Course Outcome Across all programmes

Programme Outcome Across all the programmes

Program Outcomes (PO's)	
PO 1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
PO 2	**Problem analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**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.
PO 4	**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
PO 5	**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.
PO 6	**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.
PO 7	**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.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**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.
PO 11	**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.
PO 12	**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.

1. **Course Outcome of 1st Year Course across all the Programmes offered**

Chemistry Cycle

Course Outcomes 2015 Scheme

Course Name:C 101(15MAT11) Engineering Mathematics I	
C101.1	Use partial derivatives to calculate rates of change of multivariate functions.
C101.2	Analyse position, velocity and acceleration in two or three dimensions using the calculus of vector valued functions.
C101.3	Recognize and solve first order ordinary differential equations ,Newton's Law of Cooling
C101.4	Use Matrices techniques for solving systems of linear equations in the different various of linear algebra.
Course Name: C102 (15CHE12/22) Engineering Chemistry	
C102.1	Electrochemical and concentration cells. Classical & modern batteries and fuel cells.
C102.2	Causes & effects of corrosion of metals and control of corrosion. Modification of surface properties of metals to develop resistance to corrosion, wear, tear, impact etc. by electroplating and electro less plating.
C102.3	Production & consumption of energy for industrialization of country and living standards of people. Utilization of solar energy for different useful forms of energy.
C102.4	Replacement of conventional materials by polymers for various applications.
C102.5	Boiler troubles; sewage treatment and desalination of sea water Over viewing of synthesis, properties and applications of nanomaterials.
Course Name: C103 (15PCD13/23) PROGRAMMING IN C AND DATA STRUCTURES	
C103.1	Achieve Knowledge of design and development of C problem solving skills.
C103.2	Understand the basic principles of Programming in C language
C103.3	Design and develop modular programming skills.
C103.4	Effective utilization of memory using pointer technology Understands the basic concepts of pointers and data structures.
Course Name: C104(15CED14/24)COMPUTER AIDED ENGINEERING DRAWING	
C104.1	Students will be able to demonstrate the usage of CAD software.
C104.2	Students will be able to visualize and draw Orthographic projections, Sections of solids and Isometric views of solids.
C104.3	Students are evaluated for their ability in applying various concepts to solve practical problems related to engineering drawing.

Course Name: C105(15ELN15/25)BASIC ELECTRONICS

C105.1	Appreciate the significance of electronics in different applications
C105.2	Understand the applications of diode in rectifiers, filter circuits and wave shaping,
C105.3	Apply the concept of diode in rectifiers, filters circuits
C105.4	Design simple circuits like amplifiers (inverting and non-inverting), comparators, adders, integrator and differentiator using OPAMPS
C105.5	Compile the different building blocks in digital electronics using logic gates and implement simple logic function using basic universal gates
C105.6	Understand the functioning of a communication system, and different modulation technologies
C105.7	Understand the basic principles of different types of Transducers.

Course Name: C106 (15CPL16/26)COMPUTER PROGRAMMING LABORATORY	
C106.1	Gaining Knowledge on various parts of a computer.
C106.2	Able to draw flowcharts and write algorithms
C106.3	Able design and development of C problem solving skills.
C106.4	Able design and develop modular programming skills. Able to trace and debug a program

Course Name: C107(15CHEL17/27)ENGINEERING CHEMISTRY LABORATORY	
C107.1	Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results,
C107.2	Carrying out different types of titrations for estimation of concerned in materials using comparatively more and quantities of materials involved for good results

Course Name: C108 (15CIV18/15CIV28)ENVIRONMENTAL STUDIES	
C108.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale
C108.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment
C108.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues

Course Name: C 201(15MAT21) ENGINEERING MATHEMATICS-II	
C201.1	solve differential equations of electrical circuits, forced oscillation of mass spring and elementary heat transfer
C201.2	solve partial differential equations fluid mechanics, electromagnetic theory and heat transfer
C201.3	Evaluate double and triple integrals to find area , volume, mass and moment of inertia of plane and solid region.
C201.4	Use curl and divergence of a vector valued functions in various applications of electricity, magnetism and fluid flows.
C201.5	Use Laplace transforms to determine general or complete solutions to linear ODE

Physics cycle

Course Outcomes 2015 Scheme

Course Name:C101(15MAT11) Engineering Mathematics I	
C101.1	Use partial derivatives to calculate rates of change of multivariate functions.
C101.2	Analyse position, velocity and acceleration in two or three dimensions using the calculus of vector valued functions.
C101.3	Recognize and solve first order ordinary differential equations ,Newton's Law of Cooling
C101.4	Use Matrices techniques for solving systems of linear equations in the different various of linear algebra.
Course Name: C102 (15PHY12 / 22) Engineering Physics	
C102.1	Learn and understand more about basic principles and to develop problem solving skills and implementation in technology.
C102.2	Gaining knowledge about Modern Physics and Quantum mechanics will update the basic concepts to implement the skills.
C102.3	Study of material properties and their applications is the prime role to understand and use in engineering applications and studies.
C102.4	Study of Lasers and optical fibres and its applications are to impart knowledge and to develop skills and to use modern instruments in the engineering applications.
C102.5	Understanding of Crystal structure and applications are to boost the technical skills and its applications.
C102.6	The concept of shock waves and its applications will bring the latest technology to the students at the first year level.
C102.7	The study of basic Nano Science and the principle of SEM will enable the students to get into advanced study of Nano Composite materials and Nano Electronics.
Course Name: C103 (15CIV13/23) ELEMENTS OF CIVIL ENGINEERING AND MECHANICS	
C103.1	Know basics of Civil Engineering, its scope of study, knowledge about Roads, Bridges and Dams
C103.2	Comprehend the action of Forces, Moments and other loads on systems of rigid bodies
C103.3	Compute the reactive forces and the effects that develop as a result of the external loads
C103.4	Locate the Centroid and compute the Moment of Inertia of regular cross sections.
C103.5	Express the relationship between the motion of bodies
C103.6	Equipped to pursue studies in allied courses in Mechanics.
Course Name: C104(15EME14/24) ELEMENTS OF MECHANICAL ENGINEERING	
C104.1	Various Energy sources, Boilers, Prime movers such as turbines and IC engines, refrigeration and air-conditioning systems
C104.2	Metal removal process using Lathe, drilling, Milling Robotics and Automation

C104.3	Fair understanding of application and usage of various engineering materials.

Course Name: C105 (15ELE15/25) BASIC ELECTRICAL ENGINEERING	
C105.1	To predict the behaviour of electrical and magnetic circuits
C105.2	Select the type of generator / motor required for a particular application.
C105.3	Realize the requirement of transformers in transmission and distribution of electric power and other applications.
C105.4	Practice Electrical Safety Rules & standards.
C105.5	To function on multi-disciplinary teams

Course Name: C106 (15WSL16/26) WORKSHOP PRACTICE	
C106.1	Demonstrate and produce different types of fitting models.
C106.2	Gain knowledge of development of sheet metal models with an understanding of their applications
C106.3	Perform soldering and welding of different sheet metal & welded joints.
C106.4	Understand the Basics of Workshop practices.

Course Name: C107(15PHYL17 / 27)ENGINEERING PHYSICS LABORATORY	
C107.1	Develop skills to impart practical knowledge in real time solution.
C107.2	Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.
C107.3	Design new instruments with practical knowledge.
C107.4	Gain knowledge of new concept in the solution of practical oriented problems and to understand more deep knowledge about the solution to theoretical
C107.5	Understand measurement technology, usage of new instruments and real time applications in engineering studies.

Course Name: C108 (15CPH18/28) Constitution of India, Professional Ethics and Human Rights	
C108.1	Have general knowledge and legal literacy about Indian Constitution and thereby it helps to take up competitive examinations & to manage/face complex societal issues in society.
C108.2	Understand state and central policies(Union and State Executive), fundamental Rights & their duties.
C108.3	Understand Electoral Process, Amendments and special provisions in Constitution.
C108.4	Understand powers and functions of Municipalities, Panchayats and Co-operative Societies, with Human Rights and NHRC.
C108.5	Understand Engineering & Professional ethics and responsibilities of Engineers.
C108.6	Have an awareness about basic human rights in India

Course Name: C 201(15MAT21) ENGINEERING MATHEMATICS-II	
C201.1	solve differential equations of electrical circuits, forced oscillation of mass spring and elementary heat transfer

C201.2	solve partial differential equations fluid mechanics, electromagnetic theory and heat transfer
C201.3	Evaluate double and triple integrals to find area , volume, mass and moment of inertia of plane and solid region.
C201.4	Use curl and divergence of a vector valued functions in various applications of electricity, magnetism and fluid flows.
C201.5	Use Laplace transforms to determine general or complete solutions to linear ODE

CSE Department:

Course Name: CCS201(15MAT31) Engineering Mathematics	
CCS201.1	Use of periodic signals and Fourier series to analyse circuits
CCS201.2	Explain the general linear system theory for continuous-time signals and systems using the Fourier Transform
CCS201.3	Analyse discrete-time systems using convolution and the z-transform
CCS201.4	Use appropriate numerical methods to solve algebraic and transcendental equations and also to calculate a definite integral
CCS201.5	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
CCS201.6	Solve the simple problem of the calculus of variations

Course Name: CCS202 (15CS32) Analog and Digital Electronics	
CCS202.1	Explain the operation of JFETs and MOSFETs , Operational Amplifier circuits and their application, Design of Counters, Registers and A/D & D/A converters
CCS202.2	Explain Combinational Logic, Simplification Techniques using Karnaugh Maps, Quine McClusky technique.
CCS202.3	Demonstrate Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors, working of Latches, Flip-Flops, Designing Registers, Counters, A/D
CCS202.4	Design of Counters, Registers and A/D & D/A converters

Course Name: CCS203 (15CS33) Data Structures and Applications	
CCS203.1	Use different types of data structures, operations and algorithms
CCS203.2	Apply searching and sorting operations on files
CCS203.3	Use stack, Queue, Lists, Trees and Graphs in problem solving
CCS203.4	Implement all data structures in a high-level language for problem solving.

Course Name: CCS204(15CS34) Computer Organization	
CCS204.1	Explain the basic organization of a computer system.
CCS204.2	Demonstrate functioning of different sub systems, such as processor, Input/output, and memory
CCS204.3	Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems.
CCS204.4	Design and analyse simple arithmetic and logical units.

Course Name: CCS205(15CS35) Unix and Shell Programming	
CCS205.1	Explain the basic organization of a computer system.
CCS205.2	Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.

CCS205.3	Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems.
CCS205.4	Design and analyse simple arithmetic and logical units.
Course Name: CCS206(15CS36) Discrete Mathematical structures	
CCS206.1	Use propositional and predicate logic in knowledge representation and truth verification.
CCS206.2	Demonstrate the application of discrete structures in different fields of computer science.
CCS206.3	Solve problems using recurrence relations and generating functions
CCS206.4	Application of different mathematical proofs techniques in proving theorems in the courses.
CCS206.5	Compare graphs, trees and their applications.
Course Name: CCS211(15MAT41) Engineering Mathematics II	
CCS211.1	Use propositional and predicate logic in knowledge representation and truth verification.
CCS211.2	Demonstrate the application of discrete structures in different fields of computer science.
CCS211.3	Solve problems using recurrence relations and generating functions.
CCS211.4	Application of different mathematical proofs techniques in proving theorems in the courses.
CCS211.5	Compare graphs, trees and their applications
Course Name: CCS212(15CS42) Software Engineering	
CCS212.1	Design a software system, component, or process to meet desired needs within realistic
CCS212.2	Assess professional and ethical responsibility
CCS212.3	Function on multi-disciplinary teams
CCS212.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
CCS212.5	Analyse, design, implement, verify, validate, implement, apply, and maintain software
Course Name: CCS213(15CS43) Design and Analysis of Algorithms	
CCS213.1	Describe computational solution to well-known problems like searching, sorting etc.
CCS213.2	Estimate the computational complexity of different algorithms.
CCS213.3	Devise an algorithm using appropriate design strategies for problem solving.

