DEPARTMENT OF MECANICAL ENGINEERING

Program Specific Outcomes

PSO.1	To apply design principles for providing optimum solutions in design and manufacturing using CAD tools.
PSO.2	To apply competency and proficiency in the field of core allied engineering

Program Educational Objectives

PEO.1	Provide Solution to application level Programme of Mechanical Engineering using knowledge of basic science and fundamentals of engineering.
PEO.2	Design mechanical system by using skills and knowledge of core competencies along with allied engineering skill.
PEO.3	Acquire the competency for interdisciplinary research in social technological area like environment and sustainability by inculcating profession, ethical, value, teamwork, leadership, and communication and managerial skill.
PEO.4	Develop attitude or lifelong learning to make graduate adaptable to ever changing dynamic industrial and social environment.

DEPARTMENT OF COMPUTER ENGINEERING

Program Specific Outcomes

PSO.1	The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying
PSO.2	The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

Program Educational Objectives

PEO.1	To prepare globally competent graduates having strong fundamentals and domain knowledge to provide effective solutions for engineering problems.
PEO.2	To prepare the graduates to work as a committed professionals with strong professional ethics and values, sense of responsibilities, understanding of legal, safety, health, societal, cultural and environmental issues.
PEO.3	To prepare committed and motivated graduates with research attitude, lifelong learning, investigative approach, and multidisciplinary thinking.
PEO.4	To prepare the graduates with strong managerial and communication skills to work effectively as individual as well as in teams.

DEPARTMENT OF CIVIL ENGINEERING

Program Specific Outcomes

PSO.1	Graduates of the program shall pursue civil engineering and advance to positions of greater responsibility and leadership and will meet the expectations of employers of Civil Engineers.
PSO.2	Graduates shall enter and successfully progress in, or complete, advanced degree programs within their fields of choice.

Program Educational Objectives

PEO.1	To create the knowledge of core areas related to the field of Civil Engineering.
PEO.2	To enable students to apply Civil Engineering principles to design, construct and implement the civil techniques to meet the customer satisfaction.
PEO.3	Graduates shall enter and successfully progress in, or complete, advanced degree programs within their fields of choice.
PEO.4	To sensitize students towards social issues and to introduce them to professional ethics and practices.

DEPARTMENT OF ELECTRICAL ENGINEERING

Program Specific Outcomes

PSO.1	Apply appropriate techniques and modern Engineering hardware and software tools in power systems to engage in life- long learning and to successfully adapt in multi-disciplinary environments
PSO.2	Understand the impact of Professional Engineering solutions in societal and environmental context, commit to professional ethics and communicate effectively.

Program Educational Objectives

PEO.1	To provide students with the knowledge of Mathematics, Basic principles of Engineering and Computing, Basic Sciences and Social Sciences in general and Electrical Engineering in particular so as to develop necessary skill to analyse and synthesize electrical circuits, algorithms and complex apparatus.
PEO.2	To prepare students as competent to analyse and provide economically feasible and socially acceptable solutions of real life technical problems in industry, research and academics related to power, information and electronic hardware.
PEO.3	To prepare students to excel in professionalism, smart and ethical conduct, interpersonal skills and adoptability in communication to prevalent trends in technology as well as changing technology so as to work successfully in various Industrial and Government organizations, both at the National and International level, with professional competence and ethical administrative acumen so as to be able to handle critical situations and meet deadlines.
PEO.4	To prepare and encourage students to undergo research work as well as to involve in scientific innovations for sustainable development

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Program Specific Outcomes

PSO.1	The ability to absorb and apply fundamental knowledge of core Electronics and Communication Engineering subjects in the analysis, design, and development of various types of integrated electronic systems as well as to interpret and synthesize the experimental data leading to valid conclusions.
PSO.2	Competence in using electronic modern IT tools (both software and hardware) for the design and analysis of complex electronic systems in furtherance to research activities.

Program Educational Objectives

PEO.1	The graduate shall have successful professional carrier in electronics and telecommunication engineering with leadership and teamwork qualities.
PEO.2	Graduates shall utilize functional and disciplinary skill to address diversified engineering problems with social concern.
PEO.3	The graduates shall explore engineering capabilities to resolve technical problems and engage in lifelong learning and research.

Department of Mechanical Engineering:

Semester –III

CO of the Course "Engineering Mathematics III"	
CO1	Solve higher order linear differential equations and apply to modeling and analyzing mass spring systems.
CO2	Apply Laplace transform and Fourier transform techniques to solve differential equations involved in engineering applications.
CO3	Apply statistical methods in testing and quality control.
CO4	Perform vector differentiation and integration, analyze the vector fields and apply to fluid flow problems.
CO5	Solve various partial differential equations such as wave equation, one and two dimensional heat flow equations.
CO6	Apply the concept of numerical integration in various applications.
CO of the Course "Manufacturing Process-I "	
CO1	Understand and analyze foundry practices like pattern making, mold making, Core making and Inspection of defects
CO2	Understand and analyze Hot and Cold Working, Rolling, Forging, Extrusion and Drawing Processes.
CO3	Understand different plastic molding processes, Extrusion of Plastic and Thermoforming
CO4	Understand different Welding and joining processes and its defects
CO5	Understand, Design and Analyze different sheet metal working processes
CO6	Understand the constructional details and Working of Centre Lathe
CO of the Course "Computer Aided Machine Drawing"	
CO1	Understand the importance of CAD in the light of allied technologies such as CAM,CAE, FEA, CFD, PLM.
CO2	Understand the significance of parametric technology and its application in 2D
CO3	Understand the significance of parametric feature-based modeling and its application in3D machine components modeling.
CO4	Ability to create 3D assemblies that represent static or dynamic Mechanical Systems.
CO5	Ability to ensure manufacturability and proper assembly of components and assemblies.

CO6	Ability to communicate between Design and Manufacturing using 2D drawings
CO of the Course "Thermodynamics"	
CO1	Apply various laws of thermodynamics to various processes and real systems
CO2	Apply the concept of Entropy, Calculate heat, work and other important thermodynamic properties for various ideal gas processes
CO3	Estimate performance of various Thermodynamic gas power cycles and gas refrigeration cycle and availability in each case.
CO4	Estimate the condition of steam and performance of vapour power cycle and vapour compression cycle
CO5	Use Psychromertic charts and estimate various essential properties related to Psychrometry and processes
CO6	Use Psychromertic charts and estimate various essential properties related to Psychrometry and processes
CO of the Course "Material Science (MS)"	
CO1	Understand the basic concepts and properties of Material.
CO2	Detect the defects in crystal and its effect on crystal properties.
CO3	Define the mechanical properties of materials and conduct destructive and non destructive tests to evaluate and test the properties of materials.
CO4	Understand corrosion and suggest various means to prevent corrosion
CO5	Understand various surface modification processes.
CO6	Select proper metal, alloys, nonmetal and powder metallurgical component for specific requirement.
CO of the Course "Strength of Materials (SOM)"	
CO1	Demonstrate fundamental knowledge about various types of loading and stresses induced.
CO2	Draw SFD and BMD for different types of loads and support conditions.
CO3	Compute Moment of Inertia of Symmetric & unsymmetrical structural sections. Apply Bending theory, Evaluate bending stress, draw bending stress distribution diagram for
CO4	Analyze buckling and bending phenomenon in columns and beams.
CO5	Determine Stresses, strain & deformations in determinate shafts of homogeneous & composite circular cross section subjected to twisting moment.

CO6	Determine & understand the principal stresses on various oblique plane. Analyze the different failure theory and how to calculate the stresses strain energy and to design the
Semester IV	
CO of the Course "Fluid Mechanics (FM)"	
CO1	Describe and determine various properties of fluid for operating conditions encountered in fluid engineering problems
CO2	Determine total pressure and couple exerted by static fluid on plan and curved surfaces encountered in dam structures and stability of floating objects.
CO3	Describe various types of flow and their physics and determine velocity, acceleration stream function and velocity potential at any point in a flow field to recognize
CO4	Discuss physics and the governing equations associated with laminar and turbulent flows to analyze and design flow measuring devices and pipe flow systems
CO5	Discuss physics of laminar and turbulent flows in external flow to determine drag and lift forces on surfaces of stationary and moving objects
CO6	Develop mathematical correlation for complex flow phenomenon in terms of dimensionless parameters.
CO of the Course "Soft Skills (SS)"	
CO1	Improved communication, interaction and presentation of ideas.
CO2	Right attitudinal and behaviouralchange
CO3	Developed right-attitudinal and behavioral change
CO4	Write resume and will be aware of corporate/Business Etiquettes
CO5	Team building capabilities and imrpoved Teamwork
CO of the Course "Theory of Machines – I (TOM-I)"	
CO1	Construct and demonstrate the working of planar mechanisms to be used in industrial applications.
CO2	Determine the mass moment of inertia of rigid bodies having symmetric and irregular shape.
CO3	Determine static and dynamic forces on components of slider crank mechanism.
CO4	Differentiate between different power absorbing and transmitting devices like Clutch, Brake and Dynamometer and calculate torque.
CO5	Analyze velocity and acceleration of simple mechanism by analytical and graphical methods.

