2.6.1 – Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

Program Outcomes

The students in the Information Technology course will attain:

a. an ability to apply knowledge of mathematics, computing, science, engineering and technology;

b. an ability to define a problem and provide a systematic solution with the help of conducting experiments, analyzing the problem and interpreting the data;

c. an ability to design, implement, and evaluate a software or a software/hardware system, component, or process to meet desired needs within realistic constraints;

d. an ability to identify, formulate, and provide systematic solutions to complex engineering/Technology problems;

e. an ability to use the techniques, skills, and modern engineering technology tools, standard processes necessary for practice as a IT professional;

f. an ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems with necessary constraints and assumptions;

g. an ability to analyze and provide solution for the local and global impact of information technology on individuals, organizations and society;

h. an ability to understand professional, ethical, legal, security and social issues and responsibilities;

i. an ability to function effectively as an individual or as a team member to accomplish a desired goal(s);

j. an ability to engage in life-long learning and continuing professional development to cope up with fast changes in the technologies/tools with the help of electives, professional organizations and extra-curricular activities;

k. an ability to communicate effectively in engineering community at large by means of effective presentations, report writing, paper publications, demonstrations;

l. an ability to understand engineering, management, financial aspects, performance, optimizations and time complexity necessary for professional practice;

m. an ability to apply design and development principles in the construction of software systems of varying complexity.

PSOs

PSO1	Students should be able to apply knowledge of mathematics, calculus-based physics and chemistry to Identify, formulate and solve engineering problems.
PSO2	Students should be able to design and execute various Civil Engineering structures, systems and components within realistic constraints.
PSO3	Students should contribute to fundamental as well as applied research in Civil Engineering and engage in lifelong learning.

B.E

401 001 Environmental Engineering II

CO1: Graduates should gain and understand basic concepts of building construction and foundation types, their suitability and failure.

CO2: Graduates should understand brick and block masonry construction.

CO3: Graduates should be able to learn types, suitability and construction details of various flooring and roofing material.

CO4: Graduates should learn about installation, specification and types of doors, windows arches and lintels.

CO5: Graduates should gain knowledge of planning, design and construction of various vertical circulations.

CO6: Graduates should demonstrate awareness of safety in construction. Should gain detail knowledge about various miscellaneous material.

401002 Transportation Engineering

CO1 To become acquainted Plan highway networks

CO2 To be able to Design highway geometrics

CO3 To be able to Design Intersections and prepare traffic management

plans

CO4 To be aware of pavement materials

CO5 To become familiar with Design flexible and rigid pavements.

CO6 Understand the principles of construction and maintenance of

highways

401004 Elective I: ARCHITECTURE AND TOWN PLANNING

CO 01: Graduates should gain and understand basic concepts of town

planning.

CO2: Graduates should be able to understand landscape architecture.

CO3: Graduates should be able to understand the concept of urban design, sustainable development and city development.

CO4: Graduates should able to understand the planning agencies and traffic transportation system.

CO5: Graduates should be able to understand smart city approach

401004 Elective I - Advanced Concrete Technology

CO 01. To understand the basic concepts of Cement & Concrete.

CO 02. To understand and study the various types of special Concrete.

CO 03. To understand and study the Mix design of special Concrete.

CO 04. To study the basic concept of fibre reinforced concrete.

CO 05. To study the various special fibre reinforced concrete

CO 06. To know and understand the various properties of Ferrocement.

401 005 Elective II

Total Quality Management

CO 01. To understand the concept of Quality

CO 02. To understand the Implication of Quality on Business

CO 03. To Implement Quality Implementation Programs

CO 04. To have exposure to challenges in Quality Improvement Programs

401007 Dams and Hydraulic Structures

CO 01. Student should able to understand the purpose of estimating and mode of measurements.

CO 02. Student should able to understand the methods of taking out quantities using IS 1200 rules.

CO 03. Student should able to understand the specifications and analysis of rates.

CO 04. Student should able to understand the methods of executing works and tenders.

CO 05. Student should able to understand the contracts and conditions of contracts.

401008 Quantity Surveying, Contracts and tenders

CO 01. Student should able to understand the purpose of estimating and mode of measurements.

CO 02. Student should able to understand the methods of taking out quantities using IS 1200 rules.

CO 03. Student should able to understand the specifications and analysis of rates.

CO 04. Student should able to understand the methods of executing works and tenders.

CO 05. Student should able to understand the contracts and conditions of contracts.

401 009 Elective III

Air Pollution and Pollution

CO 01 :- Introduction of major problems in indoor air pollution and control, regulations

CO 02 :- Familiar with regulations pertinent to air pollutions

CO 03 :- Describe general air pollution problems, meteorological definitions, air transport equations and pollution control matters and devices

CO 04 :-The contents involved the knowledge of causes of air pollution.

CO 05 :- The contents involved the knowledge of health related to air pollution.

CO-06:- To develop skills relevant to control of air pollution.

401 010 Elective IV

Construction Management

CO 01 :- To apply business and management skills in positions within the construction industry.

CO 02 :- To apply technical skills and knowledge in mathematics, science, construction, and technology in support of planning, analyzing, and solving construction problems.

CO 03 :- To use industry resources including associations and organizations, professional publications, and governmental data to analyze, evaluate, and apply current trends within the industry.

CO 04 :- To manage a quality construction project from start to completion while maintaining budget, schedule, and safety requirements.

CO 05 :- To analyze, evaluate, and select computer applications for the purpose of efficient and effective project management.

T. E.

301001 Hydrology and water resource engineering.

CO 01 :- Various components of hydrologic cycle that affect the movement of water in the earth

CO 02 :- Various Stream flow measurements technique

CO 03 :- the concepts of movement of ground water beneath the earth

CO 04 :- the basic requirements of irrigation and various irrigation techniques, requirements of the crops

CO 05 :- Basic components of reservoir planning works.

CO 06 :- Apply mathematics, science, and technology in the field of water resource Engineering

301002 Infrastructure Engineering and Construction Techniques

CO-1: To understand the meaning and scope of Infrastructure Engineering, basic concepts of Railway Engineering.

CO-2: To understand and study the various details of Railway Engineering.

CO-3: To understand and study the various Construction Techniques. [III]

CO-4: Get acquainted Tunneling construction methods. [IV]

CO-5: To study the various types of Docks & Harbors. [V]

CO-6: To know and understand the various Construction Equipments. [VI]

301003 Structural Design-I

CO 1: Student should able to understand the Philosophy of limit state design & To understand the design of various Tension members.

CO 2 Student should able to understand the design of various Compression members in steel Structure.

CO 3 Student should able to understand the design of various column bases in steel Structure.

CO 4 Student should able to understand the design of Beam and beam to column.

CO 5 Student should able to understand the design of Welded plate girder in steel Structure.

CO 6 Students are able to acquire the knowledge and skill of analyzing different Types of Trusses and design.

301004 Structural Analysis-II

CO 01. Graduates should understand analysis of beams and frames by slope and deflection method

CO 02. Graduates should understand analysis of beams and portal frames by moment distribution method

CO 03. Graduates should be able to learn fundamental concepts of flexibility method of analysis

CO 04. Graduates should learn about the fundamental concepts of stiffness method of analysis

CO 05. To learn Finite Difference Method & Approximate methods of analysis of multi-storied

CO 06. Graduates should analysis Finite element method & shape functions

301005 Fluid Mechanics-II

CO 01. Study the flow around the Streamlined Structure

CO 02. Understand the concept for open channel section and criteria for Economical section

CO 03. Design of hydraulic parameter of Open channel

CO 04. Design and understand the capacity of pump and its functioning

CO 05. Design and understand the capacity of Turbine and its functioning

CO 06. Understand concept and design energy dissipation of GVF and RVF

301007 Advanced Surveying

CO-1: Student should able to understand the concept of trigonometric leveling and shouldable to apply various corrections with handeling the instrument.

CO-2: Student should able to use Nautical Sextant to measure angles on field.

CO-3: Student should able to understand concepts of Aerial photogrammetry and remote sensing and adjustment of geodetic quadrilateral.