Course Name: CCS214(15CS44) Microprocessors and microcontrollers	
CCS214.1	Make familiar with importance and applications of microprocessors and microcontrollers
CCS214.2	Expose architecture of 8086 microprocessor and ARM processor
CCS214.3	Familiarize instruction set of ARM processor
Course Name: CCS215(15CS45) Object Oriented Programming with JAVA	
CCS215.1	Explain the object-oriented concepts and JAVA

CCS215.2	Develop computer programs to solve real world problems in Java.
CCS215.3	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 Name: CCS216(15CS46) Data communications	
CCS216.1	Illustrate basic computer network technology.
CCS216.2	Identify the different types of network topologies and protocols.
CCS216.3	Enumerate the layers of the OSI model and TCP/IP functions of each layer.
CCS216.4	Make out the different types of network devices and their functions within a network
CCS216.5	Demonstrate the skills of subnetting and routing mechanisms.
Course Name: CCS301(15CS51) Management and Entrepreneurship for IT Industry	
CCS301.1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
CCS301.2	Utilize the resources available effectively through ERP
CCS301.3	Make use of IPRs and institutional support in entrepreneurship
Course Name: CCS302(15CS52) Computer Networks	
CCS302.1	Explain principles of application layer protocols
CCS302.2	Recognize transport layer services and infer UDP and TCP protocols
CCS302.3	Classify routers, IP and Routing Algorithms in network layer
CCS302.4	Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard
CCS302.5	Describe Multimedia Networking and Network Management
Course Name: CCS303(15CS53) Database Management System	
CCS303.1	Identify, analyse and define database objects, enforce integrity constraints on a database using RDBMS.
CCS303.2	Use Structured Query Language (SQL) for database manipulation.
CCS303.3	Design and build simple database systems
CCS303.4	Develop application to interact with databases.
Course Name: CCS304(15CS54-ATC) Automata theory and Computability	
CCS304.1	Introduce core concepts in Automata and Theory of Computation
CCS304.2	Identify different Formal language Classes and their Relationships
CCS304.3	Design Grammars and Recognizers for different formal languages
CCS304.4	Prove or disprove theorems in automata theory using their properties
CCS304.5	Determine the decidability and intractability of Computational problems
Course Name: CCS305(15CS551) Object Oriented Modelling and Design	
CCS305.1	Describe the concepts of object-oriented and basic class modelling.
CCS305.2	Draw class diagrams, sequence diagrams and interaction diagrams to solve difficulties.
CCS305.3	Choose and apply a befitting design pattern for the given problem.
Course Name: CCS306(15CS553) Advanced JAVA and J2EE	

CCS306.1	Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
CCS306.2	Build client-server applications and TCP/IP socket programs
CCS306.3	Illustrate database access and details for managing information using the JDBC API
CCS306.4	Describe how servlets fit into Java-based web application architecture
CCS306.5	Develop reusable software components
Course Name: CCS307(15CS565) Cloud Computing	
CCS307.1	Explain the concepts and terminologies of cloud computing
CCS307.2	Demonstrate cloud frameworks and technologies
CCS307.3	Define data intensive computing
CCS307.4	Demonstrate cloud applications
Course Name: CCS308(15CS564) Dot Net framework for application development	
CCS308.1	Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#
CCS308.2	Demonstrate Object Oriented Programming concepts in C# programming language
CCS308.3	Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications.
CCS308.4	Illustrate the use of generics and collections in C#
CCS308.5	Compose queries to query in-memory data and define own operator behaviour

Course Name: CCS311(15CS61) Cryptography, Network Security And Cyber Law	
CCS311.1	Discuss cryptography and its need to various applications
CCS311.2	Design and develop simple cryptography algorithms
CCS311.3	Understand cyber security and need cyber Law
Course Name: CCS312(15CS62) Computer Graphics And Visualization62	
CCS312.1	Design and implement algorithms for 2D graphics primitives and attributes.
CCS312.2	Illustrate Geometric transformations on both 2D and 3D objects.
CCS312.3	Apply concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination Models.
CCS312.4	Decide suitable hardware and software for developing graphics packages.
Course Name: CCS313(15CS63-SS & CD) System Software and Compiler Design	
CCS313.1	Define System Software such as Assemblers, Loaders, Linkers and Microprocessors
CCS313.2	Familiarize with source file, object file and executable file structures and libraries
CCS313.3	Describe the front-end and back-end phases of compiler and their importance to
Course Name: CCS314(15CS64) Operating Systems	
CCS314.1	Demonstrate need for OS and different types of OS

CCS314.2	Apply suitable techniques for management of different resources
CCS314.3	Use processor, memory, storage and file system commands
CCS314.4	Realize the different concepts of OS in platform of usage through case study.
Course Name: CCS315(15CS651) Data Mining and Data Warehousing	
CC315.1	Identify data mining problems and implement the data warehouse
CC315.2	Write association rules for a given data pattern.
CC315.3	Choose between classification and clustering solution.
Course Name: CCS316(15CS653) Operation research	
CCS316.1	Select and apply optimization techniques for various problems.
CCS316.2	Model the given problem as transportation and assignment problem and solve.
CCS316.3	Apply game theory for decision support system.
Course Name: CCS317(15CS663) Wireless Networks and Mobile Computing	
CCS317.1	Summarize various mobile communication systems.
CCS317.2	Describe various multiplexing systems used in mobile computing.
CCS317.3	Indicate the use and importance of data synchronization in mobile computing
Course Name: CCS318(15CS661) Mobile Application Development	
CCS318.1	Create, test and debug Android application by setting up Android development environment
CCS318.2	Implement adaptive, responsive user interfaces that work across a wide range of devices.
CCS318.3	Infer long running tasks and background work in Android applications
CCS318.4	Demonstrate methods in storing, sharing and retrieving data in Android applications
CCS318.5	Analyse performance of android applications and understand the role of permissions and security
Course Name: CCS401(15CS71) Web Technology and its Applications	
CCS401.1	Adapt HTML and CSS syntax and semantics to build web pages.
CCS401.2	Construct and visually format tables and forms using HTML and CSS
CCS401.3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
CCS401.4	Appraise the principles of object oriented development using PHP
CCS401.5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.
Course Name: CCS402 (15CS72) Advanced Computer Architecture	
CCS402.1	Describe computer architecture.
CCS402.2	Measure the performance of architectures in terms of right parameters.
CCS402.3	Summarize parallel architecture and the software used for them.
Course Name: CCS403(15CS73) Machine Learning	
CCS403.1	Explain the concepts of parallel computing and hardware technologies
CCS403.2	Compare and contrast the parallel architectures

CCS403.3	Illustrate parallel programming concepts
Course Name: CCS404(15CS743) Information and Network Security	
CCS404.1	Analyse the Digitals security lapses
CCS404.2	Illustrate the need of key management
Course Name: CCS405(15CS754) Storage Area Networks	
CCS405.1	Identify key challenges in managing information and analyse different storage networking technologies and virtualization
CCS405.2	Explain components and the implementation of NAS
CCS405.3	Describe CAS architecture and types of archives and forms of virtualization
CCS405.4	Illustrate the storage infrastructure and management activities

Course Name: CCS411(15CS81) Internet of Things and Applications	
CCS411.1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.
CCS411.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
CCS411.3	Appraise the role of IoT protocols for efficient network communication.
CCS411.4	Elaborate the need for Data Analytics and Security in IoT.
CCS411.5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry
Course Name: CCS412(15CS82) Big Data Analytics	
CCS412.1	Master the concepts of HDFS and MapReduce framework
CCS412.2	Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
CCS412.3	Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
CCS412.4	Infer the importance of core data mining techniques for data analytics
CCS412.5	Compare and contrast different Text Mining Techniques
Course Name: CCS413(15CS832) User Interface Design	
CCS413.1	Design the user interface, design, menu creation and windows creation and connection between menu and windows

Civil department

Course Outcomes 2015 Scheme

Course Name: CCV201 (15MAT31) Engineering Mathematics –III	
CCV201.1	Know the use of periodic signals and Fourier series to analyze circuits and system communications.
CCV201.2	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform.

CCV203.3	Employ appropriate numerical methods to solve algebraic and transcendental equations.
CCV204.4	Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems
CCV205.5	Determine the extremals of functional and solve the simple problems of the calculus of variations.

Course Name: CCV202 (15CV32) Strength of Materials	
CCV202.1	To evaluate the strength of various structural elements internal forces such as compression, tension, shear, bending and torsion.
CCV202.2	To suggest suitable material from among the available in the field of construction and manufacturing.
CCV202.3	To evaluate the behaviour and strength of structural elements under the action of compound stresses and thus understand failure concepts.
CCV202.4	To understand the basic concept of analysis and design of members subjected to torsion.
CCV202.5	To understand the basic concept of analysis and design of structural elements such as columns and struts.

Course Name: CCV203 (15CV33) Fluid Mechanics	
CCV203.1	Possess a sound knowledge of fundamental properties of fluids and fluid continuum
CCV203.2	Compute and solve problems on hydrostatics, including practical applications
CCV203.3	Apply principles of mathematics to represent kinematic concepts related to fluid flow
CCV203.4	Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
CCV203.5	Compute the discharge through pipes and over notches and weirs

Course Name: CCV204 (15CV34) Basic Surveying	
CCV204.1	Possess a sound knowledge of fundamental principles Geodetics
CCV204.2	Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.
CCV204.3	Capture geodetic data to process and perform analysis for survey problems
CCV204.4	Analyze the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours

Course Name: CCV205 (15CV35) Engineering Geology	
CCV205.1	Students will able to apply the knowledge of geology and its role in Civil Engineering
CCV205.2	Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices
CCV205.3	Analyze the natural disasters and their mitigation.
CCV205.4	Assess various structural features and geological tools in ground water exploration, Natural resource estimation and solving civil engineering problems.

CCV205.5	Apply and asses use of building materials in construction and asses their properties

Course Name: CCV206 (15CV36) Building Materials and Construction

CCV206.1	Select suitable materials for buildings and adopt suitable construction techniques.
CCV206.2	Adopt suitable repair and maintenance work to enhance durability of buildings.

Course Name: CCV211 (15MAT41) Engineering Mathematics –IV*

CCV211.1	Solve first and second order ordinary differential equation arising in flow problems using single step and multistep numerical methods.
CCV211.2	Illustrate problems of potential theory, quantum mechanics and heat conduction by employing notions and properties of Bessel's functions and Legendre's polynomials.
CCV211.3	Explain the concepts of analytic functions, residues, poles of complex potentials and describe conformal and Bilinear transformation arising in field theory and signal processing
CCV211.4	Develop probability distribution of discrete, continuous random variables and joint probability distribution occurring in digital signal processing, information theory and design engineering.
CCV211.5	Demonstrate testing of hypothesis of sampling distributions and illustrate examples of Markov chains related to discrete parameter stochastic process.

Course Name: CCV212 (15CV42) Analysis of Determinate Structures

CCV212.1	Evaluate the forces i n determinate trusses by method of joints and sections
CCV212.2	Evaluate the deflection of cantilever, simply supported and overhanging beams by different Methods
CCV212.3	Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and bent frames.
CCV212.4	Determine the stress resultants in arches and cables.
CCV212.5	Understand the concept of influence lines and construct the ILD diagram for the moving

Course Name: CCV213 (15CV43) Applied Hydraulics

CCV213.1	Apply dimensional analysis to develop mathematical modelling and compute the parametric values in prototype by analysing the corresponding model parameters
CCV213.2	Design the open channels of various cross sections including economical channel sections
CCV213.3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation, Compute water surface profiles at different conditions
CCV213.4	Design turbines for the given data, and to know their operation characteristics under different operating conditions

Course Name: CCV214 (15CV44) Concrete Technology

CCV214.1	Relate material characteristics and their influence on microstructure of concrete
CCV214.2	Distinguish concrete behaviour based on its fresh and hardened properties

CCV214.3	Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes.
Course Name: CCV215 (15CV45) Basic Geotechnical Engineering	
CCV215.1	Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties
CCV215.2	Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures
CCV215.3	Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability to estimate seepage losses across hydraulic structure
CCV215.4	Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory
CCV215.5	Ability to solve practical problems related to estimation of consolidation settlement of soil deposits also time required for the same.
Course Name: CCV216 (15CV46) Advanced Surveying	
CCV216.1	Apply the knowledge of geometric principles to arrive at surveying problems
CCV216.2	Use modern instruments to obtain geo-spatial data and analyse the same to appropriate engineering problems
CCV216.3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments;
CCV216.4	Design and implement the different types of curves for deviating type of alignments
Course Name: CCV301 (15CV51) Design of RC Structural Elements	
CCV301.1	Understand the design philosophy and principles
CCV301.2	Solve engineering problems of RC elements subjected to flexure, shear and torsion
CCV301.3	Demonstrate the procedural knowledge in designs of RC structural elements such as slabs, columns and footings
CCV301.4	Owns professional and ethical responsibility
Course Name: CCV302 (15CV52) Analysis of Indeterminate Structures	
CCV302.1	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method
CCV302.2	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.
CCV302.3	Construct the bending moment diagram for beams and frames by Kani's method.
CCV302.4	Construct the bending moment diagram for beams and frames using flexibility method
CCV302.5	Analyze the beams and indeterminate frames by system stiffness method.
Course Name: CCV303 (15CV53) Applied Geotechnical Engineering	
CCV303.1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
CCV303.2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils

