2.6 Student Performance and Learning Outcomes

1. PROGRAM OUTCOMES (POs)

PO No.	PROGRAM OUTCOMES (POs)
PO 1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and stainability :** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to ones own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

2. PROGRAM SPECIFIC OUTCOMES (PSOs)

Chemical Engineering

Sr. No.	Program Specific Outcomes (PSO)
PSO 1	Evaluate and identify separation process for the system.
PSO 2	Apply the knowledge of unit operations and unit processes for design the chemical plant.
PSO 3	Evaluate the energy scenario & environment related issues in Chemical Plants.

Civil Engineering

Sr. No.	Program Specific Outcomes (PSO)
PSO 1	Analyze, Design, Construct, Maintain and Operate infrastructure projects.
PSO 2	Assess the environmental impact of various projects and take required measures to curb environmental deterioration.
PSO 3	Able to use latest softwares pertaining to various streams of Civil Engineering.

Computer Engineering

Sr. No.	Program Specific Outcomes (PSO)
PSO 1	**Logic Building:** Participate in Planning, Implementing and evaluating language – specific team programming solutions to specific application in system programming, networking, databases and machine intelligence.
PSO 2	**Application development skill:** Complete individual practical experiences in a variety of programming languages and situations for solving real life problems.
PSO 3	**Competency Development:** Develop the IT competencies using knowledge, skills and disposition to prepare or global workplace.

Electronics Engineering

Sr. No.	Program Specific Outcomes (PSO)
PSO 1	Design building blocks of real time applications and automation by using modern engineering tools and multidisciplinary concepts.
PSO 2	Build confidence to participate and succeed in competitive examinations and technical competitions.
PSO 3	Broaden the knowledge in various administrative skill sets, exposure to entrepreneurial setup and society outreach program as a whole.

Electronics & Telecommunication Engineering

Sr. No.	Program Specific Outcomes (PSO)
PSO 1	Analyze and simulate diverse problems in the field of communication.
PSO 2	Design and analyze a system with applications in signal and image processing.
PSO 3	Build, test and evaluate an embedded system with real time constraints.
PSO 4	Design and implement a system towards automatic control in varied engineering problems.

Information Technology

Sr. No.	Program Specific Outcomes (PSO)
PSO 1	**Logic Building:** Participate in Planning, Implementing and evaluating language – specific team programming solutions to specific application in system programming, networking, databases and machine intelligence.
PSO 2	**Application development skill:** Complete individual practical experiences in a variety of programming languages and situations for solving real life problems
PSO 3	**Competency Development:** Develop the IT competencies using knowledge, skills and disposition to prepare or global workplace

Mechanical Engineering

PSO No.	PROGRAM SPECIFIC OUTCOMES (PSOs)
PSO 1	To apply design and development principles to provide solutions in Machine Design, Production Technology, Thermal Engineering and CAD-CAM domain to meet desired needs.
PSO 2	To apply competency and proficiency in the field of allied engineering.

3. Course Outcome

			F.Y. B. Tech. Engineering
Year	**Course Code**	**Course Name**	**Course Outcome**
F Y B.Tech.	AS105	Calculus & Differential Equations	1. Solve first order and first degree ordinary differential equations. 2. Analyze and solve real world phenomenon governed by first order ordinary differential equations. 3. Apply concepts of linear differential equations of second and higher order to solve different systems in engineering world. 4. Infer the problems based on properties of partial differentiation. 5. Examine the applications of partial differentiation. 6. Solve and examine the solution of partial differential equations by theoretical methods.
F Y B.Tech.	AS106	Engineering Physics	1. Evaluate the importance of order of all physical quantities and compare the order of size of different objects. 2. Apply the theoretical knowledge of optics to understand the physics behind engineering applications. 3. Apply that light is transverse in nature. 4. Demonstrate the necessity of quantum mechanics and the distinction between the domains of classical and quantum mechanics. 5. Evaluate and apply the Schrödinger's equation to the motion of an electron orbiting round the shell. 6. Apply the concepts of Quantum Physics in different branches of engineering.
F Y B.Tech.	CH101	Science of Nature	1) Explain natural biological processes and their technical aspects in view of optimizing Engineering solutions. 2) Explain important biological inventions that changed the human life and their impact on engineering. 3) Identify different methodologies for water quality analysis for industrial application. 4) Apply basic concepts of analytical techniques for analysis of various chemical Compounds. 5) Apply the knowledge of nano science for betterment of the society. 6) Categorize the different engineering materials and to solve engineering problems.

F Y B.Tech.	EX102	Electrical and Electronics Engineering	1) Develop Renewable energy system (PV) & power factor improvement circuits. 2) Distinguish behavior of three phase circuits& power measurement methods. 3) Analyze analog circuits. 4) Design Digital circuits. 5) Demonstrate the use of Instrumentation system in various fields. 6) Identify electrical machines used in typical domestic and industrial sector Application.
F Y B.Tech.	CV102	Applied Mechanics	1. Determine the resultant and support reactions. 2. Equilibrium Analysis of bodies involving frictional forces. 3. Evaluate Centroid of bodies and moment of inertia of sections. 4. Identify the type of motion and its kinematic parameters. 5. Analyze the motion under action of constant and variable forces. 6. Apply energy and momentum methods for kinetics problems.
	ME104	Engineering Graphics	1. Develop and/or comprehend a simple engineering drawing in both First and Third angle orthographic projections. 2. Interpret engineering drawings. 3. Apply visualization skills to develop surfaces. 4. Analyze engineering drawings. 5. Decide annotations for two dimensional drawings. 6. Create manual drawing & CAD data using SP46 standards.
F Y B.Tech.	HP103	English for Engineers	1. Interpret texts written in English. 2. Apply English grammar rules correctly. 3. Choose and employ appropriate words from AWL and NAWL in communication. 4. Develop sentence and text in English coherently and formally. 5. Demonstrate overall improvement in communication skills. 6. Analyze and infer from written, audio and video texts.
F Y B.Tech.	CS101	Logic Development-C Programming	1. List the various data types, control structures and looping structures supported by C language. 2. Differentiate between various data types supported by C language. 3. Implement the solutions for various algorithms in C language. 4. Analyze various parameter passing methods to functions in C language.

F Y B.Tech.	ME106	Design Thinking	1. Recall fundamental principles of design thinking. 2. Explain all the dimensions of user and his needs using design thinking approach. 3. Outline user centric problem by using information gathering techniques. 4. Compare multiple solutions through ideation process. 5. Interpret most appropriate solution for defined user centric problem. 6. Develop the most optimum solution.
F Y B.Tech.	ME105	Experimental Tools and Techniques	1. Recall the tools required for the measurements. 2. Summarize the application of various engineering tools used. 3. Identify the right tools for selected purpose. 4. Inspect various parts of the system. 5. Justify the most appropriate technique which can be compatible with the existing environment. 6. Develop the system which will give appropriate solution to the identified problem.
F Y B.Tech.	AS107	Statistics and Integral Calculus	1. Assess statistical problems. 2. Solve the probability distribution problems. 3. Evaluate complex integrals. 4. Sketch curves by analyzing the given equation of curves. 5. Evaluate the multiple integrals. 6. Apply the knowledge of multiple integrals to solve engineering problems.
F Y B.Tech.	CS102	Python Programming Applications	1. Debug syntax and semantics in Python programs. 2. Demonstrate proficiency in handling strings and file system. 3. Implement the programs using core data structures like Lists and Dictionaries. 4. Interpret the concepts of Object Oriented Programming in Python. 5. Develop solution for real life problems using Python.

**Chemical Engineering**			
Year	**Course Code**	**Course Name**	**Course Out Come**
S.Y. B.Tech.	AS201	Applied Mathematics	1. Analyze the output response of given linear system using Laplace Transform. 2. Analyze the frequency response of the system using appropriate Fourier transform. 3. Justify the selection of appropriate transform for a given system. 4. Solve and examine the solution of partial differential equations by theoretical methods. 5. Determine the solution of ordinary differential equations using Euler's, Runge-Kutta 4th order and the interpolation using Newton's and Lagrange's interpolating methods. 6. Implement Laplace Transform, Fourier transform and Numerical methods to find the solution of given problem using MATLAB.
S.Y. B.Tech.	CH201	Environmental Science	1. Identify the various human activities adversely affecting the natural resources and the balance ecosystem. 2. Observe the various aspects of ecosystems and suggest ways to protect them. 3. Experiment the pollution of given locality and suggest steps to mitigate pollution. 4. Record the sources of pollution and their controls. 5. Compare laws and standards for pollution. 6. Categorize the social and professional responsibility towards environment.
S.Y. B.Tech.	CH202	Material and Energy Balance	1. Interpret the data presented in different unit systems. 2. Apply the various gas laws to calculate the unknowns in the given system. 3. Develop the material balance equation for the given system. 4. Analyze the heating value of the given fuel. 5. Calculate the heat of reaction for the given reaction at the specific conditions. 6. Calculate the energy requirement for the given system.