301008 Project Management and Engineering Economics

CO 1 Enable them to formulate and analize project management and engineering economics problems

CO 2 To enable them to plan and schedule the projects

CO 3 To aware about various resources available and to plan site while considering various parameters.

CO 4 To explain them concept of project monitoring and controlling

CO 5 To learn the concepts of economics and enable them to use in projects.

CO 6 To describe project appraisal and various terminologies associated with it.

301009 Foundation Engineering

CO 01 :-Identify a suitable foundation system for a structure.

CO 02 :-Evaluate the importance of raft foundation and principles of design for buildings and tower structures.

CO 03 :-Analyse and design pile foundations.

CO 04 :- Examine and discuss various machine foundations.

CO 05 :-Analyse and design Sheet piles and cofferdams.

301011 Environmental Engineering-I

CO 1 Know about Noise Pollution, Air Pollution and Solid Waste Management.

CO 2 Know about Water supply scheme and quality and demand of water.

CO 3 Understand the principles of water treatment operations and processes (Aeration and sedimentation).

CO 4 Understand the principles of Coagulation, Flocculation and Filtration.

CO 5 Understand the mechanism of Disinfection and Water softening.

CO 6 Understand the Water distribution system and Rainwater harvesting.

S. E.

201001 Building Technology and Materials

CO1 Graduates should gain and understand basic concepts of building construction and foundation types, their suitability and failure.

CO2 Graduates should understand brick and block masonry construction.

CO3 Graduates should be able to learn types, suitability and construction details of various flooring and roofing material.

CO4 Graduates should learn about installation, specification and types of doors, windows arches and lintels.

CO5 Graduates should gain knowledge of planning, design and construction of various vertical circulations.

CO6 Graduates should demonstrate awareness of safety in construction. Should gain detail knowledge about various miscellaneous material.

207001Engineering Mathematics III

CO 01 :- Ordinary and Partial differential equations applied to structural analysis and fluid

dynamics in civil engineering.

CO 02 :- Numerical methods for analyzing problems in hydraulics, geotechnics and structures

in civil engineering.

CO 03 :- Statistical methods such as correlation, regression analysis and probability theory for

experimental data to quantify risk and safety in their designs.

CO 04 :- Vector differentiation and integration applied to problems in fluid mechanics.

201006 Surveying

CO1   Student should be able to understand the basic concepts of surveying, basic operations and applying on the field by using Prismatic Compass & Plane Table [I]

CO2   Student should be able to understand the Various aspect of leveling and contouring and to apply them on field using Leveling Instruments [II]

CO3   Student should be able to apply theodolite for angular and linear measurements in horizontal and vertical planes and should be able to compute consecutive and independent coordinates of theodolite traverse stations. [III]

CO4   Student should be able to understand the different types of curve and should be able to design the curves and setting out them by various methods .[IV]

CO5   Student should be able to test and identify the operative condition of theodolite and should be able to carry out its permanent adjustments and should be able to apply tachometry techniques to analyses the horizontal and vertical distances of the distant objects [V]

CO6   Students should be able to apply survey techniques in various construction felids and should be in position to operate and apply total station in field survey.[VI]

201002 Strength of Materials

CO 01 :- Compute different type of stresses in determinate, indeterminate, homogeneous and

composite structures.

CO 02 :- Develop bending and shear stress diagram.

CO 03 :- Determine the torsional stresses and stresses due to strain energy for different loading

conditions.

CO 04 :- Explain the concept of principal stresses due to combined loading and able to

compare the values of analytical and graphical (Mohr's circle) method.

CO 05 :- Plot loading diagram, Shear Force Diagram (SFD) and Bending Moment Diagram (BMD).

CO 06 :- Analyze axially and eccentrically loaded column

201003 Geotechnical Engineering

CO 01 :- Differentiate the different types of soil and their engineering properties and classify

them;

CO 02 :- Determine the soil properties in laboratory and develop a proficiency in handling

experimental data;

CO 03 :- Understand of the concept of effective stress and its influence on soil behavior.

CO 04 :- Develop an understanding of the influence of water flow on the engineering

behaviour of soils.

CO 05 :- Analyze engineering properties like compaction, permeability, soil shear strength.

CO 06 :- Compute the lateral thrust due to backfill on the retaining walls.

CO 07 :- Classify soil slopes and identify their modes of failure.

201004Fluid Mechanics I

CO 01 :-Use fluid properties, dimensional analysis for solving problems of fluid flow.

CO 02 :- Solve fluid statics problems.

CO 03 :- Measure fluid pressure.

CO 04 :- Calibrate discharge measuring instrument like ventrurimeter, orifice meter.

CO 05 :- Distinguish between various types of fluid flows and find the fluid velocity using

principles of Kinematics and Dynamics.

CO 06 :- Design pipes to carry particular amount of discharge.

201001: Building Technology and Materials

CO 1 Identify types of building and basic requirements of building components.

CO 2 Explain types of masonry, formwork, casting procedure and necessity of underpinning and scaffolding.

CO 3 Elucidate different types of flooring and roofing materials.

CO 4 Describe types of doors, windows, arches and lintel.

CO 5 Illuminate means of vertical circulation and protective coatings.

CO 6 Explain different materials especially eco-friendly materials and safety measures to be adopted at any construction site.

201008 Structural Analysis I

CO 1 Understand the basic concept of static and kinematic indeterminacy, slope and deflection of determinate and indeterminate beams for analysis of structures.

CO 2 Analyze indeterminate beams structures and frames.

CO 3 Evaluate determinate and indeterminate trusses and its application in the field.

CO 4 Apply influence line diagrams for the analysis of structures under moving load.

CO 5 Analyze two and three hinged arches and its application.

CO 6 Apply plastic analysis for indeterminate steel structures by limits state method.

207009 Engineering Geology

CO 01 :-To study basic of engineering geology and introductory part of the earth science.

CO 02 :- To understand the utility and application of geological principles in various phases of

civil engineering activities.

CO 03 :- To describe the sources, and characterization of common Building materials.

CO 04 :-To learn the basic aspects occur due to structural features like folds and faults.

CO 05 :- To explain various natural hazards and their implications on structures and effects on

society.

201007 Concrete Technology

CO-1 Understand chemistry, properties, and classification of cement, fly ash, aggregates and admixtures, and hydration of cement in concrete.

CO-2 Prepare and test the fresh concrete.

CO-3 Test hardened concrete with destructive and nondestructive testing instruments.

CO-4 Get acquainted to concrete handling equipments and different special concrete types.

CO-5 Design concrete mix of desired grade.

CO-6 Predict deteriorations in concrete and repair it with appropriate methods and techniques.

201010 Soft Skill

CO 01 :- To help the students in building interpersonal skills.

CO 02 :- To develop skill to communicate clearly.

CO 03 :- To enhance team building and time management skills.

CO 04 :-To learn active listening and responding skills.

Department of Computer Engineering

PSOs

Name of Department: Computer

PSO1	**Project Development:** Successfully complete hardware and/or software related system or application projects, using the phases of project development life cycle to meet the requirements of service and product industries; government projects; and automate other engineering stream projects.
PSO2	**Domain Expertise:** Demonstrate effective application of knowledge gained from different computer domains like, data structures, data bases, operating systems, computer networks, security, parallel programming, in project development, research and higher education.
PSO3	**Career Development**: Achieve successful Career and Entrepreneurship- The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

SEM-I				
Sr.No.	Class	Subject Code	Subject Name	Cos
1	SE	210242	Discrete Mathematics	1. Solve real world problems logically using appropriate set, function, and relation models and interpret the associated operations and terminologies in context. 2. Analyze and synthesize the real world problems using discrete mathematics
2	SE	210242	Digital Electronics & Logic Design	1. Realize and simplify Boolean Algebraic assignments for designing digital circuits using KMaps. 2. Design and implement Sequential and Combinational digital circuits as per the specifications. 3. Apply the knowledge to appropriate IC as per the design specifications. 4. Design simple digital systems using VHDL.

