING **Course Code: 15CV63**

CO.No.	OUTCOMES After completing the course the student will be able to:
C311.1	Acquire the capability of proposing a new alignment or re-alignment of existing roads,conduct necessary field investigation for generation of required data.
C311.2	Evaluate the engineering properties of the materials and suggest the suitability of thesame for pavement construction.
C311.3	Design road geometrics, structural components of pavement and drainage.
C311.4	Evaluate the highway economics by few select methods and also will have a basicknowledge of various highway financing concepts

Course Title: WATER SUPPLY AND TREATMENT ENGINEERING

Course Code: 15CV64

CO.No.	OUTCOMES After completing the course the student will be able to:
C312.1	Estimate average and peak water demand for a community.
C312.2	Evaluate available sources of water, quantitatively and qualitatively and makeappropriate choice for a community.
C312.3	Evaluate water quality and environmental significance of various parameters andplan suitable treatment system.
C312.4	Design a comprehensive water treatment and distribution system to purify anddistribute water to the required quality standards.
C312.5	Estimate average and peak water demand for a community.

Course Title: ALTERNATIVE BUILDING MATERIALS **Course Code: 15CV653**

CO.No.	OUTCOMES After completing the course the student will be able to:
C313.1	Solve the problems of Environmental issues concerned to building materials and cost effective building technologies;
C313.2	Suggest appropriate type of masonry unit and mortar for civil engineering constructions; also they are able to Design Structural Masonry Elements under Axial Compression.
C313.3	Analyse different alternative building materials which will be suitable for specific climate and in an environmentally sustainable manner. Also capable of suggesting suitable agro and industrial wastes as a building material.
C313.4	Recommend various types of alternative building materials and technologies and design a energy efficient building by considering local climatic condition and building material

Course Title: WATER RESOURCES MANAGEMENT

Course Code: 15CV661

CO.No.	OUTCOMES After completing the course the student will be able to:
C314.1	Assess the potential of groundwater and surface water resources.
C314.2	Address the issues related to planning and management of water resources.
C314.3	Know how to implement IWRM in different regions
C314.4	Understand the legal issues of water policy.
C314.5	Select the method for water harvesting based on the area.

Course Title: SOFTWARE APPLICATION LAB Course Code: 15CVL67

CO.No.	OUTCOMES After completing the course the student will be able to:
C315.1	Use software skills in a professional set up to automate the work and thereby reducecycle time for completion of the work

Course Title: EXTENSIVE SURVEY PROJECT /CAMP Course Code: 15CVL68

CO.No.	OUTCOMES After completing the course the student will be able to:
C316.1	Apply Surveying knowledge and tools effectively for the projects
C316.2	Understanding Task environment, Goals, responsibilities, Task focus, working in Teams towards common goals, Organizational performance expectations, technical and behavioral competencies.
C316.3	Application of individual effectiveness skills in team and organizational context, goal setting, time management, communication and presentation skills.
C316.4	Professional etiquettes at workplace, meeting and general
C316.5	Establishing trust based relationships in teams & organizational environment

Course Title: Municipal and Industrial Waste Water Engineering

Course Code: 15CV71

CO.No.	OUTCOMES After completing the course the student will be able to:
C401.1	Acquires capability to design sewer and Sewerage treatment plant.
C401.2	Evaluate degree of treatment and type of treatment for disposal, reuse and recycle.
C401.3	Identify waste streams and design the industrial waste water treatment plant.
C401.4	Manage sewage and industrial effluent issues.

Course Title: Design of RCC and Steel Structures **Course Code: 15CV72**

CO.No.	OUTCOMES After completing the course the student will be able to:
C402.1	Students will acquire the basic knowledge in design of RCC and Steel Structures.
C402.2	Students will have the ability to follow design procedures as per codal provisions and skills to arrive at

Course Title: Hydrology and Irrigation Engineering Course Code: 15CV73

CO.No.	OUTCOMES After completing the course the student will be able to:
C403.1	Understand the importance of hydrology and its components.
C403.2	Measure precipitation and analyze the data and analyze the losses in precipitation.
C403.3	Estimate runoff and develop unit hydrographs.
C403.4	Find the benefits and ill-effects of irrigation.
C403.5	Find the quantity of irrigation water and frequency of irrigation for various crops.
C403.6	Find the canal capacity, design the canal and compute the reservoir capacity.

Course Title: Ground Water & Hydraulics Course Code: 15CV742

CO.No.	OUTCOMES After completing the course the student will be able to:
C404.1	Find the characteristics of aquifers.
C404.2	Estimate the quantity of ground water by various methods.
C404.3	Locate the zones of ground water resources.
C404.4	Select particular type of well and augment the ground water storage.

Course Title: Urban Transportation and Planning **Course Code: 15CV751**

CO.No.	OUTCOMES After completing the course the student will be able to:
C405.1	Design, conduct and administer surveys to provide the data required for transportation planning.
C405.2	Supervise the process of data collection about travel behavior and analyze the data for use in transport planning.
C405.3	Develop and calibrate modal split, trip generation rates for specific types of land use developments.
C405.4	Adopt the steps that are necessary to complete a long-term transportation plan.

Course Title: Rehabilitation and Retrofitting of Structures

Course Code: 15CV753

CO.No.	OUTCOMES After completing the course the student will be able to:
C405.1	Understand the cause of deterioration of concrete structures.
C405.2	Able to assess the damage for different type of structures
C405.3	Summarize the principles of repair and rehabilitation of structures
C405.4	Recognize ideal material for different repair and retrofitting technique

Course Title: Environmental Engineering Laboratory

Course Code: 15CVL76

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C406.1	To Acquire capability to conduct experiments and estimate the concentration of different parameters
C406.2	To Compare the result with standards and discuss based on the purpose of analysis.
C406.3	To Determine type of treatment, degree of treatment for water and waste water.
C406.4	To Identify the parameter to be analyzed for the student project work in environmental stream.

Course Title: Computer Aided Detailing of Structures Course Code: 15CVL77

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C407.1	To Prepare detailed working drawings of buildings and industrial structures

Course Title: Project phase 1 Course Code: 15CVP78

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C408.1	Analyze the learning and understand techniques for Project planning, scheduling and Execution Control.

Course Title: QUANTITY SURVEYING AND CONTRACTS MANAGEMENT

Course Code: 15CV81

CO.No.	OUTCOMES After completing the course the student will be able to:
C408.1	Prepare detailed and abstract estimates for roads and building.
C408.2	Prepare valuation reports of buildings.
C408.3	Interpret Contract document's of domestic and international construction works

Course Title: DESIGN OF PRE STRESSED CONCRETE ELEMENTS

Course Code: 15CV82

CO.No.	OUTCOMES After completing the course the student will be able to:
C409.1	Understand the requirement of PSC members for present scenario.
C409.2	Analyse the stresses encountered in PSC element during transfer and at working.
C409.3	Understand the effectiveness of the design of PSC after studying losses
C409.4	Capable of analyzing the PSC element and finding its efficiency.
C409.5	Design PSC beam for different requirements

Course Title: EARTHQUAKE ENGINEERING Course Code: 15CV831

CO.No.	OUTCOMES After completing the course the student will be able to:
C410.1	Acquire basic knowledge of engineering seismology
C410.2	Develop response spectra for a given earthquake time history and its implementation to estimate response of a given structure.
C410.3	Understanding of causes and types of damages to civil engineering structuresduring different earthquake scenarios
C410.4	Analyze multi-storied structures modeled as shear frames and determine lateralforce distribution due to earthquake input motion using IS-1893 procedures.
C410.5	Comprehend planning and design requirements of earthquake resistant featuresof RCC and Masonry structures thorough exposure to different IS-codes of practices.