Computer Engineering			
Year	Course Code	Course Name	Course Outcomes
FY B. Tech			
FY B.Tech.	CS101	Logic Development – C Programming	1. List the various data types, control structures and looping structures supported by C language 2. Differentiate between various data types supported by C language 3. Implement the solutions for various algorithms in C language 4. Analyze various parameter passing methods to functions in C language.
SY B. Tech			
SY B.Tech.	CS201	Data and File Structures	1. Explain the concept of data structure. 2. Develop efficient algorithm for a given problem. 3. Choose effective data structures in approaching a problem solution 4. Make use of appropriate sorting and searching algorithm for a given application.
SY B.Tech.	CS202	Digital Electronics and Microprocessor	1. Design Combinational digital circuits as per the specifications. 2. Design Sequential digital circuits as per the specifications. 3. Explain the architecture of the microprocessor 8086. 4. Explain the architecture of the microprocessor 80386. 5. Develop assembly language programs using 32/64 bit registers.
SY B.Tech.	CS211	Discrete Structure and Graph Theory	1. Develop the notion of mathematical thinking, mathematical proofs and reasoning in problem-solving 2. Make use of set, function, relation models, associated operations and terminology in context 3. Demonstrate the use of algebraic structure, logical possibilities for algorithmic design 4. Model problems of computing using graphs and trees.
SY B.Tech.	CS212	Database Management Systems	1. Explain basic concepts of database management system. 2. Perform basic operation with DBMS. 3. Design and develop database application using ER diagram and normalization. 4. Handle various concurrency and recovery issues. 5. Optimize the performance of database
SY B.Tech.	ET206	Software Prototyping	1. Consolidate the techniques, skills & modern engineering tools. 2. Apply acquired skills to the construction of a prototype project.

			3. Execute a prototype project by performing tasks in team.
			4. Demonstrate the work carried out in a team.
style center	**TY B. Tech**		
TY B.Tech.	CS302	Computer Organization & Architecture	1: Identify the different components of the computer system 2: Illustrate different types of commercial processors 3: Classify the memory organization in the computer system 4: Analyze arithmetic operations. 5: Examine the parallel processing environment.6: Examine the multicore computing environment
TY B.Tech.	CS303	Theory Of Computation	1. List the various types of languages, respective recognition machines, and various classes of problems. 2. Differentiate between various types of languages, respective recognition machines, classes of problems. 3. Apply the steps for the construction of various types of machines from language and vice versa. 4. Analyze the type of machine to be used to recognize the particular language. 5. Design the machine for the given specification of language. 6. Justify the complexity of the given class of problem.
TY B.Tech.	CS304	Computer Graphics and Gaming	1: To apply mathematics to develop Computer graphics operations. 2: To develop programs on 2D and 3D transformation and Hierarchical transformation. 3: To apply various methods for projection. 4: To demonstrate clipping algorithms. 5: To develop animation and gaming application.
TY B.Tech.	CS305	Skill Development Lab	1. Acquire practical knowledge within the chosen area of technology for project development. 2. Identify, analyze, formulate and handle programming projects with a comprehensiveand systematic approach. 3.Contribute as an individual or in a team in development of technical projects. 4.Incorporate best practices for building applications. 5.Test and validate developed prototype against the original requirements of the problem. 6.Express technical ideas, strategies and methodologies in written form.
TY B.Tech.	CS306	Skill Development Lab	1. Perform the analytics in R on real time data sets. 2. Analyze the real time data with graphical visualization. 3. Generate the different types of analytics reports. 4. Develop the models using analytics for BI Process. 5. Test and validate developed prototype against the original requirements of the problem. 6. Use Tableau Visualization effectively for Data Analytics.
TY B.Tech.	CS311	Descriptive Analytics	1. Outline the data warehouse architecture. 2. Apply the various data preprocessing techniques for making

			data marts for a given application. 3. Apply the various operations of OLAP cube. 4. Apply regression and Correlation on real datasets. 5. Generate frequent item sets for given datasheet.
TY B.Tech.	CS312	Artificial Intelligence	1. Analyze the variations in agents and environments behavior and major functions implemented in a general agent. 2. Evaluate agents using search algorithms such as uninformed search, informed search or local search. 3. Illustrate adversarial search mechanism and game-playing agents. 4. Identify capabilities of specific knowledge representation formalisms for specific tasks. 5. Apply the methodology to transfer human knowledge into an expert system. 6. Explain the learning and adaptation capability of neural systems.
TY B.Tech.	CS321	Design and Analysis of Algorithms	1. Analyze and compare complexity of different types of algorithm for different types of problems. 2. Explain various problem solving strategies. 3. Design efficient algorithm for a given problem using the strategies learned. 4. Solve intractable problems using approximation algorithms.
TY B.Tech.	CS322	Compiler Design	1. Use different compiler construction tools. 2. .Design a compiler following design principles of compiler 3. Implement a compiler with various phases. 4. Apply code generation and optimization techniques 5. Demonstrate Flex and Bison tools to create a lexical analyzer and parser.
TY B.Tech.	CS323	Computer Networks	1. Comprehend signals and communications types. 2. Distinguish data communication system and its components 3. Elaborate different types of network topologies and protocols. 4. Demonstrate various analog and digital modulation and demodulation techniques. 5. Evaluate routing protocols for different real time systems. 6. Design different application/systems related to networking.
TY B.Tech.	CS324	Mino Project	1. Execute an idea in a team as well as within constraints. 2. Acquire knowledge of the techniques, skills and modern engineering tools necessary for engineering practices. 3. Use standard engineering tools and processes for design, simulation, testing, analysis in implementation and deployment of theoretical idea into practice. 4. Use standard documentation and presentation tools for a professional report and presentation of the work.
TY B.Tech.	CS331	Predictive Analytics	1. Analyze various Association Algorithms. 2. Apply the classification and prediction techniques. 3. Use the advanced classification techniques.

			4. Analyze the unsupervised learning methods.
			5. Analyze the different clustering methods.
			6. Apply the feature engineering and ensemble learning.
TY B.Tech.	CS332	Machine Learning	1. Explain supervised & unsupervised learning.
			2. Make use of methods and techniques of machine learning
			3. Apply learning methods to solve real time examples.
			4. Analyze the various machine learning algorithms.
			5. Design the ML algorithms.
TY B.Tech.	CS301	Operating System	1. Relate the basic principles of operating systems and its computational resources
			2. Organize process and threads execution in operating system effectively.
			3. Detect the deadlock to handle the related issues.
			4. Interpret the problems regarding memory management.
			5. Analyze the efficiency of File System.
Final Year, B.Tech.			
Final Year B.Tech.	CS401	Software Engineering, Testing and Quality Assurance	1.Select the appropriate Software development paradigm for the given project.
			2.Create a Software Requirement specification SRS document for the given project.
			3.Prepare a risk mitigation plan for the project under consideration.
			4.Create Test cases for different testing techniques using Testing tools.
			5.Understand software quality standards.
Final Year B.Tech.	CS411	Operating System Design	1. Demonstrate the design and structure of Unix operating system
			2. Develop short system utilities and applications using system calls
			3. Choose the system calls to manipulate the process context and control its execution
			4. Compare memory management policies.
			5. Create modules using toy operating system
Final Year B.Tech.	CS412	Wireless and Mobile Networks	1. Determine issues and challenges in Wireless Network.
			2. Categories different types of wireless networks.
			3. Determine issues and challenges of Mobile Ad-Hoc Networks.
			4. Assessing the features of Mobile Ad-Hoc Networks.
			5. Design and implement Wireless Sensor Network.
			6. Apply different security algorithms in wireless sensor network.
Final Year B.Tech.	CS422	Deep Learning	1. Illustrate the fundamentals of deep learning neural network.
			2. Identify various strategies for deep neural network model. 3. Classify different data set using convolutional neural network.
			4. Examine the sequence modelling using different algorithms.
			5. Interpret deep learning concepts in real time applications.
			6. Explain the working of Deep Reinforcement Learning model.