CO of the Course "Engineering Metallurgy (EM)"	
CO1	Describe how metals and alloys formed and how the properties change due to microstructure
CO2	Apply core concepts in Engineering Metallurgy to solve engineering problems.
CO3	Conduct experiments, as well as to analyze and interpret data
CO4	Apply engineering Knowledge to prepare the heat treatment cycles, time & temp. required calculations for conduction of heat treatment as per requirement.
CO5	Possess the skills and techniques necessary for modern materials engineering practice.
CO6	Recognize how metals can be strengthened by alloying, cold-working, and heat treatment.
CO of the Course "Applied Thermodynamics (ATD)"	
CO1	Classify I.C engines construction and materials used, working principle and explain losses encountered in fuel air and actual cycle.
CO2	Analyze requirements of carburation, stages of combustion in SI engines, theory of abnormal combustion and combustion chambers for SI engine.
CO3	Evaluate fuel injection system, stages of combustion in CI engines, theory of abnormal combustion and combustion chambers for CI engine.
CO4	Evaluate performance of IC engines and results of the tests.
CO5	Explain systems necessary for efficient operation of IC engines and get familiar with emissions, norms and controlling techniques.
CO6	Explain the classification and working of air compressors and evaluate the performance of reciprocating air compressor.
Semester V	
CO of the Course "Design of Machine elements-I"	
CO1	Ability to analyze the stress-strain, of Machine Elements to understand, identify, quantify the failure modes.
CO2	Ability to Design Power Screw for Various Applications.
CO3	Ability to design fasteners and welded joints subjected to different loading conditions
CO4	Ability to design various Springs for strength and stiffness.
CO5	Select standard data and components by using Design Data Books, Codes and Standards for avoiding failure of machine components.

CO6	Ability to understand the actual mechanism of different failure of mechanical component
CO of the Course ”Heat Transfer”	
CO1	Analyze the various modes of heat transfer and implement the basic heat conduction equations for steady one dimensional thermal system.
CO2	Implement the general heat conduction equation to thermal systems with and without internal heat generation and transient heat conduction.
CO3	Analyze the heat transfer rate in natural and forced convection and evaluate through experimentation investigation.
CO4	Interpret heat transfer by radiation between objects with simple geometries.
CO5	Analyze the heat transfer equipment and investigate the performance.
CO of the Course "Theory of Machines II”	
CO1	Student will be able to understand fundamentals of gear theory which will be the prerequisite for gear design..
CO2	Student will be able to perform force analysis of Spur, Helical, Bevel, Worm and Worm gear
CO3	The student to analyze speed and torque in epi-cyclic gear trains which will be the prerequisite for gear box design.
CO4	Student will be able to design cam profile for given follower motions and understand cam Jump phenomenon, advance cam curves
CO5	The student will synthesize a four bar mechanism with analytical and graphical method
CO6	a. The student will analyze the gyroscopic couple or effect for stabilization of Ship Aeroplane and Four wheeler vehicle.
CO of the Course “Turbo Machine”	
CO1	Classify turbo machines along with its applications and discuss impulse momentum principle to evaluate performance parameters for flat, inclined plate, curved vane and
CO2	Analyze impulse water turbine with design aspects, selection criteria, performance parameters and characteristics for its use in hydroelectric power plant
CO3	Differentiate reaction water turbines, draft tube types, governing mechanism, with design aspects, selection criteria and determine performance parameters and
CO4	Discuss steam nozzle, impulse, and reaction steam turbine with governing mechanism, selection criteria, losses and evaluate performance parameters for its use in thermal power plant.
CO5	Classifyrotodynamic, centrifugal pump, heads, cavitation, priming, along with multi staging, system resistance curve and evaluate performance with design aspects and selection criteria for household and industrial application.
CO6	Discuss the construction and working of centrifugal and axial flow compressor with its analysis.

CO of the Course ”Metrology & Quality Control”	
CO1	Understand the methods of measurements, selection of measuring instruments/ standards of measurements, carry out data collection and its analysis.
CO2	Explain tolerance, limits of size, fits, geometrics and position tolerances and gauge design.
CO3	Understand and use/apply quality control techniques/ statistical tools appropriately.
CO4	Develop an ability of problem solving decision making by identifying and analyzing the cause for variation and recommend suitable corrective actions for quality improvement.
CO of the Course ”Skill Devlopment”	
CO1	To develop the skill for required in shop floor working.
CO2	To have knowledge of the different tools and tackles used in machine assembly shop.
CO3	Use of theoretical knowledge in practice
CO4	Practical aspect of the each component in the assembly of the machine
Semester VI	
CO of the Course ”Numerical Methods and Optimization ”	
CO1	Understand the concept of errors and mathematical accuracy
CO2	Learn the basic concept of numerical solution of Algebraic and linear
CO3	simultaneous equations
CO4	Generate Solutions for real life problem using optimization techniques
CO5	Use appropriate Numerical Methods to solve complex mechanical engineering problems and analyze research problem
CO6	Understand the Numerical solution of ordinary differential equations and partial
CO of the Course “Design of Machine Element-II”	
CO1	Design and analyze Gears to avoid bending and pitting failure for constant speed gear box.
CO2	Design sliding contact bearing and Select rolling contact bearing on the basis of dynamic loading for various applications.

CO3	Ability to design belt drives and selection of belt, rope and chain drives.
CO4	Select standard data and components by using Design Data Books, Codes and Standards for avoiding failure of machine components.
CO5	Ability to import different application of gears for suitable industrial use.
CO6	Ability to import different applications of bearing for industrial use.
CO of the Course "Refrigeration and Air Conditioning"	
CO1	Demonstrate the fundamental Principles of Thermodynamics and working principal of R.A.C. methods
CO2	Analyze the performance of the different Refrigeration cycle using P-h chart & property table & select appropriate for application.
CO3	Select the appropriate refrigerant with respect to properties, application & environmental issues by comparative study.
CO4	Analyze & Design appropriate air-conditioning system for any application
CO5	Illustrate and analyze the principles and working of various equipment & safety controls & select in RAC system
CO6	Demonstrate duct system design methods by solving simple numerical.
CO of the Course "Mechatronics"	
CO1	Identification of key elements of mechatronics system and its representation in terms of block diagram
CO2	Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O
CO3	Interfacing of Sensors, Actuators using appropriate DAQ micro-controller
CO4	Time and Frequency domain analysis of system model (for control application)
CO5	PID control implementation on real time systems
CO6	Development of PLC ladder programming and implementation of real life system.
Semester VII	
CO of the Course "Hydraulics & Pneumatics"	
CO1	Understand the concept, basic working principle,basic energy conversion and storage units in hydraulic system.

CO2	Identify various applications of hydraulic & pneumatic systems
CO3	Selection of appropriate components required for hydraulic and pneumatic systems
CO4	Analyse hydraulic and pneumatic systems for industrial/mobile applications
CO5	Design a system according to the requirements
CO6	Develop and apply knowledge to various applications
CO of the Course "CADCAM and Automation"	
CO1	Apply homogeneous transformation matrix for geometrical transformations of 2D CAD entities for basic geometric transformations.
CO2	Use analytical and synthetic curves and surfaces in part modeling
CO3	Do real times analysis of simple mechanical elements like beams, trusses, etc. and comment on safety of engineering components using analysis software.
CO4	Generate CNC program for Turning / Milling and generate tool path using CAM software
CO5	Demonstrate understanding of various rapid manufacturing techniques and develop competency in designing and developing products using rapid manufacturing technology
CO6	Understand the robot systems and their applications in manufacturing industries.
CO of the Course "Dynamic of Machinery"	
CO1	Implement balancing technique to complete balancing of rotating & reciprocating masses in multi cylinder inline & radial engines.
CO2	Express the fundamentals of vibrations and estimate natural frequencies for single DOF un-damped and damped free vibratory systems.
CO3	Formulate analytical competency to judge the response to forced vibrations due to harmonic excitation, base excitation and excitation due to reciprocating and rotary
CO4	Formulate mathematical model and estimate natural frequencies, mode shapes (Eigen values and Eigen vectors) for DOF undamped free longitudinal and transverse vibratory
CO5	Choose suitable vibration measuring instrument for industrial / real life applications and select suitable method for vibration control
CO6	Interpret noise, its measurement and reduction techniques for industry and day to day life problems
CO of the Course "Elective-I Finite Element Method"	
CO1	To explain the fundamentals of FEA pertaining to structural and heat transfer domain.

CO2	To formulate and solve 1D element structural problems involving bars, beams, trusses, frames and steady state heat transfer problems.
CO3	To construct and solve 2D element problems involving triangular, quadrilateral, axi-symmetric, Iso-parametric & higher order elements.
CO4	To evaluate appropriate FEA technique to solve dynamic vibrational problems.
CO5	To demonstrate the use of FEA software applied to solve structural and heat transfer problems.
CO of the Course "Elective-II Automobile Engineering"	
CO1	Classify I.C engines construction and materials used, working principle and explain losses encountered in fuel air and actual cycle.
CO2	Analyze requirements of carburetion , stages of combustion in SI engines, theory of abnormal combustion and combustion chambers for SI engine.
CO3	Evaluate fuel injection system, stages of combustion in CI engines, theory of abnormal combustion and combustion chambers for CI engine.
CO4	Evaluate performance of IC engines and results of the tests.
CO5	Explain systems necessary for efficient operation of IC engines and get familiar with emissions, norms and controlling techniques.
CO6	Explain the classification and working of air compressors and evaluate the performance of reciprocating air compressor.
Semester VIII	
CO of the Course "Energy Engineering"	
CO1	Describe the power generation scenario, the layout components of thermal power plant and analyze the improved Rankin cycle, Cogeneration cycle
CO2	Analyze the steam condensers, recognize the an environmental impacts of thermal power plant and method to control the same
CO3	Recognize the layout, component details of hydroelectric power plant and nuclear power plant
CO4	Realize the details of diesel power plant, gas power plant and analyze gas turbine power cycle
CO5	Emphasize the fundaments of non-conventional power plants
CO6	Describe the different power plant electrical instruments and basic principles of economics of power generation.
CO of the Course "Mechanical System Design"	
CO1	The student will understand the difference between component level design and system level design.