Course Title: ADVANCED FOUNDATION DESIGN
Course Code: 15CV834

CO.No.	OUTCOMES After completing the course the student will be able to:
C410.1	Estimate the size of isolated and combined foundations to satisfy bearing capacityand settlement criteria.
C410.2	Estimate the load carrying capacity and settlement of single piles and pile groupsincluding laterally loaded piles
C410.3	Understand the basics of analysis and design principles of well foundation, drilledpiers and caissons
C410.4	Understand basics of analysis and design principles of machine foundations
C410.5	Estimate the size of isolated and combined foundations to satisfy bearing capacityand settlement criteria.

Course Title: **INTERNSHIP /PROFESSIONAL PRACTICE**

Course Code: 15CV84

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C411.1	Commit to professional ethics and responsibilities as a member in team/individual.
C411.2	Communicate technically and general information by means of oral/written presentation skills with professionalism.

Course Title: **Project Viva Voce** **Course Code: 15CV85**

CO.No.	**OUTCOMES** After completing the course the student will be able to:
C412.1	Construct a team, distribute the work and commit to professional ethics and responsibilities as a member in a team and individual.
C412.2	Design &Demonstrate the proposed work in module wise with proper time allocation and finance management.
C412.3	Assess the post analysis implementation and identify its future scope, issues and impact.
C412.4	Communicate technical and general information by means of oral as well as written presentation skills with professionalism.

Course Title: Seminar **Course Code: 15CVS86**

CO.No.	OUTCOMES After completing the course the student will be able to:
C413.1	Identify the emerging technical field by applying the engineering concepts from the research repository
C413.2	Survey the related literature for better understanding.
C413.3	Analyze the methodology used in the identified paper.
C413.4	Prepare the power point presentation and documentation by applying ethical principles with committed professional responsibilities as an individual.
C413.5	Discuss the issues and future scope for available technology.

AMC ENGINEERING COLLEGE

DEPARTMENT OF PHYSICS 2017-18

Course Title: Engineering Physics **Course Code: 17PHY22**

CO. No.	**OUTCOMES** After completing the course the student will be able to:
CO1	Gain Knowledge about Modern physics and quantum mechanics will update the basic concepts to implement the skills.
CO2	Study of material properties and their applications is the prime role to understand and use in engineering applications and studies.
CO3	Study Lasers and Optical fibers and its applications are to import knowledge and to develop skills and to use modern instruments in the engineering applications.
CO4	Understand Crystal structure and applications are to boost the technical skills and its applications.
CO5	Expose shock waves concept and its applications will bring latest technology to the students at the first year level to develop research orientation programs at higher semester level.
CO6	Understand basic concepts of nano science and technology.

Course Title: Engineering Physics Lab **Course Code: 17PHYL27**

CO. No.	OUTCOMES After completing the course the student will be able to:
CO1	Determine physical constants (radius of curvature of a Plano convex lens, wavelength of a laser and Stefan's index) by performing experiments based on optical phenomena (Interference, diffraction and Stefan's law).
CO2	Determine electrical parameters (Inductance, capacitance, resistance, bandwidth and quality factor) with the help of obtained frequency response curve by performing LCR series & parallel experiments and Black Box experiment.
CO3	Determine the fermi energy of copper and dielectric constant of a material (paper) by performing experiments based on temperature dependence of resistance, and charging & discharging of a capacitor.
CO4	Determine electrical parameters (knee voltage, breakdown voltage, forward & reverse dynamic resistance, input resistance, α & β, and responsivity) of electronic devices including zener diode, transistor and photodiode by performing experiments based on the concepts of semiconductors.
CO5	Determine the elastic constants of materials (Young's modulus-wood and rigidity modulus-steel) by performing uniform bending and Torsional pendulum experiments.

AMC ENGINEERING COLLEGE

DEPARTMENT OF CHEMISTRY

Course Title: Engineering Chemistry (CBCS) **Course Code: 17CHE12/17**

CO. No.	**OUTCOMES** After completing the course the student will be able to:
CO1	Recall and Explain the Principles of Chemistry related to Electrochemistry, batteries, fuel cells, metals and Engineering materials.
CO2	Retrieve the Causes and effects of corrosion of metals and its control and interpret engineering problems in chemistry perspective to achieve solutions.
CO3	Carry out the Production & consumption of energy for industrialization of country and improving the living standards of people. Utilization of solar energy for different useful forms.
CO4	Explain the replacement of conventional materials (metals) by polymers and Nano materials for various domestic and Industrial applications.
CO5	Apply the knowledge of chemistry in solving societal problems related to public health, safety and environmental issues.

Course Title: Engineering Chemistry Lab(CBCS) **Course Code: 17CHE17/27**

CO. No.	OUTCOMES After completing the course the student will be able to:
CO1	Analysis of materials using small quantities of materials involved for quick and accurate results by handling different types of instruments.
CO2	Estimation of concerned in materials using comparatively more quantities of material involved for good results by Carrying out different types of titrations.

AMC ENGINEERING COLLEGE

DEPARTMENT OF MATHEMATICS

ENGINEERING MATHEMATICS-I (17MAT11)

On completion of this course students will be able to

CO No.	Statement
1.	Find nth derivatives of product of two functions and polar curves.
2.	Use partial derivatives to calculate rates of change of multivariate functions.
3.	Analyze position, velocity and acceleration in two or three dimensions using the calculus of vector valued functions.
4.	Recognize and solve first-order ordinary differential equations, Newton's law of cooling.
5.	Use matrices techniques for solving systems of linear equations in the different areas of Linear Algebra.

ENGINEERING MATHEMATICS-II (17MAT21)

On completion of this course students will be able to

CO No.	Statement
1.	Solve differential equations of electrical circuits, forced oscillation of mass spring and elementary heat transfer.
2.	Solve partial differential equations fluid mechanics, electromagnetic theory and heat transfer.
3.	Evaluate double and triple integrals to find area , volume, mass and moment of inertia of plane and solid region.
4.	Use curl and divergence of a vector valued functions in various applications of electricity, magnetism and fluid flows.
5.	Use Laplace transforms to determine general or complete solutions to linear ODE.

Engineering Mathematics-III (15MAT31)

On completion of this course students will be able to

CO No.	Statement
1.	Use of periodic signals and Fourier series to analyze circuits.
2.	Explain the general linear system theory for continuous-time signals and systems using the Fourier Transform.
3.	Analyze discrete-time systems using convolution and the z-transform.
4.	Use appropriate numerical methods to solve algebraic and transcendental equations and also to calculate a definite integral.
5.	Use curl and divergence of a vector function in three dimensions, as well as apply the Green's Theorem, Divergence Theorem and Stokes' theorem in various applications and solve the simple problem of the calculus of variations.

Engineering Mathematics-IV (15MAT41)

On completion of this course students will be able to

CO No.	Statement
1.	Use appropriate numerical methods to solve first and second order ordinary differential equations.
2.	Use Bessel's and Legendre's function which often arises when a problem possesses axial and spherical symmetry, such as in quantum mechanics, electromagnetic theory, hydrodynamics and heat conduction.
3.	State and prove Cauchy’s theorem and its consequences including Cauchy's integral formula.
4.	Compute residues and apply the residue theorem to evaluate integrals.
5.	Analyze, interpret, and evaluate scientific hypotheses and theories using rigorous statistical methods.

ADDITIONAL MATHEMATICS – I (15MATDIP31)

On completion of this course students will be able to

CO No.	Statement
1.	Understand the fundamental concepts of complex numbers and vector algebra to analyze the problems arising in related area.
2.	Use derivatives and partial derivatives to calculate rates of change of multivariate functions.
3.	Learn techniques of integration including double and triple integrals to find area, volume, mass and moment of inertia of plane and solid region.
4.	Analyze position, velocity and acceleration in two or three dimensions using the calculus of vector valued functions.
5.	Recognize and solve first-order ordinary differential equations occurring in different branches of engineering.