Final Year B.Tech.	CS422	Big Data Analytics	1. Prepare for data summarization, query, and analysis. 2. Apply data modeling techniques to large data sets. 3. Create applications for Big Data analytics. 4. Build a complete business data analytic solution.
Final Year B.Tech.	CS431	Digital Enterprise and Management	1. Deliver people-centric, mobile-first, cloud solutions that simplify service delivery 2. Support employees whenever, wherever and however they want to work 3. Deliver improved performance, higher availability, and reduced risk while optimizing IT costs 4. Reduce risk and comply with standards in multi-cloud environments
Final Year B.Tech.	CS441	Distributed System	1. Classify distributed system models and architectures 2. Explain design issues of distributed system 3. Design distributed applications using distributed communication models 4. Analyze different algorithms for concurrency and synchronization of distributed system 5. Analyze the performance of distributed system based ob fault tolerance, security, scalability.
Final Year B.Tech.	CS442	Ubiquitous System	1. To present a survey on pervasive computing building blocks. 2. To create presentations using pervasive computing techniques and devices. 3. To solve problems for multi-core or distributed, concurrent/Parallel environments.
Final Year B.Tech.	CS443	Cloud And Virtualization	1. Ability to solve problems of distributed system 2. Ability to solve networking problems 3. Ability to improve resource utilization 4. Ability to resolve network issues
Final Year B.Tech.	CS452	Pattern Recognition	1. Understand various algorithms for pattern recognition 2. Illustrate the clustering concepts and algorithms 3. Analyze various classification technique 4. Implement various pattern recognition and feature extraction technique
Final Year B.Tech.	CS403	Advanced Skill Development Laboratory R Programming	1. Perform the analytics in R on real time data sets. 2. Analyze the real time data with graphical visualization. 3.Generate the different types of analytics reports. 4. Develop the models using analytics for BI Process. 5. Test and validate developed prototype against the original requirements of the problem 6. Use Tableau Visualization effectively for Data Analytics.
Final Year B.Tech.	CS306	Advanced Skill Development Laboratory Advanced Java Programming	1: Identify advance concepts of java programming Servlet and JSP.2: Design and develop platform independent applications using a variety of component based frameworks3: Able to implement the concepts of Hibernate & EJB for building enterprise Applications.

Final Year B.Tech.	CS422	Deep Learning	1. Illustrate the fundamentals of deep learning neural network. 2. Identify various strategies for deep neural network model. 3. Classify different data set using convolutional neural network. 4. Examine the sequence modelling using different algorithms. 5. Interpret deep learning concepts in real time applications. Interpret deep learning concepts in real time applications. 6. Explain the working of Deep Reinforcement Learning model.

Civil Engineering			
Year	**Course Code**	**Course Name**	**Course Out Come**
SY B.Tech.	CV201	Mechanics of Solids	1. Enlist and explain the different types of actions on a structural component. 2. Draw axial force diagrams for axially loaded members, shear force diagrams and bending moment diagrams for statically determinate beams and twisting moment diagram for statically determinate shafts.
SY B.Tech.	CV202	Geospatial Engineering	1. Apply the techniques of levelling to solve Engineering problems. 2. Interpret and implement the principles of trigonometry for surveying using standardized methods. 3.Perform traversing and triangulation by implementing the basic principles of surveying 4.Construct different types of curves for alignment of roads and railways and lay out civil engineering structure on field 5.Record data and perform analysis by using modern surveying tools 6. Analyze field data to minimize errors using mathematical models.
SY B.Tech.	CV211	Buildings Design and Construction	1. Explain various components of residential/commercial buildings and basic building materials used for their construction 2. Explain various forms of floors, roofs, doors, windows, arches, lintels and masonry construction.

			3.Implement relevant bye laws in functional design of buildings in a prescribed locality in India. 4. Select suitable types of material and masonry for construction of various types of buildings. 5. Functionally design a single/multi-storied residential/commercial buildings.
SY B.Tech.	CV212	Geotechnical Engineering	1. Grade engineering properties of soil based on index. 2. determine engineering properties of soil by performing relevant experiments. 3. explain seepage & flow net. 4. apply basic soil mechanics principle to calculate various stresses induced in soil. 5. choose suitable method for improvement in soil characteristics 6. evaluate bearing capacity of different types of soils.
TY B.Tech.	CV301	Mechanics of Fluids	1. Explain the properties and behavior of the fluid at rest and in motion, visualize the fluid flows 2. Apply the principles of statics to find the hydrostatic force in various fluid problems 3. Apply equations of motion to various flow conditions and compute discharge of the flows 4. Analyse complex flow patterns using model studies 5. Analyse laminar and turbulent flows in a pipeline and design simple pipe networks 6. Explain the terms of the open channel flow equations and to solve open channel flow problems using appropriate equations
TY B.Tech.	CV302	Structural Analysis	After completion of the course, students will be able to: 1: Determine internal forces in structure and sketch deflected shapes. 2. Determine displacements of determinate structures. 3. Analyse indeterminate structures by force methods. 4. Analyse indeterminate structures by displacements methods. 5: Estimate the collapse load for indeterminate structures.
TY B.Tech.	CV303	Concrete Technology	1.Explain different types concrete ingredients with their properties. 2. Identify properties of concrete using various IS tests 3. Produce a concrete with specific mix 4. Explain special types of concrete techniques.

			5. Illustrate different concrete related equipments 6: Analyze various reasons for failure of concrete.
TY B.Tech.	CV321	Design of Structures	1.Design axially loaded elements using Limit state method. 2.Design elements subjected to bending and shear using Limit state method. 3.Design elements subjected to combined axial force, bending and shear using LSM. 4.Design connections of structural elements for the actions they are subjected to, using limit state method. 5.Envisage lacuna of Force based design and understand recent trends in design.
TY B.Tech.	CV322	Transportation Engineering	1.Plan highway networks 2.Design highway geometrics 3.Design Road Intersections 4.Design flexible and rigid pavements 5.Understand the principles of construction and maintenance of highways 6.Understand the principles of construction and maintenance of Bridges
TY B.Tech.	CV323	Water Resources Engineering	1.Analyze hydro-meteorological dataAnalyze hydro-meteorological data 2.Develop rainfall-runoff relationship hydrological models 3.Estimate reservoir capacities, yield and losses 4.Design irrigation canals and canal network 5.Estimate irrigation efficiencies and canal capacities 6.Estimate aquifer parameters
TY B.Tech.	CV401	Drinking Water & Sanitary Engineering	1.Analyze the characteristics of water and wastewater 2.Estimate the quantity of drinking water and domestic wastewater generated 3.Design the various units of water treatment plant 4.Design the water distribution system and sewerage system 5.Design the various units of sewerage treatment plant

TY B.Tech.	CV431	Estimation & Costing	1.To have understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management 2.To take out of quantities for various construction projects 3.To prepare estimates for various civil engineering works 4.To calculate rates for various items of construction. 5.To draft specifications and tender notice. 6.To prepare valuation report for residential building
TY B.Tech.	CV411	Building Services	1.Understand the concepts of plumbing and drainage plan. 2.Explain the concepts and techniques of water proofing and rain water harvesting 3. Develop a model showing details of the electrification work. 4.Define principles of ventilation and air conditioning 5.Select proper method for thermal insulating building. 6.Select proper method for sound insulating building
TY B.Tech.	CV412	Advanced Design of Structures	1. Understand process of prestressing. 2. Design prestressed beam sections for flexure and shear. 3. Design building frames for vertical and horizontal loads. 4. Design rectangular and circular water tanks on ground. 5. Analyse and design retaining walls. 6. Design special foundations like combined, strap, raft, etc.
	CV413	Railway Engineering	1. explain Components of Railway Track, different Railway Gauges 2. design track Gradients as per given requirements 3. discuss various Types of Track Turnouts 4. describe purposes and facilities at Railway Stations 5. explain Interlocking and modern signal system 6. describe Surface Defects on Railway Track and Their Remedial Measures
	CV414	Hydro Power Engineering	1.Describe Instruments and their measurement techniques 2.Investigate requirements of Hydro power plants 3.Design components of Hydropower plant 4.Design Hydropower pumps 5.Describe design details of Power House
	CV441	Foundation Engineering	1. Identify types of soil & its characteristics 2. Adopt suitable soil exploration technique and interpretation of related data 3. Design both shallow and deep foundation