CCV303.3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
CCV303.4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
CCV303.5	Capable of estimating load carrying capacity of single and group of piles
Course Name: CCV304 (15CV551) Air pollution and Control	
CV304.1	Identify the major sources of air pollution and understand their effects on health and environment.
CV304.2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
CV304.3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.
CV304.4	Choose and design control techniques for particulate and gaseous emissions.
Course Name: CCV305 (15CV552) Railways, Harbors, tunneling and Airports	
CV305.1	Acquires capability of choosing alignment and also design geometric aspects of railway system, runway, taxiway.
CV305.2	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.
CV305.3	Develop layout plan of airport, harbour, dock and will be able relate the gained knowledge to identify required type of visual and/or navigational aids for the same.
CV305.4	Apply the knowledge gained to conduct surveying, understand the tunnelling activities.
Course Name: CCV306 (15CV561) Traffic Engineering	
CV306.1	Understand the human factors and vehicular factors in traffic engineering design.
CV306.2	Conduct different types of traffic surveys and analysis of collected data using statistical concepts.
CV306.3	Use an appropriate traffic flow theory and to comprehend the capacity & signalized intersection analysis.
CV306.4	Understand the basic knowledge of Intelligent Transportation System.
Course Name: CCV311 (15CV61) Construction Management and Entrepreneurship	
CCV311.1	Understand the construction management process.
CCV311.2	Understand and solve variety of issues that are encountered by every professional in discharging professional duties.
CCV311.3	Fulfil the professional obligations effectively with global outlook.
Course Name: CCV312 (15CV62) Design of Steel Structural Elements	
CCV312.1	Possess a knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behaviour of structural steel
CCV312.2	Understand the Concept of Bolted and Welded connections.
CCV312.3	Understand the Concept of Design of compression members, built-up columns and columns splices.
CCV312.4	Understand the Concept of Design of tension members, simple slab base and gusseted base.
CCV312.5	Understand the Concept of Design of laterally supported and un-supported steel beams.

Course Name: CCV313 (15CV63) Highway Engineering	
CCV313.1	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.
CCV313.2	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.
CCV313.3	Design road geometrics, structural components of pavement and drainage.
CCV313.4	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.
Course Name: CCV314 (Subject Code: 15CV64) Water Supply and Treatment Engineering	
CCV314.1	Estimate average and peak water demand for a community.
CCV314.2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.
CCV314.3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
CCV314.4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.
Course Name: CCV315 (15CV651) Solid Waste Management	
CCV315.1	Analyse existing solid waste management system and to identify their drawbacks.
CCV315.2	Evaluate different elements of solid waste management system.
CCV315.3	Suggest suitable scientific methods for solid waste management elements.
CCV315.4	Design suitable processing system and evaluate disposal sites
Course Name: CCV316 (15CV653) Alternative Building Materials	
CCV316.1	Solve the problems of Environmental issues concerned to building materials and cost effective building technologies;
CCV316.2	Suggest appropriate type of masonry unit and mortar for civil engineering constructions; also they are able to Design Structural Masonry Elements under
CCV316.3	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.
CCV316.4	Recommend various types of alternative building materials and technologies and design a energy efficient building by considering local climatic condition and building material.
Course Name: CCV317 (15CV661) Water Resource Management	
CCV318.1	Develop analytical skills. 2. 3. 4.
CCV318.2	Learn principles of analysis of stress and strain.
CCV318.3	Develop problem solving skills.
CCV318.4	Understand the principles of FEM for one and two dimensional problems.
Course Name: CCV401 (15CV71) Municipal and Industrial Waste Water Engineering	
CCV401.1	Acquires capability to design sewer and Sewerage treatment plant.
CCV401.2	Evaluate degree of treatment and type of treatment for disposal, reuse and recycle.
CCV401.3	Identify waste streams and design the industrial waste water treatment plant.

CCV401.4	Manage sewage and industrial effluent issues.
Course Name: CCV402 (15CV72) Design of RCC and Steel Structures	
CCV402.1	Students will acquire the basic knowledge in design of RCC and Steel Structures.
CCV402.2	Students will have the ability to follow design procedures as per codal provisions and skills to arrive at structurally safe RC and Steel members. □
Course Name: CCV403 (15CV73) Hydrology and Irrigation Engineering	
CCV403.1	Understand the importance of hydrology and its components.
CCV403.2	Measure precipitation, analyze the data, and analyze the losses in precipitation.
CCV403.3	Estimate runoff and develop unit hydrographs.
CCV403.4	Find the benefits and ill effects of irrigation.
CCV403.5	Find the quantity of irrigation water and frequency of irrigation for various crops.
CCV403.6	Find the canal capacity, design the canal and compute the reservoir capacity.
Course Name: CCV404 (15CV741) Design of Bridges	
CCV404.1	Understand the load distribution and IRC standards.
CCV404.2	Design the slab and T beam bridges.
CCV404.3	Design Box culvert, pipe culvert
Course Name: CCV405 (15CV742) Ground Water & Hydraulics	
CCV405.1	Find the characteristics of aquifers.
CCV405.2	Estimate the quantity of ground water by various methods.
CCV405.3	Locate the zones of ground water resources.
CCV405.4	Select particular type of well and augment the ground water storage.
Course Name: CCV406 (15CV751) Urban Transportation and Planning	
CCV406.1	Design, conduct and administer surveys to provide the data required for transportation planning
CCV406.1	Supervise the process of data collection about travel behaviour and analyse the data for use in transport planning.
CCV406.1	Supervise the process of data collection about travel behaviour and analyse the data for use in transport planning.
CCV406.1	Adopt the steps that are necessary to complete a long-term transportation plan.
Course Name: CCV411 (15CV81) Quantity Surveying and Contracts Management	
CCV411.1	Prepare detailed and abstract estimates for roads and building.
CCV411.2	Prepare valuation reports of buildings.
CCV411.3	Interpret Contract documents of domestic and international construction works
Course Name: CCV412 (15CV82) Design of Pre Stressed Concrete Elements	
CCV412.1	Understand the requirement of PSC members for present scenario.
CCV412.2	Analyse the stresses encountered in PSC element during transfer and at working.
CCV412.3	Understand the effectiveness of the design of PSC after studying losses
CCV412.4	Capable of analysing the PSC element and finding its efficiency.
CCV412.5	. Design PSC beam for different requirements.

Course Name: CCV413 (15CV831) Earthquake Engineering	
CCV413.1	Acquire basic knowledge of engineering seismology
CCV413.2	Develop response spectra for a given earthquake time history and its implementation to estimate response of a given structure.
CCV413.3	Understanding of causes and types of damages to civil engineering structures during different earthquake scenarios
CCV413.4	Analyse multi-storied structures modelled as shear frames and determine lateral force distribution due to earthquake input motion using IS-1893 procedures.
CCV413.5	Comprehend planning and design requirements of earthquake resistant features of RCC and Masonry structures thorough exposure to different IS-codes of practices.

Course Name: CCV414 (15CV833) Pavement Design	
CCV414.1	Check the stability of gravity dams and design the dam.
CCV414.2	Estimate the quantity of seepage through earth dams.
CCV414.3	Design spillways and aprons for various diversion works.
CCV414.4	Select particular type of canal regulation work for canal network.

Department of Electronics and Communication Engineering

Course Outcomes 2015 Scheme

COURSE NAME: ENGINEERING MATHEMATICS CEC201(15MAT31)	
CEC201.1	Know the use of periodic signals and Fourier series to analyze circuits and system communications.
CEC201.2	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z transform.
CEC201.3	Employ appropriate numerical methods to solve algebraic and transcendental equations.
CEC201.4	Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
CEC201.5	Determine the extremals of functional and solve the simple problems of the calculus of variations.
Course name: ANALOG ELECTRONICS CEC202(15EC32)	
CEC202.1	Describe the working principle and characteristics of BJT, FET, Single stage, cascaded and feedback amplifiers.
CEC202.2	Describe the Phase shift, Wien bridge, tuned and crystal oscillators using BJT/FET/UJT.
CEC202.3	Calculate the AC gain and impedance for BJT using re and h parameters models for CE and CC configuration.
CEC202.4	Determine the performance characteristics and parameters of BJT and FET amplifier using small signal model
CEC202.5	Determine the parameters which affect the low frequency and high frequency responses of BJT and FET amplifiers and draw the characteristics..

CEC202.6	Evaluate the efficiency of Class A and Class B power amplifiers and voltage regulators.

Course name: DIGITAL ELECTRONICS CEC203(15EC33)

CEC203.1	Develop simplified switching equation using Karnaugh Maps and Quine-McClusky techniques.
CEC203.2	Explain the operation of decoders, encoders, multiplexers, demultiplexers, adders, subtractors and comparators
CEC203.3	Explain the working of Latches and Flip Flops (SR,D,T and JK)..
CEC203.4	Design Synchronous/Asynchronous Counters and Shift registers using Flip-flops.
CEC203.5	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits, state diagrams, registers and counters
CEC203.6	Apply the knowledge gained in the design of Counters and Registers.

Course name: NETWORK ANALYSIS CEC204(15EC34)

CEC204.1	Acquire knowledge for solving problems related to • Series and Parallel combination of Passive Components, Source Transformation and Source Shifting.
CEC204.2	Network Theorems and Electrical laws to reduce circuit complexities and to arrive at feasible solutions.
CEC204.3	Various Two port Parameters and their Relationship for finding Network Solutions.
CEC204.4	Analyze the Performance of various Types of Networks Using different concepts and principles.

Course name: ELECTRONIC INSTRUMENTATION CEC205(15EC35)

CEC205.1	Describe instrument measurement errors and calculate them.
CEC205.2	Describe the operation of Ammeters, Voltmeters, Multimeter and develop circuits for multi-age Ammeters and Voltmeters. .
CEC205.3	Describe functional concepts and operation of Digital voltmeters and instruments to measure voltage, frequency, time period, phase difference of signals, rotation speed, capacitance and pH of solutions.
CEC205.4	Describe functional concepts and operation of Digital voltmeters and instruments to measure voltage, frequency, time period, phase difference of signals, rotation speed, capacitance and pH of solutions. Describe functional concepts and operation of various Analog measuring instruments to measure output power, field Strength, impedance, stroboscopic speed, in/out of phase, Q of coils, insulation resistance and pH.
CEC205.5	Describe and discuss functioning and types of Oscilloscopes, Signal generators and Transducers.
CEC205.6	Utilize AC and DC bridges for passive component and frequency measurements.

Course name: ENGINEERING ELECTROMAGNETICS CEC206(15EC36)

CEC206.1	Evaluate problems on electric field due to point, linear, volume charges by applying conventional methods or by Gauss law.
CEC206.2	Determine potential and energy with respect to point charge and capacitance using Laplace equation.
CEC206.3	Calculate magnetic field, force, and potential energy with respect to magnetic materials.
CEC206.4	Apply Maxwell's equation for time varying fields, EM waves in free space and conductors.
CEC206.5	Evaluate power associated with EM waves using Poynting theorem.

Course name: ENGINEERING MATHEMATICS-IVCEC212(15EC41)	
CEC211.1	Solve systems of linear equations in the different areas of linear algebra.
CEC211.2	Solve second and higher order differential equations occurring in of electrical circuits, damped/un-damped vibrations.
CEC211.3	Describe Laplace transforms of standard and periodic functions.
CEC211.4	Determine the general/complete solutions to linear ODE using inverse Laplace transforms.
CEC211.5	Recall basic concepts of elementary probability theory and, solve problems related to the decision theory, synthesis and optimization of digital circuits
Course name: MICROPROCESSORS CEC212(15EC42)	
CEC212.1	Explain the History of evaluation of Microprocessors, Architecture of 8086, 8088, 8087, CISC & RISC, Von-Neumann & Harvard CPU architecture
CEC212.2	Write 8086 Assembly level programs using the 8086 instruction set
CEC212.3	Write modular programs using procedures and macros.
CEC212.4	Write 8086 Stack and Interrupts programming
CEC212.5	Interface 8086 to Static memory chips and 8255, 8254, 0808 ADC, 0800 DAC, Keyboard, Display and Stepper motors.
CEC212.6	Use INT 21 DOS interrupt function calls to handle Keyboard and Display
Course name: CONTROL SYSTEMSCEC213(15EC43)	
CEC213.1	Develop the mathematical model of mechanical and electrical systems
CEC213.2	Understand time domain specifications for first and second order systems
CEC213.3	Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method
CEC213.4	Determine the stability of a system in the time domain using Route Harvitz criteria and root locus technique
CEC213.5	Determine the stability of a system in the frequency domain using Nyquist and bode plots
CEC213.6	Model a control system in continuous and discrete time using state variable techniques
Course name: SIGNALS AND SYSTEMS CEC214(15EC44)	
CEC214.1	Classify the signals as continuous/discrete, periodic/aperiodic, even/odd, energy/power and deterministic/random signals.
CEC214.2	Determine the linearity, causality, time-invariance and stability properties of continuous and discrete time systems.
CEC214.3	Compute the response of a Continuous and Discrete LTI system using convolution integral and convolution sum.
CEC214.4	Determine the spectral characteristics of continuous and discrete time signal using Fourier analysis.