ADDITIONAL MATHEMATICS – II (15MATDIP41)

On completion of this course students will be able to

CO No.	Statement
1.	Solve systems of linear equations in the different areas of linear algebra.
2.	Solve second and higher order differential equations occurring in of electrical circuits, damped/un-damped vibrations.
3.	Describe Laplace transforms of standard and periodic functions.
4.	Determine the general/complete solutions to linear ODE using inverse Laplace transforms.
5.	Recall basic concepts of elementary probability theory and, solve problems related to the decision theory, synthesis and optimization of digital circuits.

AMC ENGINEERING COLLEGE

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS

STATEMENTS	
PROGRAM OUTCOMES (PO)	
PO1	**Computational 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	**Conduct investigations of complex problems:** Use Research-Based Knowledge and Research methods including design of Experiments, Analysis and Interpretation of data, and synthesis of the information to provide valid conclusions
PO5	**Modern tool usage:** Create, Select, Adapt and Apply Appropriate techniques, resources, and Modern Computing tools to Complex Computing activities, with an understanding of the limitations.
PO6	**Professional Ethics:** Understand and Commit to Professional Ethics and Cyber regulations, Responsibilities, and norms of Professional Computing Practices.
PO7	**Life-long Learning:** Recognize the need, and have the ability, to engage in independent Learning for Continual Development as a Computing Professional.
PO8	**Project management and finance**: Demonstrate Knowledge and understanding of the 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	**Communication Efficacy:** 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 Concern:** Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practices.
PO11	**Individual and Team Work:** Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.
PO12	**Innovation and Entrepreneurship:** 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.
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Graduates will be able to Analyze, Design and Implement Solutions in IT Sector using Cutting Edge Technologies.
PSO2	Graduates will be able to Design and Deploy Software in various Application Domains.

Data Structures Using C [As per Choice Based Credit System (CBCS) scheme]SEMESTER – I			
Subject Code	16MCA11	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			

Course Outcome (CO): At the end of this course, the students will be able toCO1:
Understand basics of C programming language
CO2: Acquire knowledge of
- Various types of data structures, operations and algorithms
- Sorting and searching operations

CO3: Analyze the performance of
- Stack, Queue, Lists, Trees, Hashing, Searching and Sorting techniques

CO4: Implement all the applications of Data structures in a high-level language
CO5: Design and apply appropriate data structures for solving computing problems.

UNIX Programming [As per Choice Based Credit System (CBCS) scheme]SEMESTER – I			
Subject Code	16MCA12	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			

Course Outcome (CO): At the end of this course, the students will be able to
CO1: Understand and experience the UNIX environment, File system and hierarchy.
CO2: Demonstrate commands to extract, interpret data for further processing.
CO3: Apply commands to perform different tasks on various applications
CO4: Analyze the usage of different shell commands, variables and AWK filtering.
CO5: Evaluate different commands with sample shell scripts

[As per Choice Based Credit System (CBCS) scheme] SEMESTER – I			
Subject Code	16MCA13	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			

Course Outcome (CO): At the end of this course, the students will be able to

CO1: Understand the fundamentals of web and thereby develop web applications using various development languages and tools.

CO2:Build the ability to select the essential technology needed to develop and implement web applications

CO3: Use Scripting language utilities for static and dynamic environment

CO4: Design XML document with presentation using CSS and XSLT.

CO5: Develop CGI applications using PERL.

Computer Organization [As per Choice Based Credit System (CBCS) scheme] SEMESTER – I			
Subject Code	16MCA14	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			

Course Outcome (CO): At the end of this course, the students will be able to

CO1: Understand the Basics of Digital System

CO2: Understand the Basics of Computer System Organization

CO3: Apply the concepts of the number system in Designing Digital System.

CO4: Analyze the need of Logic circuits in digital system

CO5: Create logic circuits for real time requirement

DISCRETE MATHEMATICAL STRUCTURES [As per Choice Based Credit System (CBCS) scheme]SEMESTER – I			
Subject Code	16MCA15	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			

Course Outcome (CO): At the end of this course, the students will be able to
CO1: Use the logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions, and integers.
CO2: Calculate numbers of possible outcomes of elementary combinatorial processes such as permutations and combinations.
CO3: Calculate probabilities and conditional probabilities.
CO4: Apply graph theory models of data structures and state machines to solve problems ofconnectivity and constraint satisfaction, for example, scheduling.

DATA STRUCTURES USING C LABORATORY			
Subject Code	16MCA16	CIE Marks	20
Number of Lecture Hours/Week	01Hour Tutorial/ Instructions 02 Hours Laboratory	SEE Marks	80
Total Number of Lecture Hours	42	SEE Hours	03
CREDITS – 02			

Course Outcomes(CO):At the end of this course, the students will be able to
*CO1:*Apply data structure concepts to develop interactive applications in C.
CO2: Linear data structures and their applications such as Stacks, Queues and ListsCO3: Non-Linear Data Structures and their Applications
CO4: Be fluent in the use of different types of sorting and searching techniques

UNIXProgrammingLaboratory			
Laboratory Code	16MCA17	CIE Marks	20
Number of Lecture Hours/Week	01Hour Tutorial/Instructions 02 Hours Laboratory	SEE Marks	80
Total Number of Lecture Hours	42	SEE Hours	03
CREDITS – 02			

Course Outcome (CO): At the end of this course, the students will be able toCO1:
Understand the Unix programming environment.
CO2: Be fluent in the use of Vi editor.
CO3: Be able to design and implement shell scripts to manage users with different types ofpermission and file based applications.
CO4: Be fluent to write Awk scripts.

PYTHON PROGRAMMING [As per Choice Based Credit System (CBCS) scheme]SEMESTER – II			
Subject Code	16MCA21	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			
Course Outcome (CO): At the end of this course, the students will be able toCO1: Understand and comprehend the basics of python programming. **CO2:** Apply knowledge in real time applications. **CO3:** Understands about files and its applications.			
Modules			**Teaching Hours**

Object Oriented Programming Using C++ [As per Choice Based Credit System (CBCS) scheme]SEMESTER – II			
Subject Code	16MCA22	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			
Course Outcome (CO): At the end of this course, the students will be able to **CO1:** Differentiate between object oriented programming and procedure oriented programming & Disseminate the importance of Object oriented programming **CO2:**Apply C++ features such as Classes, objects, constructors, destructors, inheritance, operator overloading, and Polymorphism, Template and exception handling in program design and implementation. **CO3:** Use C++ to demonstrate practical experience in developing object-oriented solutions. **CO4:** Analyze a problem description and build object-oriented software using good coding practices and techniques. **CO5:** Implement an achievable practical application and analyze issues related to object-oriented techniques in the C++ programming language.			

DATABASE MANAGEMENT SYSTEM [As per Choice Based Credit System (CBCS) scheme]SEMESTER – II			
Subject Code	16MCA23	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			
Course Outcome (CO): At the end of this course, the students will be able to **CO1:** Demonstrate the fundamentals of data models and conceptualize and depict adatabase system and Make use of ER diagram in developing ER Model **CO2:** To Summarize the SQL and relational database design. **CO3:** Illustrate transaction processing, concurrency control techniques and recovery **CO4:** Inference the database design in the real world entities.			

Operating Systems [As per Choice Based Credit System (CBCS) scheme] SEMESTER – II			
Subject Code	16MCA24	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			
Course Outcome (CO): At the end of this course, the students will be able to CO1: Understand the Basics of Computer and Operating Systems Structure**CO2:** Realize the concept of Process Management and Mutual Execution **CO3:** Understand the concepts of the Deadlock and different approaches to memorymanagement. **CO4:** Learn the concepts of file system **CO5:** Understand the concepts of Computer Security.			

SYSTEM SOFTWARE [As per Choice Based Credit System (CBCS) scheme]SEMESTER – II			
Subject Code	16MCA25	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			
Course Outcome (CO): At the end of this course, the students will be able to **CO1:** Understand the introductory concepts of system software, SIC and SIC/XE machinearchitecture. **CO2:** Understand the design and implementation of Assemblers with implementation examples. **CO3:** Design and implement the linkers and loaders, macro processors and respective implementation examples. **CO4:** Learn the basic design and working of compilers.			

