



Program Outcomes (POs)

PO1

Engineering knowledge:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2

Problem analysis:

Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3

Design/development of solutions:

Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4

Conduct investigations of complex problems:

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5

Modern tool usage:

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6

The engineer and society:

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7

Environment and sustainability:

Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8

Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9

Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10

Communication:

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11

Project management and finance:

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12

Life-long learning:

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



**Jayawant Shikshan Prasarak Mandal's
JSPM Narhe Technical Campus
Rajarshi Shahu School of Engineering and
Research**



Program Specific Outcomes (PSOs)

Computer Engineering Department

Graduates of Computer Engineering Program shall-

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|--------|------------------------------------------------------------------------------------------------|
| PSO1:- | An ability to apply design and development principles in the construction of software systems. |
| PSO2:- | An ability to develop advance tools for software testing. |
| PSO3:- | An ability to use various approaches, skills and tools to secure the cyberspace |

Mechanical Engineering Department

Graduates of Mechanical Engineering Program shall-

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|--------|------------------------------------------------------------------------------------------|
| PSO1:- | Analyze, design and Evaluate mechanical components and systems using state of the art IT |
| PSO2:- | Analyze, Design and Evaluate Thermal systems including IC Engines, Refrigeration and Air |
| PSO3:- | Plan Including methods design, process plan, process automation and quality assurance |
| PSO4:- | Apply modern management tools for manufacturing of mechanical components and systems |

Civil Engineering Department

Graduates of Civil Engineering Program shall-

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|--------|--------------------------------------------------------------------------------------------------|
| PSO1:- | Survey, geotechnical investigation, feasibility study of public buildings, industrial buildings, |
| PSO2:- | Specify, analyze, design, supervise, tests the foundation and superstructures of civil |
| PSO3:- | : Analysis of water resources hydrological systems, water conveying systems, hydraulic systems |
| PSO4:- | Formulate environmental engineering system, modern management and construction |

Electronics & Telecommunication Engineering Department

Graduates of Electronics & Telecommunication Engineering Program shall-

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| PSO1:- | Apply to knowledge to analyze & solve complex engineering problem useful to society |
| PSO2:- | Demonstrate an ability to design & implement multidisciplinary project using modern tool with |

MBA Department

MBA Students will get acquainted with:-

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|--------|------------------------------------------------------------------------------------------------|
| PSO1:- | Students obtain relevant interdisciplinary knowledge of accounting, finance, marketing, HRM |
| PSO2:- | With acquired skills set, student will be fit in job industry or can start its own business or |

MCA Department

MCA Students will get acquainted with:-

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|--------|------------------------------------------------------------------------------------------------|
| PSO1:- | An ability to apply design and development principles in the development of software system. |
| PSO2:- | Demonstrate professional excellance in industry,public services or academia with strong skills |



Department: First Year Engineering			
Class & Semester	Subject & Code	Cos	Course Outcomes
FE SEM-1/SEM-II	BASIC ELECTRONICS ENGINEERIN(104012)	CO1	Apply the concepts of PN junction and special purpose diodes for different applications.
		CO2	Explain configuration, biasing, characteristics, parameters and application of transistor.
		CO3	Analyze modes, parameter, feedback and various applications of operational amplifier.
		CO4	Construct various digital circuit diagrams using gates with precise output and reduced complexity.
		CO5	Classify power devices and transducers with respect to requirement.
		CO6	Identify transmission media and modulation for electronic communication along with details of mobile communication.
FE SEM-II	ENGINEERING MECHANICS(101011)	CO1	Able to analyze the coplanar and non coplanar force system to find resultant.
		CO2	Able to locate centroid of given composite lamina and wire bend.
		CO3	Able to analyze kinematics of rectilinear and curvilinear motions parameters.
		CO4	Able to analyze kinetics of rectilinear and curvilinear motions using D'alembert principle, impulse, momentum and work energy principles.
		CO5	Draw FBD and analyze coplanar and non coplanar forces system in equilibrium, including beam, frames, cables and truss structures.
		CO6	Apply coulombs law of friction to engineering problem of wedges, ladder and rope of belt friction.
FE SEM-1	FUNDAMENTALS OF PROGRAMMING LANGAUGE-I(110003)	CO1	To learn and acquire art of computer programming.
		CO2	To know about some popular programming languages and how to choose a programming language for solving problem using a computer.

		CO3	To learn and implement applications using C programming.
FE SEM-1/SEM-II	BASIC ELECTRICAL ENGINEERING(103004)	CO1	1. Demonstrate and analyze measurement of resistance with the variation of temperature, insulation resistance, calculation related to energy consumption in power system.
		CO2	2. Explain the fundamentals of electromagnetism, Faraday's Laws and compare electrical and magnetic circuit.
		CO3	3. Apply the concepts of electromagnetism to analyze principle of transformer and summarize the concepts of electrostatics.
		CO4	4. Extend the concept of electromagnetic induction for generation of ac and its representation for practical analysis of ac circuits.
		CO5	5. Illustrate the concepts of single and three phase ac circuits along with the phasor diagrams.
		CO6	6. Simplify the networks and provide the solution by applying Kirchhoff's laws and theorems.
FE SEM-1/SEM-II	ENGINEERING PHYSICS(107002)	CO1	1. Able to analyze basic knowledge of optics for engineering and technological problems.
		CO2	2. Able to understand terms and applications related to sound engineering for social and scientific applications.
		CO3	3. Able to apply the concepts of polarization and laser for scientific, industrial and medical applications.
		CO4	4. Able to apply knowledge of semiconductor physics for recent trends and advances in technological development.
		CO5	5. Able to understand basic concepts of matter waves for developing mathematical and analytical abilities in wave mechanics.
		CO6	6. Able to use knowledge of superconductors and nano-materials in recent trends and advance technology.
FE SEM-II	ENGINEERING MATHS-II(107008)	CO1	Modeling of various physical systems such as Newton's law of cooling, LCR circuits, rectilinear motion, mass spring systems heat transfer etc.
		CO2	Design and analysis of continuous and discrete system, where knowledge of Fourier series and Harmonic analysis is required.
		CO3	Advanced technique to evaluate integrals.
		CO4	Measurement of arc lengths of various curves.
		CO5	Sphere, cone and cylinder that arise in vector calculus , electro-magnetic field Theory, CAD-CAM , Computer Graphics etc.
		CO6	Multiple integrals which are used in calculating areas, volumes, mean and Root mean square values mass, moments of inertia

			and centre of gravity.
FE SEM-1	BASIC CIVIL AND ENVIRONMENTAL ENGINEERING(101005)	CO1	Able to explain role of civil engineers in different areas of civil engineering with interdisciplinary approach.
		CO2	Able to illustrate different construction materials and components of a structure.
		CO3	Able to classify types of maps and modern surveying tools and techniques.
		CO4	Able to apply concept of environment and the role of civil engineers in sustainable development.
		CO5	Able to utilize various principles of building planning and concept of green building.
		CO6	Able to classify types of energy and environmental pollution.
FE SEM-1	BASIC MECHANICAL ENGINEERING(103004)	CO1	Able to define the scope of mechanical engineering, compare and classify the machine elements.
		CO2	Able to elaborate the steps in design process.
		CO3	Able to select different manufacturing processes for given engineering applications.
		CO4	Able to select machine tools for manufacturing of machine components.
		CO5	Able to explain the basic concepts of thermodynamics, principle of energy conservation and conversion.
		CO6	Able to identify and explain different power producing devices and power consuming devices.
FE SEM-1	ENGINEERING GRAPHICS-I(102006)	CO1	To identify reference, principal, auxiliary planes and utilize fundamentals of engineering drawing to draw and interpret projection of lines.
		CO2	To apply concept of reference and auxiliary plane method for projection of different shapes of planes.
		CO3	To draw and explain projection of solids resting on HP.
		CO4	To draw various types of engineering curves and development of lateral surfaces of solid.
		CO5	To draw orthographic views of given pictorial view.
		CO6	To perceive two dimensional engineering drawings for imagining and constructing three dimensional engineering drawing.
FE SEM-1	ENGINEERING MATHEMATICS-I(107001)	CO1	System of linear equations arising in all engg. Fields, using matrix methods ,Eigen values and Eigen vectors etc.
		CO2	Algebraic and transcendental equations.
		CO3	Error analysis and approximations.
		CO4	Ordinary and partial differential equations.
		CO5	Engg. Applications like vibration theory ,heat transfer , electrical circuits etc.
		CO6	Stationary Values of functions arising in

			optimization techniques.
FE SEM-II	FUNDAMENTALS OF PROGRAMMING LANGAUGE-II(110010)	CO1	Study & Analyze the Object Oriented Programming Language to design and develop applications.
		CO2	Design and Develop the Web Application using web development languages.
		CO3	Study and Analyze the Advanced Mobile OS and Embedded System's real time application(Intruder Alarm) can be developed using C.
FE SEM-1/SEM-II	ENGINEERING CHEMISTRY(107009)	CO1	To understand technology involved in improving quality of water for industrial use.
		CO2	To understand basic concepts of electro analytical technique that facilitates rapid and reliable measurements.
		CO3	To know chemical structure of Polymers and its effects on their various properties when used as engineering materials.
		CO4	To lay foundation for the application of polymers for specific application and as composite Study of fossil fuels and derived fuels with its properties and applications.
		CO5	An insight into nanomaterials and composite materials aspect of modern chemistry.
		CO6	To know principles of chemical and electrochemical reactions causing corrosion and methods used for minimizing corrosion

Department: Civil

SE-SEM I	Building Technology and Materials [201001]	CO1	Identify types of building and basic requirements of building components
		CO2	Explain types of masonry, formwork, casting procedure and necessity of underpinning and scaffolding
		CO3	Elucidate different types of flooring and roofing materials
		CO4	Describe types of doors, windows, arches and lintel
		CO5	Illuminate means of vertical circulation and protective coatings
		CO6	Explain different materials especially eco-friendly materials and safety measures to be adopted at any construction site
SE-SEM I	Engineering Mathematics III [207001]	CO1	Solve higher order linear differential equations and its applications to model problems on bending of beams, whirling of shafts and mass spring systems
		CO2	Apply the knowledge of numerical methods for solution of system of linear equations and differential equations in Civil Engineering
		CO3	Apply statistical methods and regression analysis in analyzing and interpreting experimental data, testing of hypothesis Binomial, Poisson, Normal and chi-square
		CO4	Transform physical phenomenon into vectors; understand vector calculus and its applications

			to fluid mechanics
		CO5	Apply knowledge of vector integral calculus in fluid mechanics and various civil engineering applications
		CO6	Apply various partial differential equations in civil engineering, one dimensional diffusion and wave equations, one and two dimensional heat equations under different conditions
SE-SEM I	Surveying [201006]	CO1	Able to analyse surveying data (traverse data) using distance and angle measuring equipment, including errors and the need for error control
		CO2	Able to draw and interpret contour maps to facilitate design of various civil engineering projects
		CO3	Able to perform theodolite survey
		CO4	Able to describe types, design and setting of curves
		CO5	Able to set out civil engineering works and use of modern digital equipment
SE-SEM I	Strength of Materials [201002]	CO1	Compute different type of stresses in determinate, indeterminate, homogeneous and composite structures
		CO2	Develop bending and shear stress diagram
		CO3	Determine the torsional stresses and stresses due to strain energy for different loading conditions
		CO4	Explain the concept of principal stresses due to combined loading and able to compare the values of analytical and graphical (Mohr's circle) method
		CO5	Plot loading diagram, Shear Force Diagram (SFD) and Bending Moment Diagram (BMD)
		CO6	Analyze axially and eccentrically loaded column
SE-SEM I	Geotechnical Engineering [201003]	CO1	Differentiate the different types of soil and their engineering properties and classify them;
		CO2	Determine the soil properties in laboratory and develop a proficiency in handling experimental data;
		CO3	Understand of the concept of effective stress and its influence on soil behavior
		CO4	Develop an understanding of the influence of water flow on the engineering behaviour of soils
		CO5	Analyze engineering properties like compaction, permeability, soil shear strength
		CO6	Compute the lateral thrust due to backfill on the retaining walls
		CO7	Classify soil slopes and identify their modes of failure
SE- SEM II	Fluid Mechanics I [201004]	CO1	Able to describe properties of Fluids and perform the dimensional analysis
		CO2	Able to interpret and solve fluid static problems

		CO3	Able to understand and apply the knowledge of fluid kinematics
		CO4	Able to identify, analyze and apply the principles of fluid dynamics
		CO5	Able to illustrate formation of boundary layer
		CO6	Able to analyze the pipe flow network using concept of pipe flow
SE- SEM II	Architectural Planning and Design of Buildings [201005]	CO1	Able to relate various amenities and services including safety and land use zoning with respect to town planning
		CO2	Able to describe the various legal aspects and documentation for township from commencement to completion of project
		CO3	Able to apply the principles of architectural planning and design considering features of green building
		CO4	Able to recognize safety aspects and components of earthquake resistant structure
		CO5	Able to describe different building services and applying knowledge to actual situation
		CO6	Able to draw the architectural drawings by applying building rules and byelaws
		CO7	Able to compile ideas and plan residential buildings
		CO8	Able to compile ideas and plan public buildings
SE- SEM II	Structural Analysis I[201008]	CO1	Understand the basic concept of static and kinematic indeterminacy, slope and deflection of determinate and indeterminate beams for analysis of structures
		CO2	Analyze indeterminate beams structures and frames
		CO3	Evaluate determinate and indeterminate trusses and its application in the field
		CO4	Apply influence line diagrams for the analysis of structures under moving load
		CO5	Analyze two and three hinged arches and its application
		CO6	Apply plastic analysis for indeterminate steel structures by limits state method
SE- SEM II	Engineering Geology[207009]	CO1	Able to identify the different types of minerals and rocks found on the earth's surface and their modes of formation
		CO2	Able to identify various structural features out in the field and explain the theories postulated behind the formation of folded mountains
		CO3	Able to explain the historical aspect of geology and the Way Rivers and oceans modify the geomorphology of an area
		CO4	Able to explain various types of surveys, role of remote sensing and GIS in civil engineering
		CO5	Able to judge the feasibility of a site as suitable for building dams, reservoirs and tunnels
		CO6	Able to explain the effects of various natural

			disasters such as volcanoes, earthquakes and landslides while working in the field as a civil engineer and judge the feasibility of a stone as a good building stone
SE- SEM II	Concrete Technology[201007]	CO1	Able to describe the general perspective ingredients of concrete
		CO2	Able to explain fresh and hardened properties of concrete
		CO3	Able to describe tests of hardened concrete and special types of concrete
		CO4	Able to explain special concreting techniques , equipment and application of Ferrocement in construction industry
		CO5	Able to design concrete mix of various concrete grades
		CO6	Able to describe the behavior and repair of concrete structures under adverse conditions
SE- SEM II	Soft Skills[201010]	CO1	Able to identify their own goals, strengths and weaknesses and thus their opportunities
		CO2	Able to Speak confidently with the correct pronunciation and accurate language, listen to the speaker with utmost attention, write a structured report of the project at hand & write applications and effective resumes
		CO3	Able to dress up professionally for any occasion to make a lasting impression
		CO4	Able to demonstrate the art of speaking effectively and make others speak, get others involved, work together and reach the conclusion to the problem at hand faster
		CO5	Able to work effectively as an associate and not a BOSS!
		CO6	Able to be a professional even under stress
TE-SEM I	Hydrology and Water Resources Engineering[301001]	CO1	Able to describe the hydrologic cycle and analyze the precipitation data
		CO2	Able to explain the stream gauging
		CO3	Able to explain the methods of irrigation and assess the canal revenue
		CO4	Able to describe the ground water hydrology
		CO5	Able to analyze the flood frequency and runoff hydrograph
		CO6	Able to characterize the various terms related to reservoir planning
		CO7	Able to explain the lift irrigation schemes and process of water logging
TE-SEM I	Infrastructure Engineering[301002]	CO1	Able to explain the provisions made for infrastructural sectors in the five year plan
		CO2	Able to describe the components of permanent way of railways
		CO3	Able to explain the techniques and equipments used for dredging, dewatering and formwork
		CO4	Able to illustrate types of tunnels and their construction techniques

		CO5	Able to explain docks and harbors
		CO6	Able to describe and analyze different types of earth moving equipment
TE-SEM I	Structural Design I[301003]	CO1	Able to determine the ultimate tensile capacity of steel members and design tension members
		CO2	Able to analyze and design compression members
		CO3	Able to find flexural strength of steel beams and to design the beams for given loading
		CO4	Able to analyze the loads and their effects on plate girder and design of the plate girder
		CO5	Able to analyze the loads and their effects on gantry girder and design of the gantry girder
		CO6	Able to design an industrial steel building using IS 800;2007
TE-SEM I	Structural Analysis II[301004]	CO1	Analyse static indeterminate structures by classical displacement methods
		CO2	Analyse static indeterminate structures by flexibility matrix method
		CO3	Analyse static indeterminate structures by stiffness matrix method
		CO4	Analyse statically determinate beams by finite difference method and describe applications of finite element method to one and two dimensional problems
		CO5	Analyse multistory frames for gravity loads and lateral loads by approximate methods
TE-SEM I	Fluid Mechanics II[301005]	CO1	Able to analyze the basics of flow around submerged bodies, and fundamental concepts of unsteady flow in Fluid Mechanics
		CO2	Able to describe open channel flow and applications of energy and momentum equations for open channel flow
		CO3	Able to explain types of flow based on energy depth relationship
		CO4	Able to analyze uniform flow formula and characteristics of hydraulic jump with applications to civil engineering problems
		CO5	Able to explain the impact of jets and working of centrifugal pumps and hydraulic turbines
		CO6	Able to differentiate the GVF profile and its computations in open channel
TE-SEM I	Employable Skill Development [301006]	CO1	Able to exhibit critical thinking & assertiveness while speaking on both technical and non-technical topics
		CO2	Able to confidently participate in and lead group discussions and contribute significantly to the outcomes
		CO3	Able to analyze a project under execution or already executed and identify the strengths, weaknesses; finally reaching reasonable solutions
		CO4	Able to develop self-learning habits through uses of available resources and improve Employability of self