CO2	Ability to design various mechanical systems like pressure vessels, machine tool gear boxes, material handling systems, etc. for the specifications stated/formulated.
CO3	Ability to learn optimum design principles and apply it to mechanical components.
CO4	Ability to handle system level projects from concept to product.
CO of the Course "Industrial Engineering"	
CO1	Describe different aspect of industrial engineering and productivity improvement techniques.
CO2	Apply different concepts of method study to improve the work content
CO3	describe and analyze techniques of work measurement and time study
CO4	Illustrate different aspect of work system design and production planning control
CO5	Identify various cost accounting and financial management practices applicable in different industries
CO6	Apply concept of engineering economy, ergonomics and industrial safety practices.
CO of the Course "Advanced Manufacturing Process"	
CO 1	Classify and analyze special forming processes
CO 2	Analyze and identify applicability of advanced joining processes
CO 3	Understand and analyze the basic mechanisms of hybrid non-conventional machining techniques
CO4	Select appropriate micro and nano fabrication techniques for engineering applications
CO5	Understand and apply various additive manufacturing technology for product development
CO6	Understand material characterization techniques to analyze effects of chemical composition, composition variation, crystal structure, etc.
CO of the Course "Product Design and Development"	
CO1	Understand essential factors for product design
CO2	Design product as per customer needs and satisfaction
CO3	Understand Processes and concepts during product development

CO4	Understand methods and processes of Forward and Reverse engineering
CO5	Carry various design processes as DFA, DFMEA, design for safety
CO6	Understand the product life cycle and product data management

Course Name: Discrete Mathematics Class: SE Computer Engineering
Course Code: 202051 (2015Pattern)
CO1 - Solve real world problems logically using appropriate set, function, and relation models
CO2 - Interpret the associated operations and terminologies in context
CO3 - Analyze and synthesize the real world problems using discrete mathematics
CO4 - Design mathematical model, as well as to analyze and interpret data
CO5 - Analyze and synthesize the real world problems using tree
CO6 - Solve the real world problem logically using Algebraic Structures
Course Name: Digital Electronics & Logic Design Class: SE Computer Engineering
Course Code: 210242 (2015Pattern)
CO1- Realize and simplify Boolean Algebraic assignments for designing
digital circuits using K-Maps
CO2- Apply the knowledge to appropriate IC as per the design specifications
CO3- Design and implement Combinational digital circuits as
per the specifications
CO4- Design and implement Sequential digital circuits as
per the specifications
CO5- Design simple digital systems using VHDL
CO6- Develop simple embedded system for simple real world application
Course Name: Data Structures and Algorithm Class: SE Computer Engineering
Course Code: 210243 (2015Pattern)
CO1 - Develop knowledge of basic data structures for storage and retrieval of
ordered or unordered data

CO2 - Use linear and nonlinear data structures like stack, queues and linked list
CO3 - Understand and design the algorithms to solve programming problems
CO4 - Analyze and compare algorithms for efficiency using Big-O notation
CO5- Analyze the problems to apply suitable algorithm and data structure
CO6- To develop application using data structures.
Course Name: Computer Organization & Architecture Class: SE Computer Engineering
Course Code: 210244 (2015Pattern)
CO1-Demonstrate computer architecture concepts & analyze the principles of computer architecture using examples drawn from
CO2 - Design of modern memories related with demonstration of
Computer architecture concepts
CO3 - Determine & Design for various techniques of computer I/O related with computer architecture.
CO4 - Design elements of modern instruction set & different addressing
modes.
CO5 - Evaluate various design alternatives in processor organization.
CO6 - Analyze the principles of execution of instructions in hardwired & micro programmed control.
Course Name: Object Oriented Programming Class: SE Computer Engineering
Course Code: 210245 (2015Pattern)
CO1 - Analyze the strengths of object oriented programming
CO2 - Design and apply OOP principles for effective programming
CO3 - Develop programming application using object oriented programming language C++
CO4 - Percept the utility and applicability of OOP
CO5 - Learn and apply features of OOP to model real life problems.

CO6- Able to develop application using OOP which solve society problems
Course Name: Engineering Mathematics III Class: SE Computer Engineering
Course Code: 207003 (2015Pattern)
CO1-Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits
CO2-Solve problems related to Fourier transform, Z-Transform and applications to Signal and Image processing
CO3-Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data as applied to machine intelligence
CO4-Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals
CO5-Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing
CO6-Analyse ,transformation for digital filter & Computer Graphics
Course Name: Computer Graphics Class: SE Computer Engineering
Course Code: 210251 (2015Pattern)
CO 1 - Analyze the strengths and weaknesses of programming languages for effective and efficient program development
CO 2 - To inculcate the principles underlying the programming languages enabling to learn new programming languages
CO 3 - To grasp different programming paradigms
CO 4 - To use the programming paradigms effectively in application development
CO 5 - To learn the various algorithms for generating and rendering graphical figures
CO 6 - Student should be able to do Animation Programming
Course Name: Advanced Data Structures Class: SE Computer Engineering
Course Code: 210252 (2015 Pattern)
CO1 - Apply appropriate advanced data structure and efficient algorithms to approach the problems of various domain

CO2 - Design the algorithms to solve the programming problems
CO3 - Effective and efficient use of data structures in solving various Computer Engineering domain problems
CO4 - Analyze the algorithmic solutions for resource requirements and
optimization
CO5- Use appropriate modern tools to understand and analyze the functionalities
confined to the data structure usage
CO6- To design and implementation of various basic and advanced data structures
Course Name: Microprocessor Class: SE Computer Engineering
Course Code: 210253 (2015Pattern)
CO1-Understand the Basic programming model of 80386& apply assembly language programming to develop small real life embedded application.
CO2-Demonstrate system architecture, memory management concepts.
CO3-Analyze the mechanism of protection related to 80386 & understands the principles of multitasking.
CO4-Apply assembly language programming with I/O & evaluate to design interrupts in 80386 modes.
CO5-To understand architecture of the advanced processor thoroughly to use the resources for programming & understand the concepts
CO6-To understand the higher processor architectures descended from 80386 architecture.
Course Name: Principles of Programming Languages Class: SE Computer Engineering
Course Code: 210254 (2015Pattern)
CO1-To analyze the strengths and weaknesses of programming languages for effective and efficient program development
CO2-To inculcate the principles underlying the programming languages enabling to learn new programming languages
CO3-To grasp different programming paradigms
CO4-To use the programming paradigms effectively in application development

CO5- To use Object Oriented Programming concept in application development
CO6-To use Applet for Application development
Course Name: Theory of Computation Class: TE Computer Engineering
Course Code: 3101241 (2015 Pattern)
CO1 -Introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars;notions of algorithm decidability, complexity, and computability
CO2 - Enhance/develop student's ability to understand and conduct,mathematical proofs for computation and algorithms
CO3 - Be exposed to a broad overview of the theoretical foundations of computer science
CO4 - To Study abstract computing models
CO5 - To learn Grammar and Turing Machine
CO6 - To learn about the theory of computability and complexity
Course Name: Database Management System Class: TE Computer Engineering
Course Code: 310242 (2015Pattern)
CO1 - Design E-R Model for given requirements and convert the same into database tables
CO2 - Use database techniques such as SQL & PL/SQL
CO3 - Use modern database techniques such as NOSQL
CO4 - Explain transaction Management in relational database System
CO5 - Describe different database architecture and analyses the use of
appropriate architecture in real time environment
CO6 - Students will be able to use advanced database Programming concepts Big Data - HADOOP
Course Name: Information Systems &Engineering Economics Class: TE Computer

Course Code: 310244 (2015Pattern)
CO1 - Understand the need, usage and importance of an Information System to an organization.
CO2 - Understand the activities that are undertaken while managing, designing, planning, implementation, and deployment of computerized information system in an organization.
CO3 - Further the student would be aware of various Information System solutions like ERP, CRM, Data warehouses and the issues in successful implementation of these technology solutions in any organizations
CO4 - Outline the past history, present position and expected performance of a company engaged in engineering practice or in the computer industry.
CO5 - Perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives.
CO6 - Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.
Course Name: Computer Networks Class: TE Computer Engineering
Course Code: 310245 (2015 Pattern)
CO1 - Analyze the requirements for a given organizational structure to select the most appropriate networking architecture, topologies, transmission mediums, and technologies
CO2 - Demonstrate design issues, flow control and error control
CO3 - Analyze data flow between TCP/IP model using Application, Transport and Network Layer Protocols.
CO4 - Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community.
CO5 - Illustrate Client-Server architectures and prototypes by the means of correct standards and technology.
CO6 - Demonstrate different routing and switching algorithms
Course Name: Design and Analysis of Algorithm Class: TE Computer Engineering
Course Code: 310250 (2015Pattern)
CO1 - Argue the correctness of algorithms using inductive proofs and invariants.
CO2 - Find optimal solution by applying various methods.
CO3 - Design the algorithms to solve programming problems.