			4. Design special cases of foundations
	CV442	Engineering Geology	1. classify the geological hazards, erosion, flooding, dewatering and seismic Investigations etc. 2. demonstrate the earthquake & landslide to check the stability of structure
	CV443	Design of Hydraulic Structures	1.Perform the stability analysis of gravity dams 2.Explain the causes of failure of different types of dams and their design criteria 3.Design components of dam outlet works 4.Design minor irrigation structures 5.Integrate relevant concept and methodologies in the area of hydraulics, water resources and geotechnical engineering
	CV444	Air & Noise Pollution and Control measures	1.Understand meteorological aspects of air pollution 2.Understand air pollution control methods 3.Design unit operations for pollution control 4.Identify sampling and analysis techniques for air quality assessment 5.Understand noise pollution control methods
	CV445	Advance Geospatial Engineering	1. To understand the basics of Geodetic Surveying 2. To understand how to perform Hydrographic Surveying using Nautical Sextant 3. To know setting out of construction 4. To find points on earth surface and in space 5. To prepare plans of an area by aerial Photogrammetry 6. To know in detail the concept of remote sensing & GPS in identification of land features from space
	CV311	Construction Planning & Management	1. Explain various project managerial and planning concepts. 2. Explain different methods for project scheduling and controlling. 3. Analyze project budget with different prospects. 4. Illustrate various concepts and methods for quality and safety management. 5. Functionally design a schedule for a residential building.

	CV331	Operation Research	1. Solve the optimization problems 2. Apply LPP to Transportations problems which is essential for a Civil Engineer &solve assignment problems in an easy way 3. Make decision of replacing of situation with suitable substitute 4. Examine the real conditions of a project so that loss can be avoided 5. Organize an appropriate order of operations to service facilities 6. Solve the Linear programming problems for minimizing the project cost and maximizing its profit
	CV421	Financial Management	1. Understand the role of financial management in business operation 2. Analyze the finances of individual corporation in terms of capital requirements 3. Have an understanding of risk within the context of financial decision making 4. Have an understanding of supply chain management
	CV451	Statistical Methods in Construction	1. Simulate, Sample, and test the data that will accurately addresses the research problem. 2. Analyze result appropriateness using correlation and regression analysis. 3. Understand basic principles of statistical inference. 4. Apply probability and distribution concepts in construction. 5. Compute probabilities and check for hypothesis and failure conditions.
	CV304	ETABS (Extended Three-Dimensional analysis of building system)	1.Select major theories, approaches and methodologies used in software for structural engineering 2. Analysis to real engineering design problems. 3. Articulate importance of software's in research and industry by simulation work.
	CV403	Urban & Town Planning	1. Apply the principles and elements of architectural composition in spatial planning system and spatial policies in India. 2.Demonstrate the knowledge of contemporary ideas of shaping space in cities, Make Landscape design in urban context by solving issues involved in Urban Renewal 3. Acknowledge scope and breadth of planning theories, its contemporary manifestation 4. Conduct civic surveys for development plans & short and long range planning for alternative infrastructure systems while designing for present and future cities and regions.

Department of E&TC Engg. & Electronics Engg.

Year	Course Code	Course Name	Course Out Come
			The students after completion of the course will be able to:
SY B.TECH.	CH201	Environmental Science	1. Identify the various human activities adversely affecting the natural resources and the balance ecosystem.
			2. Analyze the various aspects of ecosystems and suggest ways to protect them.
			3. Carry out detailed study of pollution of given locality and suggest steps to mitigate pollution.
			4. Identify the sources of pollution and their controls
			5: Apply laws and standards for pollution
			6: Justify the social and professional responsibility towards environment
SY B.TECH.	AS202	Applied Mathematics	1. Analyze the output response of given linear system using Laplace Transform.
			2: Analyze the frequency response of the system using appropriate Fourier transform.
			3: Determine the stability of discrete system and the solution of difference equation using Z-Transform.
			4: Justify the selection of appropriate transform for a given system. 5: Determine the solution of ordinary differential equations using Euler's, Runge-Kutta 4thorder and the interpolation using Newton's and Lagrange's interpolating methods.
			6: Implement Laplace Transform, Fourier transform and Numerical methods to find the solution of given problem using MATLAB.
SY B.TECH.	ET201	System Engineering	1.Explaintherationaleforusingsystems thinking for complex adaptive systems
			2.Analyzeinteractionwithstakeholdersinaparticipatory way for research study 3:DesignSystemEngineeringframework
			4:Apply system engineering tools
			5:Evaluate the system
SY B.TECH.	ET202	Analog Electronics	1. Identify and correctly utilize the external lead structure and basic electrical characteristics of common semiconductor devices (PN junctions, MOSFETs, and BJTs)
			2. Illustrate the feedback mechanism in the design of electronic circuits

			3. Scrutinize and project electronic circuits for various signals at low and high frequencies
			4: Analyze performance parameters of various electronics circuits
			5: Compile component ideas into electronic circuits
SY B.TECH.	ET203	Digital Systems and Applications	1. Design combinational circuits and its applications 2. Design various sequential circuits 3. Construct state diagrams for various sequential circuits 4. Identify various logic families and semiconductor memories 5. Develop VHDL code for various combinational and sequential digital circuits Classify various architectures of microprocessor
SY B.TECH.	ET206	Prototyping	1. Consolidate the techniques, skills and modern engineering tools. 2. Apply acquired skills to the construction of a prototype project. 3. Develop a prototype project by performing tasks in team. 4. Demonstrate the work carried out in a team.
SY B.TECH.	HP201	Psychology	1. Explain the basic concepts of Psychology 2. Apply the concept of conditioning in day to day life. 3. Demonstrate effetely the personality traits in regular life. 4. Use social psychological theories and principles to real life experiences both in one's own life and in a broader social context 5. Employ the techniques of conflict and stress management in day to day life.
SY B.TECH.	IT201	Engineering Informatics	1. Interpretation of Data, Information and Knowledge. [Apply] 2. Make use of data acquisition techniques for an information system. [Apply] 3. Categories different storage techniques. [Analyze] 4. Develop dashboard for effective communication of information. [Create] 5. Determine components of Human computer interaction. [Evaluate] 6. Design IoT based information system. [Create]
SY B.TECH.	ME201	Material Engineering	1: Select material for engineering application 2: Classify and compare available materials 3: Utilize available material for specified purpose 4: Analyze the compare desire quality of materials from standard data 5: Measure useful properties of material

SY B.TECH.	ET211	Signals and Systems	.1: Classify various types of signals and systems.
			.2: Analyze Linear Time Invariant Systems.
			.3: Inspect continuous and discrete time systems in time and frequency domain.
			.4: Describe sampling theorem and reconstruction of signal.
			.5: Test discrete time systems using Z transform
SY B.TECH.	ET212	Network Analysis Techniques	1: Analyze complex linear circuits analytically and graphically.
			2: Solve network equations using graph theory.
			3: Examine the performance of tuned circuits in time domain and frequency domainand its application in filter design.
			4: Analyze different filter configurations and applications there-of.
			5: Inspect two port network of a given electronic circuit.
			6: Apply the concepts of transmission line of plane electromagnetic waves in bounded media.
SY B.TECH.	ET213	Minor Project	1: Define the problem to be solved
			2:Apply knowledge of various engineering tools to develop the solution to the problem
			3: Critically analyze the options available to solve the problem and select the one identified most effective
			4: Justify the selection of the method to solve the problem is-a-vis other options considered
			5: Build the working model of the solution to solve the problem
ETX			
SY B.TECH.	EX202	Applied Digital Circuits	1: Implement common VHDL constructs. 2: To implement behavioral and structural coding styles 3: To develop VHDL test bench and identify the simulation only constructs. 4: To design FSM for counters and other sequential applications. 5: To develop the algorithmic state machine for digital systems using MSI building blocks. 6: To illustrate the various architectures and device technologies of FPGA.
SY B.TECH.	EX211	Analog and Digital Communication	1: Describe the fundamental concepts and apply them for communication systems.
			2: Illustrate and criticize the use of different coding schemes.
			3: Compare and criticize different multiple access mechanisms