CEC214.5	Compute Z-transforms, inverse Z- transforms and transfer functions of complex LTI systems.
Course name: PRINCIPLES OF COMMUNICATION SYSTEMS CEC215(15EC45)	
CEC215.1	Determine the performance of analog modulation schemes in time and frequency domains.
CEC215.2	Determine the performance of systems for generation and detection of modulated analog signals.
CEC215.3	Characterize analog signals in time domain as random processes and in frequency domain using Fourier transforms.
CEC215.4	Characterize the influence of channel on analog modulated signals
CEC215.5	Determine the performance of analog communication systems.
Course name: LINEAR INTEGRATED CIRCUITS CEC216(15EC46)	
CEC216.1	Explain Op-Amp circuit and parameters including CMRR, PSRR, Input & Output Impedances and Slew Rate
CEC216.2	Design Op-Amp based Inverting, Non-inverting, Summing & Difference Amplifier
CEC216.3	Design Op-Amp based AC Amplifiers including Voltage Follower, Inverting / Noninverting & Difference Amplifier
CEC216.4	Develop circuits for Op-Amp based Voltage / Current Sources & Sinks, Current, Instrumentation and Precision Amplifiers
CEC216.5	Develop circuits for Op-Amp based linear and non-linear circuits comprising of limiting, clamping, Sample & Hold, Differentiator / Integrator Circuits, Peak Detectors ,Oscillators and Multiplier & Devider
CEC216.6	Design first & Second Order Low Pass, High Pass, Band Pass, Band Stop Filters and Voltage Regulators
CEC216.7	Explain applications of linear ICs in phase detector, VCO, DAC, ADC and Timer
Course name: MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT CEC301(15ES51)	
CEC301.1	Understand the fundamental concepts of Management and Entrepreneurship
CEC301.2	Select a best Entrepreneurship model for the required domain of establishment
CEC301.3	Describe the functions of Managers, Entrepreneurs and their social responsibilities
CEC301.4	Compare various types of Entrepreneurs
CEC301.5	Analyze the Institutional support by various state and central government agencies
Course name: DIGITAL SIGNAL PROCESSING CEC302(15EC52)	
CEC302.1	Determine response of LTI systems using time domain and DFT techniques.
CEC302.2	Compute DFT of real and complex discrete time signals.

CEC302.3	Computation of DFT using FFT algorithms and linear filtering approach.
CEC302.4	Solve problems on digital filter design and realize using digital computations
Course name: Verilog HDL CEC303(15EC53)	
CEC303.1	Write Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction.
CEC303.2	Write simple programs in VHDL in different styles.
CEC303.3	Design and verify the functionality of digital circuit/system using test benches. Identify the suitable Abstraction level for a particular digital design.
CEC303.4	Write the programs more effectively using Verilog tasks and directives.
CEC303.5	Perform timing and delay Simulation.
Course name: INFORMATION THEORY AND CODINGCEC304(15EC54)	
CEC304.1	Explain concept of Dependent & Independent Source, measure of information, Entropy, Rate of Information and Order of a source
CEC304.2	Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms
CEC304.3	Model the continuous and discrete communication channels using input, output and joint probabilities
CEC304.4	Determine a codeword comprising of the check bits computed using Linear Block codes, cyclic codes & convolutional codes
CEC304.5	Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes, BCH and Golay codes.
Course name: SWITCHING & FINITE AUTOMATA THEORYCEC305(15EC552)	
CEC305.1	Explain the concept of threshold logic
CEC305.2	Understand the effect of hazards on digital circuits and fault detection and analysis
CEC305.3	Define the concepts of finite state model
CEC305.4	Analyze the structure of sequential machine
CEC305.5	Explain methods of state identification and fault detection experiments
Course name: AUTOMOTIVE ELECTRONICS CEC306(15EC561)	
CEC306.1	Acquire an overview of automotive components, subsystems, and basics of Electronic Engine Control in today's automotive industry.
CEC306.2	Use available automotive sensors and actuators while interfacing with microcontrollers / microprocessors during automotive system design.

CEC306.3	Understand the networking of various modules in automotive systems, communication protocols and diagnostics of the sub systems.
CEC306.4	Design and implement the electronics that attribute the reliability, safety, and smartness to the automobiles, providing add-on comforts and get fair idea on future Automotive Electronic Systems.
CEC308.3	Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.
CEC308.4	Interface the hardware to the programmable chips and obtain the required output

Course name: DIGITAL COMMUNICATION CEC311(15EC61)

CEC311.1	Associate and apply the concepts of Bandpass sampling to well specified signals and channels.
CEC311.2	Analyze and compute performance parameters and transfer rates for low pas and bandpass symbol under ideal and corrupted non band limited channels.
CEC311.3	Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels.
CEC311.4	Demonstrate by simulation and emulation that bandpass signals subjected to corrupted and distorted symbols in a bandlimited channel, can be demodulated and estimated at receiver to meet specified performance criteria.

Course name: ARM MICROCONTROLLER & EMBEDDED SYSTEMS CEC312(15EC62)

CEC312.1	Describe the architectural features and instructions of 32 bit microcontroller ARM Cortex M3.
CEC312.2	Apply the knowledge gained for Programming ARM Cortex M3 for different applications.
CEC312.3	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
CEC312.4	Develop the hardware /software co-design and firmware design approaches.
CEC312.5	Explain the need of real time operating system for embedded system applications.

Course name: VLSI Design CEC313(15EC63)

CEC313.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling.
CEC313.2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects.
CEC313.3	Interpret Memory elements along with timing considerations
CEC313.4	Demonstrate knowledge of FPGA based system design
CEC313.5	Interpret testing and testability issues in VLSI Design

CEC313.6	Analyze CMOS subsystems and architectural issues with the design constraints.
Course name: COMPUTER COMMUNICATION NETWORKS CEC314(15EC64)	
CEC314.1	Identify the protocols and services of Data link layer.
CEC314.2	Identify the protocols and functions associated with the transport layer services.
CEC314.3	Describe the layering architecture of computer networks and distinguish between the OSI reference model and TCP/IP protocol suite.
CEC314.4	Distinguish the basic network configurations and standards associated with each network.
CEC314.5	Construct a network model and determine the routing of packets using different routing algorithms.
Course name: ARITIFICAL NEURAL NETWORKS CEC315(15EC653)	
CEC315.1	Understand the role of neural networks in engineering, artificial intelligence, and cognitive modelling.
CEC315.2	Understand the concepts and techniques of neural networks through the study of the most important neural network models.
CEC315.3	Evaluate whether neural networks are appropriate to a particular application.
CEC315.4	Apply neural networks to particular applications, and to know what steps to take to improve performance.
Course name: DIGITAL SYSTEM DESIGN USING VERILOG CEC316(15EC663)	
CEC316.1	Construct the combinational circuits, using discrete gates and programmable logic devices.
CEC316.2	Describe Verilog model for sequential circuits and test pattern generation.
CEC316.3	Design a semiconductor memory for specific chip design
CEC316.4	Design embedded systems using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores.
CEC316.5	Synthesize different types of processor and I/O controllers that are used in embedded system.
Course name: MICROWAVES AND ANTENNAS CEC401(15EC71)	
CEC401.1	Describe the use and advantages of microwave transmission
CEC401.2	Analyze various parameters related to microwave transmission lines and waveguides
CEC401.3	Identify microwave devices for several applications
CEC401.4	Analyze various antenna parameters necessary for building an RF system
CEC401.5	Recommend various antenna configurations according to the applications

Course name: DIGITAL IMAGE PROCESSING CEC402(15EC72)	
CEC402.1	Understand image formation and the role human visual system plays in perception of gray and color image data.
CEC402.2	Apply image processing techniques in both the spatial and frequency (Fourier) domains.
CEC402.3	Design image analysis techniques in the form of image segmentation and to evaluate the Methodologies for segmentation.
CEC402.4	Conduct independent study and analysis of Image Enhancement techniques.
Course name: POWER ELECTRONICS CEC403(15EC73)	
CEC403.1	Describe the characteristics of different power devices and identify the various applications associated with it.
CEC403.2	Illustrate the working of power circuit as DC-DC converter.
CEC403.3	Illustrate the operation of inverter circuit and static switches.
CEC403.4	Determine the output response of a thyristor circuit with various triggering options
CEC403.5	Determine the response of controlled rectifier with resistive and inductive loads.
Course name: REAL TIME SYSTEMS CEC404(15EC743)	
CEC404.1	Understand the fundamentals of Real time systems and its classifications.
CEC404.2	Understand the concepts of computer control, operating system and the suitable computer hardware requirements for real-time applications
CEC404.3	Develop the software languages to meet Real time applications.
CEC404.4	Apply suitable methodologies to design and develop Real-Time Systems.
Course name: SATELLITE COMMUNICATION CEC405(15EC755)	
CEC405.1	Describe the satellite orbits and its trajectories with the definitions of parameters associated with it.
CEC405.2	Describe the electronic hardware systems associated with the satellite subsystem and earth station
CEC405.3	Describe the various applications of satellite with the focus on national satellite system.
CEC405.4	Compute the satellite link parameters under various propagation conditions with the illustration of multiple access techniques.
Course name: Wireless Cellular and LTE 4G Broadband CEC411(15EC81)	
CEC411.1	Understand the system architecture and the functional standard specified in LTE 4G.
CEC411.2	Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice fr om users.

CEC411.3	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
CEC411.4	Test and Evaluate the Performance of resource management and packet data processing and transport algorithms.
Course name: FIBER OPTICS and NETWORKS CEC412(15EC82)	
CEC412.1	Classification and working of optical fiber with different modes of signal propagation.
CEC412.2	Describe the transmission characteristics and losses in optical fiber communication.
CEC412.3	Describe the construction and working principle of optical connectors, multiplexers and amplifiers
CEC412.4	Describe the constructional features and the characteristics of optical sources and detectors
CEC412.5	Illustrate the networking aspects of optical fiber and describe various standards associated with it.
Course name: NETWORK AND CYBER SECURITY CEC413(15EC835)	
CEC413.1	Explain network security protocols
CEC413.2	Understand the basic concepts of cyber security
CEC413.3	Discuss the cyber security problems
CEC413.4	Explain Enterprise Security Framework
CEC413.4	Apply concept of cyber security framework in computer system administration

Department of Electrical and Electronics Engineering

Course Outcomes 2015 Scheme

Course Name: CEE201(15MAT31) Engineering Mathematics	
CEE201.1	Know the use of periodic signals and Fourier series to analyse circuits and system communications.
CEE201.2	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform
CEE201.3	Employ appropriate numerical methods to solve algebraic and transcendental equations.
CEE201.4	Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems
CEE201.5	Determine the extremes of functional and solve the simple problems of the calculus of variations.
Course Name: CEE202 (15EE32) Electrical Circuit analysis	
CEE202.1	Apply knowledge of mathematics, science, and engineering to the analysis and design of electrical circuits.
CEE202.2	Identify, formulate, and solve engineering problems in the area circuits and systems.
CEE202.3	Analyse the solution and infer the authenticity of it.
Course Name: CEE203 (15EE33) Transformers & Generators	
CEE203.1	Explain the construction and operation and performance of transformers.
CEE203.2	Explain different connections for the three phase operations, their advantages and applications
CEE203.3	Explain the construction and operation of Synchronous machines and evaluate the regulation of Synchronous machines by different methods.
CEE203.4	Analyse the operation of the synchronous machine connected to infinite machine.
Course Name: CEE204(15EE34)Analog Electronic circuits	
CEE204.1	Utilize the characteristics of transistor for different applications.
CEE204.2	Design and analyse biasing circuits for transistor
CEE204.3	Design, analyse and test transistor circuitry as amplifiers and oscillators

Course Name: CEE205(15EE35) Digital System Design	
CEE205.1	Design and analyse combinational & sequential circuits
CEE205.2	Design circuits like adder, sub tractor, code converter etc.
CEE205.3	Understand counters and sequence generators.
Course Name: CEE206(15EE36) Electrical & Electronic Measurements	
CEE206.1	Explain the importance of units and dimensions
CEE206.2	Measure resistance, inductance and capacitance by different methods
CEE206.3	Explain the working of various meters used for measurement of power and energy.