		CO5	Able to be a member as well as a leader of project teams
		CO6	Able to compile data and write effective reports
TE-SEM II	Advanced Surveying [301007]	CO1	Able to carry out field geodetic survey and apply triangulation adjustment with modern equipment's
		CO2	Able to perform Geodetic trigonometric leveling
		CO3	Able to perform hydrographic survey and get solution for problems related to it
		CO4	Able to describe aerial photography and applications in civil engineering
		CO5	Able to explain Remote sensing and GIS and its application in civil engineering field
TE-SEM II	Project Management and Engineering Economics [301008]	CO1	Able to explain the importance, objective, and functions of project management
		CO2	Able to analyze the network for planning and scheduling of project
		CO3	Able to apply project monitoring, resource allocation using project management software's
		CO4	Able to apply a engineering economics in construction industry
		CO5	Able to apply concept of material management and implement safety norms
		CO6	Able to evaluate project appraisal and prepare project feasibility report and Detailed Project report
TE-SEM II	Foundation Engineering [301009]	CO1	Ability to Understand the importance of soil investigation and determine various soil Properties
		CO2	Ability to calculate the allowable bearing capacity of Shallow foundations and soil conditions
		CO3	Ability to Understand the settlement behaviour of different type of soil
		CO4	Ability to Evaluate Load caring capacity of deep foundation
		CO5	Able to understand sheet piles and characterization of BC soil, remedial measures to be cultivated for foundations
		CO6	Able to explain application of geo-synthetics and different earthquake aspects
TE-SEM II	Structural Design II [301010]	CO1	Able to distinguish different design philosophies of design of RC structures and analyze the limitations and advantages of each
		CO2	Able to apply different limit states for singly and doubly reinforced, balanced beam section and to design one way slabs
		CO3	Able to design two way slabs and staircases
		CO4	Able to design flexural members
		CO5	Able to design flexural members for shear, bond, torsion and design continuous beam with concept of redistribution of moments

		CO6	Able to design column and column footing
TE-SEM II	Environmental Engineering I [301011]	CO1	Able to describe sources and effects of noise and air pollution, evaluate its quality as per BIS
		CO2	Able to identify a suitable water intake structure, describe water supply scheme and define water demand for a community
		CO3	Able to design Aeration and Sedimentation processes with due importance to quality of water as per BIS
		CO4	Able to design Coagulation, Flocculation and Filtration processes used for raw water treatment
		CO5	Able to describe disinfection, water softening methods, demineralization, adsorption along with fluoridation and defluoridation techniques
		CO6	Able to describe Rain water harvesting, packaged Water treatment plant and determine the capacity of ESR
		TE-SEM II	Seminar & Technical Communication [301012]
CO2	Evaluate, credit, and synthesize sources of the selected seminar topic		
CO3	Identify the disciplinary context for different kinds of writing, including both informal writing (like scientific note taking) and formal writing (like report writing)		
CO4	Draft a report consistent with expectations of the discipline, including an appropriate organization, style, voice and tone		
CO5	Perform critical readings of their own writing and proofreading		
CO6	Demonstrate an understanding of the unique demands of oral presentation and ability to follow discussions and oral arguments		
BE- SEM I	Environmental Engineering II [401001]	CO1	Able to characterize sewage and design a sewage collection system
		CO2	Able to describe stream sanitation and design of primary treatment of sewage
		CO3	Able to analyze and design secondary (biological) sewage treatment units for STP
		CO4	Able to analyze and design low cost sewage treatment methods
		CO5	Able to analyze and design anaerobic treatment units
		CO6	Able to explain different industrial waste water treatment methods
BE- SEM I	Transportation Engineering [401002]	CO1	Able to calculate the lengths of different category roads and the construction priority based on the saturation system carry out feasibility surveys
		CO2	Able to analyses traffic characteristics by conducting various traffic studies
		CO3	Able to design the geometric elements and

			structural design of flexible and rigid pavements
		CO4	Able to perform various tests on aggregates and bitumen and access the suitability for road works, quality control, materials characterization and construction procedure of various types of roads
		CO5	Able to design the runway and its orientation using the wind rose diagram, to determine the most feasible site for runway and zoning laws
		CO6	Able to calculate the various elements of a bridge like afflux, scour depth, most economical span Identify the components of a bridge and their Suitability under different conditions
BE- SEM I	Structural Design III [401003]	CO1	Able to describe various systems of prestressing and analyze member strength
		CO2	Able to design Prestressed member for flexure and shear
		CO3	Able to do load calculations and load transfer phenomenon of structures
		CO4	Able to analyze the frame structure for different load combinations
		CO5	Able to design and detailing of floor beam in a frame
		CO6	Able to design and detailing of different elements of special structures like retaining walls, liquid retaining structures, combined footings and their behavior under load
BE- SEM I	Elective I: Advanced Concrete Technology [401004]	CO1	Able to identify types of cement and aggregate to be used to improve the overall quality of concrete and study various properties of concrete
		CO2	Able to describe special types of concrete and their properties
		CO3	Able to design special types of concrete mix of specified strength and able to describe various nondestructive tests
		CO4	Able to explain properties of hardened fibers like GFRC, SFRC and SIFCON
		CO5	Able to explain ferrocement and Analysis and design of prefabricated concrete structural elements
BE- SEM I	Elective II TQM & MIS in Civil Engineering [401005]	CO1	Know the various definitions of Quality and Discuss the management Gurus, Role of Construction manager in Site
		CO2	To Study the concept of data and Information and Management information system in construction Advantages and disadvantages of MIS in construction
		CO3	To know the definition of TQM, Need for TQM, importance of TQM, what is 6 sigma , why we need that, what are the methods and benefits of 6 sigma, discuss some common construction defects

		CO4	Understand the concept of TQM, Quality control and quality management systems Understand the benefits of quality management system
		CO5	Understand the concept of functional and characteristics of functional MIS and Strategic planning process Understand the process of Benchmarking and its advantages and types
		CO6	Understand the concept of modern tool in TQM implementation Study and use of various modules of ERP software for construction and GIS,GPS,Android Subsystems
BE- SEM II	Dams and Hydraulics Structures [401007]	CO1	Able to analyse and ,design gravity dam ,earthen dam and check its stability
		CO2	Able to explain generalized information regarding dams
		CO3	Able to design hydraulic structures
		CO4	Able to explain river training methods and design of guide bund
		CO5	Able to explain hydropower engineering with respect to its components and functions
BE- SEM II	Quantity Surveying, Contracts and Tenders [401008]	CO1	Able to describe types of estimates and importance of approximate estimate
		CO2	Able prepare detailed estimate for Civil Engg Structures
		CO3	Able to draft suitable specifications to meet expectations of client and prepare the rate analysis
		CO4	Able to choose suitable method of valuation of property and implement it
		CO5	Able to explain execution of works in PWD and tendering
		CO6	Able to illustrate meaning, validity, the conditions and laws of contract
BE- SEM II	Elective III: Hydropower Engineering [401009]	CO1	Able to explain various energy resources and analyze hydropower potential
		CO2	Able to design components of hydro power plants
		CO3	Able to explain various types of turbines and design them
		CO4	Determine electrical terms and regulations related to hydro power
BE- SEM II	Elective IV Construction Management [401010]	CO1	Able to explain the basics construction management,
		CO2	Able to implement construction scheduling and illustrate work study and its measurement
		CO3	Able to describe labour laws and financial aspects of construction projects
		CO4	Able to identify and analyse the risks involved in projects and perform value analysis
		CO5	Able to explain material and human resource management in construction
		CO6	Able to explain basic terminologies and applications of artificial intelligence in civil

			engineering
BE- SEM II	Project Work [401006]	CO1	Convert an open ended problem statement into a statement of proposed work
		CO2	Decompose problem/task into subtasks and establish a methodology and process by which progress may be evaluated
		CO3	Select and apply appropriate methods/models, or mathematical simulations of the real world and analyzes the data to provide information for decisions
		CO4	Perform feasibility analysis and evaluates quality of solutions to select the best one
		CO5	Produce usable documents of record regarding the design process
		CO6	Collaborate with team members to achieve a common goal
		CO7	Enhance awareness and critical self-examination of one's own values, and to appreciate the relevance of personal values in the business/workplace and develop skills which recognizes and resolves ethical issues while working
SE-Sem-I	Discrete Mathematics - 210241	CO1	Able to analyze Significance of Discrete Mathematics, Types of Sets, Proof by Mathematical Induction and Strong Mathematical Induction
		CO2	Able to describe Relations and Their Properties, Transitive Closure and Warshall's Algorithm, Injective and Bijective functions
		CO3	Illustrate The Basics of Counting, Generalized Permutations and Combinations, Algorithms for generating Permutations and Combinations.
		CO4	Able to analyze Graphs and Graph Models, Euler and Hamilton Paths, Dijkstra's Algorithm, Planar Graphs, Graph Colouring.
		CO5	properties of trees, Spanning Trees and Minimum Spanning, The Max flow Min Cut Theorem
		CO6	The structure of algebra, Monoids, Groups, Homomorphism and Normal Subgroups, coding theory
SE-Sem-I	Digital Electronics and Logic Design-210242	CO1	Realization of Logic gates with simplification of logic functions, Description of design of combinational Logic and logic minimization.
		CO2	Description of sequential Logic circuits with synchronous and Asynchronous method using Flip-flops, Registers,

			counters.
		CO3	Description of Algorithmic state machines and VHDL.
		CO4	Description of Programmable Logic Devices.
		CO5	Classification of logic families using TTL, CMOS, Interfacing.
		CO6	Comparison of Microprocessor and Microcontroller, Description of Microcontroller 8051 using programming models.
SE-Sem-I	Data Structures and Algorithms	CO1	Knowledge of engineering fundamental to solve problems using algorithms, Algorithm design tools
	-201243	CO2	Understand application of linear data structure problems in new situations by applying acquired knowledge, facts, techniques and rules in a different way
		CO3	Design and implement an abstract data type linked list by using static or dynamic implementations
		CO4	Design and implement an abstract data type such as stack. Analyses evaluate and choose appropriate abstract data types and algorithms to solve particular problems
		CO5	Select and implement an abstract data type such as queue
		CO6	Select and apply different searching and sorting technique to solve problem.
Class	Subject & Code	Cos	Course Outcomes
SE-Sem-I	Computer Organization and Architecture-210244	CO1	Critical understanding of computer evolution and basic structure of computer
		CO2	Master the concept of memory, cache memory, internal & external memory
		CO3	Ability to understand input/output systems & direct memory access
		CO4	Master the concept of operations of processors, its instruction set & addressing modes
		CO5	Ability to understand the concept pipelining, parallelism and design issues
		CO6	Ability to understand the concept of processing unit

SE-Sem-I	Object Oriented Programming-210245	CO1	Able to understand paradigm of OOP & POP with the concept of function, data, object and classes
		CO2	Understand inheritance and polymorphism and construct program using different types of inheritance
		CO3	Describe the concept of function overloading, operator overloading, virtual functions and polymorphism and pointer.
		CO4	Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
		CO5	BE familiar with the fundamentals of file handling with the concept of streams, file
		CO6	Analyze search and sort technique using standard template library
SE-Sem-I	Digital Electronics Lab-210246	CO1	Construct basic combinational circuits and verify their functionalities.
		CO2	Perform number conversions between different number systems
		CO3	Apply the design Procedures to design basic sequential circuits
		CO4	Determine the appropriateness of the choice of the ICs used in a given digital circuit.
		CO5	Demonstrate skills to test and trouble shoot a digital circuit.
SE-Sem-I	Data Structures Lab - 210247	CO1	Understand application of linear data structure.
		CO2	Design and implement an abstract data type linked list by using static or dynamic implementations. Application Of link list such as polynomial manipulations
		CO3	Apply link list concept to solve practical problem.
		CO4	Design and implement an abstract data type.
		CO5	Understand application of linear data structure queue
		CO6	Solve problem using different sorting & searching technique.

Class	Subject & Code	Cos	Course Outcomes
SE-Sem-I	Object Oriented Programming Lab-210248	CO1	To prepare object-oriented design for small/medium scale problems
		CO2	To understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code.
		CO3	Able to program using C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.
		CO4	Understand and demonstrate the concept of Generic programming using standard Template Library
SE-Sem-I	Soft Skills-210249	CO1	To encourage the all round development of students by focusing on soft skills.
		CO2	To make communication effective through verbal/oral communication and improve the listening skills.
		CO3	Able to write precise briefs or reports and technical documents.
		CO4	Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.
		CO5	Become more effective individual through goal/target setting, self motivation and practicing creative thinking
		CO6	To expose students to right attitudinal and behavioral aspects and to build the same through activities
SE-Sem-I	Audit Course 1-210250	CO1	Understanding the importance of ecological balance for sustainable development
		CO2	Understanding the impacts of developmental activities and mitigation measures
		CO3	Understand and realize the multi-disciplinary nature of the environment, its components, and inter-relationship between man and environment
		CO4	Understand the relevance and importance of the natural resources in the sustenance

			of life on earth and living standard
Class	Subject & Code	Cos	Course Outcomes
SE-Sem-II	Engineering Mathematics - III	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, Digital filters and Computer graphics
SE-Sem-II	Computer Graphics-210251	CO1	Generation and modification of graphics objects
		CO2	Manipulation of graphics objects
		CO3	Creation, modification and manipulation of higher order entities
		CO4	Design and develop animations
SE-Sem-II	Advanced Data Structures-210252	CO1	Design and implement solutions for different problems on tree.
		CO2	Apply different data structures to solve problems on graphs.
		CO3	Describe and implement the hash function and concepts of collision and its resolution methods.
		CO4	Compare and design dynamic and static trees.
		CO5	Construct heap and multiway trees.
		CO6	Explain and apply various file organizations.
SE-Sem-II	Microprocessor-210253	CO1	Understand and compare Architecture of advanced processors and its resources.
		CO2	Apply assembly language programming to

			develop real life applications.
		CO3	Compare different processor configurations.
		CO4	Implement parallel processing and math Co-processor.
SE-Sem-II	Principles of Programming Languages(210254)	CO1	To learn the software development process and concept of syntax and semantics of language.
		CO2	To classify the different data types and construct the structure of computation.
		CO3	To infer different programming paradigms
		CO4	To understand the basic of Object Oriented Programming Language.
		CO5	To demonstrate the principles Object Oriented Programming using java.
		CO6	To use the concept of exception handling and develop a program using applet.
SE-Sem-II	Computer Graphics Lab -210255	CO1	Design and develop graphical objects using algorithms
		CO2	Implement higher order entities using object oriented concepts of C++ and Java programming
		CO3	Implement natural objects using advanced graphics tools like OpenGL
SE-Sem-II	Advanced Data Structures Lab -210256	CO1	To apply appropriate advanced data structure and efficient algorithms to approach the problems of various domain
		CO2	To use effective and efficient data structures in solving various Computer Engineering domain problems.
		CO3	To analyze the algorithmic solutions for resource requirements and optimization
		CO4	To use effective and efficient data structures in solving various Computer Engineering domain problems
SE-Sem-II	Microprocessor Lab-210257	CO1	Understand and compare Architecture of advanced processors and its resources.
		CO2	Apply assembly language programming to develop real life applications.
		CO3	Compare different processor configurations.
		CO4	Implement parallel processing and math

			Co-processor.
SE-Sem-II	Audit Course 2-210258	CO1	To encourage research, scholarship, and a spirit of inquiry
		CO2	To encourage students at all levels to develop patentable technologies.
		CO3	To provide environment to the students of the Institute for creation, protection, and commercialization of intellectual property and to stimulate innovation
TE-Sem-I	Theory of Computation -310241	CO1	Able to expose a broad overview of the theoretical foundations of computer science and basic properties of deterministic and nondeterministic finite automata
		CO2	Master the overview concepts of regular languages and finite automata
		CO3	Master the overview concepts of Context Free Grammar
		CO4	An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution with Turing machines
		CO5	Master push-down automata, and Turing recognizable languages
		CO6	Able to demonstrate their understanding of key notions, such as algorithm computability, decidability, and complexity through problem solving
TE-Sem-I	Database Management Systems (DBMS)- 310242	CO1	Identify structure of database system using data models and ER models
		CO2	Demonstrate SQL and PL/SQL
		CO3	Provide database design approaches with normalization
		CO4	Define and discuss transaction management, concurrency control, query optimization and performance tuning
		CO5	Be familiar with various database architectures and applications
		CO6	Understand the usage of modern tools and recent software
TE-Sem-I	Software Engineering & Project Management - 310343	CO1	Understand the methods of capturing, specifying, visualizing and analyzing software requirements

		CO2	Understand the methods of capturing, specifying, visualizing and analyzing software requirements
		CO3	Understand Design and Testing principles to S/W project development
		CO4	Understand project management through life cycle of the project
		CO5	Understand Plan, schedule and execute a project considering the risk management
		CO6	understand software quality attributes
TE-Sem-I	Information Systems & Engineering Economics -310344	CO1	Understand the role of Information Systems in Organization.
		CO2	Understand how to manage information system.
		CO3	Knowledge of Information system Development and project management.
		CO4	Knowledge of Engineering economic.
		CO5	Knowledge of Engineering economic and Management.
		CO6	Understand cash flow and Taxes.
TE-Sem-I	Computer Networks (CN) -310345	CO1	Analyze the requirements for a given organizational structure to select the most appropriate networking architecture, opologies, transmission mediums, and technologies
		CO2	Demonstrate design issues, flow control and error control for logical link layer
		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 in real world scenario
		CO5	Discuss Client-Server architectures and prototypes by the means of appropriate standards and technology
		CO6	Discuss application layer protocol in networking standards and their real time usage
TE-Sem-I	Skills Development Lab -310346	CO1	Understand the usage of modern tools and recent software
		CO2	analyze data using current technologies
		CO3	learn the process of creation of data-driven

			web applications using current technologies
		CO4	understand how to incorporate best practices for building enterprise applications
		CO5	learn how to employ Integrated Development Environment(IDE) for implementing and testing of software solution
		CO6	construct software solutions by evaluating alternate architectural patterns
TE-Sem-I	DBMS Lab -310347	CO1	Identify structure of database system and design database tables with the help of ER models
		CO2	Understand database techniques such as SQL and PL/SQL
		CO3	Understand RDBMS model, define and discuss transaction management, concurrency control and query optimization
		CO4	Describe various database architectures; compare structured and unstructured databases i.e. SQL and NoSQL
TE-Sem-I	CN Lab -310348	CO1	Analyze the requirements for a given organizational structure to select the most appropriate networking architecture and technologies
		CO2	Demonstrate LAN and WAN protocol behavior using Modern Tools.
		CO3	Analyze data flow between peer to peer in an IP network using Application, Transport and Network Layer Protocols.
		CO4	Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community.
		CO5	Develop Client-Server architectures and prototypes by the means of correct standards and technology.
TE-Sem-I	Audit Course 3-310249	CO1	To meet the needs of ever growing industry with respect to language support.
		CO2	To get introduced to Japanese society and culture through language
		CO2	Ability to implement concept of frequent patterns and use of Associations rules.
		CO3	Analyze different methods of classification.
		CO4	Use of various clustering techniques.
		CO5	Apply concept of text and web mining.
		CO6	Explain Reinforcement Learning and Big Data Mining as well study of pattern based data mining for decision making.