					5. Develop simple embedded system for simple real world application
3	SE	210243	Data Structures and Algorithms		1. To discriminate the usage of various structures in approaching the problem solution. 2. To design the algorithms to solve the programming problems. 3. To use effective and efficient data structures in solving various Computer Engineering domain problems. 4. To analyze the problems to apply suitable algorithm and data structure. 5. To use appropriate algorithmic strategy for better efficiency
4	SE	210244	Computer Organization and Architecture		1. Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os. 2. Analyze the principles of computer architecture using examples drawn from commercially available computers. 3. Evaluate various design alternatives in processor organization
5	SE	210245	Object Oriented Programming		1. Analyze the strengths of object oriented programming 2. Design and apply OOP principles for effective programming 3. Develop programming application using object oriented programming language C++ 4. Percept the utility and applicability of OOP
6	TE	310241	Theory of Computation		1. Design deterministic Turing machine for all inputs and all outputs 2. Subdivide problem space based on input subdivision using constraints 3. Apply linguistic theory
7	TE	310242	Database Management Systems		1. Design E-R Model for given requirements and convert the same into database tables. 2. Use database techniques such as SQL & PL/SQL. 3. Use modern database techniques such as NOSQL. 4. Explain transaction Management in relational database System. 5. Describe different database architecture and analyses the use of appropriate architecture in real time environment. 6. Use advanced database Programming concepts

8	TE	310243	Software Engineering and Project Management	1. Decide on a process model for a developing a software project 2. Classify software applications and Identify unique features of various domains 3. Design test cases of a software system. 4. Understand basics of IT Project management. 5. Plan, schedule and execute a project considering the risk management. 6. Apply quality attributes in software development life cycle
9	TE	310244	Information Systems and Engineering Economics	7. Understand the need, 8. usage and importance of an Information System to an organization. 9. Understand the activities that are undertaken while managing, designing, planning, implementation, and deployment of computerized information system in an organization. 10. Further the student would be aware of various Information System solutions like ERP, CRM, Data warehouses and the issues in successful implementation of these technology solutions in any organizations 1. Outline the past history, present position and expected performance of a company engaged in engineering practice or in the computer industry. 2. Perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives. 3. Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.
10	TE	310245	Computer Networks	1. Analyze the requirements for a given organizational structure to select the most appropriate networking architecture, topologies, transmission mediums, and technologies 2. Demonstrate design issues, flow control and error control 3. Analyze data flow between TCP/IP model using Application, Transport and Network Layer Protocols.

				4. Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community. 5. Illustrate Client-Server architectures and prototypes by the means of correct standards and technology. 6. Demonstrate different routing and switching algorithms
11	BE	410241	High Performance Computing	1. Describe different parallel architectures, inter-connect networks, programming models 2. Develop an efficient parallel algorithm to solve given problem 3. Analyze and measure performance of modern parallel computing systems 4. Build the logic to parallelize the programming task
12	BE	410242	Artificial Intelligence and Robotics	1. Identify and apply suitable Intelligent agents for various AI applications 2. Design smart system using different informed search / uninformed search or heuristic approaches. 3. Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem. 4. Apply the suitable algorithms to solve AI problems
13	BE	410243	Data Analytics	1. Write case studies in Business Analytic and Intelligence using mathematical models 2. Present a survey on applications for Business Analytic and Intelligence 3. Provide problem solutions for multi-core or distributed, concurrent/Parallel environments
14	BE	410244	Data Mining and Warehousing	1. Apply basic, intermediate and advanced techniques to mine the data 2. Analyze the output generated by the process of data mining 3. Explore the hidden patterns in the data 4. Optimize the mining process by choosing best data mining technique
15	BE	410245(B)	Software Testing and Quality Assurance	1. Describe fundamental concepts in software testing such as manual testing, automation testing and software quality assurance. 2. Design and develop project test plan, design test cases, test 3. data, and conduct test operations

				4. Apply recent automation tool for various software testing for testing software 5. Apply different approaches of quality management, assurance, and quality standard to software system 6. Apply and analyze effectiveness Software Quality Tools

<div align="center">

SEM-II

</div>

1	SE	207003	Engineering Mathematics III	1. Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits. 2. Solve problems related to Fourier transform, Z-Transform and applications to Signal and Image processing. 3. Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data as applied to machine intelligence. 4. Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals. 5. Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing, Digital filters and Computer graphics
2	SE	210251	Computer Graphics	1. Apply mathematics and logic to develop Computer programs for elementary graphic operations Develop scientific and strategic approach to solve complex problems in the domain of Computer Graphics 2. Develop the competency to understand the concepts related to Computer Vision and Virtual reality 3. Apply the logic to develop animation and gaming programs
3	SE	210252	Advanced Data Structures	1. To apply appropriate advanced data structure and efficient algorithms to approach the problems of various domain. 2. To design the algorithms to solve the programming problems. 3. To use effective and efficient data structures in solving various Computer Engineering domain problems.

				4. To analyze the algorithmic solutions for resource requirements and optimization 5. To use appropriate modern tools to understand and analyze the functionalities confined to the data structure usage.
4	SE	21025 3	Microprocess or	1. To apply the assembly language programming to develop small real life embedded application. 2. To understand the architecture of the advanced processor thoroughly to use the resources for programming 3. To understand the higher processor architectures descended from 80386 architecture
5	SE	21025 4	Principles of Programming Languages	1. To analyze the strengths and weaknesses of programming languages for effective and efficient program development. 2. To inculcate the principles underlying the programming languages enabling to learn new programming languages. 3. To grasp different programming paradigms 4. To use the programming paradigms effectively in application development
6	TE	31025 0	Design & Analysis of Algorithms	1. Formulate the problem 2. Analyze the asymptotic performance of algorithms 3. Decide and apply algorithmic strategies to solve given problem 4. Find optimal solution by applying various methods
7	TE	31025 1	Systems Programming & Operating System (SP & OS)	1. Analyze and synthesize system software 2. Use tools like LEX & YACC. 3. Implement operating system functions.
8	TE	310252	Embedded Systems & Internet of Things (ES & IoT)	1. Implement an architectural design for IoT for specified requirement.
9	TE	310253	Software Modeling and Design	1. Analyze the problem statement (SRS) and choose proper design technique for designing web-based/ desktop application. 2. Design and analyze an application using UML modeling as fundamental tool

					3. Apply design patterns to understand reusability in OO design 4. Decide and apply appropriate modern tool for designing and modeling. 5. Decide and apply appropriate modern testing tool for testing web-based/desktop application
10	TE	310254	Web Technology		1. analyze given assignment to select sustainable web development and design methodology 2. develop web based application using suitable client side and server side web technologies 3. develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management
11	BE	410250	Machine Learning		1. Distinguish different learning based applications 2. Apply different preprocessing methods to prepare training data set for machine learning. 3. Design and implement supervised and unsupervised machine learning algorithm. 4. Implement different learning models 5. Learn Meta classifiers and deep learning concepts
12	BE	410251	Information and Cyber Security		1. Gauge the security protections and limitations provided by today's technology. 2. Identify information security and cyber security threats. 3. Analyze threats in order to protect or defend it in cyberspace from cyber-attacks. 4. Build appropriate security solutions against cyber-attacks
13	BE	410252(D)	Soft Computing and Optimization Algorithms		1. Apply soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, fuzzy inference systems and genetic algorithms 2. 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

14	BE	410253(C)	Cloud Computing	1. To install cloud computing environments.
				2. To develop any one type of cloud
				3. To explore future trends of cloud computing

Department of E&TC

SE (E&Tc)

PSOs

PSO1	To lay foundation for gaining proficiency in domain knowledge of Electronics and Telecommunication Engineering.
PSO2	Develop communication skills to percolate cutting edge technologies to end user.
PSO3	Develop attitude of life long learning for successful professional carrier.

Name: Signals & systems   Code: 204181

CO1	Understand mathematical description and representation of continuous and discrete time
CO2	Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system.
CO3	Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms.
CO4	Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s- domain.
CO5	Understand the basic concept of probability, random variables & random signals and develop the ability to find correlation, CDF, PDF and probability of a given event.

Name: Electronic Devices and Circuits   Code: 204182 E

CO1	1. Comply and verify parameters after exciting devices by any stated method.
CO2	2. Implement circuit and test the performance.
CO3	3. Analyze small signal model of FET and MOSFET.
CO4	4. Explain behavior of FET at low frequency.
CO5	5. Design an adjustable voltage regulator circuits.