CO4 - Ability to analyze asymptotic runtime complexity of algorithms including formulating recurrence relations.
CO5-Write mathematical modeling of algorithm for problem solving
CO6-Make use of complexity theory in problem solving
Course Name: Systems Programming &Operating System Class: TE Computer Engineering
Course Code: 310251 (2015Pattern)
CO1 - Analyze and synthesize system software
CO2 - Understand the internal of language translator
CO3 - Use tools like LEX & YACC
CO4 - Understand the Operating System internals
CO5 - Implement Operating System functions
CO6 - Understand process scheduling for multi-cores Operating System
Course Name: Embedded Systems and Internet of Things Class: TE Computer Engineering
Course Code: 310252 (2015Pattern)
CO1 - To understand fundamentals of IoT and embedded system including essence, basic design strategy and process modeling
CO2 - To introduce students a set of advanced topics in embedded IoT and lead them to understand research in network.
CO3 - To develop comprehensive approach towards building small low cost embedded IoT system
CO4 - To understand fundamentals of security in IoT
CO5 - To learn to implement secure infrastructure for IoT
CO6 - To learn real world application scenarios of IoT along with its societal and economic impact using case studies
Course Name: Software Modeling and Design Class: TE Computer Engineering
Course Code: 310253 (2015 Pattern)

CO1 -Analyze the problem statement (SRS) and choose proper design technique for designing web-based/ desktop application
CO2 -Design and analyze an application using UML modelling as fundamental tool
CO3 -Apply design patterns to understand reusability in OO design
CO4 -Decide and apply appropriate modern tool for designing and modelling
CO5 -Apply proper architecture design technique for designing application
CO6 -Decide and apply appropriate modern testing tool for testing web-based/desktop application

Course Name: Web Technology Class: TE Computer Engineering
Course Code: 310254 (2015Pattern)
CO1 - Analyze given assignment to select sustainable web development design methodology
CO2 - Develop web based application using suitable client side and server side web technologies
CO3 - To decide the choice of web technology for designing the web site/Application
CO4 - To develop the interaction application
CO5-To develop reach the web based Application

Course Name:Artificial Intelligence & Robotics Class: BE Computer Engineering
Course Code:410242 (2015 Pattern)
CO1- Apply suitable Intelligent agents for various AI applications.
CO2-Design smart system using different search techniques like heuristic,informed and uninformed .
CO3-Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem.
CO4-Apply the suitable algorithms to solve AI problems. .
CO5-Describe various machine learning techniques and develop smart system application.
CO6-Relate machine learning techniques to embedded systems.

Course Name: High Performance Computing Class: BE Computer Engineering
Course Code: 410241 (2015 Pattern)
CO1-To transform algorithms in the computational area to efficient programming code for modern computer architectures
CO2-To write, organize and handle programs for scientific computations
CO3-To create presentation using tools for performance optimization and debugging.
CO4-To present analysis of code with respect to performance, suggest and implement performance improvements.
CO5-To present test cases to solve problems for multi-core or distributed, concurrent/Parallel environment.
CO6-To develop time and space efficient algorithms

Course Name:Data Analytics Class: BE Computer Engineering
Course Code: 410243 (2015 Pattern)
CO1-Students will be able to understand data analytic life cycle for the data science projects
CO2-Students will be able to write case studies in Business Analytics and Intelligence using mathematical models
CO3-Students will be able to present a survey and advanced analytical methods for clustering and classification
CO-4Students will be able to provide problem solutions for multi-core or distributed, concurrent/Parallel environments.

Course Name: ELECTIVE-I- Data Mining and warehousing Class: BE Computer Engineering
Course Code: 410244(D) (2015 Pattern)
CO1-To Understand the fundamentals of Data Mining
CO2-To Identify the appropriateness and need of mining the data along with models and data representation
CO3-To Learn the pre-processing minig, and post processing of the data
CO4-Use of Various clustering techniques
CO5-Apply concept of text and web mining

CO6-To understand various methods, techniques and algorithms in data minig

Course Name: ELECTIVE-II-Mobile Communication Class: BE Computer Engineering
Course Code: 410245(B) (2015 Pattern)
CO1-Justify the Mobile Network performance parameters and design decisions.
CO2-Choose the modulation technique for setting up mobile network.
CO3-Formulate GSM/CDMA mobile network layout considering futuristic requirements which conforms to the technology.
CO4-Use the 3G/4G technology based network with bandwidth capacity planning
CO5-Percept to the requirements of next generation mobile network and mobile applications.
CO6-Apply design parameters for setting up mobile network.

Course Name: Machine Learning Class: BE Computer Engineering
Course Code:410250 (2015 Pattern)
CO1-To Distinguish different learning based applications
CO2-To Apply different preprocessing methods to prepare training data set for machine learning.
CO3-To Implement different learning models and machine learning algorithms
CO4-To Use machine learning methods for multivariate data analysis in various scientific fields
CO5-To Design and implement supervised and unsupervised machine learning algorithm.
CO6-To Choose and apply appropriate Machine Learning Techniques for analysis, forecasting, categorization and clustering of the data

Course Name:Informtion and Cyber Security Class: BE Computer Engineering
Course Code:410251 (2015 Pattern)
CO1-To Gauge the security protections and limitations provided by today's technology.
CO2-To Identify information security and cyber security threats.

CO3-To Analyze threats in order to protect or defend it in cyberspace from cyber-attacks.
CO4-To Build appropriate security solutions against cyber-attacks.
CO5-To Analyze the working of Firewall.
CO6-To Detect the Intruders.

Course Name: ELECTIVE-III-Soft Computing and Optimization Algorithms Class: BE Computer Engineering
Course Code:410252 (D) (2015 Pattern)
CO1- Apply soft computing methodologies using artificial neural networks,
CO2-Apply soft computing methodologies using fuzzy sets and fuzzy logic
CO3-Apply soft computing methodologies using fuzzy inference systems and genetic algorithms
CO-4Design and development of certain scientific and commercial application using computational neural network models
CO5-Design and development of certain scientific and commercial application using fuzzy models, fuzzy clustering applications
CO-6Design and development of certain scientific and commercial application using genetic algorithms in specified applications.
Course Name: Cloud Computing Class: BE Computer Engineering
Course Code:410253 (C) (2015 Pattern)
CO1- To Install cloud computing environments.
CO2-To Develop any one type of cloud and evaluate the file storage and security aspect of developed cloud.
CO3-To Understand the use of virtualization in cloud computing and its impact on cloud services
CO4-To Understand and evaluate technical aspects of Amazon web services.
CO5-To Analyze the ubiquitous nature of cloud with enabling technologies like Internet of Things.
CO6-To Explore and analyze future trends of cloud computing

Class	**SE (Civil)**
Semester	**III**
Course Name	**Building Technology and Materials**
Course Code	**201001**
Course Outcomes	At the end of this course, the student will be able to:
CO201001.1	Identify types of building and basic requirements of building components.
CO201001.2	Explain types of masonry, formwork, casting procedure and necessity of underpinning and scaffolding.
CO201001.3	Elucidate different types of flooring and roofing materials.
CO201001.4	Describe types of doors, windows, arches and lintel.
CO201001.5	Illuminate means of vertical circulation and protective coatings.
CO201001.6	Explain different materials especially eco-friendly materials and safety measures to be adopted at any construction site.

Class	**SE (Civil)**
Semester	**III**
Course Name	**Geotechnical Engineering**
Course Code	**201003**
Course Outcomes	At the end of this course, the student will be able to:
CO201003.1	Differentiate the different types of soil and their engineering properties and classify them
CO201003.2	Determine the soil properties in laboratory and develop a proficiency in handling experimental data
CO201003.3	Understand of the concept of effective stress and its influence on soil behavior
CO201003.4	Develop an understanding of the influence of water flow on the engineering behaviour of soils
CO201003.5	Analyze engineering properties like compaction, permeability, soil shear strength
CO201003.6	Compute the lateral thrust due to backfill on the retaining walls.

Class	**SE (Civil)**
Semester	**III**
Course Name	**Engineering Mathematics III**
Course Code	**207001**
Course Outcomes	At the end of this course, the student will be able to:
CO207001.1	Solve higher order linear differential equations and apply to civil engineering problems such as bending of beams and whirling of shafts.
CO207001.2	Solve system of linear equations using direct and iterative numerical techniques and develop solutions to ordinary differential equations using single step and multistep methods applied to structural systems.
CO207001.3	Apply statistical methods like correlation, regression analysis in analyzing and interpreting experimental data and probability theory applied to construction management
CO207001.4	Perform vector differentiation and integration, analyze the vector fields and apply to fluid flow problems.
CO207001.5	Solve various partial differential equations such as wave equation, one and two dimensional heat flow equations.
CO207001.6	Solve P.D.E and apply it for initial value problems and boundary value problems

Class	**SE (Civil)**
Semester	**III**
Course Name	**Strength of Materials**
Course Code	**201002**
Course Outcomes	At the end of this course, the student will be able to:
CO201002.1	Compute different type of stresses in determinate, indeterminate, homogeneous and composite structures.
CO201002.2	Develop bending and shear stress diagram.
CO201002.3	Determine the torsional stresses and stresses due to strain energy for different loading conditions
CO201002.4	Explain the concept of principal stresses due to combined loading and able to compare the values of analytical and graphical (Mohr’s circle) method.