TE-Sem-II	Design & Analysis of Algorithms-310250	CO1	Able to understand Fundamentals of Algorithms
		CO2	Understand Different computational Models
		CO3	Design algorithms using standard algorithm design techniques
		CO4	Analyze the asymptotic performance of algorithms
		CO5	Understand Randomized and Approximation Algorithm
		CO6	Explore Different Parallel and Distributed Algorithms
TE-Sem-II	Systems Programming & Operating System-310251	CO1	Understand basics of System Programming and data structure used in
		CO2	Understand the role played by system software's such as assembler, interpreter, linker, loader and compilers in the development of IT solutions.
			Use tools such as lex and yacc to design a compiler for a elementary language grammar.
		CO4	Master various process management concepts including scheduling, synchronization, deadlocks
		CO5	Master concepts of memory management including virtual memory.
		CO6	Apply concepts relating to operating systems, such as processor and disk scheduling, parallel processing, and file system organization
TE-Sem-II	Embedded Systems & Internet of Things-310252	CO1	To understand fundamentals of IoT and embedded system, basic design
		CO2	To introduce students a set of advanced topics in embedded IoT and lead them to recognize exploration in network.
			To develop small low cost embedded IoT system.
		CO4	To Solve fundamentals of security in IoT,
		CO5	To implement secure infrastructure for IoT
		CO6	To choose real world application scenarios

			of IoT
TE-Sem-II	Software Modeling and Design-310253	CO1	To understand and apply Object Oriented concept for designing OO based model or application.
		CO2	To understand requirement document and then transform it into the appropriate design
		CO3	To select and apply design techniques using UML for software system.
		CO4	To understand different architectural designs and to transform them into proper model.
		CO5	To choose design tools and apply design patterns.
		CO6	To apply and use appropriate test tool for testing web-based or desktop application.
TE-Sem-II	Web Technology-310254	CO1	Understand web development process & elements using different tools
		CO2	Discover various client side technologies based on scripting languages
		CO3	Discover various server side technologies based on scripting languages
		CO4	Develop web based application using suitable client side and server side web technologies
		CO5	Analyze given assignment to select sustainable web development and design methodology
		CO6	Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management
TE-Sem-II	Seminar & Technical Communication-310255	CO1	To develop ability of thinking and motivation for seminar
		CO2	To develop ability to perform literature survey
		CO3	To develop ability to generate proof-of-concept
		CO4	To develop ability to prepare presentation
		CO5	To develop Seminar presentation and Technical Communication Skills
TE-Sem-II	Web Technology Lab-310256	CO1	Understand Web development process and elements using different tools
		CO2	Discover various Client Side Technologies

			based on Scripting languages
		CO3	Discover various Server Side Technologies based on Scripting languages
		CO4	Develop web based application using suitable client side and server side web technologies
		CO5	Analyze given assignment to select sustainable web development and design methodology
		CO6	Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management
TE-Sem-II	SP & OS Lab-310257	CO1	Understand basics of System Programming and data structure used in system design process.
		CO2	Understand role played by system software's such as assembler, interpreter, linker, loader & compilers in the development of IT solutions.
		CO3	Use tools such as lex and yacc to design a compiler for a elementary language grammar.
		CO4	Master various process management concepts including scheduling, synchronization, deadlocks
		CO5	Master concepts of memory management including virtual memory.
		CO6	Apply concepts relating to operating systems, such as processor and disk scheduling, parallel processing, and file system organization
TE-Sem-II	ES & IoT Lab-310258	CO1	To understand fundamentals of IoT and embedded system, basic design strategy and process modeling.
		CO2	To introduce students a set of advanced topics in embedded IoT and lead them to recognize exploration in network.
		CO3	To develop small low cost embedded IoT system
		CO4	To Solve fundamentals of security in IoT
		CO5	To implement secure infrastructure for IoT
		CO6	To choose real world application scenarios of IoT
BE-SEM I	High Performance Computing [410241]	CO1	To describe different parallel architectures, inter-connect networks, programming models

		CO2	To develop an efficient parallel algorithm to solve given problem
		CO3	To understand the Basic Communication operation with speed improvement
		CO4	To understand the concepts of Analytical Modeling of Parallel Programs
		CO5	To understand Searching, Sorting and Graph Algorithms
		CO6	To analyze and measure performance of modern parallel computing systems
BE-SEM I	Artificial Intelligence & Robotics [410242]	CO1	To understand fundamentals of AI & various peculiar search strategies.
		CO2	To classify Decomposition techniques & Planning
		CO3	To understand the fundamentals of knowledge representation
		CO4	To understand the concepts of machine learning
		CO5	To understand the fundamentals of robot system & its control.
		CO6	To apply the robotics for solving real world problems
BE-SEM I	Data Analytics[410243]	CO1	To develop problem solving abilities using Mathematics.
		CO2	To apply algorithmic strategies while solving problems.
		CO3	To develop time and space efficient algorithms.
		CO4	To study algorithmic examples in distributed concurrent and parallel environments.
BE-SEM I	Software Testing and Quality Assurance [410245 (B)]	CO1	Describe fundamental concepts in software testing such as manual testing, automation testing and software quality assurance.
		CO2	Design and develop project test plan, design test cases, test data, and conduct test operations
		CO3	Apply recent automation tool for various software testing for testing software
		CO4	Apply different approaches of quality management, assurance, and quality standard to software system
		CO5	Apply and analyze effectiveness Software Quality Tools

BE-SEM I	Software Architecture and Design [410244 (B)]	CO1	Express the analysis and design of an application.
		CO2	Specify functional semantics of an application
		CO3	Evaluate software architectures
		CO4	Select and use appropriate architectural styles and software design patterns
BE-SEM I	Data Mining & Warehousing [410244 (D)]	CO1	Understand the basic concept of Data Mining.
		CO2	Ability to implement concept of frequent patterns and use of Associations rules.
		CO3	Analyze different methods of classification.
		CO4	Use of various clustering techniques.
		CO5	Use of various clustering techniques.
		CO6	Explain Reinforcement Learning and Big Data Mining as well study of pattern based datamining for decision making.
BE-SEM I	Mobile Communication [410245 (D)]	CO1	Understand the basic concepts of Cellular Network.
		CO2	Master the knowledge about MAC for mobile network.
		CO3	To know GSM architecture and support services.
		CO4	Deploy the 3G/4G technology based network with bandwidth capacity planning.
		CO5	Adapt to the requirements of next generation mobile network and mobile applications.
BE-SEM I	Project -410448	CO1	To write SRS and other software engineering documents in the project report using mathematical models developed and NP-Hard analysis
		CO2	To write test cases using multi-core, distributed, embedded, concurrent/Parallel environments
		CO3	To write a conference paper
		CO4	To practice presentation, communication and team-work skills

BE-SEM II	Machine Learning [410250]	CO1	Distinguish different learning based applications
		CO2	Apply different preprocessing methods to prepare training data set for machine learning.
		CO3	Apply different methods of data preprocessing to input dataset.
		CO4	Learn Meta classifiers and deep learning concepts
BE-SEM II	Information and Cyber Security [410251]	CO1	Gauge the security protections and limitations provided by today's technology.
		CO2	Identify information security and cyber security threats.
		CO3	Analyze threats in order to protect or defend it in cyberspace from cyber-attacks.
		CO4	Build appropriate security solutions against cyber-attacks.
BE-SEM II	Soft Computing and Optimization Algorithms [410252 (D)]	CO1	Have a general understanding of soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, fuzzy inference systems and genetic algorithms
		CO2	Design and development of certain scientific and commercial application using computational neural network models, fuzzy models, fuzzy clustering applications and genetic algorithms in specified applications.
BE-SEM II	Human Computer Interface [410253 (B)]	CO1	Understand the basics of human and computational abilities and limitations.
		CO2	Understand basic theory, tools and techniques in HCI.
		CO3	Learn a variety of methods for evaluating the quality of a user interface.
		CO4	Apply appropriate HCI techniques to design systems that are usable by people
BE-SEM II	Project-410455	CO1	Demonstrate a sound technical knowledge of their selected project topic.
		CO2	Be able to select and apply appropriate

			communication tools and write technical papers and reports
		CO3	Utilize appropriate laboratory equipment, computer software and instrumentation, in order to accomplish the objectives of a project
		CO4	Communicate effectively the results of a project in oral presentations and written reports
ME-I-SEM-I	Research Methodology 510101	CO1	Understand some basic concepts of research and its methodologies
		CO2	Select and define appropriate research problem and parameters.
		CO3	Prepare a project proposal (to undertake a project).
		CO4	organize and conduct research (advanced project) in a more appropriate manner
ME-I-SEM-I	Research Methodology 510101	CO1	understand some basic concepts of research and its methodologies
		CO2	Select and define appropriate research problem and parameters.
		CO3	Prepare a project proposal (to undertake a project).
		CO4	organize and conduct research (advanced project) in a more appropriate manner
ME-I-SEM-I	Bio-Inspired Optimization Algorithms 510102	CO1	Describe the natural phenomena that motivate the algorithms
		CO2	Apply nature-inspired algorithms to optimization
		CO3	Select the appropriate strategy or optimal solution based on bio-inspired algorithms
ME-I-SEM-I	Software Development and Version Control 510103	CO1	Select and apply the design patterns to software development
		CO2	Design software for real engineering Problems
		CO3	Demonstrate team work for development of software in collaborative environment
		CO4	Use of open source version control tool.
ME-I-SEM-I	Embedded and Real Time Operating Systems 510104	CO1	Recognize and classify embedded and real-time systems
		CO2	Explain communication bus protocols used for embedded and real-time systems
		CO3	Classify and exemplify scheduling algorithms
		CO4	Apply software development process to a given RTOS application

		CO5	Design a given RTOS based application
ME-I-SEM-I	Advanced Digital Signal Processing 510105A	CO1	Apply various transforms for Digital signal Processing
		CO2	Use appropriate filters to suit to the DSP application
		CO3	Choose the best DS Processor for the application development
		CO4	Design the DSP application for the practical use
ME-I-SEM-I	Laboratory Proficiency I 510106	CO1	Understand the philosophy of research in general
		CO2	Understand basic concepts of research and its methodologies
		CO3	Learn the methodology to conduct the Literature Survey
ME-I-SEM-II	Operations Research 510108	CO1	Identify the characteristics of different types of decision-making environments
		CO2	Use appropriate decision making approaches and tools
		CO3	Develop critical thinking and objective analysis of decision problems
		CO4	Apply the OR techniques for efficacy
ME-I-SEM-II	System Simulation and Modeling 510109	CO1	To apply modeling to understand system behavior
		CO2	To design the simulation scheme for particular system
		CO3	To analyze the modeled and simulated systems
		CO4	To compare the results of simulations confined to real world application
ME-I-SEM-II	Machine Learning 510110	CO1	Acquire fundamental knowledge of learning theory
		CO2	Design and evaluate various machine learning algorithms
		CO3	Use machine learning methods for multivariate data analysis in various scientific fields
		CO4	
			Choose and apply appropriate Machine Learning Techniques for analysis, forecasting, categorization and clustering of the data

ME-I-SEM-II	Image Processing Elective II 510111A	CO1	Apply relevant mathematics required for image processing
		CO2	Perform and analyze various image processing methods using appropriate tools
		CO3	Use various image processing methods in spatial and frequency domain
		CO4	Explore current trends and future scope in image processing applications
ME-I-SEM-II	Web Mining Elective II 510111B	CO1	Transform Web Information into analytical form;
		CO2	Use various means to analyze and synthesize Social Networking information
		CO3	Use appropriate tools used in analyzing the web information
ME-I-SEM-II	Seminar I 510112	CO1	To use multiple thinking strategies to examine real-world issues and explore creative avenues of expression
		CO2	To acquire, articulate, create and convey intended meaning using verbal and non-verbal method of communication
		CO3	To learn and integrate, through independent learning in sciences and technologies, with disciplinary specialization and the ability to integrate information across
ME-II-SEM-III	Fault Tolerant Systems 610101	CO1	Analyze the system for the requirement of fault tolerance
		CO2	Simulate the fault tolerance algorithms
		CO3	Implement diagnosis and recovery of the system
		CO4	Assess the reliability of the system
ME-II-SEM-III	Information Retrieval 610102	CO1	Implement the concept of Information Retrieval
		CO2	Evaluate and Analyze retrieved information
		CO3	Generate quality information out of retrieved information
		CO4	Apply clustering and classification algorithms to analyze the information
ME-II-SEM-III	Cloud Security Elective III 610103A	CO1	Use various services offered for cloud environment
		CO2	Apply computing security fundamentals

			confined to cloud environment
		CO3	Analyze the cloud system for vulnerabilities, threats and attacks
ME-II-SEM-III	Seminar II 610104	CO1	To use multiple thinking strategies to examine real-world issues and explore creative avenues of expression,.
		CO2	To acquire, articulate, create and convey intended meaning using verbal and non-verbal method of communication.
		CO3	To learn and integrate, through independent learning in sciences and technologies, with disciplinary specialization and the ability to integrate information across
ME-II-SEM-III	Dissertation Stage I 610105	CO1	Conduct thorough literature survey confined to the domain of choice
		CO2	Develop presentation skills to deliver the technical contents
		CO3	Furnish the report of the technical research domain
		CO4	Analyze the findings and work of various authors confined to the chosen domain
ME-II-SEM-IV	Seminar III 610107	CO1	To use multiple thinking strategies to examine real-world issues and explore creative avenues of expression,.
		CO2	To acquire, articulate, create and convey intended meaning using verbal and non-verbal method of communication.
		CO3	To learn and integrate, through independent learning in sciences and technologies, with disciplinary specialization and the ability to integrate information across
ME-II-SEM-IV	Dissertation Stage II 610108	CO1	Critically analyze the results and their interpretation ; infer findings
		CO2	Report and present the original results in an orderly way and placing the open questions in the right perspective.
		CO3	Link techniques and results from literature as well as actual research and future research lines with the research.
		CO4	Appreciate practical implications and constraints of the specialist subject
Department: ENTIC			
SE-I	Signals & Systems (204181)	CO1	To Analyze the Mathematical Expressions of Continues, discrete time signals and systems
		CO2	To Classify and Summarize on different categories of signals and systems.

		CO3	To Analyze Linear Time Invariant System (LTI) in time and transform domain.
		CO4	To Illustrate applications of Fourier and Laplace transform
		CO5	To apply the concepts signals in various applications
SE-I	Electronic Devices & Circuits (204182)	CO1	Understand semiconductor devices FET and MOSFET to observe its performance.
		CO2	Comply and verify parameters after exciting devices by any stated method.
		CO3	Simulate electronics circuits using computer simulation software to obtain desired results
		CO4	Understand and verify simulated circuit with hardware implementation. Implement hardware circuit to test performance and application for what it is being designed.
		CO5	Analyze and interpret FET and MOSFET circuits for small signal at low and high frequencies.
		CO6	Understand and apply concept of feedback to improve stability of circuits.
		CO7	Design an adjustable voltage regulator circuits
SE-I	Electrical Circuits and Machines (204183)	CO1	Undestand & learn the Network Theorem
		CO2	Undestand the necessicity & condition of parallel operation ;SC & OC Test & Polarity test of transformer
		CO3	Explain various methods of speed control & Break test of DC Shunt motor
		CO4	To Introduce the working of DC Shunt, Series & Compound Also 3 phase Induction motor
		CO5	To analogy between 3 Phase Induction Motor, transformer & Circle diagram of 3 phase induction motor
SE-I	Data Structures and Algorithms (204184)	CO1	Discuss various data types. Explain different types of control statements. Declare & Define functions. Understand Array, Pointers and Structure. Explain how algorithms are analyzed in terms of space and time complexity.
		CO2	CO2:Understand and learn searching and sorting. Explain various sorting and searching techniques. Analyze various sorting & searching algorithms in terms of their time complexity.
		CO3	Define stack and queue. Discuss insertion

			and deletion operations related stack and queue. Describe application of stack and queue.
		CO4	Understand the use of linked list. Discuss various types of linked lists, including singly, circular & doubly linked list. Explain how operations like insertion and deletion can be performed on linked list.
		CO5	Explain tree, binary tree and various traversals of binary tree. Explain Binary Search tree and its various operations.
		CO6	Define graph and various terminologies related to graph. Discuss traversals operations of graphs. Understand various applications of graphs such as finding shortest path, spanning trees.
SE-I	Digital Electronics (204185)	CO1	Use knowledge of various structure and parameters of different digital logic families for system component design
		CO2	Design combinational circuits & sequential circuits for solution to given problem statement
		CO3	Design & Implement appropriate finite state machine technique to solve complex engineering problem
		CO4	Analyze and design semiconductor memories using PLD's for system component design
		CO5	Analyze architecture and working of microcontroller for basic operations and Simulate using keil software
SE-I	Electronic Measuring Instruments & Tools(204186)	CO1	To Understand fundamental of various electrical measurements.
		CO2	To Understand and describe specifications, features and capabilities of electronic instruments.
		CO3	To Finalize the specifications of instrument and select an appropriate instrument for given measurement.
		CO4	Carry out required measurement using various instruments under different setups.
		CO5	Able to compare measuring instruments for performance parameters
SE-I	Audit Course (204192)	CO1	Provide basic overview on road safety & traffic management issues in view of the alarming increase in vehicular population of the country.
		CO2	Insight into the transportation system management (TSM) techniques.
		CO3	Overview of the engineering & legislative measures for road safety.