CEE206.4	Explain the working of different electronic instruments and display devices.

Course Name: CEE211(15MAT41) Engineering Mathematics II	
CEE211.1	Use appropriate single step and multi-step numerical methods to solve first and second order ordinary differential equations arising in flow data design problems.
CEE211.2	Explain the idea of analyticity, potential field's residues and poles of complex potentials in field theory and electromagnetic theory.
CEE211.3	Employ Bessel's functions and Legendre's polynomials for tackling problems arising in continuum Mechanics, hydrodynamics and heat conduction.
CEE211.4	Describe random variables and probability distributions using rigorous statistical methods to analyse problems associated with optimization of digital circuits, information, coding theory and stability analysis of systems.
CEE211.5	Apply the knowledge of joint probability distributions and Markov chains in attempting engineering problems for feasible random events

Course Name: CEE212(15EE42) Power Generation & Economics	
CEE212.1	Design a software system, component, or process to meet desired needs within realistic Constraints.
CEE212.2	Assess professional and ethical responsibility
CEE212.3	Function on multi-disciplinary teams.
CEE212.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
CEE212.5	Analyse, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.

Course Name: CEE213(15EE43) Transmission & Distribution	
CEE213.1	Explain the concepts of various methods of generation of power
CEE213.2	Explain the importance of HVAC, EHVAC, UHVAC and HVDC transmission.
CEE213.3	Design and analyse overhead transmission system for a given voltage level.
CEE213.4	Calculate the parameters of the transmission line for different configurations and assess the performance of line.
CEE213.5	Explain the use of underground cables and evaluate different types of distribution systems.

Course Name: CEE214(15EE44) Electric Motors	
CEE214.1	Explain the constructional features of Motors and select a suitable drive for specific application.
CEE214.2	Analyse and assess the performance characteristics of DC motors by conducting suitable tests and control the speed by suitable method
CEE214.3	Explain the constructional features of Three Phase and Single phase induction Motors and assess their performance.
CEE214.4	Control the speed of induction motor by a suitable method.
CEE214.5	Explain the operation of Synchronous motor and special motors.

Course Name: CEE215(15EE45) Electromagnetic Field Theory	
CEE215.1	Use different coordinate systems to explain the concept of gradient, divergence and curl of a vector.
CEE215.2	Use Coulomb's Law and Gauss Law for the evaluation of electric fields produced by different charge configurations
CEE215.3	Calculate the energy and potential due to a system of charges.
CEE215.4	Explain the behaviour of electric field across a boundary between a conductor and dielectric and between two different dielectrics
CEE215.5	Explain the behaviour of magnetic fields and magnetic materials.
CEE215.6	Assess time varying fields and propagation of waves in different media
Course Name: CEE216(15EE46) Operational Amplifiers & Linear IC's	
CEE216.1	Explain the basics of linear ICs.
CEE216.2	Design circuits using linear ICs.
CEE216.3	Demonstrate the application of Linear ICs.
CEE216.4	Use ICs in the electronic projects.
Course Name: CEE301(15EE51) Management and Entrepreneurship	
CEE301.1	Explain the field of management, task of the manager, planning and the need of proper staff, recruitment and selection process.
CEE301.2	Discuss work allocation, the structure of organization, the modes of communication and importance of managerial control in business
CEE301.3	To explain need of coordination between the manager and staff in exercising the authority and delegating duties.
CEE301.4	To explain the social responsibility of business and leadership
CEE301.5	Explain the concepts of entrepreneurship and the role and importance of the entrepreneur in economic development
CEE301.6	Show an understanding of the role and importance of Small Scale Industries, business plan and its presentation
CEE301.7	Discuss the concepts of project management, capitol building process, project feasibility study, project appraisal and project financing
CEE301.8	Discuss the state /central level institutions / agencies supporting business enterprises
Course Name: CEE302(15EE52) Microcontroller	
CEE302.1	Discuss the history of the 8051 and features of other 8051 family members and the internal architecture of the 8051.
CEE302.2	Explains the use of an 8051 assembler, the stack and the flag register, loop, jump, and call instructions.
CEE302.3	Discuss 8051 addressing modes, accessing data and I/O port programming, arithmetic, logic instructions, and programs.
CEE302.4	Develop 8051C programs for time delay, I/O operations, I/O bit manipulation, logic and arithmetic operations, data conversion and data serialization
CEE302.5	Discuss the hardware connection of the 8051 chip, its timers, serial data communication and its interfacing of 8051to the RS232
CEE302.6	Discuss in detail 8051 interrupts and writing interrupt handler programs

CEE302.7	Interface 8051 with real-world devices such as LCDs and keyboards, ADC, DAC chips and sensors
CEE302.8	Interface 8031/51 with external memories, 8255 chip to add ports and relays, opt isolators and motors.

Course Name: CEE303(15EE53) Power Electronics	
CEE303.1	Explain application area of power electronics, types of power electronic circuits and switches their characteristics and specifications
CEE303.2	Explain types of power diodes, their characteristics, and the effects of power diodes on RL circuits.
CEE303.1	Explain the techniques for design, operation and analysis of single phase diode rectifier circuits
CEE303.4	Explain steady state, switching characteristics and gate control requirements of different power transistors and their limitations
CEE303.5	Discuss different types of Thyristors, their operation, gate characteristics and gate control requirements.
CEE303.6	Explain designing, analysis techniques and characteristics of thyristor controlled rectifiers
CEE303.7	Discuss the principle of operation of single phase and three phase DC - DC, DC – AC converters and AC voltage controllers

Course Name: CEE304(15EE54)Signals & Systems	
CEE304.1	Classify the signals and systems
CEE304.2	Explain basic operations on signals and properties of systems.
CEE304.3	Use convolution in both continuous and discrete domain for the analysis of systems given the impulse response of a system
CEE304.4	Evaluate response of a given linear time invariant system
CEE304.5	Provide block diagram representation of a linear time invariant system
CEE304.7	Apply continuous time Fourier transform representation to study signals and linear time invariant systems
CEE304.8	Apply discrete time Fourier transform representation to study signals and linear time invariant systems. Use Z-transform and properties of Z transform for the analysis of discrete time systems.

Course Name: CEE305(15ME552) Electrical Engineering Materials	
CEE305.1	Discuss electrical and electronics materials, their importance, classification and operational requirement
CEE305.2	Discuss conducting materials used in engineering, their properties and classification
CEE305.3	Discuss dielectric materials used in engineering, their properties and classification
CEE305.4	Discuss insulating materials used in engineering, their properties and classification
CEE305.5	Discuss magnetic materials used in engineering, their properties and classification
CEE305.6	Explain the phenomenon superconductivity, super conducting materials and their application in engineering
CEE305.7	Explain the plastic and its properties and application
CEE305.8	Discuss materials used for Opto electronic devices

Course Name: CEE306(15ME562) Energy & Environment	

CEE306.1	Summarize the basic concepts of energy, its distribution and general Scenario
CEE306.2	Explain different energy storage systems, energy management, audit and economic analysis
CEE306.3	Summarize the environment eco system and its need for awareness
CEE306.4	Identify the various types of environment pollution and their effects.
CEE306.5	Discuss the social issues of the environment with associated acts.

Course Name: CEE311(15EE61) Control Systems	
CEE311.1	Discuss the effects of feedback and types of feedback control systems
CEE311.2	Evaluate the transfer function of a linear time invariant system
CEE311.3	Evaluate the stability of linear time invariant systems.
CEE311.4	Apply block diagram manipulation and signal flow graph methods to obtain transfer function of systems.
CEE311.5	Demonstrate the knowledge of mathematical modelling of control systems and components
CEE311.6	Determine transient and steady state time response of a simple control system.
CEE311.7	Investigate the performance of a given system in time and frequency domains.
CEE311.8	Discuss stability analysis using Root locus, Bode plots and Nyquist plots.
CEE311.9	Determine the controller or compensator configuration and parameter values relative to how it is connected to the controlled process given the design specifications.
Course Name: CEE312(15EE62) Power System Analysis-1	
CEE312.1	Able to obtain power system network for any power system network represented by one line diagram & implement pu, method to obtain pu values of power system quantities
CEE312.2	Able to Analyse severity of power system faults & select circuit breakers for Power system protection
CEE312.3	Gain Knowledge about symmetrical components & Unsymmetrical faults
CEE312.4	Discuss the dynamics of synchronous machines, Stability & types of Stability.
Course Name: CEE313(15EE63)Electrical Machine Design	
CEE313.1	Compute the DFT of various signals using its properties and linear filtering of two sequences.
CEE313.2	Apply fast and efficient algorithms for computing DFT and inverse DFT of a given sequence
CEE313.3	Design infinite impulse response Butterworth digital filters using impulse invariant / bilinear transformation technique
CEE313.4	Design infinite impulse response Chebyshev digital filters using impulse invariant or bilinear transformation technique
CEE313.5	Realize a digital IIR filter by direct, cascade, parallel and ladder methods of realization
CEE313.6	Discuss different window functions and frequency sampling method used for design of FIR filters.

CEE313.7	Design FIR filters by use of window function or by frequency sampling method
CEE313.8	Design FIR filters by use of window function or by frequency sampling method

Course Name: CEE314(15CS64) Electrical machine Design	
CEE314.1	Discuss design factors, limitations, modern trends in design, manufacturing of electrical machines and properties of materials used in the electrical machines
CEE314.2	Derive the output equations of transformer, DC machines and AC machines.
CEE314.3	Discuss selection of specific loadings and magnetic circuits of different electrical machines
CEE314.4	Design the field windings of DC machine and Synchronous machine.
CEE314.5	Design stator and rotor circuits of a DC and AC machines.
CEE314.6	Estimate the number of cooling tubes, no load current and leakage reactance of core type transformer
CEE314.7	Discuss short circuit ratio and its effects on performance of synchronous machines.
CEE314.8	Design salient pole and non-salient pole alternators for given specifications.

Course Name: CEE315(15EE651) Computer Aided Electrical Drawing	
CEE315.1	Discuss the terminology and types of DC and AC armature windings.
CEE315.2	Develop armature winding diagram for DC and AC machines
CEE315.3	Develop a layout for substation using the standard symbols for substation equipment
CEE315.4	Draw sectional views of core and shell types transformers using the design data
CEE315.6	Draw sectional views of assembled DC machine or its parts using the design data or the sketches
CEE315.7	Draw sectional views of assembled alternator or its parts using the design data or the sketches

Course Name: CEE316(15EE662)Sensors & Transducers	
CEE316.1	Discuss need of transducers, their classification, advantages and disadvantages.
CEE316.2	Show an understanding of working of various transducers and sensors.
CEE316.3	Discuss recent trends in sensor technology and their selection.
CEE316.4	Discuss basics of signal conditioning and signal conditioning equipment.
CEE316.5	Discuss configuration of Data Acquisition System and data conversion.
CEE316.6	Show knowledge of data transmission and telemetry.
CEE316.7	Explain measurement of non-electrical quantities-temperature, flow, speed, force, torque, power and viscosity

Course Name: CEE401(15EE71)Power System Analysis-2	
CEE401.1	Formulate network matrices and models for solving load flow problems.
CEE401.2	Suggest a method to control voltage profile, show knowledge of optimal operation of generators on a busbars, optimal unit commitment
CEE401.3	Discuss optimal scheduling for Hydrothermal system, power system security & reliability
CEE401.4	Analyse short circuit faults in power system network using bus impedance matrix

CEE401.5	Perform numerical equation of swing equation by for multi machine stability
Course Name: CEE402 (15EE72) Power System Protection	
CEE402.5	To discuss performance of protective relays, components of protection scheme , relay terminology, relay construction operating principles, Overcurrent protection using electromagnetic and static relays , Overcurrent protective schemes, electromagnetic and static distance relays, effect of arc resistance, power swings, line length and source impedance on performance of distance relays.
CEE402.5	To discuss pilot protection; wire pilot relaying, carrier pilot relaying, construction, operating principles, performance of various differential relays for differential protection, protection of generators, motors, Transformer and Bus Zone Protection
CEE402.5	To explain the principle of circuit interruption and different types of circuit breakers, the construction and operating principle of different types of fuses and different terminologies related to a fuse.
CEE402.4	To discuss protection Against Overvoltage's and Gas Insulated Substation (GIS).
Course Name: CEE403(15EE73)High Voltage Engineering	
CEE403.1	Explain conduction and breakdown phenomenon in gases, liquid dielectrics.
CEE403.2	Explain breakdown phenomenon in solid dielectrics.
CEE403.3	Explain generation of high voltages and currents
CEE403.4	Discuss measurement techniques for high voltages and currents.
CEE403.5	Discuss overvoltage phenomenon and insulation coordination in electric power systems
CEE403.6	Discuss non-destructive testing of materials and electric apparatus and high-voltage testing of electric apparatus
Course Name: CEE404(15EE742) Utilization of Electric Power	
CEE404.1	Discuss electric heating, air-conditioning and electric welding
CEE404.2	Explain laws of electrolysis, extraction and refining of metals and electro deposition
CEE404.3	Explain the terminology of illumination, laws of illumination, construction and working of electric lamps.
CEE404.4	Design interior and exterior lighting systems- illumination levels for factory lighting- flood lighting-street lighting.
CEE404.5	Discuss systems of electric traction, speed time curves and mechanics of train movement
CEE404.6	Explain the motors used for electric traction and their control.
CEE404.7	Discuss braking of electric motors, traction systems and power supply and other traction systems.
CEE404.8	Explain the working of electric and hybrid electric vehicles.
Course Name: CEE405(15EE752) Testing and commissioning of power system Apparatus	
CEE405.1	Describe the process to plan, control and implement commissioning of electrical equipment's.