SY B.T ECH.	EX2 12	Circuit Theory	1Explain the concept of network in circuit theory.
			2: Simplify the complexity of the network using network theorems.
			3: Synthesize the two port network.
			4: describe the given network using Laplace transform.
			5: Analyze the network functions to find the behavior of network
			6: Evaluate stability of given network.
SY B.T ECH.	EX2 13	Minor Project	1: Illustrate how to define the problem to be solved
			2: Apply knowledge of various engineering tools to develop the solution to the problem
			3: Analyze various options available to solve the problem and select the appropriate one
			4: Justify the selection of the method to solve the problem
			5: Build the working model of the solution to solve the problem
E&TC Engg.		
TY B.T ECH.	ET3 01	Control Systems	1: Determine the transfer function of varied systems by different techniques
			2: Model SISO and MIMO systems using state space techniques
			3: Analyze the performance of LTI systems using time-domain and frequency domain techniques
			4: Infer stability of a system by different analytical and graphical methods
			5: Explain a closed loop motion control system with an application
TY B.T ECH.	ET3 02	Analog Communic ation	1: Inspect a basic flow and essential metrics in the process communication
			2: Examine different amplitude, angle modulation techniques
			3: Explain various transmitter and receiver circuits
			4: Analyze random processes and random variables
			5: Measure the noise performance of different analog modulation techniques
TY B.T ECH.	ET3 03	Microcontr oller &Applicati on	1: Compare the features of different families of the microcontrollers
			2: Explain the architecture and features of the 8 bit microcontroller
			3: Perform the interfacing of various peripherals with the microcontroller
			4: Design a microcontroller based applications
TY B.T ECH.	ET3 11	Embedded System Programmi ng	1:Explore various embedded system software such as compilers, linkers, load and assemblers
			2: Distinguish the basic linkers, loaders and software tools for program development
			3: Master various process management concepts including scheduling,

			synchronization
			4: Utilize the GNU Development tools to build embedded applications in Linux environment
TY B.T ECH .	ET3 12	IoT Architectur e and Sensors	1: Explain the fundamentals IoT Mechanisms 2: Analyze data and knowledge management in IoT technology 3: Explain IoT reference model and its architecture 4:Develop IoT applications using sensors, actuators and Network devices 5:Explain the needs of security and privacy in IoT 6:Analyze IoT platform design methodology and its design constraints
TY B.T ECH .	EX3 11	Fundament als of Robotics	1: Memorize history, concepts and key components of robotics technology. 2: Summarize classification, kinematics, sensors and actuators of industrial robots. 3: Analyze various issues in designing of manipulator, end effectors. 4: Design and implement algorithm in LabVIEW for navigating machine
TY B.T ECH .	HP3 01	Project Manageme nt	1: Explain the concept of project management. 2: Develop an ability to analyze scope, objective and vision of project initiation. 3: Able to analyze risk and different tools of project planning. 4: Develop an ability to measure progress of project by monitoring and controlling 5: Identify the problems associated with project and reviewing the same.
TY B.T ECH .	HP3 03	Basics of Entrepreneu rship	1: Why entrepreneurship requires 2: Outline the Problems Worth Solving by using various techniques like DT, JTBD 3: Identify the Customer Segments and Early Adopters 4: Develop the solution demo for identify problem. 5: Create Business Model Canvas and Minimum Viable Product
TY B.T ECH .	ET3 04	Graphical Programmi ng Lab	1: Build, simulate and solve diverse problems using LabVIEW 2: Make a use of the programming structures and data types that exist in LabVIEW 3: Create user interface with charts, graph and buttons 4: Make a use of LABVIEW to create data acquisition, analysis and display operations

			5: Construct remote instruments which can run independent of operating system
TY B.TECH.	ET305	MATLAB	1:Use MATLAB and Simulink for Problem Solving 2:Construct a Mathematical model of a given system 3:To build a GUI for a given application
TY B.TECH.	EX304	Embedded Linux	1:Explore the features of Linux through command line and shell programming 2: Demonstrate the usage of file system in Linux 3: Implement Linux scheduling algorithms 4: Configure and use tool chain in the embedded Linux environment 5: Design the various device drivers for embedded application
ETX			
TY B.TECH.	EX301	Embedded System Design	2: Illustrate microcontroller architecture & features. 1: Select appropriate microcontroller, hardware and software tools for embedded system application. 3: Construct the Assembly language & Embedded C programming for PIC 18Fxxx Microcontrollers. 4: Apply hardware and software tools for implementation of real time applications. 5: Analyze real time applications based on microcontroller and peripherals.
TY B.TECH.	EX303	Computer Network	1:Interpret basic computer network technology. 2: Make use of types of network devices in a network. 3: Analyze the basic protocols of computer networks, and how they can be used to assist in network design and implementation.
E&TC			
TY B.TECH.	ET321	Digital Communication	1: Illustrate the fundamental concepts of random variables and processes (L2) 2: Inspect different modulation and demodulation schemes (L4) 3: Analyze techniques for effective estimation & detection at receiver (L4) 4: Examine multiplexer hierarchies and multiple access techniques (L4) 5: Analyze various source and channel coding methods (L4)
TY B.TECH.	ET322	Digital Signal Processing	1:AnalyzeLTIsystemsusingDFT 2:Model IIR andFIR filters 3:Develop singlestage and multi stages amplingrate converters

			4:Buildpractical applications using DSP processor in the context of architecture and programming
TY B.T ECH .	ET3 23	Antenna Theory &Design	1:ExplainMaxwell'sEquation,uniform plane waves and its implications in antenna and wave propagation. 2: Calculate basics antenna parameters and identify antenna specifications. 3:Understand the concept to fradiation mechanism and various techniques involved in antenna parameter measurement. 4:Analyze and develop mathematical model of anantenna. 5:Explaintheconceptof micro-strip radiations 6. 6: Develop the concept of antenna array from a single element for various applications
TY B.T ECH .	ET3 31	Embedded Processor	.1:Designembeddedprocessorbaseddevicesinreal-world applications .2:ExplainArchitectureofARMcore & ARM7basedmicrocontroller .3:Implementasolution using a combination of hardware(microcontroller) and software (Embedded firm ware &its tool chain) 4..4:Utilize the standard ports and interface devices on a typical microcontroller
TY B.T ECH .	ET3 32	IoT Network & Protocols	1:Interpretfundamentals under lying principles of networking 2:Explainthe types of transmission media with real time applications 3:Analysistheprotocols used in IoT. 4:DistinguishbetweenIoTandM2M communication
TY B.T ECH .	EX3 31	Kinematics and Dynamics	1: Apply matrix algorithm for computing kinematics of robots. 2: Analyze kinematics and reverse kinematics of serial and parallel robots. 3: Prepare the path planning for robotic system. 4: Calculate Jacobian for serial and parallel robots
TY B.T ECH .	EX3 21	Real Time Operating System	1: Implement fundamental Programs for ARM CORTEX M3. 2: Analyze the importance of OS and RTOS. 3: Interpret the MCOS Structure. 4: Execute programmed multitask systems. 5: Implement task Synchronize for different application. 6: Implement Communicate between different application tasks
TY B.T	EX3 22	Digital Signal Processing	1: Classify the signals and systems based on their properties. 2: Analyze the time domain response of Discrete LTI systems.

ECH.			3: Analyze the system behavior using convolution.
			4: Determine the response of a system using Discrete Fourier Transform.
			5: Determine the response of discrete time systems using Z transform.
			6: Design the FIR and IIR filters.
TY B.TECH.	EX323	Power Electronics & Application	1: Design and implement a triggering / gate drive circuit for power converters.
			2: Design and analyze different power electronic converters.
			3: Analyze various power quality issues and their remedies.
			4: Analyze applications of power electronics.
E&TC			
B.TECH.	ET401	VLSI Design	1: Design CMOS circuits for Specific digital logic.
			2: Apply the knowledge about PLDs, FPGA Design & architectures in implementing digital design.
			3: Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
			4: Apply knowledge of testability in design and build self test circuit.
B.TECH.	ET411	Digital Image Processing	1: Analyze fundamentals of image processing
			2: Develop an algorithm for spatial and frequency domain filtering
			3: Determine various image compression and segmentation techniques
			4: Design various applications based on image processing
B.TECH.	ET412	Microwave Engineering	1: Solve problems based on impedance concept using smith chart.
			2: Design waveguide structures for different modes and cutoff frequencies.
			3: Solve problems based on microwave devices.
			4: Solve problems based on Power dividers and directional couplers.
			5: Apply RF/Microwave domain skills required for different job roles existing in industry.
B.TECH.	ET413	RISC Processors	1: Explain architecture of ARM core & ARM 7 based microcontroller
			2: Perform interfacing of different peripherals
			3: Develop embedded system applications using networking protocols.
			4: Perform Linux based application using ARM Processor