		CO4	Discuss measures for improving road safety education levels among the public.
TE-I	Digital Communication (304181)	CO1	Identify the signal and select formatting technique with implementation of modulation.
		CO2	To get the knowledge of an importance of multiplexing, data formats, synchronization, scramblers and application of it in communication system.
		CO3	Analyze the signal as well as random nature of noise and error performance of digital communication system.
		CO4	Analyze the received signal as well as nature of noise present and recovery with various filters.
		CO5	Compare and select appropriate digital modulation techniques
TE-I	Digital Signal Processing (304182)	CO1	Test the effect of sampling on continuous time signal to obtain discrete time signals and also able to describe and interpret the basic elements of digital Signal processing.
		CO2	Apply Discrete Fourier transforms (DFT) for different types of signals, interpret the information obtained and able to evaluate Fast Fourier Transform (FFT) algorithms for faster realization of signals and systems.
		CO3	Judge and compare the different LTI system by specific analysis using Z-transform
		CO4	Design the IIR filters using the concept of analog filters and schematize their realization using different forms.
		CO5	Design the FIR filters using window and frequency sampling method. Also able to compare the magnitude and phase response of different digital filters
		CO6	Apply and analyze the concepts of DSP in different real world applications.
TE-I	Electromagnetics (304183)	CO1	Apply the knowledge of the basics and fundamental concepts of electrostatics and magneto statics using appropriate techniques.
		CO2	To interpret the electromagnetic problems using Maxwell's equations.
		CO3	According to given problem statement, and solve the Maxwell's equations.
		CO4	To analyze boundary conditions and understand the field at the interface of two different media.
		CO5	Analysis & Synthesis time varying electric and magnetic fields, wave propagation in

			different types of media.
		CO6	Analyze the fundamentals of electromagnetic theory and transmission lines.
TE-I	Microcontrollers (304184)	CO1	To Illustrate need of microcontrollers in embedded system design.
		CO2	To study architecture and features of different Microcontroller
		CO3	To learn various hardware and software tools for developing real world applications
		CO4	To learn interfacing of real world input and output devices with microcontroller
		CO5	To construct the applications of Microprocessors and Microcontrollers in real word.
TE-I	Mechatronics-304185	CO1	Identification of key elements of mechatronics system and its representation in terms of block diagram.
		CO2	Gain knowledge and understand working principle of Sensors and Transducer.
		CO3	Analyze and understand the working of Hydraulic and Pneumatic systems.
		CO4	Understand of various data presentation and data logging systems
		CO5	Learn concept of actuator and analyze its use in various mechatronics system
		CO6	Understand working of various mechatronics system in automobile industry
TE-I	Signal Processing & Communication Lab (304191)	CO1	Test the effect of sampling on continuous time signal to obtain discrete time signals.
		CO2	Apply Discrete Fourier transforms (DFT) for different types of signals and verify the properties of DFT.
		CO3	Judge and compare the different LTI system by specific analysis using Z-transform.
		CO4	Design the IIR filters using the concept of analog filters
		CO5	Design the FIR filters using window method. Also able to compare the magnitude and phase response of different digital filters.
		CO6	Apply and analyze the concepts of DSP in different real world applications.
		CO1	Identify the signal and select formatting technique with implementation of modulation.
		CO2	To get the knowledge of an importance of multiplexing, data formats, synchronization, scramblers and application of it in

			communication system.
		CO3	Compare and select appropriate digital modulation techniques
TE-I	Microcontroller & Mechatronics Lab - 304192	CO1	Gain knowledge and Importance of different mechatronics components for the use to design simple mechatronics system.
		CO2	Able to analyze and compare working principle of various sensors and transducers used in mechatronics system
TE-I	Electronic System Design(304193)	CO1	Understand fundamental concepts and working principles of electronics devices to design electronics systems. Design working, reliable and electronic system to meet specifications.
		CO2	CO2:Understand and learn Sensor, transducer, Design of Data Acquisition Systems.
		CO3	Learn RDBMS Concepts used in design / simulation software.
		CO4	Understand Communication System. Design of (AM / FM / FSK), Mixer, Audio / Power Amplifier, HF Oscillator, Cascade Amplifier
		CO5	Discuss PCB artwork components and design Artwork.
BE-I	VLSI Design & Technology (404181)	CO1	Simulate, Synthesize and implement various digital circuits for system component design.
		CO2	Identify and analyze various PLD architecture for problem statements designs and in various research methods.
		CO3	Select and apply appropriate technique and Engineering norms to manage power consumption of VLSI chip.
		CO4	Design, implement and estimate analog & digital CMOS circuits to solve complex engineering problems for public health and safety.
		CO5	Identify and analyze various faults in VLSI circuits for better suggestion and clear instructions.
BE-I	Computer Networks & Security (404182)	CO1	Apply, Develop the appropriate techniques for transmission of data from one host to other host for problem statement design.
		CO2	Selection of appropriate Ethernet type according to various applications to solve complex engineering problems.
		CO3	Describe and analyze the hardware, software, various components of a

			network and compare them for problem statement design and public health and safety.
		CO4	List and classify Ethernet types for system component design, different Connecting devices in computer networks for better suggestions and clear instructions.
		CO5	List, analyze and apply different routing algorithms for getting appropriate technique of routing.
		CO6	Identify the class of IP addresses for given computers for as per engineering norms and create LAN connection between two computers as per professional ethics.
		CO7	Analysis of cryptography and network security techniques for public safety, Manage installing and configuring networking applications for system component design
BE-I	Radiation & Microwave Technique (404183)	CO1	Gain knowledge of the wave propagation in free space & understand the different types of antenna.
		CO2	Acquire knowledge about the different radiating elements.
		CO3	Analyze wave propagation in TE, TM or TEM modes, in structures such as rectangular or circular waveguides, coaxial lines, surface wave lines, strip line, and micro strip lines.
		CO4	Learn microwave network theory and evaluate use of scattering matrix and Understand wave propagation in non-reciprocal media such as ferrites and nonlinear devices such as isolators, circulators, and ferrite phase shifters.
		CO5	Identify the use of microwave components and devices in microwave application.
		CO6	Acquire knowledge about the measurements to be done at microwave applications for today's generation
BE-I	Elective I: Embedded Systems & RTOS (404184)	CO1	Design real time embedded system application to match recent trends in techno commercial market.
		CO2	Apply knowledge of different scheduling algorithms to solve complex design issues.
		CO3	Examine priorities for application development.
		CO4	Match synchronization with time, tasks with the help of different software and hardware tools, models.
		CO5	Interpret knowledge for product

			development.
		CO6	Develop the ability among students to synthesize data and technical concepts for application to product design.
BE - I	Elective I : Digital Image & Video Processing (404184)	CO1	Understand the concept of digital image processing and perform the basic operations on image
		CO2	Learn design and integrate image enhancement and image restoration techniques.
		CO3	Analyze the different image coding and compression techniques
		CO4	Evaluate object segmentation and image analysis techniques
		CO5	Represent and describe images with various descriptors
		CO6	Illustrate basic concepts of video processing
BE-I	Elective II: Electronic Product Design (404185)	CO1	Apply the knowledge of the basics and fundamental concepts of electronic product development.
		CO2	Apply the solutions of complex engineering problems for design and Implementation of electronic product.
		CO3	Analyze the formulation for deciding the specifications of product and will be able to debug the developed design of the electronic product.
		CO4	Analysis and testing of hardware and software design using appropriate methods.
		CO5	Apply the appropriate techniques of various PCB design and precautions while designing.
		CO6	Analysis & Synthesis various environmental and electromagnetic standards.
BE-I	Lab Practice I-CN & RMT (404186)	CO1	Gain knowledge and importance of different microwave components for the use of high frequency applications.
		CO2	Learn to calculate the free space wavelength using slotted line and able to compare with theoretical value.
		CO3	Learn to plot gun oscillator characteristics using different readings.
		CO4	Learn and use DHCP , FTP server in real life applications
		CO5	Apply the encryption and decryption algorithm for security purpose
BE-I	Lab Practice II-VLSI & Elective I:DIVP	CO1	Match synchronization with time, tasks with the help of different software and

	(404187)		hardware tools, models.
		CO2	Apply knowledge of different scheduling algorithms to solve complex design issues.
		CO3	Learn design and integrate image enhancement and image restoration techniques.
		CO4	Analyze the different image coding and compression techniques
BE-I	Project Phase I (404188)	CO1	Able to apply the relevant knowledge and skills, which are acquired within the technical area, to a given problem
		CO2	Within given constraints, even with limited information, independently analyze and discuss complex inquiries/problems and handle larger problems on the advanced level within the technical area
		CO3	Be able to document and present one's own work, for a given target group, with strict requirements on structure, format, and language usage.
		CO4	Be able to identify one's need for further knowledge and continuously develop one's own competencies
SE-II	Engineering Mathematics III (207005)	CO1	Solve higher order linear differential equation using appropriate techniques for 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.
		CO4	Perform vector differentiation and integration to analyze the vector fields.
		CO5	Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing, Digital filters and Computer graphics.
SE-II	Integrated Circuits (204187)	CO1	Explain basic building blocks of op-am and identify closed loop configurations of op amp
		CO2	Design and analyze linear and non linear application of op amp
		CO3	Design and Compare various convertors using op amp
		CO4	Apply functionalities of PLL to various applications
SE-II	Control Systems (204188)	CO1	Model a physical and electrical system and visualize its input-output relationships

			by means of block diagrams and Signal flow graph.
		CO2	Analyze a linear control system in time and frequency domain using graphical methods.
		CO3	Model and analyze the control system using state space analysis.
		CO4	Visualize the concept of PLC and PID controllers and analyze digital control system using transfer function
SE-II	Analog Communication (204189)	CO1	Explain the various components of electronics communication system and describe the various amplitude modulation techniques.
		CO2	Analyze the AM radio receiver and evaluate the radio receiver performance parameters.
		CO3	Describe the mathematical analysis of FM with frequency spectrum.
		CO4	Demonstrate the FM radio receiver and describe the detection techniques.
		CO5	Explain signal to noise ratio , noise figure, noise temperature for single and cascaded stages in communication system.
SE-II	Object Oriented Programming (204190)	CO1	Define object oriented concepts used in C++ and Java.
		CO2	Demonstrate fundamentals of programming such as variables, expressions conditional and iterative execution, methods, etc. in C++ and Java.
		CO3	Apply fundamentals of object-oriented programming in C++, Java such as classes, invoking methods, using class libraries, etc.
		CO4	Develop computer program to solve specified problems with C++ and JAVA languages..
		CO5	Use the Java SDK environment and eclipse IDE to create, debug and run simple Java programs.
SE-II	Employability Skill Development(204191)	CO1	Explain and design various types of linear power supply.
		CO2	Design data acquisition system with its specifications
		CO3	Recognize and design SMPS for desired specification
SE-II	Audit Course -2 (204193)	CO1	Student will have ability of basic communication.
		CO2	Student will have the knowledge of Japanese script
		CO3	get introduced to reading , writing and

			listening skills
TE-II	Power Electronics (304186)	CO1	Identify, design and Implement basic requirement for electronics applications
		CO2	Analyze and Design different power converters
		CO3	Parameter estimation and performance evaluation
		CO4	Develop skills to build, troubleshoot and simulate power electronic circuits
		CO5	Design and Implementation of protection circuits
TE-II	Information Theory, Coding and Communication Networks -304187	CO1	Derive equations for entropy, mutual information and apply the basics of information theory for calculating channel capacity to perform information theoretic analysis of communication system.
		CO2	Choose suitable source coding technique design specific data compression techniques and calculate the compression achieved
		CO3	Describe encoding and decoding linear block and cyclic codes and will able to apply these for error detection and correction to Design a channel coding scheme for a communication system.
		CO4	Formulate convolution codes & BCH code for performance analysis and Channel performance improvement against burst errors.
		CO5	Understand and apply fundamental principles of data communication and networking and also able to apply flow and error control techniques in communication networks
TE-II	Business Management (304188)	CO1	Describe fundamentals of Management thoughts, vital for understanding the conceptual frame work of Management as a discipline.
		CO2	Understand quality assessment tools for project development including analysis of impact of finance factors.
		CO3	Recognize the development, impact of manpower on internal and external environment to promote entrepreneurship.
		CO4	Know about modern ways of managing information for successful business.
TE-II	Advanced Processors - 306189	CO1	Describe the ARM Microcontroller Architecture and its features
		CO2	Interface the advanced peripherals to ARM based Micro controllers
		CO3	Develop Embedded System with available resources.

TE-II	System Programming & Operating System - 304190	CO1	Gain knowledge and understand concepts and theory behind the implementation of high level programming languages.
		CO2	Gain knowledge and understand basic functioning of various system software's like Assembler, Compiler etc.
		CO3	Gain knowledge about function and complexity of various language translators like linker & loader
		CO4	Analyze and understand basic principles used in design of modern operating system and various services provided by operating system
		CO5	Gain knowledge about significance of memory management in modern operating systems
TE-II	Power and ITCT Lab - 304194	CO1	Gain knowledge and importance of different peripheral components for the used in embedded system
		CO2	Able to interface various input output devices with ARM processor
		CO3	To observe the characteristics of different types of power devices
		CO1	Calculate channel capacity and mutual information of various channels to perform information theoretic analysis of communication system.
		CO2	Choose suitable source coding technique design specific data compression techniques and calculate the compression achieved
		CO3	To apply encoding and decoding linear block and cyclic codes for error detection and correction to design a channel coding scheme for a communication system.
		CO4	Formulate convolution codes & BCH code for performance analysis and Channel performance improvement against burst errors
CO5	Understand and apply fundamental principles of data communication and networking and also able to apply flow and error control techniques in communication networks		
TE-II	Advanced Processors and System Prograaming. Lab - 304195	CO1	Interface the advanced peripherals to ARM based Micro controllers
		CO2	Develop Embedded System with available resources.
		CO3	Gain knowledge about function and complexity of various language translators like linker & loader
		CO4	Analyze and understand basic principles used in design of modern operating system and

			various services provided by operating system
		CO5	Gain knowledge about significance of memory management in modern operating systems
TE-II	Employability Skills and Mini Project -304196	CO1	Mini Project Work should be carried out in the Design / Projects Laboratory.
		CO2	Project designs ideas can be necessarily adapted from recent issues of electronic design magazines
		CO3	PCB manufacturing through vendor/at lab, Hardware assembly, programming (if required) Testing, Enclosure Design, Fabrication etc
		CO4	Use of Hardware devices/components is mandatory
		CO5	Layout versus schematic verification is mandatory
		CO6	Bare board test report shall be generated
BE-II	Mobile Communication(404189)	CO1	Selection of appropriate switching techniques for given situation.
		CO2	Estimation of delay in system
		CO3	Applying particular technique for traffic control
		CO4	Analyzing the effect of frequency and propagation on utility of signal
		CO5	Designing the allocation of propagation path between transmitter and receiver
		CO6	Examine and analyze the GSM, PSTN TST switch, 3G mobile phone, CDMA system
		CO7	Implement the system of VOIP
BE-II	Broadband Communication Systems(404190)	CO1	Identify & analyze optical components used for system component design.
		CO2	Estimate and analyze various parameters of optical fiber to solve complex engineering problems.
		CO3	Select appropriate multichannel system for efficient communication and problem statement design.
		CO4	Identify and analyze various launching techniques and orbital mechanisms to get communication system as per engineering norms.
		CO5	Identify various satellite subsystems to meet the socio economic challenges.
		CO6	Design and analyze satellite link for sustainable satellite communication.