Name: Electrical Circuits and Machines   Code: 204183

CO1	1. Analyze basic AC & DC circuit for voltage, current and power by using KVL, KCL, andnetwork theorems.

CO2	2. Explain the working principle of different electrical machines.
CO3	3. Select proper electrical motor for given application.
CO4	4. Design and analyze transformers.

Name: Data Structures and Algorithms   Code: 204184

CO1	1. Discuss the computational efficiency of the principal algorithms such as sorting & searching.
CO2	2. Write and understand the programs that use arrays & pointers in C
CO3	3. Describe how arrays, records, linked structures are represented in memory and use them in algorithms.
CO4	4. Implement stacks & queues for various applications.
CO5	5. Understand various terminologies and traversals of trees and use them for various applications.

Name: Digital Electronics   Code: 204185

CO1	1. Use the basic logic gates and various reduction techniques of digital logic circuit in detail.
CO2	2. Design combinational and sequential circuits.
CO3	3. Design and implement hardware circuit to test performance and application.
CO4	4. Understand the architecture and use of microcontrollers for basic operations and Simulate using simulation software.

Name: Electronic Measuring Instruments & Tools   Code: 20418

CO1	. Understand fundamental of various electrical measurements.
CO2	Understand and describe specifications, features and capabilities of electronic instruments.
CO3	Carry out required measurement using various instruments under different setups.
CO4	Select appropriate instrument for the measurement of electrical parameter professionally.

Name: Engineering Mathematics III   Code: 207005

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 Communication systems and Signal processing.
CO3	Obtain Interpolating polynomials, numerically differentiate and integrate functions,

	numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.
CO4	Perform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields.

Name: Integrated Circuits   Code: 204187

CO1	Understand and verify results (levels of V & I) with hardware implementation.
CO2	Implement hardwired circuit to test performance and application for what it is being designed.
CO3	Understand the characteristics of IC and Op-Amp and identify the internal structure.
CO4	Understand and identify various manufacturing techniques.
CO5	Perform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields.
CO6	Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing

Name: Control Systems   Code: 204188

CO1	Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.
CO2	Determine the (absolute) stability of a closed-loop control system
CO3	Perform time domain and frequency domain analysis of control systems required for stability analysis.
CO4	Perform time domain and frequency domain correlation analysis
CO5	Apply root-locus, Frequency Plots technique to analyze control systems.
CO6	Express and solve system equations in state variable form.

Name: Analog Communications   Code: 204189

CO1	. Understand and identify the fundamental concepts and various components of analogcommunication systems.
CO2	Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system.
CO3	Describe analog pulse modulation techniques and digital modulation technique.
CO4	Develop the ability to compare and contrast the strengths and weaknesses of variouscommunication systems.

Name: Object Oriented Programming   Code: 204190

CO1	Describe the principles of object oriented programming.
CO2	Apply the concepts of data encapsulation, inheritance in C++.
CO3	Understand basic program constructs in Java
CO4	Apply the concepts of classes, methods and inheritance to write programs Java
CO5	Use arrays, vectors and strings concepts and interfaces to write programs in Java.
CO6	Describe and use the concepts in Java to develop user friendly program,

Name: EMPLOYABILITY SKILL DEVELOPMENT   Code: 204191

CO1	Have skills and preparedness for aptitude tests
CO2	Be equipped with essential communication skills (writing, verbal and non-verbal)
CO3	Master the presentation skill and be ready for facing interviews.
CO4	Build team and lead it for problem solving.

TE (E&Tc)

Name: Digital Communication   Code: 304181

CO1	1) Understand working of waveform coding techniques and analyse their performance.
CO2	2) Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.
CO3	3) Perform the time and frequency domain analysis of the signals in a digital communication system.
CO4	4) Design of digital communication system
CO5	5) Understand working of spread spectrum communication system and analyze its performance. Course Contents Unit I

Name: Digital Signal Processing   Code: 304182

CO1	1) Analyze the discrete time signals and system using different transform domain techniques.
CO2	2) Design and implement LTI filters for filtering different real world signals.
CO3	3) Develop different signal processing applications using DSP processor.

Name: Electromagnetics   Code: 304183

CO1	1) Understand the basic mathematical concepts related to electromagnetic vector fields.

CO2	2) Apply the principles of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density.
CO3	3) Apply the principles of magnetostatics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density.
CO4	4) Understand the concepts related to Faraday's law, induced emf and Maxwell's equations.
CO5	5) Apply Maxwell's equations to solutions of problems relating to transmission lines and uniform plane wave propagation.

Name: Microcontrollers   Code: 304184

CO1	1) Learn importance of microcontroller in designing embedded application.
CO2	2) Learn use of hardware and software tools.
CO3	3) Develop interfacing to real world devices.

Name: Mechatronics   Code: 304185

CO1	1 Identification of key elements of mechatronics system and its representation in terms of block diagram
CO2	2 Understanding basic principal of Sensors and Transducer.
CO3	3. Able to prepare case study of the system given.

Name: Electronics System Design   Code: 304193

CO1	Apply the fundamental concepts and working principles of electronics devices to design electronics systems.
CO2	Shall be able to interpret datasheets and thus select appropriate components and devices
CO3	Select appropriate transducer and signal conditioning circuit to design prototype of Data Acquisition system
CO4	Design an electronic system/sub-system and validate its performance by simulating the same.
CO5	Shall be able to use an EDA tool for circuit schematic and simulation.
CO6	Create, manage the database and query handling using suitable tools.

Name: Power Electronics   Code: 304186

CO1	Design & implement a triggering / gate drive circuit for a power device
CO2	Understand, perform & analyze different controlled converters.
CO3	Evaluate battery backup time & design a battery charger.
CO4	Design & implement over voltage / over current protection circuit.

Name: Information Theory Coding Techniques and Communication Networks   Code: 304187

CO1	Perform information theoretic analysis of communication system.
CO2	Design a data compression scheme using suitable source coding technique.
CO3	Design a channel coding scheme for a communication system.
CO4	Understand and apply fundamental principles of data communication and networking.
CO5	Apply flow and error control techniques in communication networks.

Name: Business Management   **Code:** 304188

CO1	Get overview of Management Science aspects useful in business.
CO2	Get motivation for Entrepreneurship
CO3	Get Quality Aspects for Systematically Running the Business
CO4	To Develop Project Management aspect and Entrepreneurship Skills.

Name: Advanced Processors   **Code:** 304189

CO1	Describe the ARM microprocessor architectures and its feature.
CO2	Interface the advanced peripherals to ARM based microcontroller
CO3	Design embedded system with available resources.
CO4	Use of DSP Processors and resources for signal processing applications.

Name: System Programming and Operating Syste   **Code:** 304190

CO1	Demonstrate the knowledge of Systems Programming and Operating Systems
CO2	Formulate the Problem and develop the solution for same.
CO3	Compare and analyse the different implementation approach of system programming operating system abstractions.
CO4	Interpret various OS functions used in Linux / Ubuntu

Name: Employability Skills and Mini Project   **Code:** 304196

CO1	Understand, plan and execute a Mini Project with team
CO2	Implement electronic hardware by learning PCB artwork design, soldering techniques, testing and troubleshooting etc.
CO3	Prepare a technical report based on the Mini project.
CO4	Deliver technical seminar based on the Mini Project work carried out.

BE (E&Tc)

Name: VLSI Design& Technology   Code: 404181

CO1	Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
CO2	Understand chip level issues and need of testability.
CO3	Design analog & digital CMOS circuits for specified applications.