B.TECH.	ET414	Machine Learning	1: Explain fundamentals of machine learning.
			2: Describe supervised and unsupervised learning.
			3: Analyze mathematically various machine learning approaches and paradigms.
			4: Implement machine learning solutions for classification, regression, and clustering problems.
			5: Compare various machine learning techniques and to get an insight of when to apply a particular machine learning approach
B.TECH.	HP401	Engineering Economics	1: The students would have understood the basic concepts of Economics.
			2: The students would have acquired knowledge, with respect to concepts, principles and practical applications of Economics, which govern the functioning of a firm/organization under different market conditions
			3: The course is designed to improve critical thinking, problem solving skills by using economic models and theories and predict economic relationships
			4: Students entering any profession in the workforce today must be able to utilize these basic economic principles. The course expected to develop critical understanding of current topics in economics and able to formulate their own opinions on economic issues
B.TECH.	ET403	Programming in Java	1: Map data in the form of class and objects
			2: Link the data and dataset in terms of inheritance &multithreading
			3: Implement Simple projects using Java
B.TECH.	ET421	Low-Power SoC Architecture & Applications	1: Understand architecture of SOC.
			2: Explain architecture of ARM CORTEX & CORTEX based microcontroller
			3: Implement interfacing of real world peripherals with ARM CORTEX based microcontroller.
			4: Develop applications & programming based on ARM CORTEX based microcontroller.
			5: Understand basic & advanced concept of Nano devices.
B.TECH.	ET422	Privacy and Security in IoT	1: Explainsecurity and fundamentals in IoT.
			2: Describe the various securing techniques in IoT.
			3: Discuss access management solutions for IoT
			4: Applythe privacy techniques in IoT.
			5: Develop applications of cloud for IoT.

B.TECH.	EX 421	Robotics Vision	1: Choose optimum parameters for robotics vision system
			2: Apply image processing algorithms in robotics application.
			3: Illustrate various image capturing and processing techniques.
			4: Experiment with object recognition strategies
B.TECH.	ET431	Advanced Communication Systems	1: Solve problems related to wireless channels and systems.
			2: Apply domain knowledge in multiple access techniques.
			3: Solve problems based on microwave devices.
			4: Solve problems based on Power dividers and directional couplers.
			5: Design satellite link with given parameters.
B.TECH.	EX 441	Biomedical Engineering	1: Elaborate the origin of various bio-signals and the electrodes used to measure them.
			2: Illustrate the various biomedical and radiological instruments
			3: Apply the knowledge of electrical safety while designing.
			4: Apply the knowledge of biotelemetry and telemedicine in the fields of biomedical.
			5: Apply the concept of biomechanics and biomaterial in biomedical Engineering.
B.TECH.	ET442	Artificial Intelligence	1: Articulate various search methods
			2: Use various knowledge representation methods
			3: Explaindifferent Game Playing concepts
			4: Describe Natural Language Processing techniques
B.TECH.	ET443	Wireless Sensor Network	1: Apply knowledge of wireless sensor networks(WSN) to various application areas
			2: Identify communication protocols employed in WSNs.
			3: Understand and explain protocol design issues (especially energy-efficiency) and protocol designs for wireless sensor networks
			4: Conduct performance analysis of WSN.
B.TECH.	ET444	Speech Signal Processing	1: Illustrate vocal tract, practical vocal tract model for speech analysis & synthesis
			2: Analyze the Principles of speech synthesis

Year	Course Code	Course Name	Course Outcomes
			3: Explain Multidimensional voice profile (MDVP), Pratt, Dr. speech software, Discrete Circuits in speech information processing
B.TECH.	ET451	Real-Time Embedded System	1: Analyze the scheduling algorithms for real-time computing, 2: Apply the techniques to evaluate worst-case delays and utilization bounds. 3: Design embedded systems with real-time constraints
B.TECH.	ET452	Energy Management for IoT Devices	1: Identify various energy sources and energy harvesting based sensor networks 2: Explain the various piezoelectric materials and Non-linear techniques. 3: Analyze various Power sources for WSN. 4: Develop applications of Energy harvesting systems.
B.TECH.	EX 451	Intelligent and High Performance Robotics	1: Classify different types of learning, planning and reasoning under AI methods. 2: Identify appropriate AI methods to solve a given problem. 3: Formalize a given problem in the language/framework of different AI methods. 4: Explore and analyze diverse fields in robotic applications.
B.TECH.	EX431	Consumer Electronics	1: Inspect different blocks of television sets for troubleshooting. (L4) 2: Identify and resolve the fault in audio system. (L3) 3: Test any office equipment in order to avoid malfunctioning. (L4) 4: Measure the parameters of microwave oven for its functionality (L5) 5: Dissect the washing machine for troubleshooting. (L4) 6: Estimate faults in refrigerator system. (L5)

Information Technology

Year	Course Code	Course Name	Course Outcomes
SY B.Tech Courses			
SY B.Tech.	IT201	Engineering Informatics	1. Interpret Data, Information and Knowledge. 2. Make use of data acquisition techniques for an information system. 3. Categories different storage techniques. 4. Develop dashboard for effective communication of information. 5. Determine components of Human computer interaction. 6. Model IoT based information system.

			TY B.Tech Course
TY B.Tech.	IT311	Cryptography And System Security	1. Identify the security threats, and the security services and mechanisms to counter them. 2. Classify symmetric cryptography, asymmetric cryptography. 3. Choose security algorithms in computer network. 4. Identify the different security technology and digital signature. 5. Importance of security services and mechanisms in the network protocol. 6. Simplify the requirements and mechanisms for identification and authentication.
TY B.Tech.	IT331	Cyber Security	1. Choose appropriate resources to stay abreast of the latest industry tools and techniques 2. Understand what a vulnerability is and how to address most common vulnerabilities 3. Illustrate a fundamental knowledge of Cyber Security 4. Outline the fundamental risk management principles as it relates to Cyber Security 5. Analyze and evaluate systems with respect to maintaining operations in the presence of risks and threats. 6. Apply web security principles and identify security attacks.
TY B.Tech.	IT303	Web Technology	1. Apply the principles and protocols of web engineering. 2. Construct a responsive web pages using HTML & CSS. 3. Apply the basic of scripting language to provide interactivity and validation. 4. Compare the different frame work for the development of single page web application. 5. Distinguish client and server side technology for design & development of web application.
TY B.Tech.	IT321	COMPUTATIONAL INTELLIGENCE	1. Explain about the basics of soft computing techniques and also their use in some real life Situations. 2. Solve the problems using neural networks techniques. 3. Find the solution using different fuzzy logic techniques. 4. Make use of genetic algorithms for different modeling. 5. Test for various soft computing techniques.
TY B.Tech.	IT 301	Computability Theory	1. Construct a finite state machine and inter conversion between them. 2. Construct the regular expressions and regular language. 3. Develop a language, grammar and inter conversion between them. 4. Design the push down automata and Turing machine. 5. Classify the automata's, language and grammar. 6. Distinguish a decidable and un decidable problems, P and NP class problems.
TY B.Tech.	IT 302	Operating System	1. Relate the basic principles of operating systems and its computational resources 2. Organize process and threads execution in operating system effectively. 3. Detect the deadlock to handle the related issues. 4. Interpret the problems regarding memory management. 5. Analyze the efficiency of File System.

TY B.Tech.	IT 303	Web Technology	1. Apply the principles and protocols of web engineering. 2. Construct a responsive web pages using HTML & CSS. 3. Apply the basic of scripting language to provide interactivity and validation. 4. Build the single page web application using AngularJS. 5. Create a dynamic web pages using any client & server side programming.
TY B.Tech.	IT 321	Computational Intelligence	1. Explain about the basics of soft computing techniques and also their use in some real life situations. 2. Solve the problems using neural networks techniques. 3. Find the solution using different fuzzy logic techniques. 4. Make use of genetic algorithms for different modeling. 5. Test for various soft computing techniques.
TY B.Tech.	IT 322	Cloud Services and Application	1. Virtual Physical Machine. 2. Apply basics of cloud computing for Creating Cloud services. 3. Contrast the cloud service. 4. Measure and Monitor the Applications in Cloud environment. 5. Deploy the Applications in AWS Cloud.
TY B.Tech.	IT 323	Mobile Application Development	1. Utilize the major components of Android API for developing the apps. 2. Analyze the life cycles of Activities, Applications and Fragments. 3. Build application logic using the Java programming language. 4. Design UI-rich applications using all the major UI components. 5. Identify the internal or external data storage of an application. 6. Build cross platform (hybrid) mobile application.
Final Year B.Tech. Course			
Final Year B.Tech.	IT411	Operating System and Administration	1. Administer (Demonstrate) the operating system using the internal commands. 2. Organize the various users, files and applications on the computer system 3. Utilize various command-line functions and utilities to control the access and support operating systems. 4. Examine procedures for identifying and resolving common problems using operating system utilities and tools.
Final Year B.Tech.	IT413	Information Retrieval	1. Understand the process of representing, retrieving and analyzing IR models and advanced IR models. 2. Understand structure of web and working of crawlers 3. Develop IR models form standard IR models. 4. Develop the standard methods for web indexing and evaluation 5. To analyze optimization techniques & various algorithms used in web search.