PYTHON PROGRAMMING LABORATORY			
Laboratory Code	16MCA26	CIE Marks	20
Number of Lecture Hours/Week	01Hour Tutorial/ Instructions 02 Hours Laboratory	SEE Marks	80
Total Number of Lecture Hours	42	SEE Hours	03
CREDITS – 02			

Course Outcome (CO): At the end of this course, the students will be able to
CO1: Apply object-oriented programming concepts to develop dynamic interactive Pythonapplications.
CO2: Use the procedural statements: assignments, conditional statements, loops, method calls and arrays
CO3: Design, code, and test small Python programs with a basic understanding of top-downdesign.
CO4: Learn how to create GUI andsolve real-world problem using language idioms, data structures and standard library

OBJECT ORIENTED PROGRAMMING USING C++ LABORATORY			
Laboratory Code	16MCA27	CIE Marks	20
Number of Lecture Hours/Week	01 Hours Tutorial/ Instructions 02 Hours Laboratory	SEE Marks	80
Total Number of Lecture Hours	42	SEE Hours	03
CREDITS – 02			

Course Outcome (CO): At the end of this course, the students will be able to CO1: Apply and implement major programming and object oriented concepts likefunction overloading, operator overloading, Encapsulations, and inheritance, message passing to solve real-world problems.
CO2: Use major C++ features such as Virtual functions, Templates for data typeindependent designs and File I/O to deal with large data sets.
CO3: Analyze, design and develop solutions to real-world problems applying OOP Concepts of C++.

DATABASE MANAGEMENT SYSTEMS LABORATORY			
Laboratory Code	16MCA28	CIE Marks	20
Number of Lecture Hours/Week	01Hour Tutorial/ Instructions 02 Hours Laboratory	SEE Marks	80
Total Number of Lecture Hours	42	SEE Hours	03
CREDITS – 02			

Course Outcome (CO): At the end of this course, the students will be able to
CO1: Understand, appreciate the underlying concepts of database technologies
CO2: Able to create database with different types of integrity constraints and use the SQLcommands such as DDL, DML, DCL, TCL to access data from database objects.
CO3: Design and implement a database schema for a given problem domain
CO4: Perform embedded and nested queries
CO5: Take up real world problems independently

Computer Networks [As per Choice Based Credit System (CBCS) scheme]SEMESTER –III			
Subject Code	16MCA31	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			
Course Outcome (CO): The students will be able to **CO1**: Understand the types of Networks & Communication medias. **CO2**: Identify the components required to build different types of networks **CO3**: Understand the functionalities needed for data communication into layers**CO4**: Choose the required functionality at each layer for given application **CO5**: Understand the working principles of various application protocols			

Java Programming [As per Choice Based Credit System (CBCS) scheme]SEMESTER –III			
Subject Code	16MCA32	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			
Course Outcome (CO): At the end of this course, the students will be able to **CO1**: Understand the basic programming constructs of Java. Apply suitable OOP concepts todevelop Java programs for a given scenario. **CO2**: Illustrate the concepts of Generalization and run time polymorphism applications **CO3**: Exemplify the usage of Packages, Interfaces, Exceptions and Multithreading **CO4**: Demonstrate Enumerations, Wrappers, Auto boxing, Generics,collection framework and I/O operations **CO5**: Implement the concepts of Networking using Java network classes			

Analysis and Design of Algorithms [As per Choice Based Credit System (CBCS) scheme]SEMESTER –III			
Subject Code	16MCA33	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			
Course Outcome (CO): ***At the end of this course, the students will be able to*** **CO1**: Categorize problems based on their characteristics and practical importance. **CO2**: Develop Algorithms using iterative/recursive approach **CO3**: Compute the efficiency of algorithms in terms of asymptotic notations **CO4**: Design algorithm using an appropriate design paradigm for solving a given problem **CO5**: Classify problems as P, NP or NP Complete **CO6**: Implement algorithms using various design strategies and determine their order ofgrowth.			

Software Engineering [As per Choice Based Credit System (CBCS) scheme]SEMESTER –III			
Subject Code	16MCA34	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			

Course Outcome (CO): At the end of this course, the students will be able to

CO1: Categorize problems based on their characteristics and practical importance.

CO2: Apply the correct process models for software development.

CO3: Apply the techniques, skills, and modern engineering tools necessary forengineering practice.

CO4: Define, formulate and analyze a problem as per the testing techniques.

CO5: Apply new Generation of Software Engineering Technology to Meet Current and Future Industrial Challenges of Emerging Software Trends.

Computer Networks Laboratory [As per Choice Based Credit System (CBCS) scheme]SEMESTER –III			
Laboratory Code	16MCA36	CIE Marks	20
Number of LAB Hours/Week	01Hr Tutorial/Instructions	SEE Marks	80
	02 Hours Laboratory	SEE Hours	03
CREDITS – 02			

Course Outcome (CO): ***At the end of this course, the students will be able to*** **CO1**:

Understandthe basic terminologies used for computer networking.**CO2**:

Understand the functions of layers in the Internet Model.

CO3: Demonstrate application layer protocols used for process to process communication.

CO4: Demonstrate subnetting and routing mechanisms for a given network topology. Exemplifylink layer functionalities.

CO5: Describe the components and working of wireless networks.

Java Programming Laboratory [As per Choice Based Credit System (CBCS) scheme]SEMESTER –III			
Laboratory Code	16MCA37	CIE Marks	20
Number of LAB Hours/Week	01Hr Tutorial/ Instructions 02 Hours Laboratory	SEE Marks	80
		SEE Hours	03
CREDITS – 02			
Course Outcome (CO): At the end of this course, the students will be able to **CO1**: UnderstandJava programming language fundamentals and run time environment. **CO2**: Acquire knowledge and skill necessary to write java programs. **CO3**: Learn the object oriented concepts and its implementation in Java **CO4**: Implement the multithreading and client side programming.			

Analysis and Design of Algorithms Laboratory [As per Choice Based Credit System (CBCS) scheme]SEMESTER –III			
Laboratory Code	16MCA38	CIE Marks	20
Number of LAB Hours/Week	01Hr Tutorial /Instructions 02 Hours Laboratory	SEE Marks	80
		SEE Hours	03
CREDITS – 02			
Course Outcome (CO): At the end of this course, the students will be able to **CO1**: Implement the concepts of time and space complexity, divide-and-conquer strategy, dynamic programming, greedy and approximate algorithms. **CO2**: Describe the methodologies of how to analyze an algorithm **CO3:**Choose a better algorithm to solve the problems			

Intellectual Property Rights

[As per Choice Based Credit System (CBCS) scheme] SEMESTER –III			
Subject Code	16MCA351	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			

Course Outcome (CO): At the end of this course, the students will be able to

CO1: Identify which of the four main different types of intellectual property rights may bepresented by an output

CO2: Analyze an innovative or creative output in terms of intellectual property rights generated

CO3: Discuss the appropriateness, or not, of registering an intellectual property right **CO4:**Apply the appropriate ownership rules to intellectual property he / she has been involved in creating

CO5: Suggest ways of exploiting intellectual property rights created in his / her own work.

ENTERPRISE RESOURCE PLANNING [As per Choice Based Credit System (CBCS) scheme]SEMESTER – III			
Subject Code	16MCA352	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			

Course Outcomes(CO):*At the end of this course, the students will be able to*

CO1: Acquire knowledge of

- Benefits of ERP, Process Re-engineering
- Project management and Monitoring

CO2: Analyze the performance of

- Project implementations
- Quality management

CO3: Know how ERP evolves in market place

CO4: Develop the ERP system, ERP with E-Commerce & Internet

MIS & E-Commerce [As per Choice Based Credit System (CBCS) scheme]SEMESTER –III			
Subject Code	16MCA353	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			
Course Outcome (CO): At the end of this course, the students will be able to **CO1:** Recognize the roles and uses of technology in business systems, operations and describe organizational structure . **CO2:**Equip the students with preliminaries of technologies used in business informationsystems. **CO3:**Familiarize students with the Business applications and E-Commerce initiatives.			