Name: Computer Networks   Code: 404182

CO1	· Understand fundamental underlying principles of computer networking
CO2	· Describe and analyze the hardware, software, components of a network and the
CO3	interrelations.
CO4	· Analyze the requirements for a given organizational structure and select the most appropriate
CO5	networking architecture and technologies;
CO6	· Have a basic knowledge of the use of cryptography and network security;
CO7	· Have a basic knowledge of installing and configuring networking applications.
CO8	· Specify and identify deficiencies in existing protocols, and then go onto select new and better protocols

Name: Microwave Engineering   Code: 404183

CO1	· Formulate the wave equation in wave guide for analysis.
CO2	· Identify the use of microwave components and devices in microwave applications.
CO3	· Understand the working principles of all the microwave tubes
CO4	· Understand the working principles of all the solid state devices
CO5	· Choose a suitable microwave tube and solid state device for a particular application
CO6	· Carry out the microwave network analysis
CO7	· Choose a suitable microwave measurement instruments and carry out the required

Name: Digital Image Processing   Code: 404184

CO1	· Develop and implement algorithms for digital image processing.
CO2	· Apply image processing algorithms for practical object recognition applications.

Name: Embedded Systems & RTOS   Code: 404184

CO1	· Get insight of design metrics of Embedded systems to design real time applications to
CO2	match recent trends in technology.
CO3	· Understand Real time systems concepts.
CO4	· Understand Linux operating system and device drivers.
CO5	· Get to know the hardware – software co design issues and testing methodology for Embedded system.

Name: Electronic Product Design   Code: 404185

CO1	· Understand various stages of hardware, software and PCB design.
CO2	· Importance of product test & test specifications.
CO3	· Special design considerations and importance of documentation.

Name: Mobile Communication   Code: 404189

CO1	1. Apply the concepts of switching technique and traffic engineering to design multistage networks.
CO2	2. Explore the architecture of GSM.
CO3	3. Differentiate thoroughly the generations of mobile technologies

Name: Broadband Communication Systems   Code: 404190

CO1	Perform Link power budget and Rise Time Budget by proper selection of components and check its viability.
CO2	. Perform Satellite Link design for Up Link and Down Link.

Name: Machine Learning (Elective III)   Code: 404191

CO1	To compare and contrast pros and cons of various machine learning techniques and to get an in sight of when to apply a particular machine learning approach.
CO2	To mathematically analyze various machine learning approaches and paradigms.
CO3	To implement convolution neural networks in recognition applications.

Name: Audio Video Engineering (Elective III)   Code: 404191

CO1	Apply the fundamentals of Analog Television and Colour Television standards.
CO2	Explainthe fundamentals of Digital Television, DTV standards and parameters.
CO3	Study and understand various HDTV standards and Digital TV broadcasting systems and acquainted with different types of analog, digital TV and HDTV systems.
CO4	Understandacoustic fundamentals and various acoustic systems.

Name: Wireless Sensor Networks (Elective-IV)   Code: 404194

CO1	Explain various concepts and terminologies used in WSN
CO2	Describe importance and use of radio communication and link management in WSN
CO3	Explain various wireless standards and protocols associated with WSN
CO4	Recognize importance of localization and routing techniques used in WSN
CO5	Understand techniques of data aggregation and importance of security in WSN
CO6	Examine the issues involved in design and deployment of WSN

Department of Information Technology
PSOs

PSO1	An ability to employ technical theory and practices in Information Technologies - Software Engineering, Information Processing & Management, Programming, Communication Networks and Web Technologies.
PSO2	An ability to comprehend the computational fundamentals and computing resources.
PSO3	An ability to utilize IT systems for securely processing, storing, retrieving and transmitting information.

SE (IT)

Name: DISCRETE STRUCTURES   Code: 214441

CO1	Use set, relation and function to formulate a problem and solve it
CO2	Use graph theory and trees to formulate the problems and solve them
CO3	Use mathematical propositions and proof techniques to check the truthfulness of a real life situation.

Name: COMPUTER ORGANIZATION &ARCHITECTURE   Code: 214442

CO1	Solve problems based on computer arithmetic.
CO2	Explain processor structure & its functions.
CO3	Obtain knowledge about micro-programming of a processor.
CO4	Understand concepts related to memory & IO organization.
CO5	Acquire knowledge about instruction level parallelism & parallel organization of multiprocessors & multi core systems.

Name: DIGITAL ELECTRONICS AND LOGIC DESIGN   Code: 214443

CO1	Spectacle an awareness and apply knowledge of number systems, codes, Boolean algebra and use necessary A.C, D.C Loading characteristics as well as functioning while designing with logic gates.
CO2	Use logic function representation for simplification with K-Maps and analyze as well as design Combinational logic circuits using SSI & MSI chips.
CO3	Analyze Sequential circuits like Flip-Flops (Truth Table, Excitation table), their conversion & design the applications.
CO4	Identify the Digital Circuits, Input/Outputs to replace by FPGA
CO5	Use VHDL programming technique with different modeling styles for any digital circuits.

Name: FUNDAMENTAL OF DATA STRUCTURES   Code: 214444

CO1	Apply appropriate constructs of C language, coding standards for application development.
CO2	Use dynamic memory allocation concepts and file handling in various application developments.
CO3	Perform basic analysis of algorithms with respect to time and space complexity
CO4	Select appropriate searching and/or sorting techniques in the application development
CO5	Select and use appropriate data structures for problem solving and programming
CO6	Use algorithmic foundations for solving problems and programming

Name: PROBLEM SOLVING AND OBJECT ORIENTEDPROGRAMMING
                                               Code: 214445

CO1	Develop algorithms for solving problems by using modular programming concepts
CO2	Abstract data and entities from the problem domain, build object models and design software solutions using object-oriented principles and strategies
CO3	Discover, explore and apply tools and best practices in object-oriented programming.
CO4	Develop programs that appropriately utilize key object-oriented concepts

Name: ENGINEERING MATHEMATICS – III   Code: 207003

CO1	Solve higher order linear differential equation using appropriate techniques for modelling 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.

Name: COMPUTER GRAPHICS   Code: 214450

CO1	Apply mathematics and logic to develop Computer programs for elementary graphic operations

CO2	Develop scientific and strategic approach to solve complex problems in the domain of Computer Graphics
CO3	Develop the competency to understand the concepts related to Computer Vision and Virtual reality
CO4	Apply the logic to develop animation and gaming programs

Name: PROCESSOR ARCHITECTURE AND INTERFACING Code: 214451

CO1	Learn architectural details of 80386 microprocessor
CO2	Understand memory management and multitasking of 80386 microprocessor
CO3	Understand architecture and memory organization of 8051microcontroller
CO4	Explain timers and interrupts of 8051 microcontroller and its interfacing with I/O devices

Name: DATA STRUCTURES AND FILES   Code: 214452

CO1	Analyze algorithms and to determine algorithm correctness and time efficiency class.
CO2	Understand different advanced abstract data type (ADT) and data structures and their implementations.
CO3	Understand different algorithm design techniques (brute -force, divide and conquer, greedy, etc.) and their implementation
CO4	Apply and implement learned algorithm design techniques and data structures to solve problems.

Name: FOUNDATIONS OF COMMUNICATION AND COMPUTER NETWORK
Code: 214453

CO1	Understand data/signal transmission over communication media
CO2	Recognize usage of various modulation techniques in communication
CO3	Analyze various spread spectrum and multiplexing techniques
CO4	Use concepts of data communication to solve various related problems
CO5	Understand error correction and detection techniques.
CO6	Acquaint with transmission media and their standards

TE (IT)

Name: THEORY OF COMPUTATION   Code: 314441

CO1	To construct finite state machines to solve problems in computing.
CO2	To write mathematical expressions for the formal languages
CO3	To apply well defined rules for syntax verification.

CO4	To construct and analyze Push Down, Post and Turing Machine for formal languages.
CO5	To express the understanding of the decidability and decidability problems.
CO6	To express the understanding of computational complexity.

Name: DATABASE MANAGEMENT SYSTEMS   Code: 314442

CO1	To define basic functions of DBMS & RDBMS.
CO2	To analyze database models & entity relationship models.
CO3	To design and implement a database schema for a given problem-domain.
CO4	To populate and query a database using SQL DML/DDL commands.
CO5	Do Programming in PL/SQL including stored procedures, stored functions, cursors and packages.
CO6	To appreciate the impact of analytics and big data on the information industry and the external ecosystem for analytical and data services.