CEE405.2	Differentiate the performance specifications of transformer and induction motor.
CEE405.3	Demonstrate the routine tests for synchronous machine, induction motor, transformer & switchgears.
CEE405.4	Describe corrective and preventive maintenance of electrical equipment's.
CEE405.5	Describe corrective and preventive maintenance of electrical equipment's.

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Course Name: CEE411(15EE81) Power System Operation & Control	
CEE411.1	Describe various levels of controls in power systems, the vulnerability of the system, components, Architecture and configuration of SCADA
CEE411.2	Solve unit commitment problems
CEE411.3	Explain issues of hydrothermal scheduling and solutions to hydro thermal problems
CEE411.4	Explain basic generator control loops, functions of Automatic generation control, speed governors
CEE411.5	Develop and analyse mathematical models of Automatic Load Frequency Control
CEE411.6	Explain automatic generation control, voltage and reactive power control in an interconnected power System
CEE411.7	Explain reliability, security, contingency analysis, state estimation and related issues of power Systems.
Course Name: CEE412(15EE82) Industrial Drives & Applications	
CEE412.1	Explain the advantages and choice of electric drive.
CEE412.2	Explain dynamics and different modes of operation of electric drives
CEE412.3	Suggest a motor for a drive and control of dc motor using controlled rectifiers.
CEE412.4	Analyse the performance of induction motor drives under different conditions.
CEE412.5	Control induction motor, synchronous motor and stepper motor drives.
CEE412.6	Suggest a suitable electrical drive for specific application in the industry.
Course Name: CEE413(15EE833) Integration of Distributed Generation	
CEE413.1	Explain the performance of the system when distributed generation is integrated to the system.
CEE413.2	Discuss effects of the integration of DG: the increased risk of overload and increased losses.
CEE413.3	Discuss effects of the integration of DG: increased risk of over voltages, increased levels of power quality disturbances
CEE413.4	Discuss effects of the integration of DG: incorrect operation of the protection
CEE413.5	Discuss the impact the integration of DG on power system stability and operation.

Department of Information Science and Engineering

Course Name: CIS201(15MAT31) Engineering Mathematics	
CIS201.1	Use of periodic signals and Fourier series to analyse circuits

CIS201.2	Explain the general linear system theory for continuous-time signals and systems using the Fourier Transform
CIS201.3	Analyse discrete-time systems using convolution and the z-transform
CIS201.4	Use appropriate numerical methods to solve algebraic and transcendental equations and also to calculate a definite integral
CIS201.5	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
CIS201.6	Solve the simple problem of the calculus of variations
Course Name: CIS202(15CS32) Analog and Digital Electronics	
CIS202.1	Explain the operation of JFETs and MOSFETs , Operational Amplifier circuits and their application, Design of Counters, Registers and A/D & D/A converters
CIS202.2	Explain Combinational Logic, Simplification Techniques using Karnaugh Maps, Quine McClusky technique.
CIS202.3	Demonstrate Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors, working of Latches, Flip-Flops, Designing Registers, Counters, A/D
CIS202.4	Design of Counters, Registers and A/D & D/A converters
Course Name: CIS203(15CS33)Data Structures and Applications	
CIS203.1	Use different types of data structures, operations and algorithms
CIS203.2	Apply searching and sorting operations on files
CIS203.3	Use stack, Queue, Lists, Trees and Graphs in problem solving
CIS203.4	Implement all data structures in a high-level language for problem solving.
Course Name: CIS204(15CS34) Computer Organization	
CIS204.1	Explain the basic organization of a computer system.
CIS204.2	Demonstrate functioning of different sub systems, such as processor, Input/output, and memory
CIS204.3	Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems.
CIS204.4	Design and analyse simple arithmetic and logical units.

Course Name: CIS205(15CS35) Unix and Shell Programming	
CIS205.1	Explain the basic organization of a computer system.
CIS205.2	Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
CIS205.3	Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems.
CIS205.4	Design and analyse simple arithmetic and logical units.

Course Name: CIS206(15CS36) Discrete Mathematical structures	
CIS206.1	Use propositional and predicate logic in knowledge representation and truth verification.
CIS206.2	Demonstrate the application of discrete structures in different fields of computer science.
CIS206.3	Solve problems using recurrence relations and generating functions
CIS206.4	Application of different mathematical proofs techniques in proving theorems in the courses.
CIS206.5	Compare graphs, trees and their applications.
Course Name: CIS211(15MAT41) Engineering Mathematics II	
CIS211.1	Use propositional and predicate logic in knowledge representation and truth verification.
CIS211.2	Demonstrate the application of discrete structures in different fields of computer science.
CIS211.3	Solve problems using recurrence relations and generating functions.
CIS211.4	Application of different mathematical proofs techniques in proving theorems in the courses.
CIS211.5	Compare graphs, trees and their applications
Course Name: CIS212(15CS42) Software Engineering	
CIS212.1	Design a software system, component, or process to meet desired needs within realistic Constraints.
CIS212.2	Assess professional and ethical responsibility
CIS212.3	Function on multi-disciplinary teams
CIS212.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
CIS212.5	Analyse, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.
Course Name: CIS213(15CS43) Design and Analysis of Algorithms	
CIS213.1	Describe computational solution to well-known problems like searching, sorting etc.
CIS213.2	Estimate the computational complexity of different algorithms.
CIS213.3	Devise an algorithm using appropriate design strategies for problem solving.

Course Name: CIS214(15CS44) Microprocessors and microcontrollers	
CIS214.1	Make familiar with importance and applications of microprocessors and microcontrollers
CIS214.2	Expose architecture of 8086 microprocessor and ARM processor
CIS214.3	Familiarize instruction set of ARM processor
Course Name: CIS215(15CS45) Object Oriented Programming with JAVA	
CIS215.1	Explain the object-oriented concepts and JAVA
CIS215.2	Develop computer programs to solve real world problems in Java.

CIS215.3	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 Name: CIS216(15CS46) Data communications	
CIS216.1	Illustrate basic computer network technology.
CIS216.2	Identify the different types of network topologies and protocols.
CIS216.3	Enumerate the layers of the OSI model and TCP/IP functions of each layer.
CIS216.4	Make out the different types of network devices and their functions within a network
CIS216.5	Demonstrate the skills of subnetting and routing mechanisms.
Course Name: CIS301(15CS51) Management and Entrepreneurship for IT Industry	
CIS301.1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
CIS301.2	Utilize the resources available effectively through ERP
CIS301.3	Make use of IPRs and institutional support in entrepreneurship
Course Name: CIS302(15CS52) Computer Networks	
CIS302.1	Explain principles of application layer protocols
CIS302.2	Recognize transport layer services and infer UDP and TCP protocols
CIS302.3	Classify routers, IP and Routing Algorithms in network layer
CIS302.4	Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard
CIS302.5	Describe Multimedia Networking and Network Management
Course Name: CIS303(15CS53) Database Management System	
CIS303.1	Identify, analyse and define database objects, enforce integrity constraints on a database using RDBMS.
CIS303.2	Use Structured Query Language (SQL) for database manipulation.
CIS303.3	Design and build simple database systems
CIS303.4	Develop application to interact with databases.
Course Name: CIS304(15CS54) Automata theory and Computability	
CIS304.1	Introduce core concepts in Automata and Theory of Computation
CIS304.2	Identify different Formal language Classes and their Relationships
CIS304.3	Design Grammars and Recognizers for different formal languages
CIS304.4	Prove or disprove theorems in automata theory using their properties
CIS304.5	Determine the decidability and intractability of Computational problems
Course Name: CIS305(15CS551) Object Oriented Modelling and Design	
CIS305.1	Describe the concepts of object-oriented and basic class modelling.
CIS305.2	Draw class diagrams, sequence diagrams and interaction diagrams to solve difficulties.
CIS305.3	Choose and apply a befitting design pattern for the given problem.

Course Name: CIS306(15CS553) Advanced JAVA and J2EE	
CIS306.1	Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
CIS306.2	Build client-server applications and TCP/IP socket programs
CIS306.3	Illustrate database access and details for managing information using the JDBC API
CIS306.4	Describe how servlets fit into Java-based web application architecture
CIS306.5	Develop reusable software components
Course Name: CIS307(15CS565) Cloud Computing	
CIS307.1	Explain the concepts and terminologies of cloud computing
CIS307.2	Demonstrate cloud frameworks and technologies
CIS307.3	Define data intensive computing
CIS307.4	Demonstrate cloud applications
Course Name: CIS308(15CS564) Dot Net framework for application development	
CIS308.1	Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#
CIS308.2	Demonstrate Object Oriented Programming concepts in C# programming language
CIS308.3	Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications.
CIS308.4	Illustrate the use of generics and collections in C#
CIS308.5	Compose queries to query in-memory data and define own operator behaviour

Course Name: CCS311(15CS61) Cryptography, Network Security And Cyber Law	
CCS311.1	Discuss cryptography and its need to various applications
CCS311.2	Design and develop simple cryptography algorithms
CCS311.3	Understand cyber security and need cyber Law
Course Name: CIS312(15CS62)File Structures	
CCS312.1	Choose appropriate file structure for storage representation.
CCS312.2	Identify a suitable sorting technique to arrange the data.
CCS312.3	Select suitable indexing techniques for better performance to a given problem.
CCS312.4	Select suitable hashing techniques for better performance.
Course Name: CIS313(15CS63) Software Testing	
CIS313.1	Derive test cases for any given problem
CIS313.2	Compare the different testing techniques
CIS313.3	Classify the problem into suitable testing model

CIS313.4	Apply the appropriate technique for the design of flow graph.
CIS313.5	Create appropriate document for the software artefact.
Course Name: CIS314(15CS64) Operating Systems	
CIS314.1	Demonstrate need for OS and different types of OS
CIS314.2	Apply suitable techniques for management of different resources
CIS314.3	Use processor, memory, storage and file system commands
CIS314.4	Realize the different concepts of OS in platform of usage through case study.
Course Name: CIS315(15CS651) Data Mining and Data Warehousing	
CIS315.1	Identify data mining problems and implement the data warehouse
CIS315.2	Write association rules for a given data pattern.
CCS315.3	Choose between classification and clustering solution.
Course Name: CIS316(15CS653) Operation research	
CIS316.1	Select and apply optimization techniques for various problems.
CIS316.2	Model the given problem as transportation and assignment problem and solve.
CIS316.3	Apply game theory for decision support system.
Course Name: CIS317(15CS663) Wireless Networks and Mobile Computing	
CIS317.1	Summarize various mobile communication systems.
CIS317.2	Describe various multiplexing systems used in mobile computing.
CIS317.3	Indicate the use and importance of data synchronization in mobile computing
Course Name: CIS318(15CS661) Mobile Application Development	
CIS318.1	Create, test and debug Android application by setting up Android development environment
CIS318.2	Implement adaptive, responsive user interfaces that work across a wide range of devices.
CIS318.3	Infer long running tasks and background work in Android applications
CIS318.4	Demonstrate methods in storing, sharing and retrieving data in Android applications
CIS318.5	Analyse performance of android applications and understand the role of permissions and security
Course Name: CIS401(15CS71) Web Technology and its Applications	
CIS401.1	Adapt HTML and CSS syntax and semantics to build web pages.
CIS401.2	Construct and visually format tables and forms using HTML and CSS
CIS401.3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
CIS401.4	Appraise the principles of object oriented development using PHP
CIS401.5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.
Course Name: CIS402 (15CS72) Advanced Computer Architecture	
CIS402.1	Describe computer architecture.