CO201002.5	Plot loading diagram, Shear Force Diagram (SFD) and Bending Moment Diagram (BMD).
CO201002.6	Analyze axially and eccentrically loaded column.

Class	**SE (Civil)**
Semester	**III**
Course Name	**SURVEYING**
Course Code	**201006**
Course Outcomes	At the end of this course, the student will be able to:
CO201006.1	Operate and use surveying equipment.
CO201006.2	Draw plan or map of the existing permanent features on the ground.
CO201006.3	Classify the ground features from the map or plan.
CO201006.4	Analyze temporary adjustments and check permanent adjustments of the Theodolite
CO201006.5	Determine angle and distance
CO201006.6	Explain the working principles of surveying instrument

Class	**SE (Civil)**
Semester	**IV**
Course Name	**Engineering Geology**
Course Code	**207009**
Course Outcomes	At the end of this course, the student will be able to:
CO207009.1	Explain the basic concepts of engineering geology
CO207009.2	Differentiate between the different rock types, their inherent characteristics and their application in civil engineering.
CO207009.3	Understand physical properties, mechanical properties of the minerals and their application in civil engineering. .

CO207009.4	Identify favourable and unfavourable conditions for the buildings, roads, dam, tunneling etc through the rocks.
CO207009.5	Explain mass wasting processes, effects of mass wasting process on the civil engineering structures and remedial measures
CO207009.6	Understand Seismic activities and its effect on the civil engineering construction

Class	**SE (Civil)**
Semester	**IV**
Course Name	**Fluid Mechnics I**
Course Code	**201004**
Course Outcomes	At the end of this course, the student will be able to:
CO201004.1	Use fluid properties, dimensional analysis for solving problems of fluid flow.
CO201004.2	Solve fluid statics problems
CO201004.3	Measure fluid pressure.
CO201004.4	Calibrate discharge measuring instrument like ventrurimeter, orifice meter.
CO201004.5	Distinguish between various types of fluid flows and find the fluid velocity using principles of Kinematics and Dynamics
CO201004.6	Design pipes to carry particular amount of discharge.

Class	**SE (Civil)**
Semester	**IV**
Course Name	**Structural Analysis I**
Course Code	**201008**
Course Outcomes	At the end of this course, the student will be able to:
CO201008.1	Understand the basic concept of static and kinematic indeterminacy, slope and deflection of determinate and indeterminate beams for analysis of structures.
CO201008.2	Analyze indeterminate beams structures and frames.
CO201008.3	Evaluate determinate and indeterminate trusses and its application in the field.

CO201008.4	Apply influence line diagrams for the analysis of structures under moving load.
CO201008.5	Analyze two and three hinged arches and its application.
CO201008.6	Apply plastic analysis for indeterminate steel structures by limits state method.

Class	**SE (Civil)**
Semester	**IV**
Course Name	**Architectural Planning and Design of Buildings**
Course Code	**201005**
Course Outcomes	At the end of this course, the student will be able to:
CO201005.1	Make use of principles of planning and principles of architectural Planning
CO201005.2	Analyze the available primary or secondary data and plan different types of structures considering futuristic need of an area
CO201005.3	Improve the status of existing structures by proposing appropriate green measures
CO201005.4	Plan effectively various types of buildings according to their utility with reference to different codes.
CO201005.5	Understand and resolve contemporary issues at multi-dimensional functional levels.
CO201005.6	To develop the plan, elevation and section of load bearing and framed structures.

Class	**SE (Civil)**
Semester	**IV**
Course Name	**Concrete Technology**
Course Code	**201007**
Course Outcomes	At the end of this course, the student will be able to:
CO201007.1	Understand chemistry, properties, and classification of cement, fly ash, aggregates and admixtures, and hydration of cement in concrete.
CO201007.2	Prepare and test the fresh concrete
CO201007.3	Test hardened concrete with destructive and nondestructive testing instruments

CO201007.4	Get acquainted to concrete handling equipments and different special concrete types.
CO201007.5	Design concrete mix of desired grade
CO201007.6	Predict deteriorations in concrete and repair it with appropriate methods and techniques.

Class	**TE (Civil)**
Semester	**V**
Course Name	**Fluid Mechanics II**
Course Code	**301005**
Course Outcomes	At the end of this course, the student will be able to:
CO301005.1	Define the concepts related to boundary layer theory and drag and lift forces.
CO301005.2	Apply the knowledge of theories and equations of pipe flow in analyzing and designing the pipe network systems and its components including water hammer
CO301005.3	Utilize the concepts of uniform and critical flow through open channels including design of efficient channel sections. Also apply specific energy concepts in the
CO301005.4	Demonstrate Gradually Varied Flow & Rapidly Varied Flow analysis and its computation.
CO301005.5	Explain the different techniques of dimensional analysis in model testing.
CO301005.6	Demonstrate and apply basic concepts related to Turbines & Pumps in Water Resources planning.

Class	**TE (Civil)**
Semester	**V**
Course Name	**HWRE**
Course Code	**301001**
Course Outcomes	At the end of this course, the student will be able to:
CO301001.1	Apply the knowledge of hydrology in day to day life and utilize its basics for the measurement of precipitation
CO301001.2	Define and explain Infiltration, Evaporation and Transpiration and apply its knowledge to measure Infiltration and Interception

CO301001.3	Utilize the Technique of the Hydrograph to forecast Flood discharge at various duration.
CO301001.4	Apply the statistical technique to analyze the flood occurrence and frequency.
CO301001.5	Discuss Geo- Hydrology term in exploration of ground water potential and to assess it using various techniques.
CO301001.6	Explain the concept of ground water recharge and multipurpose project for water resources

Class	**TE (Civil)**
Semester	**V**
Course Name	**IECT**
Course Code	**301002**
Course Outcomes	At the end of this course, the student will be able to:
CO301002.1	Exhibit the knowledge of planning, design and the fundamental properties of highway materials in highway engineering.
CO301002.2	Acquire the knowledge of geometric design and draw appropriate conclusion.
CO301002.3	Understand and use the concept of different methods in design, construction, inspection and maintenance of the pavement
CO301002.4	Undertake various Traffic studies and apply the knowledge in planning and design of pavement and geometrics
CO301002.5	Understand and describe the terms related to tunnel.
CO301002.6	Understand the different sub-structures and super-structures of a docks and harbours and its construction, rating and maintenance

Class	**TE (Civil)**
Semester	**V**
Course Name	**Structural Analysis II**
Course Code	**301004**
Course Outcomes	At the end of this course, the student will be able to:
CO301004.1	Classify & discuss statically determinate & indeterminate structure
CO301004.2	Apply & Analyze the concept of influence lines for deciding the critical forces and sections while designing.

CO301004.3	Apply concept of strain energy and analyze redundant frames
CO301004.4	Explain the importance of horizontal thrust in maintaining parabola of two hinged parabolic arch for external loading and analyze the same
CO301004.5	Identify,analyze, & solve problems using slope deflection method.
CO301004.6	Apply the concept of force to solve indeterminate structure

Class	**TE (Civil)**
Semester	**V**
Course Name	**Structural Design I**
Course Code	**301003**
Course Outcomes	At the end of this course, the student will be able to:
CO301003.1	Uses of all loadings and limit state design method for steel structure.
CO301003.2	Analyze and design the Tension member
CO301003.3	Design of axial and eccentrically loaded column
CO301003.4	Design of laterally supported and unsupported beams
CO301003.5	Design of welded plate girder
CO301003.6	Explain the behavior of various connections and able to solve the problems various fasters (Bolted and welded) used in steel construction.

Class	**TE (Civil)**
Semester	**VI**
Course Name	**Environmental Engineering I**
Course Code	**301011**
Course Outcomes	At the end of this course, the student will be able to:
CO301011.1	Explain different aspects of air pollutants, its sources and effects on man and material etc.
CO301011.2	Examine composition of typical municipal wastes, their sources, and collection, treatment and disposal methods.
CO301011.3	Interpret the different characteristics of water &waste water and determine the necessity of treatment required.

CO301011.4	Compare the functions of water &waste water treatment and their different processes in water & waste water treatment plant
CO301011.5	Design different units of water treatment plant.
CO301011.6	Discuss about recent development in water & waste water treatment.

Class	**TE (Civil)**
Semester	**VI**
Course Name	**Foundation Engineering**
Course Code	**301009**
Course Outcomes	At the end of this course, the student will be able to:
CO301009.1	To learn about types and purposes of different foundation systems and structures.
CO301009.2	To provide students with exposure to the systematic methods for designing foundations.
CO301009.3	To discuss and evaluate the feasibility of foundation solutions to different types of soil conditions considering the time effect on soil behavior.
CO301009.4	To build the necessary theoretical background for design and construction of foundation systems.
CO301009.5	Evaluate the importance of raft foundation and principles of design for buildings and tower structures.
CO301009.6	Examine and discuss various machine foundations.

Class	**TE (Civil)**
Semester	**VI**
Course Name	**Project Management and Engineering Economics**
Course Code	**301008**
Course Outcomes	At the end of this course, the student will be able to:
CO301008.1	Understand functions of management and Principles of management
CO301008.2	Find out solution of activities with CPM and PERT method
CO301008.3	Calculate critical paths of construction activity

CO301008.4	Be able to perform and evaluate payback period and capitalized cost on one or more economic alternatives.
CO301008.5	Project monitoring and control with different softwares
CO301008.6	Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.