BE-II	Elective III: Audio Video Engineering(404191)	CO1	Analyze the picture elements for transmission & reception.
		CO2	Migrate into domain of contemporary technologies.
		CO3	Compare various technologies for reception.
		CO4	Select & analyze audio systems as well as acoustics for a given situation.
		CO5	Analyzing incorporation of appropriate standards
		CO6	Fault Finding & diagnosis of TV sets.
BE-II	Elective IV: Wireless Networks (404192)	CO1	Analyze recent trends in the communication field
		CO2	Understand different wireless technologies and standards.
		CO3	Categorize and analyze various protocols render by latest wireless technologies.
		CO4	Interpret, describe the basic concept of Voice over Internet Protocol and understand challenges in VOIP.
BE-II	Lab Practice-III: MC & BCS(404193)	CO1	To learn and understand the basic principles of Telecommunication switching, traffic and networks
		CO2	To learn and understand basic concepts of cellular system, wireless propagation and the techniques used to maximize the capacity of cellular network
			Estimate and analyze various parameters of optical fiber to solve complex engineering problems.
		CO4	Identify various satellite subsystems to meet the socio economic challenges.
		CO5	Design and analyze satellite link for sustainable satellite communication.
BE-II	Lab Practice-IV (Elective III):Audio Video Engineering(404194)	CO1	Analyze the picture elements for transmission & reception.
		CO2	Migrate into domain of contemporary technologies.
		CO3	Compare various technologies for reception.
		CO4	Select & analyze audio systems as well as acoustics for a given situation.
		CO5	Analyzing incorporation of appropriate standards
		CO6	Fault Finding & diagnosis of TV sets.
BE-II	Project Phase-II (404195)	CO1	be able to apply the relevant knowledge and

			skills, which are acquired within the technical area, to a given problem
		CO2	within given constraints, even with limited information, independently analyze and discuss complex inquiries/problems and handle larger problems on the advanced level within the technical area
		CO3	Be able to document and present one's own work, for a given target group, with strict requirements on structure, format, and language usage.
		CO4	Be able to identify one's need for further knowledge and continuously develop one's own competencies
ME-I	Digital CMOS Design (504201)	CO1	The student will understand the fundamentals of CMOS Technology in Digital Domain.
		CO2	The student will show the skills of designing digital VLSI.
		CO3	The student will demonstrate the ability for using backend tools in IC technology.
ME-I	Reconfigurable Computing (504202)	CO1	The student will understand concept of static and dynamic reconfiguration.
		CO2	The student will use the basics of the PLDs for designing reconfigurable circuits.
		CO3	The student will understand the reconfigurable system design using HDL
ME-I	Embedded System Design -504203	CO1	The student will study ARM Processor based Embedded System design
		CO2	The student will be able to do programming in Embedded programming in C, C++
		CO3	The student will understand Linux operating system and device driver
		CO4	The student will demonstrate the knowledge of android operating system
ME-I	Research Methodology - 504204	CO1	The student will learn research problem & its scope, objectives, and errors.
		CO2	The student will learn the basic instrumentation schemes & data collection methods.
		CO3	The student will study the various statistical techniques.
		CO4	The students will study modeling and predict the performance of experimental system.
		CO5	The student will learn to develop the research proposals.
ME-I	Elective I : MOS Device Modeling and Characterization -504205	CO1	To provide detail understanding of MOS devices structures and operations

		CO2	To understand the effect of various materials on the characteristics of MOSFET
		CO3	To acquaint the students with SPICE tool for modeling of transistor behavior
		CO4	To provide a brief knowledge of Advanced MOSFET models
ME-I	Lab. Practice I -504206	CO1	The student will show the skills of designing CMOS analog circuits.
		CO2	The student will learn to design flow graphs and flow modeling.
		CO3	The student will demonstrate the ability to analyze filter structures.
		CO4	The student will demonstrate the knowledge embedded product design related hardware and software design tools.
ME-II	Analog CMOS Design (504207)	CO1	The student will understand the fundamentals of CMOS Technology in Analog Domain.
		CO2	The student will show the skills of designing CMOS analog circuits.
		CO3	The student will demonstrate the ability for using backend tools in analog IC technology.
ME-II	System on Chip -504208	CO1	The student will learn to design flow graphs and flow modeling.
		CO2	The student will study SOC modeling and interfacing.
		CO3	The student will learn SOC memory system design, embedded software and energy management techniques for SOC design, SOC prototyping, verification, testing and physical design.
		CO4	The student will able to design , implement and test SOC.
ME-II	Embedded Automotive Systems -504209	CO1	To support the automotive parts industry by focusing on the electronics control system
		CO2	To constantly strengthen the automotive embedded automotive system
		CO3	Analyze various embedded products used in automotive industry.
		CO4	Able to interface devices and build a complete system.
ME-II	Elective II Embedded Product Design (504210)	CO1	The student will study Embedded System & Product specifications, challenges
		CO2	The student will be able to do cost estimation of Embedded product
		CO3	The student will understand the aspects of Mechanical Packaging, Testing, reliability and failure analysis, Certification (EMI / RFI) and Documentation
		CO4	The student will demonstrate the knowledge

			embedded product design related hardware and software design tools
ME-II	Lab. Practice II -504211	CO1	Understand design concepts and issues of CMOS amplifiers
		CO2	To support the automotive parts industry by focusing on the electronics control system
ME-II	Seminar I -504212	CO1	Identify, understand and discuss current, real-world issues.
		CO2	To improve oral, communication and presentation skills.
ME-III	Testing and Verification of VLSI Circuits -604201	CO1	To introduce design process in VLSI
		CO2	To understand the logical and Fault simulation models
		CO3	To learn techniques for design of testability
		CO4	To study hardware and software verification issues for testing
ME-III	ASIC Design -604202	CO1	To gain knowledge of the process of designing application specific algorithm for ASIC
		CO2	To synthesize designs in EDA tool environment
		CO3	To learn design methodologies, simulation and verification.
		CO4	To analyze issues in Mixed signal ASIC design
ME-III	Elective III (604203) Environmental Studies & CUDA	CO1	The student will learn characteristics structures and functions of ecosystems
		CO2	The student will use knowledge of different Environmental Pollution and human role in prevention of pollution
		CO3	The student will understand the social issues and Environment and Role of information technology in environment and human health.
		CO4	The student will exhibit the design for HPC and GPU Computing.
		CO5	The student will understand Parallel Programming in CUDA and Measuring Performance with Events.
ME-III	Seminar II (604204)	CO1	To explore an appreciation of the self in relation to its larger diverse social and academic contexts.
		CO2	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.
ME-III	Project Stage I (604205)	CO1	To learn the research scope and research field for particular complex problem.
		CO2	To conclude on literature survey & prepare problem definition
		CO3	Apply the relevant knowledge and skills, which are acquired within the technical area, to a given problem

ME-IV	Seminar III (604206)	CO1	Apply principles of ethics and respect in interaction with others.
		CO2	Distinguish and integrate differing forms of knowledge and academic disciplinary approaches with presentation skills.
ME-IV	Project Stage II (604207)	CO1	To gain the knowledge of various recent trends available as a solution for complex problem.
		CO2	Analyze and discuss complex inquiries/problems and handle larger problems on the advanced level within the technical area.
		CO3	Demonstrate the solution for complex problem and mentioned future scope.

Department: Mechanical Engineering

SE-SEM-I	Engineering Mathematics – III -207002	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 Vibration theory, Heat transfer and related engineering applications.
		CO3	Apply statistical methods like correlation, regression analysis in analyzing, interpreting experimental data and probability theory 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.
SE-SEM-I	Manufacturing Process-I -202041	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

SE-SEM-I	Computer Aided Machine Drawing -202042	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 sketching
		CO3	Understand the significance of parametric feature-based modeling and its application in 3D 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
SE-SEM-I	Thermodynamics - 202043	CO1	Explain fundamental of thermodynamics, laws of thermodynamics, SFEE and the concept of irreversibility to various processes and real systems.
		CO2	Explain the concept of entropy principle, gas laws and analysis of ideal gas processes to evaluate heat, work and change in internal energy, enthalpy & entropy.
		CO3	Estimate performance and second law efficiency of various thermodynamic gas power cycles and gas refrigeration cycle.
		CO4	Estimate the condition of steam, work & heat transfer during various steam processes using P-h and T-s diagrams and evaluate the performance of vapour power cycle and vapour refrigeration cycle
		CO5	Explain classification of boilers, construction, working, location of different boiler components and determine the Stoichiometric air required for combustion, performance of steam generators & natural draught requirements in boiler plants.
		CO6	Determine various properties of moist air and analysis of psychrometric processes using psychrometric charts to achieve human comfort or industrial application conditions
SE-SEM-I	Material Science -202044	CO-1	Identify and draw the crystal structure of different metals.
		CO-2	Describe the crystal imperfections in the material.
		CO-3	Describe and demonstrate the destructive and non destructive testing's
		CO-4	Identify types of corrosion and preventive

			methods.
		CO-5	Explain surface modification methods.
		CO-6	Describe powder metallurgy processes, advantaged, limitations, applications
SE-SEM-I	Strength of Material - 202051	CO-1	Apply knowledge of mathematics, science for engineering applications
		CO-2	Design and conduct experiments, as well as to analyze and interpret data
		CO-3	Design a component to meet desired needs within realistic constraints of health and safety
		CO-4	Identify, formulate, and solve engineering problems
		CO-5	Practice professional and ethical responsibility
		CO-6	Use the techniques, skills, and modern engineering tools necessary for engineering practice
SE-SEM-I	Theory of Machines – I - 202048	CO-1	Construct and demonstrate the working of planar mechanisms to be used in industrial applications.
		CO-2	Determine the mass moment of inertia of rigid bodies having symmetric and irregular shape.
		CO-3	Determine static and dynamic forces on components of slider crank mechanism.
		CO-4	Differentiate between different power absorbing and transmitting devices like Clutch, Brake and Dynamometer and calculate torque.
		CO-5	Analyze velocity and acceleration of simple mechanism by analytical and graphical methods.
		CO-6	Construct and demonstrate the working of planar mechanisms to be used in industrial applications.
SE-SEM-II	Engineering Metallurgy - 202049	CO-1	describe how metals and alloys formed and how the properties change due to microstructure
		CO-2	apply core concepts in Engineering Metallurgy to solve engineering problems
		CO-3	conduct experiments, as well as to analyze and interpret data
		CO-4	select materials for design and construction
		CO-5	possess the skills and techniques necessary for modern materials engineering practice
		CO-6	recognize how metals can be strengthened by alloying, cold-working, and heat treatment

SE-SEM-II	Applied Thermodynamics - 202050	CO-1	Classify I.C engines construction and materials used, working principle and explain losses encountered in fuel air and actual cycle.
		CO-2	Analyze requirements of carburation, stages of combustion in SI engines, theory of abnormal combustion and combustion chambers for SI engine.
		CO-3	Evaluate fuel injection system, stages of combustion in CI engines, theory of abnormal combustion and combustion chambers for CI engine.
		CO-4	Evaluate performance of IC engines and results of the tests.
		CO-5	Explain systems necessary for efficient operation of IC engines and get familiar with emissions, norms and controlling techniques.
		CO-6	Explain the classification and working of air compressors and evaluate the performance of reciprocating air compressor.
SE-SEM-II	Electrical and Electronics Engineering -203152	CO-1	Develop the capability to identify and select suitable DC motor / induction motor / special purpose motor and its speed control method for given industrial application.
		CO-2	Program Arduino IDE using conditional statements
		CO-3	Interfacing sensors with Arduino IDE
SE-SEM-II	Fluid Mechanics-202045	CO-1	Describe and determine various properties of fluid for operating conditions encountered in fluid engineering problems
		CO-2	Determine total pressure and couple exerted by static fluid on plan and curved surfaces encountered in dam structures and stability of floating objects.
		CO-3	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 conditions of possibilities of fluid flow.
		CO-4	Discuss physics and the governing equations associated with laminar and turbulent flows to analyse and design flow measuring devices and pipe flow systems
		CO-5	Discuss physics of laminar and turbulent flows in external flow to determine drag and lift forces on surfaces of stationary and moving objects
		CO-6	Develop mathematical correlation for complex flow phenomenon in terms of dimensionless parameters.

SE-SEM-II	Soft Skill-202047	CO-1	Improved communication, interaction and presentation of ideas.
		CO-2	Right attitudinal and behavioural change
		CO-3	Developed right-attitudinal and behavioral change
TE-SEM-I	Design of Machine Elements-I -302041	CO1	Ability to identify and understand failure modes for mechanical elements and design of machine elements based on strength
		CO2	Ability to design Shafts, Keys and Coupling for industrial applications.
		CO3	Ability to design machine elements subjected to fluctuating loads.
		CO4	Ability to design Power Screws for various applications.
		CO5	Ability to design fasteners and welded joints subjected to different loading conditions.
		CO6	Ability to design various Springs for strength and stiffness.
TE-SEM-I	Heat Transfer -302042	CO1	Identify the important modes of heat transfer and their applications.
		CO2	Formulate and apply the general three dimensional heat conduction equations.
		CO3	Analyze the thermal systems with internal heat generation and lumped heat capacitance..
		CO4	Understand the mechanism of convective heat transfer
		CO5	Determine the radiative heat transfer between surfaces
		CO6	Describe the various two phase heat transfer phenomenon. Execute the effectiveness and rating of heat exchangers.
TE-SEM-I	Theory of Machines –II - 302043	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 methods.
		CO6	a. The student will analyze the gyroscopic couple or effect for stabilization of Ship

			Aeroplane and Four wheeler vehicle.
			b. Student will choose appropriate drive for given application (stepped / step-less).
TE-SEM-I	Turbo Machines -302044	CO1	Apply thermodynamics and kinematics principles to turbo machines.
		CO2	Analyze the performance of turbo machines.
		CO3	Ability to select turbo machine for given application.
		CO4	Predict performance of turbo machine using model analysis.
TE-SEM-I	Metrology And Quality Control -302045	CO1	Understand the methods of measurement, selection of measuring instruments / standards of measurement, carryout data collection and its analysis.
		CO2	Explain tolerance, limits of size, fits, geometric and position tolerances and gauge design
		CO3	Understand and use/apply Quality Control Techniques/ Statistical Tools appropriately.
		CO4	Develop an ability of problem solving and decision making by identifying and analyzing the cause for variation and recommend suitable corrective actions for quality improvement.
TE-SEM-I	Skill Development - 302046	CO1	To develop the skill for assemble and disassemble of machines.
		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.
TE-SEM-II	Numerical Methods and Optimization -302047	CO1	Use appropriate Numerical Methods to solve complex mechanical engineering problems
		CO2	Formulate algorithms and programming.
		CO3	Use Mathematical Solver.
		CO4	Generate Solutions for real life problem using optimization techniques
		CO5	Analyze the research problem
TE-SEM-II	Design of Machine Elements – II -302048	CO1	To understand and apply principles of gear design to spur gears and industrial spur gear boxes

		CO2	To become proficient in Design of Helical and Bevel Gear
		CO3	To develop capability to analyse Rolling contact bearing and its selection from manufacturer's Catalogue.
		CO4	To learn a skill to design worm gear box for various industrial applications.
		CO5	To inculcate an ability to design belt drives and selection of belt, rope and chain drives.
TE-SEM-II	Mechatronics -302050	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
TE-SEM-II	Manufacturing Process-II -302051	CO1	Student should be able to apply the knowledge of various manufacturing processes.
		CO2	Student should be able to identify various process parameters and their effect on processes.
		CO3	Student should be able to figure out application of modern machining.
		CO4	Students should get the knowledge of Jigs and Fixtures for variety of operations
TE-SEM-II	Machine Shop-II - 302052	CO1	Ability to develop knowledge about the working and programming techniques for various machines and tools
TE-SEM-II	Seminar -302053	CO1	Establish motivation for any topic of interest and develop a thought process for technical presentation.
		CO2	Organize a detailed literature survey and build a document with respect to technical publications.
		CO3	Analysis and comprehension of proof-of-concept and related data.
		CO4	Effective presentation and improve soft skills.
		CO5	Make use of new and recent technology (e.g. Latex) for creating technical reports

TE-SEM-II	Refrigeration and Air conditioning -302049	CO1	Learning the fundamental principal and different methods of refrigeration and air conditioning
		CO2	Study of various refrigeration cycle and evaluate performance using mollier chart or refrigerant property tables
		CO3	comparative study of different refrigerants with respect to properties, applications and environmental issues
		CO4	Understand the basic air conditioning processes on psychrometric charts, calculate cooling load for its application in comfort and industrial air conditioning
		CO5	Study of Various equipment - operating principles, operating and safety controls employed in refrigeration and air conditioning systems
BE-SEM-I	Hydraulics and Pneumatics-402041	CO1	Learning the fundamental principles and different methods of refrigeration and air conditioning.
		CO2	Study of various refrigeration cycles and evaluate performance using Mollier charts and/ or refrigerant property tables.
		CO3	Comparative study of different refrigerants with respect to properties, applications and environmental issues.
		CO4	Understand the basic air conditioning processes on psychrometric charts, calculate cooling load for its applications in comfort and industrial air conditioning.
		CO5	Study of the various equipment-operating principles, operating and safety controls employed in refrigeration air conditioning systems
BE-SEM-I	CAD/CAM and Automation-402042	CO1	Explain geometrical transformation matrices of translation, rotation, mirror and scaling & homogeneous transformation of 2D, 3D geometries and geometric projection.
		CO2	Compare & analyze different Types of curve, Surfaces & Solids.
		CO3	Find Stresses and displacements of 1D and 2D problems by using FEA.
		CO4	Write CNC Part program for given work piece
		CO5	Explain manufacturing processes like Rapid prototyping and its relation with software's and CAD modeling.
		CO6	Explain practical applications of robot with robot gripper design, automation, CIM & CAPP
BE-SEM-I	Dynamics of Machinery-402043	CO1	To conversant with balancing problems of machines.
		CO2	To make the student conversant with

			fundamentals of vibration and noise.
		CO3	To develop competency in understanding of vibration and noise in Industry.
		CO4	To develop analytical competency in solving vibration problems.
		CO5	To make the student conversant with natural frequencies, Eigen values & Eigen vectors.
		CO6	To understand the various techniques of measurement and control of vibration and noise.
BE-SEM-I	Energy Audit and Management Elective II(402045C)	CO1	Identify importance of energy savings and energy consumption pattern in global and Indian Industry, need of renewable and energy efficiency
		CO2	Carry out energy audit, understand energy audit methodology, Energy conservation opportunities in Process, Power and manufacturing industry.
		CO3	Determination of cost of energy with the help of financial analysis techniques and study Potential for waste-heat recovery in Industry, carbon credit calculations
BE-SEM-II	Tribology (Elective III)(402049A)	CO1	To conversant with balancing problems of machines.
		CO2	To make the student conversant with fundamentals of vibration and noise.
		CO3	To develop competency in understanding of vibration and noise in Industry.
		CO4	To develop analytical competency in solving vibration problems.
		CO5	To make the student conversant with natural frequencies, Eigen values & Eigen vectors.
		CO6	To understand the various techniques of measurement and control of vibration and noise.
BE-SEM-II	Product Design and Development Elective II(402050C)	CO1	To analyze and understand the product design aspects and product development processes.
		CO2	To understand customer needs for technical development and business concerns about product.
		CO3	To understand the concepts of new product and functional requirement of the product.
		CO4	To apply appropriate approach for the design of product using reverse engineering methods
		CO5	To understand design procedures and considerations related to manufacture, assembly, robustness, safety, reliability and environment.
		CO6	To understand Product Life cycle and product data Management concepts and corresponding technology.
BE-SEM-I	Operation Research	CO1	Illustrate the need to optimally utilize the

	(ELECTIVE II)(402045B)		resources in various types of industries.
		CO2	Apply and analyze mathematical optimization functions to various applications.
		CO3	Demonstrate cost effective strategies in various application in industry.
		CO4	Students learn the use of practice oriented mathematical applications for optimization functions in an organization.
		CO5	Students get familiar with various tools of optimization, probability, statistics and simulation as applicable in particular scenarios in industry for better management of various resources.
		CO6	Understand the role of uncertainty in decision - making.
BE-SEM-II	Advanced Manufacturing Processes (Elective IV)(402050A)	CO1	Selection of appropriate manufacturing process for advance components
		CO2	Characterization of work pieces
BE-SEM-II	Mechanical System Design -402048	CO1	Analyze and design machine tool gear box, cylinder, pressure vessel and I.C. engine components for stated specifications.
		CO2	Apply the statistical considerations in design to analyze the defects and failure modes in industrial product.
		CO3	Adapt suitable material handling system and its design for industrial application.
		CO4	Develop the optimum solutions for weight, cost, size, stiffness using Johnson's method for mechanical components.
		CO5	Apply safety considerations of design for manufacture and assembly to domestic products.
BE-SEM-II	Energy Engineering - 402047	CO1	Ability to have adequacy with Design, erection and development of energy conversion plant
		CO2	Optimization of Energy Conversion plant with respect to the available resources
		CO3	Scope of alternative erection of optimized, suitable plant at the location depending upon geographical conditions.
BE-SEM-II	Robotics (Elective III)(402049B)	CO1	Understand the complete design procedure of the robot.
		CO2	Select correct mechanism for operation of the robot.
		CO3	Select necessary actuators, sensors, control for satisfactory performance of the robot.
BE-SEM-II	Industrial Engineering (Elective III)(402049C)	CO1	Apply the Industrial Engineering concept in the industrial environment
		CO2	Manage and implement different concepts involved in methods study and understanding of work content in different situations
		CO3	Undertake project work based on the course content.