CYBER SECURITY [As per Choice Based Credit System (CBCS) scheme]SEMESTER – III			
Course Code	16MCA354	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			
Course outcomes (CO):*At the end of this course, the students will be able to:* **CO1:**Define and illustrate cyber security concepts and applications **CO2:** Analyze the working of cyber security principles to system design**CO3:** Illustrate appropriate techniques to solve cyber security threats **CO4:** Evaluate and implement cyber security through network security protocols			

ADVANCED JAVA PROGRAMMING [As per Choice Based Credit System (CBCS) scheme]SEMESTER – IV			
Subject Code	16MCA41	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			
Course Outcome (CO): At the end of this course, the students will be able to **CO1:** Learn the concept of Servlet and its life cycle**CO2:** Understand JSP tags and its services **CO3:**Create packages and interfaces **CO4:** Build Database connection **CO5:** Develop Java Server Pages applications using JSP Tags. **CO6:**Develop Enterprise Java Bean Applications			

Advanced Web Programming [As per Choice Based Credit System (CBCS) scheme]SEMESTER – IV			
Subject Code	16MCA42	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			

Course Outcomes (CO):*At the end of this course, the students will be able to:*

CO1: Acquire knowledge of

- Build the Web Applications using JQuery, PHP, Ruby and D3.js.
- Model-View-Controller (MVC) Architecture.

CO2: Design the Web Pages using Ruby, Rails and Layouts.
CO3: Apply the knowledge gained in the Building a web portals.
CO4: Evaluate web site performance against user acceptance testing.

SOFTWARE TESTING AND PRACTICES [As per Choice Based Credit System (CBCS) scheme]SEMESTER – IV			
Subject Code	16MCA43	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			

Course Outcome (CO): At the end of this course, the students will be able to
CO1: Acquire knowledge of basic principles and knowledge of software testing anddebuggingand test cases.
CO2: Understand the perceptions on testing like levels of testing, generalized pseudo code and with related examples
CO3: Study the various types of testing.
CO4: Analyze the difference between functional testing and structural testing.
CO5: Analyze the performance of fault based testing.
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ADVANCED JAVA PROGRAMMING LABORATORY [As per Choice Based Credit System (CBCS) scheme]IV SEMESTER			
Laboratory Code	16MCA46	CIE Marks	20
Number of LAB Hours/Week	01Hr Instructions 02 Hrs Laboratory	SEE Marks	80
Total Number of LAB Hours	42	SEE Hours	3 Hrs
CREDITS – 02			

Course Outcome (CO): At the end of this course, the students will be able to

CO 1: Designing HTML pages to demonstrate Java Servlets, JSP, Bean and EJB programs.

CO 2: Implementing Dynamic HTML using Servlet and demonstration of service methods, auto web pagerefresh, Session tracking using cookie and Http Session in Servlet.

CO 3: Learn the fundamental of connecting to the database.

CO 4: Demonstrate JSP (page attributes, action tags and all basic tags) and types of EJB application.

ADVANCED WEB PROGRAMMING LABORATORY [As per Choice Based Credit System (CBCS) scheme]IV SEMESTER			
Laboratory Code	16MCA47	CIE Marks	20
Number of LAB Hours/Week	01Hr Instructions 02 Hrs Laboratory	SEE Marks	80
		SEE Hours	3 Hrs
CREDITS – 02			

NOTE:

1. In the examination, student should executeone question from part A.
2. Web application project group size is limited to two students only.
3. The project under part B has to be evaluated.
4. Project report duly signed by the Guide and HOD need to be submitted during examination.

Course Outcome (CO): At the end of this course, the students will be able to

CO1: Understand, analyze and apply the role of server side scripting languages. **CO2:**Build web application using PHP, Ruby, jQuery, XML and store values in MYSQL.

CO3: Build web applications consisting of graphs using D3.JS.

CO4: Analyze a web project and identify its elements and attributes In comparison to traditional projects.

ADVANCED COMPUTER NETWORKS [As per Choice Based Credit System (CBCS) scheme]SEMESTER – IV			
Subject Code	16MCA441	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			

Course Outcome (CO): At the end of this course, the students will be able to

CO1: Understand the terminology and concepts of TCP-IP reference model and IPV6 message format and its services.

CO2: Acquire theconceptsofprotocols,networkinterfaces,anddesign/performanceissuesin LocalAreaNetworksandwideareanetworks.

CO3: Analyze the difference between wireless networks and satellite network.

CO4: Evaluate the performance of TCP/IPoverasymmetric networks

DATA WAREHOUSING AND DATA MINING [As per Choice Based Credit System (CBCS) scheme]SEMESTER – IV			
Subject Code	16MCA442	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			

Course Outcome (CO): At the end of this course, the students will be able to

CO1: Learn the concept of Data warehousing and OLAP.

CO2: Understand storage and retrieval technique of data from DATA CUBE. **CO3:**Analyze different types of data and different preprocessing techniques.**CO4:**Evaluate various Association algorithms and its applications.

CO5: Apply different Classification technique.

CO6: Evaluate different types of classifiers.

CO7: Analyze different clustering techniques and their applications

SOFTWARE ARCHITECTURE [As per Choice Based Credit System (CBCS) scheme]SEMESTER – IV			
Subject Code	16MCA443	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			

Course Outcome (CO): At the end of this course, the students will be able to

CO1: Acquire knowledge of

- working principles, characteristics and basic applications of Architectural patterns.
- project life cycle context.
- how the architecture is influenced.
- the quality attributes of architecture.

CO2: Modeling quality attributes through

- check lists.
- experiments.
- back-of-the envelope analysis.

CO3: Understand the techniques of requirements gathering through interviewing stake holders,etc.

CO4: Understand different types of design patterns.

CRYPTOGRAPHY AND NETWORK SECURITY

[As per Choice Based Credit System (CBCS) scheme]SEMESTER – IV

Subject Code	16MCA444	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			

Course Outcome (CO): At the end of this course, the students will be able to

CO1: Identify common network security vulnerabilities/attacks;

CO2: Understand the foundations of Cryptography and network security. **CO2:**Understand encryption and decryption of messages using block ciphers **CO3:**Demonstrate detailed knowledge of the role of encryption to protect data.

CO4: Analyze Network Security Practice And System Security.

WIRELESS COMMUNICATION&MOBILE TECHNOLOGIES

[As per Choice Based Credit System (CBCS) scheme]SEMESTER – IV

Subject Code	16MCA451	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			

Course outcomes:*At the end of this course, the students will be able to*

CO1: Understand the classification of devices, limitations of devices, interfaces, protocol and system Architecture

CO2: Understand the importance of Wireless Medium Access control and CDMA basedcommunication and its Applications.

CO3: Understand the concepts of Network layer, Transport layer.

CO4: Analyze the working of Data Dissemination and Broadcasting Systems.

CO5: Understand and apply the Data Synchronization Server and Management Application languages (XML, Java, J2ME and JavaCard, Mobile Operating Systems).

BIG DATA ANALYTICS [As per Choice Based Credit System (CBCS) scheme]SEMESTER – IV			
Subject Code	16MCA452	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			
Course outcomes (CO):*At the end of this course, the students will be able to:* CO1: Understand the Map Reduce technique for solving Big Data problems **CO2:**Understand algorithms for Big Data by deciding on the apt Features set **CO3:**Apply algorithms for handling peta bytes of datasets **CO4:** Analyze main memory consumption for Big Data analytics **CO5:**Understand and analyze the usage of map reduce techniques for solving big data problems			

SOFTWARE QUALITY MANAGEMENT [As per Choice Based Credit System (CBCS) scheme]SEMESTER – IV			
Subject Code	16MCA453	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			
Course outcomes:*At the end of this course, the students will be able to:* **CO1:**Understand the Software Quality through Hierarchical models. **CO2:**Design the quality software by SQA plan Reviews and Audits. **CO3:**Apply quality control through CASE tools. **CO4:**Understand different quality standards.			