Name: SOFTWARE ENGINEERING AND PROJECT MANAGEMENT
Code: 314443

CO1	To identify unique features of various software application domains and classify software applications.
CO2	To choose and apply appropriate lifecycle model of software development.
CO3	To describe principles of agile development, discuss the SCRUM process and distinguish agile process model from other process models.
CO4	To analyze software requirements by applying various modeling techniques.
CO5	To list and classify CASE tools and discuss recent trends and research in software engineering.
CO6	To understand IT project management through life cycle of the project and future trends in IT Project Management.

Name: OPERATING SYSTEM   Code: 314444

CO1	Fundamental understanding of the role of Operating Systems.
CO2	To understand the concept of a process and thread.
CO3	To apply the cons of process/thread scheduling.
CO4	To apply the concept of process synchronization, mutual exclusion and the deadlock.
CO5	To realize the concept of I/O management and File system.
CO6	To understand the various memory management techniques.

Name: HUMAN-COMPUTER INTERACTION   Code: 314445

CO1	To explain importance of HCI study and principles of user-centred design (UCD) approach.
CO2	To develop understanding of human factors in HCI design.

CO3	To develop understanding of models, paradigms and context of interactions.
CO4	To design effective user-interfaces following a structured and organized UCD process.
CO5	To evaluate usability of a user-interface design.
CO6	To apply cognitive models for predicting human-computer-interactions.

Name: COMPUTER NETWORK TECHNOLOGY   Code: 314450

CO1	To know Responsibilities, services offered and protocol used at each layer of network.
CO2	To understand different addressing techniques used in network.
CO3	To know the difference between different types of network.
CO4	To know the different wireless technologies and IEEE standards.
CO5	To use and apply the standards and protocols learned, for application development.
CO6	To understand and explore recent trends in network domain.

Name: SYSTEMS PROGRAMMING   Code: 314451

CO1	To learn independently modern software development tools and creates novel solutions for language processing applications.
CO2	To design and implement assemblers and macro processors.
CO3	To use tool LEX for generation of Lexical Analyzer.
CO4	To use YACC tool for generation of syntax analyzer.
CO5	To generate output for all the phases of compiler.
CO6	To apply code optimization in the compilation process.

Name: DESIGN AND ANALYSIS OF ALGORITHMS   Code: 314452

CO1	To calculate computational complexity using asymptotic notations for various algorithms.
CO2	To apply Divide & Conquer as well as Greedy approach to design algorithms.
CO3	To practice principle of optimality.
CO4	To illustrate different problems using Backtracking.
CO5	To compare different methods of Branch and Bound strategy.
CO6	To explore the concept of P, NP, NP-complete, NP-Hard and parallel algorithms.

Name: CLOUD COMPUTING   Code: 314453

CO1	To understand the need of Cloud based solutions.
CO2	To understand Security Mechanisms and issues in various Cloud Applications
CO3	To explore effective techniques to program Cloud Systems.
CO4	To understand current challenges and trade-offs in Cloud Computing.
CO5	To find challenges in cloud computing and delve into it to effective solutions.
CO6	To understand emerging trends in cloud computing.

Name: DATA SCIENCE AND BIG DATA ANALYTICS   Code: 314454

CO1	To understand Big Data primitives.
CO2	To learn and apply different mathematical models for Big Data.
CO3	To demonstrate their Big Data learning skills by developing industry or research applications.
CO4	To analyze each learning model come from a different algorithmic approach and it will perform differently under different datasets.
CO5	To understand needs, challenges and techniques for big data visualization.
CO6	To learn different programming platforms for big data analytics.

BE (IT)

Name: Information and Cyber Security   Code: 414453

CO1	Use basic cryptographic techniques in application development.
CO2	Apply methods for authentication, access control, intrusion detection and prevention.
CO3	To apply the scientific method to digital forensics and perform forensic investigations.
CO4	To develop computer forensics awareness.
CO5	Ability to use computer forensics tools.

Name: Machine Learning and Applications   Code: 414454

CO1	Model the learning primitives.
CO2	Build the learning model.
CO3	Tackle real world problems in the domain of Data Mining and Big Data Analytics, Information Retrieval, Computer vision, Linguistics and Bioinformatics.

Name: Software Design and Modelling   Code: 414455

CO1	Understand object oriented methodologies, basics of Unified Modeling Language (UML).
CO2	Understand analysis process, use case modeling, domain/class modeling
CO3	Understand interaction and behavior modeling.
CO4	Understand design process and business, access and view layer class design
CO5	Get started on study of GRASP principles and GoF design patterns.
CO6	Get started on study of architectural design principles and guidelines in the various type of application development.

Name: Elective-I Business Analytics and Intelligence   Code: 414456E

CO1	Comprehend the Information Systems and development approaches of Intelligent Systems.
CO2	Evaluate and rethink business processes using information systems.
CO3	Propose the Framework for business intelligence.
CO4	Get acquainted with the Theories, techniques, and considerations for capturing organizational intelligence.
CO5	Align business intelligence with business strategy.
CO6	Apply the techniques for implementing business intelligence systems.

Name: Elective-II Software Testing and Quality Assurance   Code: 414457C

CO1	Test the software by applying testing techniques to deliver a product free from bugs.
CO2	Investigate the scenario and to select the proper testing technique.
CO3	Explore the test automation concepts and tools and estimation of cost, schedule based on standard metrics.
CO4	Understand how to detect, classify, prevent and remove defects.
CO5	Choose appropriate quality assurance models and develop quality.
CO6	Ability to conduct formal inspections, record and evaluate results of inspections.

Name: Distributed Computing System   Code: 414462

CO1	Understand the principles and desired properties of distributed systems based on different application areas.
CO2	Understand and apply the basic theoretical concepts and algorithms of distributed systems in problem solving.
CO3	Recognize the inherent difficulties that arise due to distributed-ness of computing resources.
CO4	Identify the challenges in developing distributed applications

Name: Ubiquitous Computing   Code: 414463

CO1	Demonstrate the knowledge of design of Ubicomp and its applications.
CO2	Explain smart devices and services used Ubicomp.
CO3	Describe the significance of actuators and controllers in real time application design.
CO4	Use the concept of HCI to understand the design of automation applications.
CO5	Classify Ubicomp privacy and explain the challenges associated with Ubicomp privacy.
CO6	Get the knowledge of ubiquitous and service oriented networks along with Ubicomp management.

Name: Elective III Information Storage and Retrieval   Code: 414464B

CO1	Understand the concept of Information retrieval.
CO2	Deal with storage and retrieval process of text and multimedia data.
CO3	Evaluate performance of any information retrieval system.
CO4	Design user interfaces.
CO5	Understand importance of recommender system.
CO6	Understand concept of multimedia and distributed information retrieval.

Name: Elective IV Rural Technologies and Community Development
Code: 414465A

CO1	Understand rural development model.
CO2	Learn different measures in rural development and its impact on overall economy.
CO3	Understand and learn importance of technologies in rural and community development.
CO4	Understand challenges and opportunities in rural development.

Department of Mechanical Engineering

PSO1	Student should able to understand the **fundamentals of mechanical system design** and able to manufacture the system for **real life applications**.
PSO2	Student should able to recognize and understand the need of renewable energy principles and its **real life applications**.
PSO3	Student should able **to understand instrumentation and measurements in mechanical systems.**

Course Name: Manufacturing Processes-I (202041)

Year of Study: S.E. III

C202.1	The students will understand the casting process.
C202.2	The students will understand the forming processes – Rolling, Forging, Extrusion& Drawing.
C202.3	The students will understand the importance of plastic & the methods of making plastic products.
C202.4	The students will understand the welding technology along with the adhesives used for joining the two parts.
C202.5	The students will understand sheet metal working of components & their applications.
C202.6	The students will understand the construction of centre lathe, various attachments of the machine & various operations performed using the lathe.