		CO4	Describe different aspects of work system design and facilities design pertinent to manufacturing industries.
		CO5	Identify various cost accounting and financial management practices widely applied in industries.
		CO6	Develop capability in integrating knowledge of design along with other aspects of value addition in the conceptualization and manufacturing stage of various products.
BE-SEM-I	Finite Element Analysis Elective-I(402050A)	CO1	Derive and use 1-D and 2-D element stiffness matrices and load vectors from various methods to solve for displacements and stresses.
		CO2	Apply mechanics of materials and machine design topics to provide preliminary results used for testing the reasonableness of finite element results.
		CO3	Explain the inner workings of a finite element code for linear stress, displacement, temperature and modal analysis.
		CO4	Interpret the results of finite element analyses and make an assessment of the results in terms of modeling (physics assumptions) errors, discretization (mesh density and refinement toward convergence) errors, and numerical (round-off) errors.
BE-SEM-II	PROJECT STAGE II-402051	CO1	Implement suitable methodology to solve the Problems pertaining to the mechanical engineering by utilizing the knowledge gained during the curriculum.
		CO2	Createthe sustainable, economicand environmental friendly solutionto the considered problem and analyze the same by effective utilization of relevant tools and techniques.
		CO3	Develop managerial skills and work as a team for obtaining the solution of mechanical or interdisciplinary engineering related problems within stipulated time, following morality and ethics.
ME-HEAT POWER SEM-III	Computational Fluid Dynamics -602113	CO1	Understand solution of aerodynamic flows. Appraise & compare current CFD software. Simplify flow problems and solve them exactly
		CO2	Define and setup flow problem properly within CFD context, performing solid modeling using CAD package and producing grids via meshing tool
		CO3	Understand both flow physics and mathematical properties of governing Navier-Stokes equations and define proper boundary conditions for solution
		CO4	Use CFD software to model relevant

			engineering flow problems. Analyse the CFD results. Compare with available data, and discuss the findings
ME-HEAT POWER SEM-III	Design of Heat Transfer Equipments -602114	CO1	Be familiar with classification of heat exchangers;
		CO2	Be aware of the use of solution methods for determining exchanger effectiveness,
		CO3	Be familiar with heat exchanger pressure drop analysis,
		CO4	. Be familiar with heat transfer characteristics,
		CO5	Be familiar with cooling tower fundamentals
		CO6	Be familiar with furnace and thermal devices
ME-HEAT POWER SEM-III	Solar Energy Elective III -602115	CO1	Understanding the principles that underlie the ability of various natural phenomena to deliver solar energy
		CO2	Understanding the technologies that are used to harness the power of solar energy
ME-HEAT POWER SEM-III	Waste Heat Recovery and Cogeneration Elective III -602115	CO1	Estimate and quantify available waste heat
		CO2	Understand economics of cogeneration and waste heat recovery systems
	Advanced Mathematics and Numerical Methods-507101	CO1	Be aware of the use of algebraic equations in modern scientific computing,
		CO2	Be familiar with regression analysis,
		CO3	Be aware of the use of numerical methods in modern scientific computing,
		CO4	Be familiar with Differentiation & Integration for double triple integration,
		CO5	Be familiar with Eigen values and Eigen vectors of matrices,
		CO6	. Be familiar with numerical integration and differentiation
		CO7	Be familiar with numerical solution of ordinary differential equations
		CO8	Be familiar with partial differential equations,
	Advanced Fluid Mechanics-502103	CO1	The candidate will acquire knowledge of an array of topics in flow mechanics.
		CO2	Advanced knowledge of potential theory, as

			well as a fundamental understanding of the mechanics of incompressible flow.
		CO3	Understanding of the fundamental conservation laws of fluid mechanics and how the theory of more specialised branches derives from these.
		CO4	Knowledge of several practical applications of the theory covered.
	Research Methodology - 502104	CO1	Understanding of the basic framework of research process.
		CO2	Develop an understanding of various research designs and techniques.
		CO3	Learning various sources of information for literature review and data collection.
		CO4	.Understanding of the ethical dimensions of conducting applied research.
		CO5	Learning various components of scholarly writing and evaluate its quality.
	Finite Element Method -502209	CO-1	To obtain an understanding of the fundamental theory of the FEA method.
		CO-2	To demonstrate the ability to create models for trusses, frames, plate structures, machine parts, and components using ANSYS general-purpose software.
		CO-3	To understand the use of the basic finite elements for structural applications using truss, beam, frame, and plane elements.
		CO-4	To demonstrate effect Non-linearity of material and use of different methods for solution of non-linear equations.
		CO-5	To formulate dynamic problems in FEM environment.
		CO-6	To Explain linear buckling problems, error estimation and different approaches in FEM.
	Material Science and Mechanical Behavior of Materials -502202	CO-1	To use simple continuum mechanics and elasticity to determine the stresses, strains, and displacements in a loaded structure.
		CO-2	To understand the mechanics and micro-mechanisms of elastic and plastic deformation, creep, fracture, and fatigue failure, as applied to metals, ceramics etc.
		CO-3	To demonstrate an approach for different perspectives of mechanical testing procedures. i.e., uniaxial, biaxial, fatigue, creep, etc.
		CO-4	To identify behavior of material under simple and complex loading conditions.
		CO-5	To explain elastic-plastic equations for elastic-plastic and plastic-rigid structures.
		CO-6	To explain different visco-elalstic models wrto damping and natural frequency.
	Advanced Mathematics -507201	CO1	To Identify inner products and its matrix representations.
		CO2	To solve complex differential equations using

			harmonic functions.
		CO3	To recall Laplace transforms, Fourier transforms to solve partial differential equations.
		CO4	To apply matrix formulation for vibration problems.
		CO5	To solve explicit and implicit problems using finite difference method.
		CO6	To use Rayleigh-Ritz, Galerkin method to solve boundary value problems.
	Advanced Mechanical Vibrations -502208	CO1	To identify single degree, multi degree freedom systems and apply numerical methods.
		CO2	To solve vibration problems of string, bars, beams and continuous systems.
		CO3	To explain single degree freedom system for arbitrary excitations.
		CO4	To apply principles of balancing to rotating machines
		CO5	To use different measurement setups to measures natural frequency and vibration characteristics.
		CO6	To explain different cross functions and responses of linear systems.
	Advanced Stress Analysis -502203	CO1	Apply the mechanics of materials methods to engineering problems to understand structural responses to various loading conditions.
		CO2	Formulate solutions to solid mechanics problems.
		CO3	Comprehend current research findings as reported in journals in the field of solid mechanics
		CO4	Apply Knowledge of stresses and strains associated with thick wall cylindrical pressure vessels and rotating disks
		CO5	Able to Apply Knowledge of Photo elasticity and its technique for Design of Components
	Analysis and Synthesis of Mechanisms -502207	CO1	To apply acceleration and auxiliary point methods to complex mechanisms.
		CO2	To indentify planar elements and solve system matrices.
		CO3	To solve euler-savy equations using curvature theory.
		CO4	To identify errors in mechanism and use different synthesis methods to improve accuracy.
		CO5	To use analytical methods of synthesis for planar mechanisms.
		CO6	To identify different transformations describing planar displacements.

Elective – I -502105	CO1	Identify importance of energy savings and energy consumption pattern in global and Indian Industry, need of renewable and energy efficiency
	CO2	Carry out energy audit; understand energy audit methodology, Energy conservation opportunities in Process, Power and manufacturing industry.
	CO3	The planning and control of whatever productive activity comprises the business of the enterprise
	CO4	The location and layout of the facility from which the production or service activity is accomplished,
	CO5	Aware of techniques and instrumentation of ambient air monitoring, establishment of ambient air monitoring stations; stack monitoring and experimental analysis of air gaseous and particulate air pollutants; standards and limits
	CO6	Aware of the air quality model, its definition, types and description of Gaussian based air quality model for point source along with its application
Elective II -502210	CO1	Layout-related topics for manufacturing: types of layouts, selection of layout type in a given scenario, ensuring flow of materials in a plant, group technology, and software for designing layouts
	CO2	The students will be able to select appropriate location for establishing industrial plants by applying the concepts of location selection.
	CO3	The students will be able to plan and design plant and production layouts through basic strategies and with computer applications.
	CO4	The students will be able to identify and analyze the problems in the existing layout/ material handling system and shall be able to optimize the layout/ material handling system
	CO5	Carry out the wide range of activities inherent in the design and manufacture of world-class products, including product design, materials selection, manufacturing processes and systems design, and product validation.
	CO6	Aware of the air quality model, its definition, types and description of Gaussian based air quality model for point source along with its application
Elective III -602215	CO1	To explain meshing techniques used for 1D, 2D and 3D components.
	CO2	To carry out static analysis of components based on various boundary conditions.
	CO3	To carry out harmonic response and transient dynamic analyses using various inputs and

			methods.
		CO4	To explain complex Eigen value problems, normal mode theory for preloaded structures.
		CO5	To apply different approaches for fatigue analysis.
		CO6	To identify factors affecting the fatigue, types of fatigue viz. multi-axis fatigue, spot weld fatigue etc.
		CO6	To design and implement Transfer based controller systems using bode plot, open and closed loop controls in frequency domain.
	Optimization Techniques -602213	CO1	To explain the importance of optimization in engineering and classify optimization problems.
		CO2	To apply the mathematical results and numerical techniques of optimization in linear programming.
		CO3	To formulate optimization models in non-linear programming.
		CO4	To analyze and variety of modern methods for various optimization problems
		CO5	To apply some optimization methods and techniques topology related practical problems.
		CO6	To solve evolutionary based optimization models such stiffness, displacement, bi-directional structures.
	Research Methodology -502204	CO1	To understand some basic concepts of research problem and its methodologies.
		CO2	To organize and conduct research using appropriate setup procedure.
		CO3	To select and define appropriate research problem and parameters.
		CO4	To perform modeling of research problem and validate.
		CO5	To construct an effective research proposal that will serve as the launching point for the study you conduct next semester.

Department: MCA

MCA-I SEMESTER-I	Fundamentals of Computer –IT11	CO1	Critical understanding of computer evolution and basic structure of computer
		CO2	Understand the concept of memory, cache memory, internal & external memory
			Ability to perform computer arithmetic operations.
		CO3	State design of Combinational circuits like half/full adder, Multiplexer/Demultiplex
		CO4	Master the concept of operations of processors, its instruction set & addressing modes
		CO5	Ability to design memory organization , concept of cache mapping techniques.
CO6	Ability to understand the concept of		

			processing unit
MCA-I SEMESTER-I	C Programming with Data Structure-IT12	CO1	Describing the basic concept of C data types, keywords,
			built in I/P & O/P functions operators, control statements.
		CO2	Understanding or array, string ,pointers, stack, queue.
			Explain the concept of memory allocation.
		CO3	Design and implement a function , structure and union. Use of File handling in C.
		CO4	Solve problem using different searching and sorting technique.
		CO5	Design and implement an abstract data type such as stack. Applications of stack-
			Expression evaluation and conversion. Concept of Infix, Prefix and Postfix Expression.
CO6	Design and implement an abstract data type such as queue.		
	Realization fo queue using array. Types of queue, Applications of queue.		
MCA-I SEMESTER-I	Software Engineering 0	CO1	Selection of s/w processing model for s/w system by comparing models
		CO2	Analyze the s/w Requirement & carryout feasibility study.
		CO3	Design s/w system using appropriate method.
		CO4	Adopting appropriate Testing Technique for fault/defect finding & quality improvement
		CO5	Scheduling & Planning of s/w system for Risk Management & Cost Estimation
		CO6	Software Standardization and Reliability Estimation.
MCA-I SEMESTER-I	Database Management System 0	CO1	Identify structure of database system using data models and ER models
		CO2	Demonstrate SQL and PL/SQL
		CO3	Provide database design approaches with normalization
		CO4	Define and discuss transaction management, concurrency control,
			query optimization and performance tuning
		CO5	5 Be familiar with various database architectures and applications
CO6	Understandthe usage of modern tools and recent software		
MCA-I SEMESTER-I	Principles andPractices of Management &OB BM11	CO1	understanding the conceptual frame work of management as a discipline.
		CO2	Develop an understanding of how various management thought work together
			to accomplish the objectives of an organization.

		CO3	Understand the processes of developing and implementing information systems.
		CO4	Learn about the importance of managing organizational change associated with information systems implementation.
		CO5	Discuss the various concepts of planning, Decision making and controlling controlling to help solving managerial problems.
		CO6	To develop understand management concepts and styles in Global context.
MCA-I SEMESTER-I	C and DS Lab-IT12L	CO1	Design and implement an abstract data type linked list by using static or dynamic implementations. Application Of link list such as polynomial manipulations.
		CO2	Apply link list concept to solve practical problem.
		CO3	Design and implement an abstract data type.
		CO4	Understand application of linear data structure queue
		CO5	Solve problem using different sorting & searching technique.
MCA-I SEMESTER-I	DBMS LabIIT14L	CO1	Identify structure of database system and design database tables with the help of ER models
		CO2	Understand database techniques such as SQL and PL/SQL
		CO3	Understand RDBMS model, define and discuss transaction management, concurrency control and query optimization
		CO4	Describe various database architectures; compare structured and unstructured databases i.e. SQL and NoSQL
MCA-I SEMESTER-I	Word Power-SS11	CO1	Able to identify their own goals, strengths and weaknesses and thus their opportunities.
		CO2	Able to Speak confidently with the correct pronunciation and accurate language, listen to the speaker with utmost attention, write a structured report of the project at hand & write applications and effective resum
		CO3	Able to dress up professionally for any occasion to make a lasting impression
		CO4	Able to demonstrate the art of speaking effectively and make others speak, get others involved, work together and reach the conclusion to the problem at hand faster.
		CO5	To make communication effective through verbal/oral communication and improve the listening skills.
		CO6	Able to be a professional even under stress.
MCA-II SEMESTER-II	Essentials of Operating System	CO1	Describe the basic components of an operating system and their role in implementations
		CO2	Explain what multi-tasking is and outline

			standard scheduling algorithms for multi-tasking.
	IT21	CO3	Give an overview of system memory management.
		CO4	Explain how file systems are implemented.
		CO5	Understand the security and protection mechanism
		CO6	Discuss the features and strengths of various contemporary operating systems.
MCA-II SEMESTER- II	Web Technologies IT-22	CO1	understand web page site planning, management and maintenance.
		CO2	concepts of developing advanced HTML pages with the help of frames, scripting languages,
			and evolving technologies like DHTML.
		CO3	Implement the role of XML for the management
		CO4	Develop Web based applications by Servlets and JSP to have
			an interactive application such as Client Server Architecture.
		CO5	Develop Graphical User Interface applications and Web based applications in J
ava by importing applet, AWT and SWING packages.			
CO6	Implement the role of XML for the management		
MCA-II SEMESTER- II	Core Java IT-23	CO1	understand the core principles of the Java Language
		CO2	Develop visual tools to produce well designed, effective applications and applets
		CO3	Understand fundamentals of object-oriented programming in Java, including
			defining classes, invoking methods, using class libraries
		CO4	Be able to use the Java SDK environment to create, debug and run simple Java programs
		CO5	ability to write a computer program to solve specified problems.
CO6	aware of the important topics and principles of software development.		
MCA-II SEMESTER- II	Essentials of Networking IT-24	CO1	To learn and understand fundamentals of computer network , network architectures,
			protocols and applications
		CO2	Describe various standard network models.
		CO3	Understand various guided transmission media.
		CO4	Analyse error detection and error correction codes.
		CO5	Understand the concepts behind medium access control sub layer.
CO6	Implement and analyse routing and congestion issues in network design.		