Principles of User Interface Design [As per Choice Based Credit System (CBCS) scheme]SEMESTER –IV			
Subject Code	16MCA454	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			
***Course Outcome (CO): At the end of this course, the students will be able to* CO1:**usethe new technologies that provide interactive devices and interfaces.**CO2:**apply the process and evaluate UID. **CO3:**understand Direct Manipulation and Virtual Environment **CO4:**discuss the command, natural languages and issues in design for maintaining QoS. **CO5:**persuade user documentations and information search.			

OBJECT-ORIENTED MODELING AND DESIGN PATTERNS

[As per Choice Based Credit System (CBCS) scheme]SEMESTER – V

Subject Code	16MCA51	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			

Course Outcomes (CO):*At the end of this course, the students will be able to*

CO1: Acquire knowledge of

- Basic UML Concepts and terminologies
- Life Cycle of Object oriented Development
- Modeling Concepts

CO2: Identify the basic principles of Software modeling and apply them in real worldapplications

CO3: Produce conceptual models for solving operational problems in software and ITenvironment using UML

CO4: Analyze the development of Object Oriented Software models in terms of

- Static behaviour
- Dynamic behaviour

CO5: Evaluate and implement various Design patterns

PROGRAMMING USING C#&.NET

[As per Choice Based Credit System (CBCS) scheme]SEMESTER – V

Subject Code	16MCA52	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			

Course Outcomes (CO):*At the end of this course, the students will be able to*

CO1: Understand C# and client-server concepts using .Net Frame Work Components. CO2: Apply delegates, event and exception handling to incorporate with ASP, Win Form, ADO.NET.

CO3: Analyze the use of .Net Components depending on the problem statement.

CO4: Implement & develop a web based and Console based application with Databaseconnectivity

MOBILE APPLICATIONS

[As per Choice Based Credit System (CBCS) scheme]SEMESTER – V

Subject Code	16MCA53	CIE Marks	20
Number of Lecture Hours/Week	04	SEE Marks	80
Total Number of Lecture Hours	50	SEE Hours	03
CREDITS – 04			

Course Outcomes(CO):*At the end of this course, the students will be able to*

CO1: Illustrate effective user interfaces that leverage evolving mobile device capabilities CO2: Develop applications using software development kits (SDKs), frameworks and toolkits CO3: Establish various methods to integrate database and server-side technologies
CO4: Design and develop open source software based mobile applications
CO5: Build and deploy competent mobile development solutions

SOFTWARE DESIGN LABORATORY

[As per Choice Based Credit System (CBCS) scheme]SEMESTER – V

Course Code	16MCA56	CIE Marks	20
Number of Practical Hours/Week Number of Instructional Hours/Week	02 01	SEE Marks	80
Total Number of Practical Hours	42	SEE Hours	03
CREDITS – 02			

Laboratory Experiments:

The student has to draw the necessary UML diagrams using any suitable UML drawing tool and implement a program in Java or C++ or C# to demonstrate the design pattern specified by the examiner. For analysis and design models -**, Class Diagram, Use-Case, Sequence diagrams** should be drawn.

Course Outcomes (CO):*At the end of this course, the students will be able to*

CO1: Understand the fundamental principles of Object-Oriented analysis, design, development and programming
CO2: Demonstrate and represent the UML model elements, to enable visual representation of the system being developed
CO3: Implement object oriented design model with the help of modern tool, Rational softwareArchitect
CO4: Analyze and differentiate the static and dynamic behavior of the system for achieving theintended functionalities of the system
CO5: Evaluate Various design patterns for applicability, reasonableness, and relation to other design criteria

.NET LABORATORY [As per Choice Based Credit System (CBCS) scheme]SEMESTER – V			
Course Code	16MCA57	CIE Marks	20
Number of Practical Hours/Week Number of Instructional Hours/Week	02 01	SEE Marks	80
Total Number of Lecture Hours	42	SEE Hours	03
CREDITS – 02			

NOTE:

1. *Students are required to execute one question from Part A and one from Part B.*
2. *Part A has to be evaluated for 50 marks and Part B has to be evaluated for 30 marks.*

Course Outcomes : ***At the end of this course, the students will be able to***

CO1: Understand C# and client-server concepts using .Net Frame Work Components
CO2: Apply delegates, event and exception handling to incorporate with ASP, Win Form, ADO.NET CO3: Analyze the use of .Net Components depending on the problem statement
CO4: Implement & develop a web based and Console based application with Database connectivity

MINI PROJECT MOBILE APPLICATIONS [As per Choice Based Credit System (CBCS) scheme]SEMESTER – V			
Course Code	16MCA58	CIE Marks	20
Number of Practical Hours/Week Number of Instructional Hours/Week	02 01	SEE Marks	80
Total Number of Lecture Hours	42	SEE Hours	03
CREDITS – 03			

Laboratory Programs:

The laboratory can be carried out only using any mobile application software.

Note:

1. Students are required to execute one question from Part A and give demo from Part B.
. Part A has to be evaluated for 40 marks and Part B has to be evaluated for 40 marks along with the report.
3. The project should be carried out with a team strength of maximum two.
4. Students are expected to work for mini project apart from lab hours also with the contact of guides.

Course outcomes:***At the end of this course, the students will be able to***

- Illustrate effective user interfaces that leverage evolving mobile device capabilities
- Develop applications using software development kits (SDKs), frameworks and toolkits
- Establish various methods to integrate database and server-side technologies
- Design and develop open source software based mobile applications
- Build and deploy competent mobile development solutions

b. Requirement Analysis
c. Software Requirement Specification
d. Analysis and Design
e. Implementation
f. Testing

The report must be evaluated for 10 Marks. Demonstration and Viva for 30 Marks.

WEB 2.0 AND RICH INTERNET APPLICATIONS

[As per Choice Based Credit System (CBCS) scheme]SEMESTER – V

Subject Code	16MCA541	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			

Course Outcomes(CO):*At the end of this course, the students will be able to*

CO1: Understand the rich internet concepts and applications.
CO2: Analyze the working of development models in web designing.
CO3: Illustrate appropriate component lifecycle techniques using frameworks.
CO4: Evaluate and implement state based systems using data models and data binding

CLOUD COMPUTING [As per Choice Based Credit System (CBCS) scheme]SEMESTER – V			
Course Code	16MCA542	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			

Course outcomes:*At the end of this course, the students will be able to*

CO1: Understand the cloud computing delivery model and the enabling technologies.CO2: Understand the cloud computing platforms, key technology drivers and cloud programming/software environments

CO3: Identify the need for cloud computing model and compare various key enablingtechnologies.

CO4: Analyze and choose an appropriate programming environment for building cloud applications.