Class	**TE (Civil)**
Semester	**VI**
Course Name	**Structural Design II**
Course Code	**301010**
Course Outcomes	At the end of this course, the student will be able to:
CO301010.1	Ability to analyze and design of columns
CO301010.2	Ability to analyze and design of beams
CO301010.3	Ability to analyze and design of Slabs
CO301010.4	Ability to analyze and design of footing
CO301010.5	An ability to design a system, component, or process to meet desired needs.
CO301010.6	An ability to identify, formulate, and solve engineering problems.

Class	**TE (Civil)**
Semester	**VI**
Course Name	**Advanced Surveying**
Course Code	**301007**
Course Outcomes	At the end of this course, the student will be able to:
CO301007.1	Evaluate horizontal and vertical distances in hilly terrain
CO301007.2	Apply survey technique to align highways curves
CO301007.3	Apply survey technique to align railway curves

CO301007.4	Explain the procedure of triangulation
CO301007.5	Explain the methods involve in photographic survey
CO301007.6	Choose advance surveying techniques over conventional method in the field of civil engineering

Class	**BE (Civil)**
Semester	**VII**
Course Name	**ENVIRONMENTAL ENGINEERING II**
Course Code	**401001**
Course Outcomes	At the end of this course, the student will be able to:
CO401001.1	Explain the concept related to water & its quality, sewage, sewer, storm water, etc in its hydraulic design.
CO401001.2	Classify and Compare the different components of sewer in construction, testing & maintenance of sewers.
CO401001.3	Distinguish the various characteristics of domestic waste water as well as industrial waste water and units of STP and CETP
CO401001.4	Design various units of conventional sewage treatment plant and the regulation of functional planning.
CO401001.5	Examine provisions for rural sanitation and perform functional design of septic tank.
CO401001.6	Design of screen chamber

Class	**BE (Civil)**
Semester	**VII**
Course Name	**STRUCTURAL DESIGN AND DRAWING III**
Course Code	**401003**
Course Outcomes	At the end of this course, the student will be able to:
CO401003.1	Identify various reinforced concrete structural members, its behavior and its purposes.
CO401003.2	Analyze the structural member and apply the knowledge in designing.
CO401003.3	Utilize of the knowledge of analysis and design and apply it in practical life

CO401003.4	Discuss the behavior and failure modes of different reinforced concrete members.
CO401003.5	Test the serviceability criteria of various reinforced concrete members.
CO401003.6	Utilize the relevant software in the analysis and design of reinforced concrete members.

Class	**BE (Civil)**
Semester	**VII**
Course Name	**TQM AND MIS IN CIVIL ENGINEERING**
Course Code	**401005**
Course Outcomes	At the end of this course, the student will be able to:
CO401005.1	Develop an understanding on quality management philosophies and frameworks
CO401005.2	Develop in-depth knowledge on various tools and techniques of quality management
CO401005.3	Learn the applications of quality tools and techniques in both manufacturing and service industry
CO401005.4	Understand difference between TQM , TQC, QC and QA
CO401005.5	Understand six sigma
CO401005.6	Develop analytical skills for investigating and analysing quality management issues in the industry.

Class	**BE (Civil)**
Semester	**VII**
Course Name	**TRANSPORTATION ENGINEERING**
Course Code	**401002**
Course Outcomes	At the end of this course, the student will be able to:
CO401002.1	Explain the function of various elements of railways
CO401002.2	Understand the relationship between the environment and transportation infrastructure and the importance the environment plays in project development of transportation projects.
CO401002.3	Explain the various principles of traffic control in railway

CO401002.4	Explain the function of various elements of tunnel and their maintenance
CO401002.5	Apply the various principles traffic control in airport
CO401002.6	Explain about layout, design and construction of permanent way, runway and taxiway

Class	**BE (Civil)**
Semester	**VII**
Course Name	**ADVANCED CONCRETE TECHNOLOGY**
Course Code	**401004**
Course Outcomes	At the end of this course, the student will be able to:
CO401004.1	Understand chemistry, properties, and classification of cement, fly ash, aggregates and admixtures, and hydration of cement in concrete
CO401004.2	Prepare and test the fresh concrete
CO401004.3	Test hardened concrete with destructive and nondestructive testing instruments
CO401004.4	Design concrete mix of desired grade
CO401004.5	Get acquainted to concrete handling equipments and different special concrete types.
CO401004.6	Predict deteriorations in concrete and repair it with appropriate methods and techniques.

Class	**BE (Civil)**
Semester	**VIII**
Course Name	**DAMS AND HYDRAULIC STRUCTURES**
Course Code	**401007**
Course Outcomes	At the end of this course, the student will be able to:
CO401007.1	Introduce dams, types of dams, safety and instrumentation of dams.

CO401007.2	Explain gravity dam, seismic analysis of dam, arch dams and other types of dams
CO401007.3	Introduce location of spillways and gates in detail
CO401007.4	Introduce earth dam,its limitations and classification. Diversion head work
CO401007.5	Give information abot canal and canal structures
CO401007.6	Introduce the necessity of cross drainage works and river training structures

Class	**BE (Civil)**
Semester	**VIII**
Course Name	**HYDROPOWER ENGINEERING**
Course Code	**401009**
Course Outcomes	At the end of this course, the student will be able to:
CO401009.1	Basic concepts of hydropower, water turbines, gradient, flow, force, power, energy and flow equations.
CO401009.2	Various types of turbines, suction tube, cavitation, hydraulic similarity, turbine characteristics
CO401009.3	Hydraulic solutions of impeller of Francis, Kaplan, Pelton and Bankiho turbines, impeller design, drawings and manufacturing technology.
CO401009.4	Determination of the basic parameters in the type and classification in power system.
CO401009.5	Basic equipment of water turbines structure, conduit and outflow facility with the necessary accessories.
CO401009.6	Specifics of small water power plants and pumped storage power plants.

Class	**BE (Civil)**
Semester	**VIII**
Course Name	**QSCT**
Course Code	**401008**
Course Outcomes	At the end of this course, the student will be able to:
CO401008.1	Explain the importance of preliminary estimate for administrative approval & technical sanction for a civil engineering project

CO401008.2	Utilize contracts and tenders in construction practices
CO401008.3	Analyze, & assess the quantity of materials required for civil engineering works as per specifications
CO401008.4	Evaluate & estimate the cost of expenditure and prepare a detailed rate analysis report
CO401008.5	Analyze and choose cost effective approach for civil engineering projects
CO401008.6	Construct detailed report on estimation and valuation process

Class	**BE (Civil)**
Semester	**VIII**
Course Name	**Construction Management**
Course Code	**401010**
Course Outcomes	At the end of this course, the student will be able to:
CO401010.1	Demonstrate the understanding of various types of projects, modern construction techniques and Exhibit the mastery in construction planning, scheduling and various
CO401010.2	Explain the knowledge of various type of equipments to be used in construction and Estimate its operational cost, understand manpower requirement, planning resources
CO401010.3	Assess the quality control aspects in planning and management, modern trends in project management
CO401010.4	Apply information system and safety provisions in construction project management
CO401010.5	Project economics, profit and loss account, balance sheet
CO401010.6	Explain various laws pertaining to civil engineering.

Department of Electrical Engineering

Course Outcomes

SE

	ADE-203143
CO.1	Understand conversion of number system, perform binary arithmetic and reduce Boolean expressions by K- Map
CO.2	Demonstrate basics of various types of Flip flops, design registers and counter.
CO.3	Analyze parameter of Op-amp and its applications.
CO.4	Apply the knowledge of Op-amp as wave form generators & filters.
CO.5	Use BJT as amplifier with various configurations.
CO.6	Analysis of uncontrolled rectifier.
	EMI-203144
CO.1	Understand various characteristics of measuring instruments, their classification and range extension technique.
CO.2	Classify resistance, apply measurement techniques for measurement of resistance, inductance.
CO.3	Explain construction, working principle and use of dynamometer type wattmeter for measurement of power under balance and unbalance condition.
CO.4	Explain Construction, working principle of 1-phase and 3-phase induction, static energy meter and calibration procedures.
CO.5	Use of CRO for measurement of various electrical parameters, importance of transducers, their classification, selection criterion and various applications.
CO.6	Measurement of various physical parameters using transducers.
	EM-I-203146
CO.1	Apply energy conversion principle in transformer.
CO.2	Testing of transformer for analysing various performanceparameters
CO.3	Apply energy conversion principle in DC machine
CO.4	Selection of DC machines for specific applications.
CO.5	Apply energy conversion principle in three phase Induction motor
CO.6	Analysing various performance parameters of three phase induction motor

	FMM-203149
CO.1	Differentiate between microprocessor and microcontroller.
CO.2	Describe the architecture and features of various types of microcontroller.
CO.3	Demonstrate programming proficiency using the various addressing modes and all types of instructions of the target microcontroller.
CO.4	Program using the capabilities of the stack, the program counter the internal and external memory, timer and interrupts and show how these are used to execute a
CO.5	Write assemble assembly language programs on PC and download and run their program on the training boards.
CO.6	Design electrical circuitry to the Microcontroller I/O ports in order to interface with external devices.
	M-III-207006
CO.1	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
CO.2	Solve problems related to Laplace transform,
CO.3	Solve problems related to Fourier transform, Z-Transform
CO.4	Perform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields.
CO.5	Analyze conformal mappings and transformations
CO.6	Perform contour integration of complex functions in the study of electrostatics and signal processing
	MS-203142
CO.1	Categorize and classify different materials from Electrical Engineering applications point of view
CO.2	Explain and summarize various properties and characteristics of different classes of materials.
CO.3	Choose magnetic materials for application in various electrical equipment.
CO.4	Choose conducting materials for application in various electrical equipment.
CO.5	Explain and describe knowledge of nanotechnology, batteries and solar cell materials.
CO.6	Test different classes of materials as per IS.
	NA-203147
CO.1	Developing strong basics for network theory.