Course Name: Computer Aided Machine Drawing (202042)
Year of Study: S.E. III

C203.1	To develop an ability to create 2-D Sketches
C203.2	To develop an ability to create Solid Models of machine components
C203.3	To develop an ability to use the Dynamic Viewing Commands
C203.4	To develop an ability to create and Edit Parametric Dimensions
C203.5	To develop an ability to use advanced tools like sweep, pattern etc.
C203.6	To develop an ability to create assembly models of simple machine

Course Name: Thermodynamics (202043)
Year of Study: S.E. III

C204.1	Students should understand and apply the first and second laws of thermodynamics to formulate and solve engineering problems for (i) closed systems, (ii) open systems, and (iii) power cycles.
C204.2	Students should be able to use thermodynamic tables, charts, and equation of state to obtain appropriate property data of working medium to solve thermodynamics problems.
C204.3	Students should get conversant with steam generator and its performance calculations and theory of combustion

Course Name: Material Science [202044]
Year of Study: S.E. III

C205.1	Student should be acquaint with basic concepts in material science and should have fundamental knowledge of material processing
C205.2	Student should have knowledge about structure of engineering materials
C205.3	Student should know about fundamentals of material testing

Course Name: Strength of Materials (202051)

Year of Study: S.E. IV

C206.1	Student should be able to calculate stresses, strains and elongation produced by the loads up to the elastic limit.
C206.2	Student should be able calculate shearing and bending stresses in beams.
C206.3	Student should be able to calculate shear force, bending moment and deflection in beams.
C206.4	Student should be able calculate stresses in shafts and columns.
C206.5	Student should be able to calculate principal stresses and apply theories of failure for simple machine elements.
C206.6	Student should be able to conduct the experiment for characterization of materials.

Course Name: Fluid Mechanics [202045]
Year of Study: S.E. III

C207.1	Student should understand the basic fluid properties and fluid statics.
C207.2	Student should understand the physics of fluid flow and basics of fluid kinematics.

C207.3	Student should understand basics of fluid dynamics and applications of Bernoulli's equation
C207.4	Student should understand mechanics of internal flow and its applications.
C207.5	Student should understand energy losses through pipe, Dimensional Analysis and their applications.
C207.6	Student should understand mechanics of external flow and their applications.

Course Name: Soft Skills (202047)
Year of Study: S.E. III

C208.1	The students have the ability of career planning by goal setting.
C208.2	The students have the ability of self assessment with SWOT analysis.
C208.3	The students have the ability to behave effectively& listen actively.
C208.4	The students have the ability of effective public speaking with presentation skills.
C208.5	The students have the ability of discussing in group positively.
C208.6	The students have the ability of writing effective resume, report writing & cover letter.

Course Name: Theory of Machines – I (202048)
Year of Study: S.E. IV

C209.1	The student will conversant with working principle four bar chain, single slider crank mechanism and double slider crank mechanism
C209.2	The students should understand the working principle of clutch, brake and dynamometer.
C209.3	The student should be able to conduct laboratory experiments for finding moment of inertia of rigid bodies.
C209.4	The student will understand analytical method for solving problems single slider mechanism, to solve kinematic problems using complex algebra method and to verify thedisplacement relation for Hooke's joints.
C209.5	The student should be able to draw velocity and acceleration diagram of simple and complex mechanism by using relative and ICR Method.
C209.6	The student should be able to draw velocity and acceleration diagram of simple and

	complex mechanism by using Coriolis component of acceleration and Klein's construction.

Course Name: Engineering Metallurgy(202049)

Year of Study: S.E. IV

C210.1	To acquaint students with basic concepts of metal structure and to impart fundamental knowledge of ferrous and non-ferrous material processing
C210.2	To know fundamentals of metallography
C210.3	To understand fundamentals of Heat treatment

Course Name: Applied Thermodynamics (202050)

Year of Study: S.E. IV

C211.1	Students should understand working of engine and its support systems and evaluation of engine performance.
C211.2	They should possess basic knowledge of engine combustion and emissions with their controlling parameters.
C211.3	Students should understand working and performance evaluation of positive displacement compressors.

Course Name: Electronics and Electrical Engineering (203152)

Year of Study: S.E. IV

C213.1	Students should conversant with Electrical and Electronic controls basic.
C213.2	It will be prerequisite for Mechatronics.
C213.3	To study Microcontrollers.
C213.4	To study Electrical drive system required to drive machines.
C213.5	Understanding and use of analog and digital meter for measurement of various parameters.
C213.6	Demonstrate the awareness on social issues and use of technology for electricalsafety and energy conservation.

Course Name: Design of Machine Elements – I [302041]

Year of Study: T.E. V

C301.1	Students should be able to analyze the stress and strain of mechanical components and understand, identify and quantify failure modes for mechanical part.
C301.2	Students will design mechanical components for fluctuating loads
C301.3	Students should be able to prepare working drawing of mechanical components and system.

Course Name: Heat Transfer (302042)

Year of Study: T.E. V

C302.1	Students should understand, be able to express and demonstrate basic principles of heat transfer
C302.2	They should formulate basic equations and work out solutions of heat transfer problems
C302.3	Students should be able to apply knowledge of heat transfer to design of fins and heat exchangers

Course Name: Theory of Machines – II (302043)

Year of Study: T.E. V

C303.1	The students will understand the gear theory and types of gear.
C303.2	The students will understand the types of gear and their motion.
C303.3	The student will understand the types of gear train.
C303.4	The student will understand the synthesis of mechanism.
C303.5	The student will understand gyroscopic principles and its applicability.
C303.6	The student should be able to determine cam profiles for different follower motions.

Course Name: Turbo Machines (302049)

Year of Study: T.E. VI

C304.1	Ability to formulate design criteria and calculate different parameters for Impulse turbines.
C304.2	Ability to formulate design criteria and calculate different parameters for Reaction turbines.
C304.3	Ability To Understand thermodynamics and kinematics behind Steam Turbines
C304.4	Ability To Understand fluid dynamics behind centrifugal pumps

C304.5	Ability To Understand thermodynamics and kinematics behind Centrifugal compressors
C304.6	Ability To Understand thermodynamics and kinematics behind Axial compressors

Course Name: Metrology and Quality Control [302044]

Year of Study: T.E. V

C305.1	An ability to apply knowledge of various tools and techniques used to determine geometry and dimensions and comparators in engineering applications
C305.2	Ability to design gauges. interferometers ,surface roughness measurment
C305.3	Students should able to measurement of threads ,gears and advances in metrology like CMM
C305.4	Students should be to analysis facts of quality and quality tools and quality circle
C305.5	An understanding of Quality Control Techniques and statistical quality control and acceptance sampling
C305.6	Students will understand Total Quality Management various facts like JIT,Sixsigma,Kanbanetc

Course Name: Numerical Methods & Optimization (302047)
Year of Study: T.E. VI

C307.1	Use appropriate Numerical Methods to solve complex mechanical engineering problems.
C307.2	Formulate algorithms and programming.
C307.3	Use Mathematical Solver.
C307.4	Generate Solutions for real life problem using optimization techniques.
C307.5	Analyze the research problem
C307.6	To develop mathematical model

Course Name: Design of Machine Elements – II (302048)
Year of Study: T.E. VI

C308.1	Students should be able to design and analyze mechanical transmission systems
C308.2	Students will design and select different types of bearings, belts, rope and chain drives from manufacturer's catalogue

C308.3	Enhancement in proficiency of CAD software for design and analysis so that students are capable to generate production drawing.

Course Name: Refrigeration and Air Conditioning (402041)
Year of Study: T.E. VII

C309.1	Ability to understand basic principles, cycles and various application areas associated with refrigeration and air conditioning.
C309.2	To acquaint students with refrigerants, global issues, vapor compression cycles, terminologies and multi pressure systems.
C309.3	Ability to understand cascade and vapor absorption refrigeration systems.
C309.4	Ability to understand different psychometric process and chart, human comfort and cooling load estimation for comfort and industrial air conditioning.
C309.5	Ability to understand air conditioning systems and the components utilized in refrigeration and air conditioning systems.
C309.6	Ability to understand duct design for air distribution systems, elementary duct design and the components utilized in air distribution systems.