ARTIFICIAL INTELLIGENCE [As per Choice Based Credit System (CBCS) scheme]SEMESTER – V			
Course Code	16MCA543	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			

Course Outcomes (CO): After studying this course, students will be able to:CO1: Acquire knowledge of

- Uncertainty and Problem solving techniques
- Symbolic knowledge representation to specify domains
- Reasoning tasks of a situated software agent

CO2: Comprehend on

- different logical systems for inference over formal domain representations
- trace on particular inference algorithm working on a given problem specification

CO3: Apply and Analyse AI technique to any given concrete problem

CO4: Interpret and Implement non-trivial AI techniques in a relatively large system

TORAGE AREA NETWORKS [As per Choice Based Credit System (CBCS) scheme]SEMESTER – V			
Course Code	16MCA544	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			
Course Outcomes (CO):*At the end of this course, the students will be able to* CO1: Understand the fundamentals of storage and storage networking concepts CO2: Analyze Network Attached and Storage Area Networks Requirements CO3: Apply and Integrate SAN and NAS solutions for an enterprise requirementsCO4: Design a secured, scalable SAN / NAS enterprise solutions			

SOFTWARE DEFINED NETWORKS [As per Choice Based Credit System (CBCS) scheme]SEMESTER – V			
Course Code	16MCA551	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			
Course Outcomes (CO):*At the end of this course, the students will be able to* CO1: Recognize the fundamentals and characteristics of Software Defined Networks CO2: Understand the basics of Software Defined Networks Operations and Data flowCO3: Discriminate different Software Defined Network Operations and Data Flow CO4: Analyse alternative definitions of Software Defined Networks CO5: Apply different Software Defined Network Operations in real world problem			

INTERNET OF THINGS (IoT) [As per Choice Based Credit System (CBCS) scheme]SEMESTER – V			
Subject Code	16MCA552	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			
Course Outcomes (CO):*At the end of this course, the students will be able to* CO1: Understand constraints and opportunities of wireless and mobile networks for Internet of Things. CO2: Analyze the societal impact of IoT security events.CO3: Develop critical thinking skills. CO4: Analyze, design or develop parts of an Internet of Things solution and map it towardselected business model(s) CO5: Evaluate ethical and potential security issues related to the Internet of Things.			

SERVICE ORIENTED ARCHITECTURES (SOA) [As per Choice Based Credit System (CBCS) scheme]SEMESTER – V			
Subject Code	16MCA553	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			
Course Outcomes (CO):*At the end of this course, the students will be able to* CO1: Describe about evolution, characteristics and services in SOA with SOA architecture, WSDL,SOAP and UDDI. CO2: Analyze the SOA Architectural style, SOA strategies, modeling web services.CO3: Design, implementing process of SOA in web service. CO4: Apply the SOA operational style for the web services.			

SOFTWARE PROJECT MANAGEMENT [As per Choice Based Credit System (CBCS) scheme]SEMESTER – V			
Course Code	16MCA554	CIE Marks	20
Number of Lecture Hours/Week	03	SEE Marks	80
Total Number of Lecture Hours	40	SEE Hours	03
CREDITS – 03			
Course Outcomes (CO):*At the end of this course, the students will be able to* CO1: Understand the practices and methods for successful software project management CO2: Identify techniques for requirements, policies and decision making for effective resource management CO3: Apply the evaluation techniques for estimating cost, benefits, schedule and risk CO4: Devise a framework for software project management plan for activities, risk, monitoringand control CO5: Devise a framework to manage people			

AMC ENGINEERING COLLEGE

DEPARTMENT OF MASTER OF BUSINESS ADMINISTRATION

AY: 2017 - 2018

STATEMENTS	
PROGRAM OUTCOMES (PO)	
PO1	Acquire sufficient theoretical knowledge and are enabled to apply them to solve practical problems in business and other organizations / Institutions of importance
PO2	Apply Effective communication skills with a high degree of lateral and critical thinking that enhances learn ability, developed for being continuously employable.
PO3	Demonstrate leadership qualities, ethically sound, enabled with decision making skills that reflect a high degree of social consciousness
PO4	Recognize the need for sustained research orientation to comprehend a growingly complex, economic, legal and ethical environment
PO5	Possess self-sustaining entrepreneurship qualities that encourages calculated risk taking.
PROGRAM SPECIFIC OUTCOMES (PSO)	
PSO1	Apply various concepts and strategies of Business Management.
PSO2	Carry out Research in the field of Management
PSO3	Demonstrate Team Management skills and to become Competitive.

PROGRAM EDUCATIONAL OBJECTIVES (PEO)	
PEO 1	Management Graduates to gain knowledge on critical functions of business
PEO 2	Produce Skilled Management Professionals to Analyse Qualitative and Quantitative Data of Enterprise to make smart decisions
PEO 3	Management Graduates to develop Positive Attitude, Leadership Qualities, Team Work, Social, Legal and Ethical Responsibilities in Business and Society.

Course Title: MANAGEMENT AND ORGANIZATIONAL BEHAVIOR
Course Code: 16MBA11

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Comprehend & correlate all the management functions which are happening around with fundamental concepts and principles of management.
2	Understand the overview of management, theory of management and practical applications of the same.
3	Effectively use their skills for self-grooming, working in groups and to achieve organizational goals.
4	Demonstrate their acumen in applying managerial and behavioral concept in real world/situation.
5	Understand and demonstrate their exposure on recent trends in management.

Course Title: ECONOMICS FOR MANAGERS **Course Code: 16MBA12**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	The student will understand the application of Economic Principles in Management decision making.
2	The student will learn the micro economic concepts and apply them for effective functioning of a Firm and Industry.
3	The student will apply the concepts of production and cost for Optimization of production.
4	The student will design Competitive strategies like pricing, product Differentiation etc. and marketing according to the market structure.
5	The student will be able to identify, assess profits and apply BEP for decision making.
6	The Student will be able to understand, assess and forecast Demand.

Course Title: ACCOUNTING FOR MANAGERS **Course Code: 16MBA13**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	Demonstrate theoretical knowledge and its application in real time accounting.
2	Demonstrate knowledge regarding accounting principles and its application.
3	Capable of preparing financial statement of sole trading concerns and companies.
4	Independently undertake financial statement analysis and take decisions.
5	Comprehend emerging trends in accounting and taxation.

Course Title: BUSINESS ANALYTICS **Course Code: 16MBA14**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	Facilitate objective solutions in business decision making under subjective conditions.
2	Demonstrate different statistical techniques in business/real-life situations.
3	Understand the importance of probability in decision making.
4	Understand the need and application of analytics.
5	Understand and apply various data analysis functions for business problems.

Course Title: MARKETING MANAGEMENT **Course Code: 16MBA15**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	Develop an ability to assess the impact of the environment on marketing function.
2	To formulate marketing strategies that incorporate psychological and sociological factors which influence buying.
3	Explain how companies identify attractive market segments, differentiate and position their products for maximum competitive advantage in the market place.
4	Build marketing strategies based on product, price, place and promotion objectives.
5	Synthesize ideas into a viable marketing plan.

Course Title: MANAGERIAL COMMUNICATION **Course Code: 16MBA16**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	The students will be aware of their communication skills and know their potential to become successful managers.
2	The students will get enabled with the mechanics of writing and can compose the business letters in English precisely and effectively.
3	The students will be introduced to the managerial communication practices in business those are in vogue.
4	Students will get trained in the art of business communication with emphasis on analyzing business situations.
5	Students will get exposure in drafting business proposals to meet the challenges of competitive environment.

Course Title: HUMAN RESOURCE MANAGEMENT **Course Code: 16MBA21**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	Understanding of HRM functions, principles, Job analysis that facilitates students to design a job description and job specification for various levels of employees.
2	Synthesize knowledge on effectiveness of recruitment process, sources & understanding of systematic selection procedure.
3	Identify the various training methods and design a training program.
4	Understand the concept of performance appraisal process in an organization. 5. List out the regulations governing employee benefit practices.

Course Title: FINANCIAL MANAGEMENT **Course Code: 16MBA22**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	Understand the basic financial concepts.
2	Apply time value of money.
3	Evaluate the investment decisions.
4	Analyze the capital structure and dividend decisions.
5	Estimate working capital requirements.

Course Title: RESEARCH METHODS **Course Code: 16MBA23**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	Understand various research approaches, techniques and strategies in the appropriate in business.
2	Apply a range of quantitative / qualitative research techniques to business and day to day management problems.
3	Demonstrate knowledge and understanding of data analysis, interpretation and report writing.
4	Develop necessary critical thinking skills in order to evaluate different research approaches in Business.