CIS402.2	Measure the performance of architectures in terms of right parameters.
CIS402.3	Summarize parallel architecture and the software used for them.
Course Name: CIS403(15CS73) Machine Learning	
CIS403.1	Explain the concepts of parallel computing and hardware technologies
CIS403.2	Compare and contrast the parallel architectures
CIS403.3	Illustrate parallel programming concepts
Course Name: CIS404(15CS743) Information and Network Security	
CIS404.1	Analyse the Digitals security lapses
CIS404.2	Illustrate the need of key management
CourseName: CIS405(15CS754) Storage Area Networks	
CIS405.1	Identify key challenges in managing information and analyse different storage networking technologies and virtualization
CIS405.2	Explain components and the implementation of NAS
CIS405.3	Describe CAS architecture and types of archives and forms of virtualization
CIS405.4	Illustrate the storage infrastructure and management activities

Course Name: CIS411(15CS81) Internet of Things and Applications	
CIS411.1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.
CIS411.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
CIS411.3	Appraise the role of IoT protocols for efficient network communication.
CIS411.4	Elaborate the need for Data Analytics and Security in IoT.
CIS411.5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry
Course Name: CIS412(15CS82) Big Data Analytics	
CIS412.1	Master the concepts of HDFS and MapReduce framework
CIS412.2	Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
CIS412.3	Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
CIS412.4	Infer the importance of core data mining techniques for data analytics
CIS412.5	Compare and contrast different Text Mining Techniques
Course Name: CIS413(15CS832) User Interface Design	
CIS413.1	Design the user interface, design, menu creation and windows creation and connection between menu and windows

Department of Mechanical Engineering

Course Name: CME201(15MAT31) Engineering Mathematics	
CME201.1	Use of periodic signals and Fourier series to analyse circuits
CME201.2	Explain the general linear system theory for continuous-time signals and systems using the Fourier Transform
CME201.3	Analyse discrete-time systems using convolution and the z-transform
CME201.4	Use appropriate numerical methods to solve algebraic and transcendental equations and also to calculate a definite integral
CME201.5	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
CME201.6	Solve the simple problem of the calculus of variations
Course Name: CME202(15ME32) Material Science	
CME202.1	Describe the mechanical properties of metals, their alloys and various modes of failure
CME202.2	Understand the microstructures of ferrous and non-ferrous materials to mechanical properties..
CME202.3	Explain the processes of heat treatment of various alloys.
CME202.4	Understand the properties and potentialities of various materials available and material selection procedures.
CME202.5	Know about composite materials and their processing as well as applications.
Course Name: CME203(15ME33) Basic Thermodynamics	
CME203.1	Explain thermodynamic systems, properties, Zeroth law of thermodynamics, temperature scales and energy interactions
CME203.2	Determine heat, work, internal energy, enthalpy for flow & non flow process using First and Second Law of Thermodynamics.
CME203.3	Interpret behaviour of pure substances and its applications to practical problems
CME203.4	Determine change in internal energy, change in enthalpy and change in entropy using TD relations for ideal gases.
CME203.5	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 Name: CME204(15ME34) Mechanics of Materials	
CME204.1	Understand simple, compound, thermal stresses and strains their relations, Poisson's ratio, Hooke's law, mechanical properties including elastic constants and their relations
CME204.2	Determine stresses, strains and deformations in bars with varying circular and rectangular cross-sections subjected to normal and temperature loads
CME204.3	Determine plane stress, principal stress, maximum shear stress and their orientations using analytical method and Mohr's circle.
CME204.4	Determine the dimensions of structural members including beams, bars and rods using Energy methods and also stress distribution in thick and thin cylinders
CME204.5	Draw SFD and BMD for different beams including cantilever beams, simply supported beams and overhanging beams subjected to UDL, UVL, Point loads and

CME204.6	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.
CME204.7	Determine slopes and deflections at various points on beams subjected to UDL, UVL, Point loads and couples.
CME204.8	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 Name: CME205(15ME35A) Metal Casting and Welding

CME205.1	Describe the casting process, preparation of Green, Core, dry sand molds and Sweep, Shell, Investment and plaster molds.
CME205.2	Explain the Pattern, Core, Gating, Riser system and Jolt, Squeeze, Sand Slinger Molding Machines.
CME205.3	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal
CME205.4	Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mold castings.
CME205.5	Explain the Solidification process and Casting of Non-Ferrous Metals.
CME205.6	Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes used in manufacturing.
CME205.7	Explain the Resistance spot, Seam, Butt , Projection, Friction, Explosive, Thermit, Laser and Electron Beam Special type of welding process used in manufacturing
CME205.8	Describe the Metallurgical aspects in Welding and inspection methods for the quality assurance of components made of casting and joining process.

Course Name: CME206(15ME36B) Mechanical Measurements and Metrology

CME206.1	Understand the objectives of metrology, methods of measurement, selection of measuring instruments, standards of measurement and calibration of end bars.
CME206.2	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.
CME206.3	Explain tolerance, limits of size, fits, geometric and position tolerances, gauges and their design.
CME206.4	Understand the principle of Johnson Mikrokator, sigma comparator, dial indicator, LVDT, back pressure gauges, Solex comparators and Zeiss Ultra Optimeter.
CME206.5	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.
CME206.6	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.
CME206.7	Understand laser interferometers and Coordinate measuring machines.
CME206.8	Explain measurement systems, transducers, intermediate modifying devices and terminating devices.
CME206.9	Describe functioning of force, torque, pressure, strain and temperature measuring devices.

Course Name: CME207(15MEL37B) Mechanical Measurements and Metrology Lab

CME207.1	To calibrate pressure gauge, thermocouple, LVDT, load cell, micrometre.
CME207.2	To measure angle using Sine Centre/ Sine Bar/ Bevel Protractor, alignment using Autocollimator/ Roller set.
CME207.3	To demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats

CME207.4	To measure cutting tool forces using Lathe/Drill tool dynamometer.
CME207.5	To measure Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth Vernier/Gear tooth micrometre.
CME207.6	To measure surface roughness using Tally Surf/ Mechanical Comparator.
Course Name: CME208(15MEL38A) Foundry and Forging Lab	
CME208.1	Demonstrate various skills of sand preparation, molding.
CME208.2	Demonstrate various skills of forging operations.
CME208.3	Work as a team keeping up ethical principles.
Course Name: CME209(15MAT41) Engineering Mathematics-IV	
CME209.1	Use appropriate numerical methods to solve first and second order ordinary differential equations.
CME209.2	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.
CME209.3	State and prove Cauchy's theorem and its consequences including Cauchy's integral formula.
CME209.4	Compute residues and apply the residue theorem to evaluate integrals.
CME209.5	Analyse, interpret, and evaluate scientific hypotheses and theories using rigorous statistical methods.
Course Name: CME210(15ME42) Kinematics of Machines	
CME210.1	Identify mechanisms with basic understanding of motion.
CME210.2	Comprehend motion analysis of planar mechanisms, gears, gear trains and cams.
CME210.3	Carry out motion analysis of planar mechanisms, gears, gear trains and cams.
Course Name: CME211(15ME43) Applied Thermodynamics	
CME211.1	Apply thermodynamic concepts to analyse the performance of gas power cycles including propulsion systems.
CME211.2	Evaluate the performance of steam turbine components.
CME211.3	Understand combustion of fuels and combustion processes in I C engines including alternate fuels and pollution effect on environment.
CME211.4	Apply thermodynamic concepts to analyse turbo machines.
CME211.5	Determine performance parameters of refrigeration and air-conditioning systems.
CME211.6	Understand the principles and applications of refrigeration systems.
CME211.7	Analyse air-conditioning processes using the principles of psychometric and Evaluate cooling and heating loads in an air-conditioning system.
CME211.8	Understand the working, applications, relevance of air and identify methods for performance improvement.
Course Name: CME212(15ME44) Fluid Mechanics	
CME212.1	Identify and calculate the key fluid properties used in the analysis of fluid behaviour.
CME212.2	Understand and apply the principles of pressure, buoyancy and floatation
CME212.3	Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering.
CME212.4	Understand and apply the principles of fluid kinematics and dynamics.
CME212.5	Understand the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.

CME212.6	Understand the basic concept of compressible flow and CFD
Course Name: CME213(15ME45B) Machine Tools and operations	
CME213.1	Explain the construction & specification of various machine tools.
CME213.2	Describe various machining processes pertaining to relative motions between tool & work piece
CME213.3	Discuss different cutting tool materials, tool nomenclature & surface finish.
CME213.4	Apply mechanics of machining process to evaluate machining time.
CME213.5	Analyse tool wear mechanisms and equations to enhance tool life and minimize machining cost.
Course Name: CME214(15ME46A) Computer Aided Machine Drawing	
CME214.1	Improve their visualization skills
CME214.2	Understand the theory of projection.
CME214.3	Make component drawings.
CME214.4	Produce the assembly drawings using part drawings.
CME214.5	Engage in lifelong learning using sketching and drawing as communication tool.
Course Name: CME215(15MEL47A) Materials Testing Lab	
CME215.1	Acquire experimentation skills in the field of material testing.
CME215.2	Develop theoretical understanding of the mechanical properties of materials by performing experiments.
CME215.3	Apply the knowledge to analyse a material failure and determine the failure inducing agent/s.
CME215.4	Apply the knowledge of testing methods in related areas.
CME215.5	Know how to improve structure/behaviour of materials for various industrial applications.
Course Name: CME216(15MEL48B) Machine Shop	
CME216.1	Perform turning , facing , knurling , thread cutting, tapering , eccentric turning and allied operations
CME216.2	Perform keyways / slots , grooves etc using shaper
CME216.3	Perform gear tooth cutting using milling machine
CME216.4	Understand the formation of cutting tool parameters of single point cutting tool using bench grinder / tool and cutter grinder
CME216.5	Understand Surface Milling/Slot Milling
CME216.6	Demonstrate precautions and safety norms followed in Machine Shop
CME216.7	Exhibit interpersonal skills towards working in a team
Course Name: CME301(15ME51) Management and Engineering Economics	
CME301.1	Understand needs, functions, roles, scope and evolution of Management.
CME301.2	Understand importance, purpose of Planning and hierarchy of planning and also analyze its types.
CME301.3	Discuss Decision making, Organizing, Staffing, Directing and Controlling.
CME301.4	Select the best economic model from various available alternatives
CME301.5	Understand various interest rate methods and implement the suitable one
CME301.6	Estimate various depreciation values of commodities
CME301.7	Prepare the project reports effectively.
Course Name: CME302(15ME52) Dynamics of Machinery	

CME302.2	Determine the forces and couples for static and dynamic conditions of four bar and slider crank mechanisms to keep the system in equilibrium.
CME302.3	Determine magnitude and angular position of balancing masses under static and dynamic condition of rotating masses in same and different planes.
CME302.4	Determine unbalanced primary, secondary forces and couples in single and multi-cylinder engine
CME302.5	Determine sensitiveness, isochronism, effort and power of porter and hartnell governors
CME302.6	Determine gyroscopic couple and effects related to 2, 4 wheeler, plane disc, ship and aeroplanes.
CME302.7	Understand types of vibration, SHM and methods of finding natural frequencies of simple mechanical systems.
CME302.7	Determine equation of motion, natural frequency, damping factor, logarithmic decrement of damped free vibration (SDOF) systems.
CME302.8	Determine the natural frequency, force and motion transmissibility of single degree freedom systems
CME302.9	Determine equation of motion of rotating and reciprocating unbalance systems, magnification factor, and transmissibility of forced vibration (SDOF) systems.

Course Name: CME303(15ME53) Turbo Machines

CME303.1	Able to give precise definition of turbomachinery
CME303.2	Identify various types of turbo machinery
CME303.3	Apply the Euler's equation for turbomachinery to analyse energy transfer in turbomachines.
CME303.4	Understand the principle of operation of pumps, fans, compressors and turbines.
CME303.5	Perform the preliminary design of turbomachines (pumps, rotary compressors and turbines)
CME303.6	Analyse the performance of turbo machinery.

Course Name: CME304(15ME54) Design of Machine Elements – I

CME304.1	Describe the design process, choose materials.
CME304.2	Apply the codes and standards in design process.
CME304.3	Analyse the behaviour of machine components under static, impact, fatigue loading using failure theories.
CME304.4	Design shafts, joints, couplings.
CME304.5	Design of riveted and welded joints.
CME304.6	Design of threaded fasteners and power screws.