MCA-II SEMESTER- II	Discrete Mathematics MT-21	CO1	Analyse the statements presented in DNF and determine their validity.
		CO2	Examine the validity of argument by using propositional and predicate calculus
		CO3	Apply basic counting techniques to solve the combinatorial problems.
		CO4	Apply sets, relations and digraphs to solve applied problems.
		CO5	Logic, Relations and Functions, Algebraic Functions and Graph
		CO6	Understand the basic concepts of graph theory and some related theoretical problems.
MCA-II SEMESTER- II	Essentials of Marketing * -BM-21 Mini Project using Web Technology IT-22L	CO1	understand the essentiality of Marketing in business Environment.
CO2		comprehend the functionalities of Marketing and IT enabled practices for organizations	
CO1		able to develop a small dynamic web application.	
CO2		Implement the role of XML for the management	
CO3		Implement the role of XML for the management	
CO4		Develop Web based applications by Servlets and JSP to have an interactive application such as Client Server Architecture.	
MCA-II SEMESTER- II	Core Java Lab * IT-23L	CO1	enhance the students Java Programming Skills.
CO2		Understand the Java concepts such as Interfaces, Packages, Exception Handling,	
CO3		Understand the Applet, multithreading, Abstract Windows Toolkit,	
CO4		Understand Java Input Output & Java collection	
MCA-II SEMESTER- II	Soft Skill - Oral Communication* SS-21	CO1	enhance the verbal communication of students.
		CO2	To focus on conversation with colleagues,
		CO3	Focus Dialogues with Higher authorities.
		CO4	To focus on Formal and Informal Conversation, etiquettes
MCA-II SEMESTER- III	Probability & Combinatorics MTC-31	CO1	Count similar things in sophisticated ways.
		CO2	Understand the mathematical underpinnings of probability.
		CO3	Use probability theory to solve interesting problems.
		CO4	Understand probabilities of events and expectations of random variables for elementary problems such as games of chance.
		CO5	Compute fault coverage and reliability in simple hardware and software applications.
		CO6	Formulate hypothesis and carryout appropriate tests to checks its acceptability
MCA-II	Multimedia Tools for	CO1	To Learn and understand various multimedia

			tools
SEMESTER-III	Presentation ITC-31	CO2	Understand the software to make the presentation effective
		CO3	describe the ways in which multimedia information is captured, processed, and rendered
		CO4	introduce multimedia quality of service (QoS) and to compare subjective and objective methods
			of assessing user satisfaction
		CO5	Analyse the utility of QoS management schemes
		CO6	Discuss privacy and copyright issues in the context of Multimedia
MCA-II SEMESTER-III	Soft Skill Presentation SSC-31	CO1	Learn Non verbal communication -Personal appearance - Posture -Gestures -Facial expressions
			-Eye contact-Space distancingBusiness Presentations
		CO2	Understand Preparing successful presentations, Planning for audience Making effective
			use of visual aid, Delivering presentation,
CO3	Introduce Mock presentations. Effective usage of Tools (MS PowerPoint)		
MCA-II	Advanced Data Structure and	CO1	Students are able to write C++ as well as DS programs with CPP using advanced language features
SEMESTER-III	C++ programming T1-IT31	CO2	utilize OO techniques to design C++ programs,
		CO3	Use the standard C++ library, exploit advanced C++ techniques.
		CO4	To introduce various techniques for representation of the data in the real world.
		CO5	To design and implementation of various basic and advanced data structures.
		CO6	To teach the concept of protection and management of data
		MCA-II SEMESTER-III	Design And Analysis of Algorithm T1-IT32
CO2	To create strong logic and problem solving approach in student..		
CO3	Explain fundamental concepts of asymptotic notations of an algorithm		
	divide and conquer techniques.		
CO4	Know various design and analysis techniques such as greedy algorithms, dynamic programming.		
CO5	Apply backtracking, branch and bound techniques for real time problems.		
CO6	Know the concepts of P, NP and NP-Complete problems.		
MCA-II	Object Oriented Analysis	CO1	students will be able to: Understand the issues involved in implementing an object-oriented

			design
SEMESTER-III	And Design TI-IT33	CO2	Analyze requirements and produce an initial design.
		CO3	Develop the design to the point where it is ready for implementation.
		CO4	Design components to maximize their reuse.
		CO5	Learn to use the essential modeling elements in the most recent release of the Unified Modeling Language.
		CO6	Learn to design the blue print of software development
MCA-II	Advance Internet	CO1	To provide extension to web development skills
SEMESTER-III	Technologies T1-IT34	CO2	introduced for student to enhance their skills like HTML 5, XML, jQuery, AJAX and PHP
		CO3	To understand technical aspects of internet technology
		CO4	To learn advanced web technology
		CO5	Students will develop a basic understanding of technologies and protocols used on the Internet
		CO6	Understand how to effectively use Internet tools technologies including current web-based applications
MCA-II SEMESTER-III	DS & C++ Lab T1-IT31L	CO1	Understand hands-on for C++ & DS programs using C++ language learnt
		CO2	Understand the programs based on class, inheritance, abstraction, encapsulation, dynamic binding,
			polymorphism, I/O systems, exception handling
		CO3	Understand the programs DS using C++ assignments should be based on Stacks, Queue, Linked List
CO4	Understand the programs based on Tree , Binary Threaded Tree & Graph program		
MCA-II SEMESTER-III	Mini Project using AIT * T1-IT34L	CO1	To get the practical knowledge of advanced Web Technologies
		CO2	Students should able to develop web based systems using HTML5, XML, PHP, AJAX, JQuery and MySQL.
MCA-II SEMESTER-III	Enterprise Resource Planning T3-IT31	CO1	To learn ERP systems its structure, modules, benefits, implementation and post
			implementation issues through real-life cases
		CO2	To comprehend the technical aspects of ERP systems
		CO3	To be able to map business processes using process mapping techniques
		CO4	To understand the steps and activities in the ERP life cycle
		CO5	To be able to identify and describe typical functionality in an ERP system
CO6	To understand concepts of reengineering and		

			how they relate to ERP system implementa- tions;
MCA-II SEMESTER- III	Data Communication and computer Networks T3-IT32	CO1	Understand Various computer networks, technologies behind networks and application protocols,
		CO2	Understand dvance network technologies like LTE, Cloud computing, Grid computing
		CO3	Recognize the different internetworking devices and their functions.
		CO4	Analyze the services and features of the various layers of data networks.
		CO5	Design, calculate, and apply subnet masks and addresses to fulfill networking requirements.
		CO6	Analyze the features and operations of various application layer protocols such as Http, DNS, and SMTP.
MCA-II SEMESTER- III	Data Warehouse, Mining , BI Tools and Applications T3-IT33	CO1	familiarized with the data-warehousing and data-mining techniques
		CO2	understand the importance of BI in emerging world.
		CO3	Design a data mart or data warehouse for any organization
		CO4	Understand Develop skills to write queries using DMQL
		CO5	Understand Extract knowledge using data mining techniques
		CO6	Understand Explore recent trends in data mining such as web mining, spatial-temporal mining
MCA-II SEMESTER- III	Information Security and Audit T3-IT33	CO1	Understand To create awareness about the values of Information
		CO2	Understand how the Information security practices are meticulously implemented in IT companies worldwide.
		CO3	understanding on basic terminology and concepts related to network and system level security,
		CO4	exposed to basic cryptography, security management, and network security techniques.
		CO5	Understand the designing and auditing a security system at conceptual level.
		CO6	Understand basics of computers and networking including Internet Protocol, routing, Domain Name Service, and network devices.
MCA-II SEMESTER- III	CCN Lab * T3-IT32L	CO1	Understand crimping, setting LAN,WLAN, dealing with network management tools like Pandora, wireshark
		CO2	Understand Virtualization, configuring IP addresses, router configuration, firewall configuration.
MCA-II	BI Tools LAB	CO1	Understand usiness intelligence techniques

			such as MOLAP, data mining, data warehousing
SEMESTER-III	T3-IT33L	CO2	Demonstration on various tools is expected.
		CO3	Understand the Data Mining Techniques to get practical overview of classification, clustering, apriori analysis.
		CO4	Demonstration of Business Intelligence Tool like Pentaho
MCA-II SEMESTER-IV	Optimization Techniques T3-ITC41	CO1	Understand near programming, dynamic programming and related optimization theories to solve real life / simulated problems
		CO2	Understand oncepts of various classical and modern methods of for constrained and unconstrained problems in both single and multivariable
		CO3	Understand the theory of optimization methods and algorithms developed for solving various types of optimization problems
		CO4	develop and promote research interest in applying optimization techniques in problems of Engineering and Technology
		CO5	To apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems.
MCA-II SEMESTER-IV	Research Methodology & Statistical Tools* ITC-42	CO1	identify, understand and solve management problems
		CO2	decision making ability of the manager.
		CO3	To create scientific attitude towards solving a management problem and impart knowledge about tools available for carrying out research with the evidence of statistical techniques.
MCA-II	Soft Skill Interview	CO1	Understand how to write CV-Covering letter (effective usage of MSWord)
SEMESTER-IV	SSC41	CO2	Understand Interviews – Types of Interviews, preparing for interviews (Opening, body-answer Q, close-ask Q), Types of questions, facing interviews, reviewing performance
		CO3	Understand facing interviews, reviewing performance Participating in mock interviews
MCA-II SEMESTER-IV	Advance Java T1-IT41	CO1	Able to do socket programming, develop server side applications with database handling using servlets, JSP, JDBC and Hibernt and Springs framework.
		CO2	provide the ability to design console based, GUI based and web based applications
		CO3	understand integrated development environment to create, debug and run multi-tier and enterprise - level applications
		CO4	Understand concepts, simple graphical user

			interfaces, basic data structures and searching and
			sorting techniques.
MCA-II SEMESTER- IV	Python Programming T1-IT42	CO1	To develop problem solving skills and their implementation through Python
		CO2	To understand and implement concepts of object oriented methodology using Python.
		CO3	Demonstrate significant experience with the Python program development environment.
		CO4	Able to Solve problems requiring the writing of well-documented programs in the Python language, including use of the logical constructs of that language;
MCA-II SEMESTER- IV	Advance DBMS T1-IT43	CO1	able to gain an awareness of the basic issues in objected oriented data models, application
		CO2	familiarize with the data-warehousing and data-mining techniques and other advanced topics.
		CO3	Be familiar with a commercial relational database system (Oracle) by writing SQL using the system.
		CO4	Mater sound design principles for logical design of databases, including the E -R method and normalization approach
MCA-II SEMESTER- IV	Cloud Computing - T1-IT44	CO1	Understand the skills and knowledge to understand how Cloud Computing Architecture can enable transformation, business development and agility in an organization.
		CO2	Understanding the key dimensions of the challenge of Cloud Computing
		CO3	Assessment of the economics , financial, and technological implications for selecting cloud computing for own organization
		CO4	Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud - based applications
		CO5	Assessment of own organizations' needs for capacity building and training in cloud computing-related IT areas
MCA-II SEMESTER- IV	Advance Java Lab * - T1-IT4IL	CO1	Understand the Java concepts such as abstract Windows Toolkit, Java Input Output, Networking, JDBC, RMI ,Java Beans
		CO2	Understand the student to enhance their Java Programming Skills.
MCA-II SEMESTER- IV	Python Programming Lab* -T1-IT42L	CO1	Understand the student to enhance their Python Programming Skills.
		CO2	Understands the python concepts functions, strings, Lists, directories, modules, input

			output,
			exception handling, object oriented concepts
MCA-II	E -Commerce & Knowledge	CO1	understand the concepts & role of e-commerce and Knowledge Management in organization
SEMESTER-IV	Management	CO2	Analyse key themes of techniques & technology to realize more value from knowledge assets.
	T3-IT-41	CO3	Evaluate the role of the major types of information systems in a business environment and their
			relationship to each other
		CO4	Identify the major management challenges to building and using information systems and learn
			how to find appropriate solutions to those challenges
MCA-II	Cyber laws and Intellectual	CO1	understand the Cyber Crime, it's types and the IT Act and Cyber laws
SEMESTER-IV	Property Rights	CO2	analyze statutory, regulatory, constitutional, and organizational laws that affect
	T3-IT42		the information technology professional.
		CO3	apply case law and common law to current legal dilemmas in the technology
			field.
		CO4	apply diverse viewpoints to ethical dilemmas in the information technology field and
			recommend appropriate actions
MCA-II	Customer Relationship	CO1	understand the role of IT or how IT is an enabler for SCM and CRM.
SEMESTER-IV	Management &		
	Supply Chain	CO2	To understand supply chain strategy framework and supply chain strategies
	Management -T3-BM43	CO3	To comprehend the functionalities of CRM in service sector
MCA-II	Software Quality Assurance	CO1	to learn Software Quality Assurance and control
SEMESTER-IV	and Control	CO2	principles of software development emphasizing processes and activities of quality
	T3-IT44		assurance
		CO3	Develops test plans and schedules for a T&QA project
		CO4	Define the scope of SW T&QA projects
MCA-II	Mini Project based on	CO1	Understand the development of mini project using the concepts of CRM and SCM
SEMESTER-IV	CRM & SCM *	CO2	demonstrate the ability to apply analytical tools to service operations and
	T3-IT43L		select appropriate production processes.
		CO3	demonstrate knowledge of the supply chain management concepts including facility location
			and capacity allocation, supplier relationships, and optimization approaches.

		CO4	demonstrate the ability to develop models to support decision-making.
MCA-II	Software Quality Assurance	CO1	Understand the project scheduling Project planning and installation techniques
SEMESTER-IV	& Control Lab* T3-IT44L	CO2	Understand the planning activity according to the basic profile of ISO/IEC 29110, perform a desk check of the project plan
		CO3	Learn tools and set up the working environment
		CO4	Analysis and documentation of requirements
MCA-III SEMESTER-V	Software Project Management ITC51	CO1	To learn process of software project management, cost estimation
		CO2	use of project Management tools, configuration management, user roles and software teams.
		CO3	Understand the fundamental principles of Software Project management & will also have a good knowledge of responsibilities of project manager and how to handle these
		CO4	Be familiar with the different methods and techniques used for
MCA-III SEMESTER-V	Project * ITC51P	CO1	Understand all requirements, do the analysis of the requirements of project. Student should prepare the SRS of the project. Student should complete the project up to design phase of SDLC.
		CO2	Able to document and present one's work with strict requirements on structure, format, and language usage
		CO3	To apply relevant knowledge and skills, within the main area, to a given problem
MCA-III SEMESTER-V	ASP .Net using C# T1-IT51	CO4	Analyze and discuss complex inquiries/problems and handle larger problems on the advanced level within the main area
		CO1	Understand the application development technology currently available.
		CO2	Understand the Set up a programming environment for ASP.net programs
		CO3	Understand the fundamentals of developing modular application by using object oriented methodologies
		CO4	Develop a data driven web application.
MCA-III SEMESTER-V	Service Oriented Architecture T1-IT52	CO1	To gain understanding of the basic principles of service orientation
		CO2	To learn service oriented analysis techniques
		CO3	To learn technology underlying the service design
		CO4	To learn advanced concepts such as service composition, orchestration and Choreography

MCA-III SEMESTER- V	Big Data Analytics T1-IT53	CO1	To Understand the Big Data challenges & opportunities ,its applications
		CO2	Gain conceptual understanding of NOSQL Database.
		CO3	Understanding of concepts of map and reduce and functional programming
		CO4	Gain conceptual understanding of Hadoop Distributed File System.
MCA-III SEMESTER- V	Mobile Application Development T1-IT54	CO1	Understand and apply the key technological principles and methods for delivering and maintaining mobile applications,
		CO2	Evaluate and contrast requirements for mobile platforms to establish appropriate strategies for development and deployment,
		CO3	Develop and apply current standard-compliant scripting/programming techniques for the successful deployment of mobile applications targeting a variety of platforms
		CO4	investigate the leading edge developments in mobile application development and use these to inform the design process.
MCA-III SEMESTER- V	Mini Project using ASP .Net* T1-IT51L	CO1	student should design dynamic website using asp.net using c#. Visual Studio 2010 is strongly Preferred.
MCA-III SEMESTER- V	Mini Project Using Mobile Application Development * T1-IT54L	CO1	Enhance their Android Programming Skills. Android concepts such as Views and view groups,
			Layouts, Creating Menus Intents, Adapters, Dialogs, location based services, file handlings,
			CRUD operation on SQLite, Gtalk, Audio, Video can be included.
MCA-III SEMESTER- V	Software Testing & Tools T3-IT51	CO1	To enable student to learn Software Testing Tools good practices with the help of various software testing techniques and tools and case studies.
		CO2	To analyze a problem and identify the computing requirements appropriate for its Solution.
		CO3	Apply software testing techniques in commercial environments and assess the adequacy of test suites using control flow, data flow, and program mutation.
		CO4	Use industry-standard testing tools such as IBM Rational Functional Tester.
MCA-III SEMESTER- V	Entrepreneurship Development	CO1	provide students with the knowledge, skills and motivation required to encourage entrepreneurial success and lay down the conditions and

	T3-BM52		solutions to the challenges that one might foresee in a venture.
MCA-III SEMESTER- V	Decision Support System T3-IT53	CO1	To learn DSS, DSS Tools, DSS implementation and impacts and Enterprise DSS.
		CO2	understand the usefulness of decision support systems arising in the practice of industrial and
			systems engineering
		CO3	understand the issues that arise in the conceptual development and implementation of
effective and user friendly decision support systems			
CO4	design, develop, and implement integrated decision support systems for industrial		
MCA-III SEMESTER- V	Business Architecture T3-IT54	CO1	Understand broad framework that covers the range of architecture work that precedes and steers System development
		CO2	to focus attention on the areas where the architect is responsible for effective design and Risk Management
MCA-III SEMESTER- V	CASE Tools Lab* T3-IT51L	CO1	To make student accustom with various automated tools used for Software Design and Development, Testing, Project Management etc.
MCA-III SEMESTER- V	Activities based on Entrepreneurship Development * T3-BM52L	CO1	To get motivation to become an entrepreneur.
		CO2	To get the knowledge of how the business can run.
		CO3	To know the procedure of financiers to raise finance
MCA-III SEMESTER- VI	Open subject relevant for each TRACK* ITC61	CO1	Common Subject Track Wise
MCA-III SEMESTER- VI	Project ITC61P	CO1	External Project *
Department : MBA			
Class-Semester	Course Name		CO
SEM I	Accounting for Business decisions	CO1	To understand the basic concepts of financial accounting, cost accounting and management accounting
		CO2	To know various tools from accounting and cost accounting this would facilitate the decision making
		CO3	To develop analytical abilities to face the business situations
		CO4	To understand the cost control systems
		CO5	To Analyze the decision Making Tool
	Economic Analysis for	CO1	To equip the students of management with