YEAR	COURSE CODE	COURSE NAME	COURSE OUTCOMES
Final Year B.Tech.	IT421	Ethical Hacking & Cyber Laws	1. Identify and analyse the stages an ethical hacker requires to take in order to compromise a target system. 2. Identify tools and techniques to carry out a various kind of scanning. 3. Critically evaluate security techniques used to protect web, network and user data. 4. Demonstrate systematic understanding of the concepts of security at the level of policy and strategy in a computer system. 5. Classify different types of webserver attacks, attack methodology, and countermeasures 6. Understand Wireless Encryption, wireless hacking methodology, and different laws that can help protect your network.
Final Year B.Tech.	IT451	Digital Forensics	1. Illustrate the fundamentals of computer forensics and Information awareness. 2. Classify the attributes of data recovery in file systems and storage media. 3. Outline the techniques of cyber forensics and intelligence. 4. Simplify the test cases in cyber forensics 5. Analyze the digital evidence of different media. 6. List the common type of digital evidence.
Final Year B.Tech.	IT442	IoT and Wireless Sensor Network	1. Understand the concept of Internet of Things and Wireless Sensor Network 2. Analyze basic protocols in Wireless Sensor Network 3. Design IoT applications in different domain and able to analyze their performance 4. Implement IoT applications

Mechanical Engineering

YEAR	COURSE CODE	COURSE NAME	COURSE OUTCOMES
S Y B.TECH. MECHANICAL	CH201	Environmental Science	1. Identify the various human activities adversely affecting the natural resources and the balance ecosystem 2. Analyze the various aspects of ecosystems and suggest ways to protect them. 3. Carry out detailed study of pollution of given locality and suggest steps to mitigate pollution.

			4. Identify the sources of pollution and their controls 5. Apply laws and standards for pollution 6. Justify the social and professional responsibility towards environment
	AS201	Applied Mathematics	1. Analyze the output response of given linear system using Laplace Transform. 2. Analyze the frequency response of the system using appropriate Fourier transform. 3. Justify the selection of appropriate transform for a given system. 4. Solve and examine the solution of partial differential equations by theoretical methods. 5. Determine the solution of ordinary differential equations using Euler's, Runge-Kutta 4th order and the interpolation using Newton's and Lagrange's interpolating methods. 6. Implement Laplace Transform, Fourier transform and Numerical methods to find the solution of given problem using MATLAB.
	ET201	System Engineering	1. Explain the rationale for using systems thinking for complex adaptive systems 2. Analyze interaction with stakeholders in a participatory way for research study 3. Design System Engineering frame work 4. Apply system engineering tools 5. Evaluate the system
	ME202	Thermal Engineering	1. Apply concepts and laws of thermodynamics to various thermal processes and real systems. 2. Formulate performance of various Thermodynamic gas power cycles. 3. Examine the condition of steam and performance of steam generators. 4. Estimate Stoichiometric air required for combustion of fuels and recent IC engine technologies.
	ME203	Solid Mechanics	1. Memorize the fundamental concepts including static equilibrium, geometry of deformation, and material constitutive behavior. 2. Understand the concept of resistance, deformation and thermal stresses and Principal Stresses. 3. Construct shear forces and bending moment diagrams for different beams under various loads. 4. To analyze concept of Slope and Deflections, Bending and Shear stresses in beams for solving numerical. 5. Judge suitable dimensions for Column, solid and hollow circular shafts for mechanical systems
	ET206	Prototyping	1. Consolidate the techniques, skills and modern engineering tools. 2. Apply acquired skills to the construction of a prototype project. 3. Develop a prototype project by performing tasks in team. 4. Demonstrate the work carried out in a team.
	IT201	Engineering Informatics	1. Interpretation of Data, Information and Knowledge. 2. Make use of data acquisition techniques for an information system. 3. Categories different storage techniques.

			4. Develop dashboard for effective communication of information.
			5. Determine components of Human computer interaction.
			6. Design IoT based information system.
	ME201	Materials Engineering	1. Classify the engineering materials and heat treatment processes applied in engineering field
			2. Interpret the specifications, composition, concepts and fundamental properties of engineering materials applied in industrial/research field.
			3. Identify the suitable materials, manufacturing process for specified application to meet the product requirements.
			4. Analyze the suitable material testing and characterization technique to ensure service life for specific product.
	ME211	Fluid Mechanics	1. Define the properties of fluids and different terms in fluid statics, kinematics and dynamics.
			2. Identify the pressure, velocity and discharge in any type of flow also able to visualize the flow.
			3. Calculate losses in the flow field.
			4. Analyse when and which types of flow equations are applicable for the flow problems.
			5. Predict the type of flow and able to use fundamental equations in real life problems.
	ME212	Manufacturing Technology	1. Select appropriate manufacturing processes and machines for manufacturing a product
			2. Demonstrate working of various machines
			3. Make use of proper tooling and different machining parameters for manufacturing
			4. Develop jigs and fixtures for specified product
			5. Utilize the CNC Technology and non-conventional machining processes in industry
	HP201	Psychology	1. Explain the basic concepts of Psychology
			2. Apply the concept of conditioning in day to day life.
			3. Demonstrate effetely the personality traits in regular life.
			4. Use social psychological theories and principles to real life experiences both in one's own life and in a broader social context
			5. Employ the techniques of conflict and stress management in day to day life.
	ME213	Minor Project	1. Define the problem to be solved.
			2. Apply knowledge of various engineering tools to develop the solution to the problem.
			3. Critically analyze the options available to solve the problem and select the one identified most effective
			4. Justify the selection of the method to solve the problem is-a-vis other options considered
			5. Build the working model of the solution to solve the problem
T Y B.TECH . MECH	ME323	Operations Research	1. Identify and develop operational research models from the verbal description of the real system
			2. Understand the mathematical tools that are needed to solve optimization problems
			3. Use mathematical software to solve the proposed models.

ANICAL			4. Solve specialized linear programming problems like the transportation and assignment problems 5. Solve network models like the shortest path, minimum spanning tree, and maximum flow problems
	ME302	Machines & Mechanisms	1. Enlist principles of kinematic pairs, chains and their classification 2. Analyze the planar mechanisms for position, velocity and acceleration 3. Interpret Constructional features and working features of parts of machines 4. Evaluate gear tooth geometry and select appropriate gears for the required applications 5. Design cams and followers for specified motion profile
	ME303	Heat Transfer	1. Define the important modes of heat transfer and state their applications 2. Compare the heat transfer rate of different thermal system 3. Calculate heat transfer by conduction, convection and thermal radiation for practical situations. 4. Analyze heat transfer in thermal systems involving several heat transfer mechanisms. 5. Recommend suitable Heat Exchanger for any practical application
	ME31#	Open Elective - Refer Annexure.	
	ME311	GEOM ETRIC MODE LING AND DESIGN	1. Recall fundamentals of Computer Graphics. 2. Explain Computer Graphics and the role of computer-aided design (CAD) in product development 3. Describe the concepts of geometric and modelling techniques. 4. Apply the knowledge to develop visualization of image display. 5. Evaluate the modeling, drafting, detailing of 2D and 3D models.
	ME312	FUNDAMEN TALS OF ROBOTICS	1. Memorize key components of robotics technology. 2. Summarize classification, sensors and actuators of industrial robots. 3. Develop different transmission system used in robotics. 4. Create a robot with sensor/Actuator.
	ME313	WORK PROCESS ASSESSMENT	1. Define productivity concepts and principles. 2. Recall the principles of economics. 3. Describe work study, method study and time study. 4. Calculate standard time to carry out a specified job with different techniques. 5. Design the man-machine system to improve human efficiency.
	HP302	Professional Skills	1. Apply Soft Skills in their professional as well as personal life. 2. Articulate various styles and skills of leadership suitable to