Course Name: CME305(15ME554) Non Traditional Machining

CME305.1	Understand the compare traditional and non-traditional machining process and recognize the need for Non-traditional machining process.
CME305.2	Understand the constructional features, performance parameters, process characteristics, applications, advantages and limitations of USM, AJM and WJM.
CME305.3	Identify the need of Chemical and electro-chemical machining process along with the constructional features, process parameters, process characteristics, applications, advantages and limitations.
CME305.4	Understand the constructional feature of the equipment, process parameters, process characteristics, applications, advantages and limitations EDM & PAM.
CME305.5	Understand the LBM equipment, LBM parameters, and characteristics. EBM equipment and mechanism of metal removal, applications, advantages and limitations LBM & EBM.

Course Name: CME306(15ME562) Energy and Environment

CME306.1	Summarize the basic concepts of energy, its distribution and general Scenario.
CME306.2	Explain different energy storage systems, energy management, audit and economic analysis.
CME306.3	Summarize the environment eco system and its need for awareness.
CME306.4	Identify the various types of environment pollution and their effects.
CME306.5	. Discuss the social issues of the environment with associated acts.
Course Name: CME307(15MEL57) Fluid Mechanics & Machinery Lab	
CME307.1	Perform experiments to determine the coefficient of discharge of flow measuring devices.
CME307.2	Conduct experiments on hydraulic turbines and pumps to draw characteristics.
CME307.3	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations.
CME307.4	Determine the energy flow pattern through the hydraulic turbines and pumps.
CME307.5	Exhibit his competency towards preventive maintenance of hydraulic machines.
Course Name: CME308(15MEL58) Energy Lab	
CME308.1	Perform experiments to determine the properties of fuels and oils.
CME308.2	Conduct experiments on engines and draw characteristics.
CME308.3	Test basic performance parameters of I.C. Engine and implement the knowledge in industry.
CME308.4	Identify exhaust emission, factors affecting them and report the remedies.
CME308.5	Determine the energy flow pattern through the I C Engine
CME308.6	Exhibit his competency towards preventive maintenance of IC engines.
Course Name: CME309(15ME61) Finite Element Analysis	
CME309.1	Understand the concepts behind formulation methods in FEM.
CME309.2	Identify the application and characteristics of FEA elements such as bars, beams, plane and iso-parametric elements.
CME309.3	Develop element characteristic equation and generation of global equation.
CME309.4	Able to apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, fluid flow, axis symmetric and dynamic problems .and solve them displacements, stress and strains induced.
Course Name: CME310(15ME62) Computer Integrated Manufacturing	
CME310.1	Able to define Automation, CIM, CAD, CAM and explain the differences between these concepts. Solve simple problems of transformations of entities on computer
CME310.2	Explain the basics of automated manufacturing industries through mathematical models and analyse different types of automated flow lines.
CME310.3	Analyse the automated flow lines to reduce down time and enhance productivity.
CME310.4	Explain the use of different computer applications in manufacturing, and able to prepare part programs for simple jobs on CNC machine tools and robot
CME310.5	Visualize and appreciate the modern trends in Manufacturing like additive manufacturing, Industry 4.0 and applications of Internet of Things leading to Smart Manufacturing
Course Name: CME311(15ME63) Heat Transfer	
CME311.1	Understand the basic modes of heat transfer.
CME311.2	Compute temperature distribution in steady-state and unsteady-state heat conduction.
CME311.3	Understand and interpret heat transfer through extended surfaces.

CME311.4	Interpret and compute forced and free convective heat transfer.
CME311.5	Explain the principles of radiation heat transfer and understand the numerical formula for heat conduction problems.
CME311.6	Design heat exchangers using LMTD and NTU methods.
Course Name: CME312(15ME64) Design of Machine Elements II	
CME312.1	Apply engineering design tools to product design.
CME312.2	Design mechanical systems involving springs, belts and pulleys.
CME312.3	Design different types of gears and simple gear boxes for different applications.
CME312.4	Design brakes and clutches.
CME312.5	Design hydrodynamic bearings for different applications
CME312.6	Select Anti friction bearings for different applications using the manufacturers, catalogue.
CME312.7	Develop proficiency to generate production drawings using CAD software
CME312.8	Become good design engineers through learning the art of working in a team with morality and ethics.
Course Name: CME313(15ME655) Automobile Engineering	
CME313.1	To identify the different parts of an automobile and it's working
CME313.2	To understand the working of transmission and braking systems
CME313.3	To comprehend the working of steering and suspension systems
CME313.4	To learn various types of fuels and injection systems
CME313.5	To know the cause of automobile emissions ,its effects on environment and methods to reduce the emissions.
Course Name: CME314(15ME662) Industrial Safety	
CME314.1	Understand the basic safety terms.
CME314.2	Identify the hazards around the work environment and industries.
CME314.3	Use the safe measures while performing work in and around the work area of the available laboratories.
CME314.4	Able to recognize the sign boards and its application.
CME314.5	Able to demonstrate the portable extinguishers used for different class of fires.
CME314.6	Able to write the case studies by sharing experience of the employees working in housekeeping, laboratories like workshops, electrical labs, machine shops, electronics and computer laboratories.
CME314.7	Able to understand and report the case studies from various references (text books, news report, journals, visiting industries like power stations, manufacturing and maintenance.
Course Name: CME315(15ME664) Total Quality Management	
CME315.1	Explain the various approaches of TQM
CME315.2	Infer the customer perception of quality
CME315.3	Analyse customer needs and perceptions to design feedback systems.
CME315.4	Apply statistical tools for continuous improvement of systems
CME315.5	Apply the tools and technique for effective implementation of TQM.
Course Name: CME316(15MEL67) Heat Transfer Lab	
CME316.1	Perform experiments to determine the thermal conductivity of a metal rod
CME316.2	Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values.
CME316.3	Estimate the effective thermal resistance in composite slabs and efficiency in pin-fin.

CME316.4	Determine surface emissivity of a test plate.
CME316.5	Estimate performance of a refrigerator and effectiveness of fin.
CME316.6	Calculate temperature distribution of study and transient heat conduction through plane wall, cylinder and fin using numerical approach.
Course Name: CME317(15MEL68) Modelling and Analysis Lab (FEA)	
CME317.1	Demonstrate the basic features of an analysis package.
CME317.2	Use the modern tools to formulate the problem, and able to create geometry, descriptive, apply boundary condition to solve problems of bars, truss, beams, plate to find stress with different loading conditions.
CME317.3	Demonstrate the deflection of beams subjected to point, uniformly distributed and varying loads further to use the available results to draw shear force and bending moment diagrams.
CME317.4	Analyse the given problem by applying basic principle to solve and demonstrate 1D and 2D heat transfer with conduction and convection boundary conditions.
CME317.5	Carry out dynamic analysis and finding natural frequencies for various boundary conditions and also analyse with forcing function.
Course Name: CME401(15ME71) Energy Engineering	
CME401.1	Summarize the basic concepts of thermal energy systems,
CME401.2	Identify renewable energy sources and their utilization.
CME401.3	Understand the basic concepts of solar radiation and analyse the working of solar PV and thermal systems.
CME401.4	Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, biogas.
CME401.5	Understand the concepts and applications of fuel cells, thermoelectric convertor and MHD generator.
CME401.6	Identify methods of energy storage for specific applications
Course Name: CME402(15ME72) Fluid Power Systems	
CME402.1	Identify and analyse the functional requirements of a fluid power transmission system for a given application.
CME402.2	Visualize how a hydraulic/pneumatic circuit will work to accomplish the function.
CME402.3	Design an appropriate hydraulic or pneumatic circuit or combination circuit like electro-hydraulics, electro-pneumatics for a given application.
CME402.4	Select and size the different components of the circuit.
CME402.5	Develop a comprehensive circuit diagram by integrating the components selected for the given application
Course Name: CME403(15ME73) Control Engineering	
CME403.1	Recognize control system and its types , control actions
CME403.2	Determine the system governing equations for physical models(Electrical, Thermal, Mechanical, Electro Mechanical)
CME403.3	Calculate the gain of the system using block diagram and signal flow graph
CME403.4	Illustrate the response of 1st and 2nd order systems
CME403.5	Determine the stability of transfer functions in complex domain and frequency
CME403.6	Employ state equations to study the controllability and observability
Course Name: CME404(15ME742) Tribology	

CME404.1	Understand the fundamentals of tribology and associated parameters.
CME404.2	Apply concepts of tribology for the performance analysis and design of components experiencing relative motion.
CME404.3	Analyse the requirements and design hydrodynamic journal and plane slider bearings for a given application.
CME404.4	Select proper bearing materials and lubricants for a given tribological application.
CME404.5	Apply the principles of surface engineering for different applications of tribology.

Course Name: CME405(15ME751) Automotive Electronics

CME405.1	Explain the electronics systems used for control of automobiles
CME405.2	Select sensors, actuators and control systems used in automobiles
CME405.3	Diagnose the faults in the sub systems and systems used automobile

Course Name: CME406(15ME754) Mechatronics

CME406.1	Illustrate various components of Mechatronics systems.
CME406.2	Assess various control systems used in automation.
CME406.3	Develop mechanical, hydraulic, pneumatic and electrical control systems.

Course Name: CME407(15ME755) Mechanical Vibrations

CME407.1	Understand and characterize the single and multi-degrees of freedom systems subjected to free and forced vibrations with and without damping.
CME407.2	Understand the method of vibration measurements and its controlling.
CME407.3	Understand the concept of dynamic vibrations of a continuous systems.

Course Name: CME408(15MEL76) Design Laboratory

CME408.1	To understand the working principles of machine elements such as Governors, Gyroscopes etc.,
CME408.2	To identify forces and couples in rotating mechanical system components.
CME408.3	To identify vibrations in machine elements and design appropriate damping methods and to determine the critical speed of a rotating shaft.
CME408.4	To measure strain in various machine elements using strain gauges.
CME408.5	To determine the minimum film thickness, load carrying capacity, frictional torque and pressure distribution of journal bearing
CME408.6	To determine strain induced in a structural member using the principle of photo-elasticity.

Course Name: CME409(15MEL77) Computer Integrated Manufacturing Lab

CME409.1	Generate CNC Lathe part program for Turning, Facing, Chamfering, Grooving, Step turning, Taper turning, Circular interpolation etc
CME409.2	Generate CNC Mill Part programming for Point to point motions, Line motions, Circular interpolation, Contour motion, Pocket milling- circular, rectangular, Mirror commands etc.
CME409.3	Use Canned Cycles for Drilling, Peck drilling, Boring, Tapping, Turning, Facing, Taper turning Thread cutting etc.
CME409.4	Simulate Tool Path for different Machining operations of small components using CNC Lathe & CNC Milling Machine
CME409.5	Use high end CAM packages for machining complex parts; use state of art cutting tools and related cutting parameters; optimize cycle time.
CME409.6	Understand & write programs for Robot control; understand the operating principles of hydraulics, pneumatics and electro pneumatic systems. Apply this knowledge to automate & improve efficiency of manufacturing.

Course Name: CME410(15ME81) Operations Research

CME410.1	Understand the meaning, definitions, scope, need, phases and techniques of operations research.
CME410.2	Formulate as L.P.P and derive optimal solutions to linear programming problems by graphical method, Simplex method, Big-M method and Dual Simplex method.
CME410.3	Formulate as Transportation and Assignment problems and derive optimum solutions for transportation, Assignment and travelling salesman problems.
CME410.4	Solve problems on game theory for pure and mixed strategy under competitive environment.
CME410.5	Solve waiting line problems for M/M/1 and M/M/K queuing models.
CME410.6	Construct network diagrams and determine critical path, floats for deterministic and PERT networks including crashing of Networks.
CME410.7	Determine minimum processing times for sequencing of n jobs-2 machines, n jobs-3machines,n jobs-m machines and 2 jobs-n machines using Johnson's algorithm.
Course Name: CME411(15ME82) Additive Manufacturing	
CME411.1	Understand the different process of Additive Manufacturing. using Polymer, Powder and Nano materials manufacturing.
CME411.2	Analyse the different characterization techniques.
CME411.3	Describe the various NC, CNC machine programing and Automation techniques.
Course Name: CME412(15ME832) Experimental Stress Analysis	
CME412.1	Explain characterize the elastic behaviour of solid bodies.
CME412.2	Describe stress strain analysis of mechanical systems using electrical resistance strain gauges.
CME412.3	Discuss skills for experimental investigations an accompanying laboratory course is desirable.
CME412.4	Discuss experimental investigations by predictions by other methods.
CME412.5	Describe various coating techniques.
Course Name: CME413(15ME835) Product Life Cycle Management	
CME413.1	Explain the various strategies of PLM and Product Data Management
CME413.2	Describe decomposition of product design and model simulation
CME413.3	Apply the concept of New Product Development and its structuring.
CME413.4	Analyze the technological forecasting and the tools in the innovation.
CME413.5	Apply the virtual product development and model analysis