Course Name: Mechatronics (302050)

Year of Study: T.E. VI

C310.1	Students should be able to identify elements of mechatronics system and its representation in terms of block diagram
C310.2	Students should be able to understand the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O
C310.3	Students should be able to understand interfacing of Sensors, Actuators using appropriate DAQ micro-controller
C310.4	Students should be able to understand Time and Frequency domain analysis of system model (for control application)
C310.5	Students should be able to understand PID control implementation on real time systems
C310.6	Development of PLC ladder programming and implementation of real life system

Course Name: Manufacturing Process-II [302051]
Year of Study: T.E. VI

C311.1	Student should be able to apply the knowledge of various manufacturing processes.
C311.2	Student should be able to identify various process parameters and their effect on processes.
C311.3	Student should be able to design and analyze various manufacturing processes and tooling.

C311.4	Student should be able to figure out application of modernization in machining.
C311.5	Students should get the knowledge of Jigs and Fixtures so as to utilize machine capability for variety of operations.
C311.6	Student should understand manufacturing processes such as, non-conventional and CNC machining

Course Name: Seminar

Year of Study: T.E. VI

C313.1	The student should be able to do literature survey to select seminar topic
C313.2	Students should be able to write technical report and prepare power point presentation.
C313.3	Students should be able to present their topic and communicate effectively in front of audience

Course Name: Hydraulics and Pneumatics (402041)
Year of Study: B.E. VII

C401.1	Students should be able to understand basic working principle of hydraulic & pneumatic systems.
C401.2	Students should be able to select appropriate pump required for hydraulic Power transmission.
C401.3	Students should be able to understand working of hydraulic actuatorsand select appropriate hydraulic actuatorsrequired for hydraulic system.
C401.4	Students should be able to understand industrial circuits of hydraulic and pneumatic system.
C401.5	Students should be able to understand operation of different components of pneumatic system.
C401.6	Students should be able to design hydraulic and pneumatic circuit for industrial applications.

Course Name: CAD/CAM Automation (402042)

Year of Study: B.E. VII

C402.1	Students will be able to understand transformations and its formulation for geometric entities.
C402.2	Students will be able to represent curves in parametric and non parametric form.
C402.3	Student will able to calculate the deflection and stresses induced in the body due to applied force using FEA techniques.
C402.4	Student will be able to generate a part programs for milling and lathe operations.
C402.5	Students will able to understand Rapid prototyping systems.
C402.6	Student will be able to know about basic components of robots and automation.

Course Name: Dynamics of Machinery

Year of Study: B.E. VII

C403.1	The students should able to understand static balancing, dynamic balancing and balancing of inline, v engine.
C403.2	The students should able to understand the basic terminology of wavelength, amplitude frequency and resonance.
C403.3	The students should able to understand concepts of single DOF with free undamped/ damped and forced Vibration.
C403.4	The students should able to understand concepts of Two DOF systems with free undamped Vibration.
C403.5	The students should able to understand concepts of working of accelerometer, microphone and FFT analyser instrument.
C403.6	The students should able to understand concepts latest trends in vibration and noise control.

Course Name: FINITE ELEMENT ANALYSIS   (402044 A) (Elective I)
Year of Study: B.E. VII

C404.1	Student should be acquainted Basic Procedure of FEA
C404.2	Student should be have with fundamental knowledge of Strength of Materials,

	Applied Mechanics
C404.3	Student should have knowledge of Numerical Method adopted for FEA solution
C404.4	Student should know fundamentals of Element Matrix Formulation by classical, energy methods
C404.5	Student should be acquainted with solution of strength of material problems using FEA tools
C404.6	Student should have fundamental knowledge of real-life application of FEA tools in various domains such as Stress analysis, thermal analysis

Course Name: Heating, Ventilation, Air Conditioning and Refrigeration Engineering   (402044 C) (Elective I)

Year of Study: B.E. VII

C404.1	Determine the performance parameters of trans-critical & ejector refrigeration systems
C404.2	Estimate thermal performance of compressor, evaporator, condenser and cooling tower.
C404.3	Describe refrigerant piping design, capacity & safety controls and balancing of vapour compressor system.
C404.4	Explain importance of indoor and outdoor design conditions, IAQ, ventilation and air distribution system.
C404.5	Estimate heat transmission through building walls using CLTD and decrement factor &time lag methods with energy-efficient and cost-effective measures for building envelope.
C404.6	Explain working of types of desiccant, evaporative, thermal storage, radiant cooling, clean room and heat pump air-conditioning systems.

Course Name: Automobile Engineering   (402045 A Elective II)

Year of Study: B.E. VII

C405.1	Students should have basic understanding of various layouts of power transmission and overview of frame and chassis construction
C405.2	Students will have knowledge about different systems used in automobiles like clutch, transmission system, steering, brakes, suspension systems, Vehicle safety:, etc. should be able to carry out vehicle performance calculations.
C405.3	Students should understand Principles and construction of battery, Electrical system and accessories Types of vehicle maintenance, servicing/overhauling

Course Name: Energy Audit and Management (402045 C) 2015 Pattern

Year of Study: B.E. VII

C405.1	Compare energy scenario of India and World
C405.2	Carry out Energy Audit of the Residence / Institute/ Organization
C405.3	Evaluate the project using financial techniques
C405.4	Identify and evaluate energy conservation opportunities in Thermal Utilities
C405.5	Identify and evaluate energy conservation opportunities in Electrical Utilities
C405.6	Identify the feasibility of Cogeneration and WHR. Use a CFD tool effectively for practical problems and research

Course Name: Project Work I (402046)

Year of Study: B.E. VII

C406.1	Students should be able to demonstrate basic knowledge of design and fabrication of models, machines and prototypes based on new ideas, robot and machines based on advanced systems.
C406.2	Students should able to design the project and develop experimental set up
C406.3	Student should be able to find out real life application of the project

Course Name: Energy Engineering (402047) 2015 Pattern
Year of Study: B.E. VIII

C407.1	Describe the power generation scenario, the layout components of thermal power plant and analyze the improved Rankin cycle, Cogeneration cycle
C407.2	Analyze the steam condensers, recognize the an environmental impacts of thermal power plant and method to control the same
C407.3	Recognize the layout, component details of hydroelectric power plant and nuclear power plant
C407.4	Realize the details of diesel power plant, gas power plant and analyze gas turbine power cycle
C407.5	Emphasize the fundaments of non-conventional power plants
C407.6	Describe the different power plant electrical instruments and basic principles of economics of power generation

Course Name Mechanical System Design (402048)
Year of Study: B.E. VIII

C408.1	Student should be able to design assemblies of mechanical systems such as machine tool gear box, material handling systems, pressure vessels, and I.C. engine
C408.2	Student should be able to optimize the components based on cost, weight and strength criteria
C408.3	Student should be able to understand the concepts and importance of value engineering, aesthetics, ergonomics in product design.

Course Name: Advanced Manufacturing Processes (402050 A) 2015 Pattern
Year of Study: B.E. VIII

C404.1	To analyze and identify applications of special forming processes
C404.2	To analyze and identify applications of advanced joining processes
C404.3	To understand and analyze the basic mechanisms of hybrid non-conventional machining techniques
C404.4	To understand various applications and methods of micro and nano fabrication techniques
C404.5	To understand advanced Additive Manufacturing (AM) technology for innovations in product development
C404.6	To understand various material characterization techniques.

Course Name: SOLAR & WIND ENERGY (402050B) (Elective IV)

Year of Study: B.E. VIII

C410.1	Student should be able to understand practical applications of solar energy thermal system.

C410.2	Student should be able to implement procedure to design solar food drier for domestic purpose referring existing system
C410.3	Student should be able to implement procedure to design parabolic dish solar cooker for domestic purpose referring existing system
C410.4	Student should be able to apply basic principle to design solar photo voltaic system for domestic purpose referring existing system
C410.5	Student should be able to understand design consideration of wind energy conversion system.
C410.6	Student should be able to apply basic principle to design miniature wind mill for domestic purpose referring existing system

Course Name: Project Work (402051)

Year of Study: B.E. VIII

C411.4	Students should able present the experimental or simulated data in the form of graphs, charts and interpret the results.
C411.5	Students should relate the project for society applications and effect of model/project on the environment
C411.6	Student should be able to present the project using modern presentation techniques.
C411.7	To understand the methodology of writing a project report/technical report. Students should publish their project work in project competitions ,research Journals