Course Title: BUSINESS GOVERNMENT AND SOCIETY **Course Code: 16MBA24**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	Students should get clear idea about the concept of incorporation of company, its relevance, characteristics, types of company, lifting of corporate
2	Student to acquire knowledge about conducting meeting, duties of directors and Investigation of the company.
3	To give the students an insight on Winding up of the companies, Mode of winding up of the companies.
4	To student will have an understanding of the macro environment of Business and various macroeconomic concepts.
5	The student will understand the industrial policies of the past and the present and the evolution over time, and how Indian Industrial structure evolved over time.
6	The student will be exposed to various economic policies of the country and the state of economy.

Course Title: STRATEGIC MANAGEMENT **Course Code: 16MBA25**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	Students should get clear idea about the concept of Strategic Management, its relevance, Characteristics, process nature and purpose.
2	Student to acquire an understanding of how firms successfully institutionalize a strategy and create an organizational structure for domestic and overseas operations and gain competitive advantage.
3	To give the students an insight on strategy at different levels of an organization to gain competitive advantage.
4	To help students understand the strategic drive in multinational firms and their decisions in different markets.
5	To enable the students to gain knowledge of strategy implementation and the control measures for effective decision-making.

Course Title: ENTREPRENEURSHIP DEVELOPMENT **Course Code: 16MBA26**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	Display keen interest and orientation towards entrepreneurship, entrepreneurial opportunities in order to setup a business.
2	As an entrepreneur learn to think creatively and understand the components in developing a Business plan.
3	Become aware about various sources of funding and institutions supporting entrepreneurs.
4	Gain consciousness towards social entrepreneurship and rural entrepreneurship opportunities.

Course Title: CONSUMER BEHAVIOUR **Course Code: 16MBAMM301**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	Explain the background and concepts vital for understanding Consumer Behaviour.
2	Identify the role of variables that determines Consumer Behaviour in Social & cultural domain.
3	Identifying the psychological and behavioural practices adopted by organizations to enhance the Consumer Behaviour.

Course Title: RETAIL MANAGEMENT **Course Code: 16MBAMM302**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	Find out the contemporary retail management, issues, and strategies.
2	Evaluate the recent trends in retailing and its impact in the success of modern business.
3	Relate store management and visual merchandising practices for effective retailing.

Course Title: SERVICE MARKETING **Course Code: 16MBAMM303**

CO.No.	OUTCOMES After completing the course, the student will be able to:
1	Develop an understanding about the various concepts and importance of Services Marketing.
2	Enhance knowledge about emerging issues and trends in the service sector.
3	Learn to implement service strategies to meet new challenges.

Course Title: PRINCIPLES & PRACTICES OF BANKING Course Code:16MBAFM301

CO.No.	OUTCOMES After completing the course the student will be able to:
1	The Student will be acquainted to various Banking and Non-Banking financial services in India.
2	The Student will understand the activities of Merchant Banking and credit rating.
3	The Student will be equipped to understand micro financing and other financial services in India.
4	The Student will understand how to evaluate and compare leasing & hire purchase.

Course Title: FINANCIAL SERVICES Course Code: 16MBAFM302

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Understand the monetary and financial policies
2	Understand the taxation and fiscal policies
3	Understand deductions and calculation of tax liability of Individuals
4	Know the corporate tax system.

Course Title: INVESTMENT MANAGEMENT Course Code: 16MBAFM303

CO.No.	OUTCOMES After completing the course the student will be able to:
1	The student will understand the capital market and various Instruments for Investment.
2	The learner will be able to assess the risk and return associated with investments and methods to value securities.
3	The student will be able to analyze the Economy, Industry and Company framework for Investment Management.
4	The student will learn the theories of Portfolio management and also the tools and techniques for efficient portfolio management.

Course Title: INDUSTRIAL RELATIONS AND LEGISLATIONS
Course Code: 16MBAHR301

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Understand about the Industrial Relations
2	Measure the value of Intangibles that HR helps builds for the organization given a particular business context to facilitate decision making.
3	Understand about the various Industrial Legislations
4	Devise, conduct and analyse a study on employees or any other related to the HR context in an organization

Course Title: RECRUITMENT AND SELECTION Course Code: 16MBAHR302

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Gain the insights of various principles and practices of recruitment and selection in an industry.
2	Equip students with various selection procedure practiced in industry.
3	Develop students with latest selection tools in the corporate sector.
4	Develop students with various testing of job recruitment and selection

Course Title: COMPENSATION AND BENEFITS Course Code:16MBAHR303

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Gain insights of various conceptual aspects of Compensation and Benefits to achieve organizational goals.
2	Determine the performance based compensation system for business excellence and solve various cases.
3	Designing the compensation strategies for attraction, motivation and retaining high quality workforce.
4	Understand the Legal & Administrative Issues in global compensation to prepare compensation plan, CTC, wage survey and calculate various bonus.

Course Title: SALES MANAGEMENT **Course Code: 16MBAMM401**

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Understand the apply the selling techniques in an organization.
2	Develop a plan for organizing, staffing & training sales force.
3	Organize sales territories to maximize selling effectiveness.
4	Evaluate sales management strategies.

Course Title: INTEGRATED MARKETING COMMUNICATIONS
Course Code: 16MBAMM402

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Define and apply knowledge of various aspects of managerial decision making related to marketing communications strategy and tactics.
2	Ability to create an integrated marketing communications plan which includes promotional strategies.
3	Explain the role of IMC in the overall marketing &Use effectiveness measures to evaluate IMC strategies.
4	Prepare advertising copy and design other basic IMC tools.

Course Title: E-MARKETING **Course Code: 16MBAMM403**

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Recognize appropriate e-marketing objectives.
2	Appreciate the e-commerce framework and technology.
3	Illustrate the use of search engine marketing, online advertising and marketing strategies.
4	Use social media & create temples.
5	Develop social media strategies to solve business problems.

Course Title: BUSINESS VALUATION ANALYSIS Course Code: 16MBAFM401

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Understand Business Valuations with its different classifications, strategies, theories, synergy etc.
2	Conduction of Business Valuations
3	Analyse the results after evaluation.
4	Critically evaluate different types of Business Valuations, takeover and antitakeover strategies.

Course Title: RISK MANAGEMENT AND INSURANCE Course Code:16MBAFM402

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Understand various types of risks.
2	Assess the process of identifying and measuring the risk.
3	Acquaint with the functioning of life Insurance in risk management.
4	Understand general insurance contract.

Course Title: TAX MANAGEMENT Course Code: 16MBAFM403

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Have clarity about Tax system in India.
2	Understanding of levy and collection of Taxes in India.
3	Have an overview of customs duty in India.
4	Understanding of valuation for customs duty

CO.No.	OUTCOMES After completing the course the student will be able to:
1	To demonstrate an understanding of the fundamentals tools of public relations practices.
2	To describe the various emerging trends in the field of public relations.
3	To analyze the importance of employee communication and organizational change.
4	To evaluate the importance of community relations.

Course Title: WORK PLACE ETHICS **Course Code: 16MBAHR402**

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Comprehend & correlate work place ethics
2	Understand the overview of ethical behavior and motivation in organization.
3	Effectively use their skills for self-grooming on leadership traits and ethics that influences them to effectively work in groups to achieve organizational goals.
4	Demonstrate their acumen in applying their knowledge in work place and behavioral concept in real world/situation.

Course Title: INTERNATIONAL HUMAN RESOURCE MANAGEMENT
Course Code: 16MBAHR403

CO.No.	OUTCOMES After completing the course the student will be able to:
1	Analyse the impact of contemporary issues and global imperatives on Human Resource concepts, policies and practices.
2	Apply concepts and knowledge in deployment, expatriate on international assignments.
3	Evaluate the effects of different human resource and international industrial relations.
4	Develop students to adopt international industrial relation strategies

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