CO.2	Develop the problem solving technique for networks by application of theorems.
CO.3	Understand the behavior of the network by analyzing its transient response through classical method
CO.4	Understand the behavior of the network by analyzing its transient response through laplace transform
CO.5	Apply knowledge of Network theory for analysis of 2-port networks
CO.6	Apply their knowledge of network theory for designing special circuits like filters
	NMCP-203148
CO.1	Develop algorithms and implement programs using C language for various numerical methods.
CO.2	Demonstrate types of errors in computation and their causes of occurrence.
CO.3	Identify various types of equations and apply appropriate numerical method to solve different equations.
CO.4	Apply different numerical methods for interpolation, differentiation and numerical integration.
CO.5	Apply and compare various numerical methods to solve first and second order ODE.
CO.6	Apply and compare various numerical methods to solve linear simultaneous equations.
	PGT-203141
CO.1	Identify operations of thermal power plant with all accessories and cycles.
CO.2	Be aware of the principle of operation, components, layout, location, environmental and social issues of nuclear, diesel and gas power plant
CO.3	Identify and demonstrate the components of hydro power plant and calculation of turbine required based on catchment area
CO.4	Find the importance of wind based energy generation along with its design, analysis and
CO.5	Apply solar energy in thermal and electrical power generation considering energy crisis, environmental and social benefits
CO.6	Understand the operation of electrical energy generation using biomass, tidal, geothermal, hydel plants, fuel cell and interconnection with grid.
	PS-I-203145
CO.1	Recognize different patterns of load curve, calculate different factors associated with it and tariff structure for LT and HT consumers.
CO.2	Aware of features, ratings, application of different electrical equipment in power station selection of overhead line insulators.

CO.3	Analyze and apply the knowledge of electrical and mechanical design of transmission lines.
CO.4	Calculation of line parameters
CO.5	Calculation of line parameters
CO.6	Identify and analyze the performance of transmission lines.

TE

	POWER ELECTRONICS-303143
CO.1	Develop characteristics of different power electronic switching devices
CO.2	Reproduce working principle of power electronic Choppers for different types of loads
CO.3	Reproduce working principle of power electronic converters for different types of loads
CO.4	Analyse the performance of power electronic converters
CO.5	Reproduce working principle of power electronic Inverters for different types of loads
CO.6	Analyse the performance of power electronic inverters
	POWER SYSTEM -II-303146
CO.1	Solve problems involving modelling, design and performance evaluation of power transmission lines.
CO.2	Solve problems involving modelling, design and performance evaluation of EHVAC lines.
CO.3	Evaluate power flow in power transmission networks and apply power flow results to solve simple planning problems.
CO.4	Calculate currents and voltages in a faulted power system under symmetrical fault and relate fault currents to circuit breaker ratings.
CO.5	Calculate currents and voltages in asymmetrical faults and relate fault currents to circuit breaker ratings.
CO.6	Solve problems involving modelling, design and performance evaluation of HVDC transmission line
	UEE-303148
CO.1	Get knowledge of principle of electric heating, welding and its applications.
CO.2	Understand collection of technical information and delivery of this technical information through presentations.

CO.3	Design simple resistance furnaces and residential illumination schemes.
CO.4	Calculate tractive effort, power, acceleration and velocity of traction.
CO.5	Get knowledge of electric braking methods, control of traction motors,
CO.6	Get knowledge of train lighting and signaling system.
	ITM-311121
CO.1	Differentiate between different types of business organization and discuss the fundamentals of economics and management.
CO.2	Explain the importance of technology management
CO.3	Explain the importance of quality management.
CO.4	Describe the characteristics of marketing and its types.
CO.5	Describe the human resource management
CO.6	Discuss the qualities of a good leader.
	Electrical Machines-II-303142
CO.1	Explain construction & working principle of three phase synchronous machines
CO.2	Estimate regulation of alternator by direct and indirect methods.
CO.3	Demonstrate operation of synchronous motor at constant load and variable excitation (v curves & ∧ curves) & constant excitation and variable load.
CO.4	Explain Speed control methods of three phase induction motor.
CO.5	Plot circle diagram of ac series motor
CO.6	Obtain equivalent circuit of single phase induction motor by performing no load & blocked rotor test.
	EIMT-303144
CO.1	Classify distribution systems, its types and substations
CO.2	Design of different earthing systems for residential and industrial premises
CO.3	Select methods of condition monitoring and testing of various Electrical Equipments
CO.4	Select methods of condition monitoring and testing of various Electrical Equipments

CO.5	Estimate and Costing of residential and industrial premises
CO.6	Different electrical safety technique.
	EAM-303150
CO.1	To get knowledge of BEE Energy policies, Electricity Acts.
CO.2	Use various energy measurement
CO.3	Use various audit instruments
CO.4	Carry out preliminary energy audit of various sectors
CO.5	Enlist energy conservation and demand side measures for electrical, thermal and utility Systems.
CO.6	Solve simple problems on cost benefit analysis.
	CS-I-303147
CO.1	Model physical system
CO.2	Determine time response of linear system
CO.3	Analyse stability of LTI system
CO.4	Analyze behavior of system in time
CO.5	Analyze behavior of system In frequency domain.
CO.6	Design PID controller for LTI system
	DEM-303149
CO.1	Determin types and specification Transformer
CO.2	Calculate main dimensions and Design of single phase and three phase transformer.
CO.3	Determine the parameters of transformer.
CO.4	Determin specifications and construction of Induction motor.
CO.5	Calculate main dimensions of three phase Induction motor.
CO.6	Determine parameters of three phase Induction motor.

	AMCA-303141
CO.1	Explain architecture of PIC18F458 microcontroller, its instructions and the addressing modes.
CO.2	Develop and debug program in assembly language or C language for specific applications
CO.3	Use of an IDE for simulating the functionalities of PIC microcontroller and its
CO.4	Use OF IDE for software and hardware development.
CO.5	Interface a microcontroller to various devices.
CO.6	Effectively utilize advance features of microcontroller peripherals.
BE	
	CS-II-403145
CO.1	Recognize the importance of digital control system.
CO.2	Familiarize with pulse transfer function.
CO.3	Analyze digital controllers.
CO.4	Present system in state space format.
CO.5	Solve state equation.
CO.6	Design observer for system.
	PLC AND SCADA -403142
CO.1	Develop and explain the working of PLC with the help of a block diagram.
CO.2	Develop architecture of SCADA
CO.3	Explain the importance of SCADA in critical infrastructure
CO.4	Execute and test the programs developed for digital and analog operations.
CO.5	Debug the programs developed for digital and analog operations.
CO.6	Reproduce block diagram representation on industrial applications using PLC and SCADA.
	EHVAC-403144

CO.1	Highlight need for EHV ac transmission.
CO.2	Calculate line parameters.
CO.3	Calculate ground parameters.
CO.4	Enlist problems encountered in EHV transmission.
CO.5	Enlist causes encountered in EHV transmission.
CO.6	Express issues related to UHV transmission discussed.
	PQ-403143
CO.1	Characterize power quality events.
CO.2	Reproduce causes of voltage sag.
CO.3	Estimate magnitude of voltage sag.
CO.4	Carry out harmonic analysis.
CO.5	Calculate total harmonic distortion.
CO.6	Calculate parameters for passive harmonic filter.
	PSOC-403141
CO.1	Identify and analyze the dynamics of power system and suggest means to improve stability of system
CO.2	Suggest the appropriate method of reactive power generation and control
CO.3	Analyze the generation-load balance in real time operation and its effect on frequency.
CO.4	Formulate objective functions for optimization tasks such as unit commitment.
CO.5	Develop automatic control strategies with mathematical relations.
CO.6	Economic load dispatch and get solution using computational techniques.
	SGP-403147
CO.1	Describe arc interruption methods in circuit breaker.
CO.2	Derive expression for restriking voltage and RRRV in circuit breaker

CO.3	Explain Construction, and working of different high voltage circuit breakers such as ABCB, SF6 CB, and VCB.
CO.4	Classify and Describe different type of relays such as over current relay, Reverse power relay, directional over current relay, Differential relay, Distance relay, Static
CO.5	Describe various protection schemes used for transformer, alternator and busbar
CO.6	Describe transmission line protection schemes.
	IE-403150
CO.1	Define various terms in illumination.
CO.2	Reproduce various terms in illumination.
CO.3	Identify various parameters for illumination system design.
CO.4	Design indoor lighting systems.
CO.5	Design outdoor lighting systems.
CO.6	Enlist state of the art illumination systems.
	PECD-403148
CO.1	Analyze the operation of the converte drive.
CO.2	Analyze the operation of the chopper fed dc drive.
CO.3	Analyze the operation of classical motor drives.
CO.4	Analyze the operation of modern induction motor drives.
CO.5	Design the current and speed controllers for a closed loop solid-state d.c motor drive
CO.6	Select the drives for any particular application
	HVE-403149
CO.1	Reproduce concepts in breadth with various concepts of breakdown phenomenon of solid, liquid and gaseous materials.
CO.2	Study various causes of overvoltage and protection from them.
CO.3	List and reproduce various methods of generation and measurement of DC high voltage.