Business Decisions		time tested tools and techniques of managerial economics to enable them to appreciate its relevance in decision making
	CO2	To explore the economics of information and network industries and to equip students with an understanding of how economics affect the business strategy of companies in these industries
	CO3	To develop economic way of thinking in dealing with practical business problems and challenges
	CO4	To know the Demand Supply Position of the Market
	CO5	To know the Money Market & Capital Market
Legal Aspects of Business	CO1	Understanding the Indian Contract Act 1871, Analyzing essential elements of a valid contract, performance, discharge and breach of contract, Evaluating contract of indemnity and contract of Guarantee, Understanding Surety and co- surety, their rights and liabilities and discharge of surety Analyzing Agency, Principal and agent relationship
	CO2	Understanding Sale of Goods act 1930 Evaluating conditions and warranties, Analyzing rights of unpaid seller, Understating transfer of property or ownership
	CO3	Understanding the Negotiable Instruments Act, 1881 Evaluating negotiation and types of endorsement, Analyzing dishonor of negotiable instruments
	CO4	Understanding Companies Act 1956, Analyzing memorandum of association, articles of association and prospectus, Understand share capital, types of share capital, buy back shares etc
	CO5	Analyzing the Consumer Protection Act and studying Patent, Copyright act and Trademark Act
Business Research Methods	CO1	To understand the concept and process of business research in business environment
	CO2	To know the use of tools and techniques for exploratory, conclusive and causal research
	CO3	To understand the concept of measurement in empirical systems
	CO4	To use statistical techniques for analysis of research data
	CO5	Analyzing the tools of research
Organizational Behavior	CO1	To gain a solid understanding of human behavior in the workplace from an individual, group, and organizational perspective
	CO2	To obtain frameworks and tools to effectively analyze and approach various Organizational situations
	CO3	To reflect upon your own beliefs, assumptions, and behaviors with respect to

		how individuals, groups, and organizations act in order to expand your options of approaches and increase your own effectiveness
	CO4	To use organizational structure
	CO5	To utilize the best practices of OB
Basics of Marketing	CO1	To introduce marketing as a business function and a philosophy
	CO2	To emphasize importance of understanding external environment in marketing decision making
	CO3	To expose students to a systematic frame work of marketing & implementations and to highlight need for different marketing approaches for services, goods, and for household consumers, organizational buyers
	CO4	To Understand the Market segmentation
	CO5	To Understand the Promotional Activity of Marketing
Business Communication Lab	CO1	To acquaint the students with fundamentals of communication and help them to transform their communication abilities
	CO2	To help the students to acquire some of the necessary skills to handle day-to-day managerial responsibilities, such as - making speeches, controlling one-to-one communication, enriching group activities and processes, giving effective presentations, writing letters, memos, minutes, reports and advertising, and maintaining one's poise in private and in public
	CO3	To build the students' confidence and to enhance competitiveness by projecting a positive image of themselves and of their future
	CO4	Able to identify the barriers to communication
	CO5	Able to analyze Communication Skills
MS-Excel & Advance Excel Lab	CO1	To familiarize Students with basic to intermediate skills for using Excel in the classroom vis-à-vis Business Applications
	CO2	To provide students hands on experience on MS Excel Utilities
	CO3	To gain proficiency in creating solutions for Data Management and Reporting
	CO4	To use data Tab & Data Tabulation
	CO5	Able to utilize the tools for analyzing the data
Selling & Negotiable Lab	CO1	To imbibe in the students, critical sales competencies that drive buying decisions
	CO2	To give insights into how to boost individual and organizational productivity through effective sales lead management
	CO3	To introduce basic theoretical principles and practical steps in the negotiating process

	Personality development Lab	CO4	To understand the negotiable tools & techniques
		CO5	To use the techniques of selling & Negotiations
		CO1	To develops an orientation towards business etiquettes and the proper etiquette practices for different business scenarios
		CO2	To learn the etiquette requirements for meetings, entertaining, telephone, and Internet business interaction scenarios
		CO3	To minimize nervousness while in social situations
		CO4	To develop the Attitude & perceptions towards positive ways
SEM II	Marketing Management	CO 1	To introduce the concept of Marketing Mix as a framework for Marketing Decision making
		CO2	To emphasize the need, importance and process of Marketing Planning and Control
		CO3	To sensitizes the students to the dynamic nature of Marketing Function
		CO4	Setting pricing objectives, Determining demand
		CO5	Identifying target audience, determining communication objectives, designing the communications
	Financial Management	CO1	To understand various concepts related to financial management
		CO2	To study in detail, various tools and techniques in the area of finance
		CO3	To develops the analytical skills this would facilitate the decision making in Business situations
		CO4	Understanding Cash flow statement – Difference between Cash flow and Fund flow statement, Ratio analysis (computation
		CO5	Components of working capital, operating cycle, types of working capital, Sources of Working Capital Financing, Factors affecting working capital
	Human Resource Management	CO1	To understand the role of HRM in an organization
		CO2	To learn to gain competitive advantage through people
		CO3	To learn to study and design HRM system
		CO4	Use of performance data, measurement process
		CO5	Industrial Relations & Disputes, Grievance Procedure, Termination, Resignation, downsizing, Lay off Retirement
	Decision Science	CO 1	To understand role of quantitative techniques in managerial decision making
		CO2	To understand process of decision problem formulation

	CO3	To understand applications of various quantitative techniques in managerial settings
	CO4	Concept, 2 by 2 zero sum game with dominance, Pure & Mixed Strategy
	CO5	Able Calculating EST, LST, EFT, LFT, Slack & probability of project completion
Operations & Supply Chain Management	CO1	To develop an understanding of the strategic importance of Operations & SCM and how it can provide a competitive advantage in the marketplace
	CO2	To understand the relationship between Operations & SCM and other business functions, such as Marketing, Finance, Accounting, and Human Resources
	CO3	To develop knowledge of the issues related to designing and managing Operations & SCM and the techniques to do so
	CO4	Able Classification of material - ABC Analysis -VED, HML, FSN, GOLF, SOS
	CO5	Generalized Supply Chain Management Model - Key Issues in SCM – Collaboration, Enterprise Extension, responsiveness, Cash to Cash Conversion
Management Information Systems	CO1	To develop conceptual understanding about latest developments in the field of Information Technology and the impact of IT in managing a business
	CO2	To learn to use Information Technology to gain competitive advantage in business
	CO 3	To learn from, with a view to emulate, entrepreneurial ventures in e-Commerce and m-Commerce
	CO 3	Understanding MIS Model for a digital firm – Organization Structure for digital firm
	CO4	Analyze Information Security and Control - Quality
Life Skill Lab	CO1	To encourage students to develop and use balanced self-determined Behavior
	CO2	To help students in enhancing self, increasing life satisfaction and Improving relationships with others
	CO3	To develops new ability to practice new problem solving skills in group and use these skills in personal life
	CO4	To Interpersonal influences on Moral development
	CO5	Memorization such as rehearsal and role learning
Geopolitics and World economic System	CO1	To expose students to the relationship between political power and geographic space amidst world economic system
	CO2	To help students understand various facets of international political economy & national system political economy

		CO3	To develop abilities to appreciate the interrelationship between the trading system, international financial system and the participants in the changed economic system
		CO4	The International Financial System - Reform of International Monetary Affairs - Nature of Financial Crises
		CO5	Do Global Corporations Pose a Threat - Consequences of Economic Globalization
	Business System & Procedure	CO1	To understand Business as an integrated system
		CO2	To develop process thinking for developing procedures
		CO3	To make students aware of various business functions & responsibilities
		CO4	Use of Automation Systems – Use of technologies such as Bar Coding, RFID etc
		CO5	Knowledge for Improvement and Writing SOP's for an entire range of activities for a segment in a manufacturing/ service organization
	Computer Aided and productivity Tools Lab	CO1	To gives students mastery of MS Office
		CO2	To enhance personal productivity through advanced features of MS Word, MS Excel & MS PowerPoint
		CO3	To impart skills of using MS Outlook and basic social networking tools
		CO4	Uses of Excel For Marketing & Statistics - Creating Business Solutions
		CO5	Creating Blogs, Using LinkedIn, and other academics and Business websites Networking, Surveys, Discussions, Business Information
SEM III	Strategic Management	CO1	To expose participants to various perspectives and concepts in the field of Strategic Management
		CO2	To help participants develop skills for applying these concepts to the solution of business problems
		CO3	To help students master the analytical tools of strategic management
		CO4	To help student to understand Competitive Strategies Grand Strategies
		CO5	To understand various Organization Structures for Strategy Implementation
	Enterprise Performance Management	CO1	To acquaint the students with a perspective of different facets of management of an enterprise
		CO2	To provide inputs with reference to the Investment Decisions along with the techniques for those decisions
		CO3	To inculcate the evaluation parameters of

		enterprise in terms of expenses, control systems and pricing
	CO4	To develop the knowledge of the concept of auditing and its applicability as performance management tool
	CO5	To understand the performance parameters for projects and To understand the performance parameters for Non-Profit
Start up and New venture management	CO1	To instill a spirit of entrepreneurship among the student participants
	CO2	To provide an overview of the competences needed to become an entrepreneur
	CO3	To give insights into the Management of Small Family Business
	CO4	To understand the Role of Support Institutions and Management of Small Business
	CO5	To understand the various cases on New Venture
Contemporary marketing research	CO1	To give the students an understanding of marketing research from both user's (management) and doer's (the researchers) perspective
	CO2	To design and produce, evaluate a research proposal & understand the quality of research studies
	CO3	To learn the basic skills to conduct professional marketing research
	CO4	To understand the applications of business research tools in Marketing decision making
	CO5	To understand the applications of business research tools in Marketing decision making
Consumer Behavior	CO1	To highlight the importance of understanding consumer behavior in Marketing
	CO2	To study the environmental and individual influences on consumers
	CO3	To understand consumer behavior in Indian context
	CO4	To understand Consumer Decision Making
	CO5	To Understand Consumer Behavior Models
Integrated Marketing Communication	CO1	Understanding the concept of Marketing and its implication in business
	CO2	Analyze the promotional activity and study the issue of industry
	CO3	Knowledge of various communication aspects of marketing
	CO4	Able to classify the "Market" in Different Segmentation and indentify the business opportunities in each segment
	CO5	To know the role advertising in marketing
Product Management	CO1	To make the students appreciate the various facets of the job of a product
	CO2	To highlight the strategic role of product management in organizational and functional context

	CO3	To emphasize the financial and other metrics of effective product management
	CO4	Able to Developing Product Strategy:
	CO5	Able to analyze Financial Analysis & Performance Appraisal for Product Management
Agri Marketing	CO1	Understanding the concept of Agricultural Marketing and its implication in Agricultural sector
	CO2	Analyze the agri industry and study the issue of industry
	CO3	Knowledge of various aspects of agricultural industry and its standardization
	CO4	Able to classify the “Market” in Different Segmentation and indentify the business opportunities in each segmentation
	CO5	To know the role of various APMC, APEDA, WTO Agri produce marketing
Business to Business Marketing	CO1	Understand the B2B Marketing Procedure
	CO2	Analyze the market condition with using industrial marketing objectives
	CO3	To ascertain the cost of the Product
	CO4	Knowledge on Personal Selling
	CO5	Analyze the cost benefit analysis
Direct Taxation	CO1	To understand the basic concepts in Income Tax Act, 1961
	CO2	To Calculate Gross Total Income and Tax Liability of an Individual
	CO3	To acquaint with online filling of various forms and Returns
	CO4	Able to understand various heads in income tax
	CO5	Able to describe deductions to be made in income tax
Financial System of India, Markets and Services	CO1	Understanding the Financial system of India and various markets
	CO2	Analyzing the role of RBI and SEBI in the financial Market
	CO3	To Differentiate between Money Market and Capital Market and Stock Exchange
	CO4	Knowledge on Merchant banking, Venture capital and Mutual Fund
	CO5	Analysis of CRISIL and Lic and Gic
Corporate finance	CO1	Understand the Goals & Governance of the firm
	CO2	Analyze the business valuation methods
	CO3	Analyze the three major factors of corporate governance
	CO4	Knowledge on dividend decisions
	CO5	Understand the corporate restructuring
Treasury Management	CO1	Understand the Goals & Objectives of treasury management
	CO2	Analyze the funds of management

	CO3	Analyze the three major factors of cash management systems
	CO4	Knowledge on internal control systems\
	CO5	Understand the role of treasury management
Financial Instrument and Derivatives	CO1	To Differentiate between Money Market and Capital Market and Stock Exchange
	CO2	Understanding the Financial system of India and various markets
	CO3	Analyzing the role of RBI and SEBI in the financial Market
	CO4	Knowledge on Merchant banking, Venture capital and Mutual Fund
	CO5	Analysis of CRISIL and Lic and Gic
labour and social security Laws	CO1	To understand fundamentals of Introduction to Labour Legislation
	CO2	To Study Laws on Working Conditions
	CO3	To Analyzing Wages & Labour Laws
	CO4	To differentiate Laws for Labour Welfare
	CO5	Knowledge on Social Security Laws
Human Resource Accounting and compensation mgt	CO1	To orient the students with the concepts related to human resource accounting & compensation management
	CO2	To facilitate learning related to human resource accounting & compensation management for employees
	CO3	Able to explain the techniques hr auditing and accounting
	CO4	Able to illustrate compensation introduction
	CO5	Able to explain issues related to compensation
Employee health and safety and welfare	CO1	Understanding the concept of Human Resources Management and its implication in organization
	CO2	Analyze the HR industry and study the process of HR
	CO3	Knowledge of various Acts and Laws of employee safety
	CO4	Able to identify the risk & recovery factor related to health & safety
	CO5	To know The Air Prevention and Control Act 1981, The Water Prevention and Control Act 1974 , The Environment Protection Act 1
Compensation management	CO1	To make the HR PROFESSIONAL understand the nuances of the crucial issues in compensation management
	CO2	To study various techniques of employee retentions
	CO3	To acquaint students with various salary structures
	CO4	Able to calculate Cost to the Company
	CO5	Able to calculate EXECUTIVE COMPENSATION
Hr audit	CO1	Understand the basic concepts of HR audit

	CO2	Learn the tools & techniques of required implementation
	CO3	To know the HR Audit Methodology
	CO4	Knowledge on effectiveness of HR audit
Essentials of Supply chain management	CO1	Understanding the supply chain strategy
	CO2	Analyzing the role managing sc for strategic fit
	CO3	Knowledge on expanding strategic scope
	CO4	Knowledge on Strategic Partnerships & Alliances
	CO5	Analysis of Supply Chain Challenges – Strategies for the future
Logistics Management	CO1	Understanding the logistics management strategy
	CO2	Analyzing the Micro dimensions of logistics
	CO3	Knowledge on Approaches of analyzing logistics systems
	CO 4	Knowledge on Logistics Relationships
	CO 5	Analysis of Service Response Logistics
Inventory management	CO1	Able to describe sources and effects of noise and air pollution, evaluate its quality as per BIS
	CO2	Able to identify a suitable water intake structure, describe water supply scheme and define water demand for a community
	CO3	Able to design Aeration and Sedimentation processes with due importance to quality of water as per BIS
	CO4	Able to design Coagulation, Flocculation and Filtration processes used for raw water treatment
	CO5	Able to describe disinfection, water softening methods, demineralization, adsorption along with fluoridation and defluoridation techniques
	CO6	Able to describe Rain water harvesting, packaged Water treatment plant and determine the capacity of ESR
Six sigma	CO1	Understanding the SIX SIGMA PROCESS
	CO2	Analyzing the role of Six Sigma methodology
	CO3	Knowledge on Six Sigma Impact measurement
	CO4	Knowledge on Six Sigma in non-manufacturing environment
	CO5	Analysis of Projects in Six Sigma-Use of DMAIC Cycle
Supply Chain Planning	CO1	Understanding the supply chain strategy
	CO2	Analyzing the role managing sc for strategic fit
	CO3	Knowledge on expanding strategic scope
	CO4	Knowledge on Strategic Partnerships & Alliances

	CO5	Analysis of Supply Chain Challenges – Strategies for the future
Supply Chain Coordination	CO1	Understanding the coordination in supply chain strategy
	CO2	Analyzing the role managing for strategic fit
	CO3	Knowledge on expanding strategic scope
	CO4	Knowledge on Strategic Partnerships & Alliances
	CO5	Analysis of Supply Chain Coordination
IT Management	CO1	To understand legal provisions of Information Technology Act, 2000
	CO2	To know Case Law and practical ramifications of the Act
	CO3	To develop understanding of managerial aspects so as to use Information technology effectively and efficiently
	CO4	To appreciate IT Management as an independent and important field of work, different from IT for Management
	CO5	To Analyze the decision Making Tool
E-Business	CO1	To appreciate e-Business as a significant business segment of the future
	CO2	To develop capacity to initiate/lead an e-business venture/ business segment
	CO3	To understand principles of BI and Analytics at conceptual level
	CO4	To develop skills to design BI and Analytics projects
	CO5	To know the E-Business strategy
Software Engineering	CO1	To develop theoretically sound understanding of Software Engineering Methods
	CO2	To develop understanding of object oriented software Engineering
	CO3	To develop ability to represent diagrammatically and in descriptive form, software engineering schemas
	CO4	To Know the software testing uses
	CO5	Analyzing the Data structure with tabulation of engineering
Mobile computing with Android	CO1	To understand technical aspects of M-computing
	CO2	To appreciate impact of M-computing on Information Technology scenario
	CO3	To understand M-computing applications; initiate new applications
	CO4	To use statistical techniques for analysis of research data
	CO5	Analyzing the tools of data computing
E-Learning	CO1	To understand e-learning as an emerging educational technology
	CO2	To learn use of tools/ technologies used for e-learning based pedagogy
	CO3	To develop capability to initiate e-learning project(s)

	CO4	To use learning structure
	CO5	To utilize the best practices of learning process
Technical Writing	CO1	To understand Technical Writing at conceptual level
	CO2	To learn tools and techniques as well as approaches to technical writing
	CO3	To develop expertise with a view to taking up technical writing as a career
	CO4	To Understand the writing skills technically
	CO5	To Understand the technical process with using ICT
Planning & Control Management	CO1	To give an overview of Planning & Control of Operations
	CO2	To explains the role of forecasting in the operations planning process
	CO3	To explain the need for aggregate planning and the steps in aggregate planning
	CO4	To explain how is capacity planning done in organizations and what is its relationship with MRP
	CO5	To highlight the importance of scheduling in operations management
Inventory Management	CO1	To give an overview of various aspects of inventory
	CO2	To explain the impact of types of inventory costs on inventory management decisions
	CO3	To explain the principles of JIT
	CO4	To use the techniques of inventory
	CO5	Able to utilize the tools for analyzing the data
Six Sigma	CO1	To provide a comprehensive understanding of six sigma
	CO2	To introduce the six sigma methodology and philosophy
	CO3	To learn how to manage change and sustain benefits
	CO4	To learn how to listen and map customer requirements
	CO5	To start executing and delivering project
Maintenance Management	CO1	To understand importance and role of Maintenance Management
	CO2	To acquaint with various alternatives of Maintenance Management
	CO3	To understand use of decision tools for Maintenance Management
	CO4	To develop the decision tools
	CO5	To understand the fundamental tools of the business
Productivity Management	CO1	To understand and appreciate significance of productivity management
	CO2	To study various productivity management methods
	CO3	To learn applicability of popular productivity management tools

		CO4	To study the techniques of work Measurement
		CO5	To Use the techniques of Productivity Management
	Project Management	CO1	To provide the students with a holistic, integrative view of Project Management
		CO2	To highlight the role of projects in modern day business organizations
		CO3	To sensitize the students to complexities of project management