CO.4	List and reproduce various methods of generation and measurement of AC and impulse high voltage.
CO.5	Demonstrate an ability to carry various DC. AC and impulse testing on high voltage equipments and materials.
CO.6	Apply safety measures, earthing, shielding for layout of HV apparatus required in High voltage laboratory.

TE (E&TC) SEM I

Digital Communication (304181)	
CO304181.1	Understand working of waveform coding techniques and analyse their performance
CO304181.2	Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.
CO304181.3	Perform the time and frequency domain analysis of the signals in a digital communication system.
CO304181.4	Design of digital communication system.
CO304181.5	Understand working of spread spectrum communication system and analyze its performance.
CO304181.6	Understand Signal space representation
Digital Signal Processing (304182)	
CO304182.1	Analyze the discrete time signals and system using different transform domain techniques.
CO304182.2	Design and implement LTI filters for filtering different real world signals.
CO304182.3	Develop different signal processing applications using DSP processor
CO304182.4	Analyse about various types of signals and their representation and their implementation on MAT LAB.
CO304182.5	Analyse various types of filters, their structures and their implementation on MAT LAB.
CO304182.6	Understand z-transform, its properties and their implementation on MAT LAB
Electromagnetics (304183)	
CO304183.1	Understand the basic mathematical concepts related to electromagnetic vector fields.
CO304183.2	Apply the principles of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density.
CO304183.3	Apply the principles of magnetostatics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density.
CO304183.4	Understand the concepts related to Faraday‘s law, induced emf and Maxwell‘s equations.

CO304183.5	Apply Maxwell‘s equations to solutions of problems relating to transmission lines and uniform plane wave propagation.
CO304183.6	Reflection losses on the unmatched Load, Problems solving using Smith chart.
Microcontrollers (304184)	
CO304184.1	Learn importance of microcontroller in designing embedded application.
CO304184.2	Learn use of hardware and software tools.
CO304184.3	Develop interfacing to real world devices.
CO304184.4	Basics of Serial Communication Protocol
CO304184.5	Develop embedded c programming for real world interfacing.
CO304184.6	Study of software development tool chain (IDE).
Mechatronics (304185)	
CO304185.1	Identification of key elements of mechatronics system and its representation in terms of block diagram
CO304185.2	Understanding basic principal of Sensors and Transducer.
CO304185.3	Able to prepare case study of the system given.
CO304185.4	Introduction to Hydraulic System
CO304185.5	Introduction to Pneumatic a Actuators
CO304185.6	Understanding Mechatronics Systems in Automobile engineering

TE (E&TC) SEM II

Power Electronics (304186)	
CO304186.1	Design & implement a triggering / gate drive circuit for a power device
CO304186.2	Understand, perform & analyze different controlled converters
CO304186.3	Evaluate battery backup time & design a battery charger.
CO304186.4	Design & implement over voltage / over current protection circuit.
CO304186.5	Identify the basic requirements for power electronics based design application

CO304186.6	Understand the analysis and design of various single phase and three phase power converter circuits and knowledge of their applications.
ITCT (304187)	
CO304187.1	Perform information theoretic analysis of communication system.
CO304187.2	Design a data compression scheme using suitable source coding technique.
CO304187.3	Design a channel coding scheme for a communication system.
CO304187.4	Understand and apply fundamental principles of data communication and networking.
CO304187.5	Apply flow and error control techniques in communication networks.
CO304187.6	Concept of Data Communication & Physical Layer
BM (304188)	
CO304188.1	Get overview of Management Science aspects useful in business.
CO304188.2	Get motivation for Entrepreneurship
CO304188.3	Get Quality Aspects for Systematically Running the Business
CO304188.4	To Develop Project Management aspect and Entrepreneurship Skills.
CO304188.5	Introduction to marketing, marketing environment
CO304188.6	Introduction to supply chain management and customer relationship management
Advanced Processors (304189)	
CO304189.1	Describe the ARM microprocessor architectures and its feature.
CO304189.2	Interface the advanced peripherals to ARM based microcontroller
CO304189.3	Design embedded system with available resources.
CO304189.4	Use of DSP Processors and resources
CO304189.5	Understanding of DSP applications in real world.
CO304189.6	Real World Interfacing with ARM7 Based Microcontroller
SPOS (304190)	

CO304190.1	Demonstrate the knowledge of Systems Programming and Operating Systems
CO304190.2	Formulate the Problem and develop the solution for same
CO304190.3	Compare and analyse the different implementation approach of system programming operating system abstractions.
CO304190.4	Interpret various OS functions used in Linux / Ubuntu
CO304190.5	Understanging of I/O management , Disk scheduling and File Management
CO304190.6	Understanding the concept of Concurrency control and deadlock

BE (E&TC) SEM I

VLSI Design & Technology (404181)	
CO404181.1	Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
CO404181.2	Understand chip level issues and need of testability.
CO404181.3	Learning digital CMOS logic design.
CO404181.4	Learning CMOS analog circuit designs.
CO404181.5	Understanding the concept of SoC
CO404181.6	Design analog & digital CMOS circuits for specified applications.
Computer Networks (404182)	
CO404182.1	Understand fundamental underlying principles of computer networking
CO404182.2	Describe and analyze the hardware, software, components of a network and the interrelations.
CO404182.3	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;
CO404182.4	Have a basic knowledge of the use of cryptography and network security;
CO404182.5	Have a basic knowledge of installing and configuring networking applications.
CO404182.6	Specify and identify deficiencies in existing protocols, and then go onto select new and better protocols.

Microwave Engineering (404183)	
CO404183.1	Formulate the wave equation in wave guide for analysis.
CO404183.2	Identify the use of microwave components and devices in microwave applications.
CO404183.3	Understand the working principles of all the microwave tubes
CO404183.4	Understand the working principles of all the solid state devices
CO404183.5	Choose a suitable microwave tube and solid state device for a particular application
CO404183.6	Carry out the microwave network analysis
CO404183.7	Choose a suitable microwave measurement instruments and carry out the required measurements.
Digital Image Processing (404184)	
CO404184.1	Understanding the fundamental concepts of Digital Image Processing.
CO404184.2	Getting knowlegde of basic image processing operations
CO404184.3	Understanding the concept of Image compression & segmentation.
CO404184.4	Develop and implement algorithms for digital image processing
CO404184.5	Understanding concept of Spatial domain & Frequency domain enhancement.
CO404184.6	Apply image processing algorithms for practical object recognition applications.
Electronic Product Design (404185)	
CO404185.1	Understand various stages of hardware, software and PCB design.
CO404185.2	Learning the different considerations of analog, digital and mixed circuit design.
CO404185.3	Special design considerations and importance of documentation
CO404185.4	Understanding SDLC models.
CO404185.5	Getting knowledge of testing methods
CO404185.6	Importance of product test & test specifications.

Mobile Communication (404189)	
CO404189.1	Explain and apply the concepts telecommunication switching, traffic and networks
CO404189.2	Analyze the telecommunication traffic
CO404189.3	Analyze radio channel and cellular capacity
CO404189.4	Explain and apply concepts of GSM and CDMA system.
CO404189.5	Understanding the concept of call set up , cell splitting and handover in mobile communication
CO404189.6	Introduction to 3G mobile systems: W-CDMA and cdma-2000.
Broadband Communication Systems (404190)	
CO404190.1	Carry out Link power budget and Rise Time Budget by proper selection of components and check its viability.
CO404190.2	Carry out Satellite Link design for Up Link and Down Link.
CO404190.3	Analyze and calculate the basic characteristics of digital terrestrial and satellite broadcasting through appropriate simulation tools.
CO404190.4	Use tools to create and manage the digital content, the interface of digital subsystems, and the operation of the most widespread terrestrial and satellite transmission protocols,
CO404190.5	understanding the system design issues and the role of WDM components in advanced light wave systems
CO404190.6	understanding the basics of orbital mechanics and the look angles from ground stations to the satellite.
Speech and Audio Signal Processing (404191)	
CO404191.1	Design and implement algorithms for processing speech and audio signals considering the properties of acoustic signals and human
CO404191.2	Analyze speech signal to extract the characteristic of vocal tract (formants) and vocal cords (pitch).
CO404191.3	Write a program for extracting LPC Parameters using Levinson Durbin algorithm
CO404191.4	Formulate and design a system for speech recognition and speaker recognition
CO404191.5	Extracting the information of the speech or audio signals in terms of cepstral features
CO404191.6	Understanding of speech & audio processing application in real time.

Wireless Networks (404192)	
CO404192.1	Keep himself updated on latest wireless technologies and trends in the communication field
CO404192.2	Understand the transmission of voice and data through various networks.
CO404192.3	Understanding various protocols and services provided by next generation netwoks
CO404192.4	Understanding the architectures of various access technologies such as 3G, 4G, WiFi .
CO404192.5	Getting knowledge on WiMAX
CO404192.6	Knowlegde of LTE Ecosystem Standards