			various situations. 3. Apply various techniques of enhancing creative thinking 4. Evaluate the situation and construct the best possible solution
ME30#	Skill Development Lab - Refer Annexure		
ME304	Autodesk Inventor		1. Identify the components of the AutoCAD user interface and basic CAD terminology. 2. Utilize AUTOCAD features to create and modify drawings. 3. Use professional-level CAD software to draw, read engineering. 4. Apply the skills attained from 2D and 3D modelling to design working drawings using Inventor.
ME305	CATIA		1. Make Database in PLM Environment 2. Apply various tools for modeling, assembly & surfacing 3. Design new products in 3D digital environment
ME321	Turbo machines		1. Classify the different turbo machines. 2. Determine the force exerted by fluid on rotating elements of turbo machines using thermo-fluid dynamics equation. 3. Solve the turbo machines problem by using their velocity triangles 4. Analyze the overall performance of turbo machines using characteristic parameters 5. Recommend the suitable turbo machines for an required application
ME322	Quality Assurance		1. Identify different measurement standards as per application. 2. Explain the tolerance, limits of size, fits and gauge design. 3. Describe measurements of threads, gears. 4. Apply QC tools at appropriate application. 5. Prepare the Quality Control Plan, Recommend corrective action.
ME301	Machine Design		1. Outline the design problem and solve it. 2. Interpret the geometrical and dimensional details of engineering drawing in design project. 3. Analyze the stresses and strains induced in a machine element. 4. Formulate the safety of power transmitting elements in different failure modes. 5. Design of power transmission system like gears, shafts, bearings using theories of failure
ME33#	Open Elective - Refer Annexure.		

	ME331	FINITE ELEMENT ANALYSIS	1. Identify mathematical model for solution of common engineering problems. 2. Formulate simple problems into finite elements. 3. Solve for modeling and meshing of structural problems. 4. Use professional-level finite element software to solve engineering problems in Solid mechanics. 5. Derive element matrix equation by different methods by applying basiclawsin mechanics and integration by parts.
	ME332	KINEMATICS AND DYNAMICS	1. Name configurations of robot. 2. Prepare trajectory design plan for shooting robot. 3. Combine kinematics and dynamics for position control. 4. Create a Programmable Robot with Transformed Mechanisms.
	ME333	FACILITY PLANNING AND DESIGN	1. Recall basics of Maintenance and safety measures in industry. 2. Identify location of facilities for business organizations. 3. Apply fundamental principles of material handling. 4. Calculate the cost of given engineered product and service. 5. Design new layouts incorporating products, process and personnel requirements for manufacturing and service organizations.
	HP303	Basics of Entrepreneurship	1. Why entrepreneurship requires 2. Outline the Problems Worth Solving by using various techniques like DT, JTBD 3. Identify the Customer Segments and Early Adopters 4. Develop the solution demo for identify problem. 5. Building Business Model Canvas and Minimum Viable Product 6. Distinguish between Revenue Streams, Pricing, Costs and Venture
	HP301	Project Management	1. Explain the concept of project management. 2. Develop an ability to analyze scope, objective and vision of project initiation. 3. Able to analyze risk and different tools of project planning. 4. Develop an ability to measure progress of project by monitoring and controlling 5. Identify the problems associated with project and reviewing the same.
	ME324	MINI PROJECT	1. Execute an idea in a team as well as within constraints. 2. Acquire knowledge of the techniques, skills and modern engineering tools necessary for engineering practices. 3. Use standard engineering tools and processes for design, simulation, testing, analysis in implementation and deployment of theoretical idea into practice. 4. Use standard documentation and presentation tools for a professional report and presentation of the work.

B.TECH. MECHANICAL	ME401	Heating Ventilation & Air Conditioning	1. Recall fundamental principles of refrigeration and air conditioning 2. Analyze the working principle of important components of the HVAC system 3. Capable of using psychometric chart at various different pressures to solve commercial cooling and heating problems. 4. Manage to construct and design descriptions for HVAC systems. 5. To design / dimensioning ventilation solutions at room level that provides acceptableindoor air quality with respect to temperature, air quality and sound.
	ME41#	Discipline Elective - Refer Annexure.	
	ME411	Mechatronics	1. Identification of key elements of mechatronics system and its representation in terms of block Diagrams. 2. Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O. 3. Selection of sensors and interfacing with DAQ. 4. Choose actuator based on application. 5. Program to control sensor and actuators.
	ME412	Pressure Vessel Design	1. Understand and explain all calculations used by the Code, and relate them to fundamental principle. 2. Explain and apply the fundamental principles of loads and stresses as applied to pressure vessels. 3. Understand the different types of stresses and their effects pressure vessel. 4. To understand the design of pressure vessels and various parts. 5. To verify the testing and failures of design vessels under thermal and fatigue load. 6. Design shells, end closures and nozzles of pressure vessels using ASME codes.
	ME413	Power Plant Engineering	1. Recall fundamentals of Thermal Engineering 2. evaluate different types of power plant 3. Experiment verification of basic concept 4. Analyze the load calculation for any system 5. Investigate the methods to reduce pollution from power plants 6. Design a simple power plant according to need
	ME414	Product Lifecycle Management	1. Recall the knowledge about phases of PLM, PLM strategies and methodology for PLM feasibility study and PDM implementation 2. Illustrate various approaches and techniques for designing and developing products. 3. Apply product engineering guidelines / thumb rules in designing

			products for moulding, machining, sheet metal working etc.
			4. Acquire knowledge in applying virtual product development tools for components, machining and manufacturing plant
ME42#	Open Elective - Refer Annexure.		
ME421	Computational Fluid Dynamics		1. Explain and calculate the governing equations for fluid flow;
			2. Apply finite difference and finite volume methods to fluid flow problems
			3. Analyze and model fluid flow and heat transfer problems
			4. Generate high quality grids and interpret the correctness of numerical results with physics.
			5. Use a CFD tool effectively for practical problems and research.
ME422	Robotic Vision & Control		1. Organize different and/or gadgets of vision systems.
			2. Analyze vision and image processing algorithms in Robot application.
			3. Illustrate various image capturing and processing techniques.
			4. Categorize motion planning.
ME423	Operations Management		1. ME311.CO.1: Identify appropriate production system based on the product attributes such as variety, volumes etc.
			2. ME311.CO.2: Explain the need of various functions in production planning for better management of manufacturing or service system.
			3. ME311.CO.3: Prepare demand forecast model for given product or service.
			4. ME311.CO.4: Analyze the material requirements for manufacturing environments.
			5. ME311.CO.5: Develop aggregate plans, master production schedule, capacity requirement plans and material requirement plans as a part of resource requirements planning system.
`	Sociology		1. Students get acquainted to sociology as a social science.
			2. Students understand the significance of sociology in solving problems.
			3. Students are able to find solutions to critical social issues.
			4. Students are sensitive to emerging social issues and attempt to solve problems.
			5. Students use tools of survey and observation to understand and change their attitude towards social issues
ME402	Project - I		
ME431	Noise Vibration & Harshness		1. Solve the one and two-degree freedom system problems
			2. Apply the knowledge of acoustics in practice.
			3. Implement the measurement and control techniques of Vibration

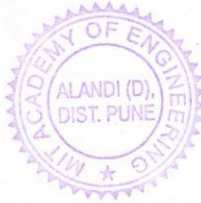|			
			and Noise
			4. Analyse the sources, effects of noise &vibration
	ME44#	Discipline Elective - Refer Annexure	
	ME441	Hydraulics & Pneumatics	1. Working principle of various components used for hydraulic & pneumatic systems.
			2. Identify various components of hydraulic & pneumatic systems.
			3. Select appropriate components required for hydraulic and pneumatic systems.
			4. Understand industrial applications of hydraulic and pneumatic system.
			5. Troubleshooting of hydraulic & pneumatic circuits through Automation studio software.
	ME442	Mechanical System Design	1. Understand the difference between component level design and system level design.
			2. Design various mechanical systems like pressure vessels, machine tool gear boxes, material handling systems, etc. for the specifications stated/formulated.
			3. Identify optimum design principles and apply it to mechanical components.
			4. Optimize design for efficient performance.
			5. Apply the concept of system design.
	ME443	Non-Conventional Machining	1. Illustrate the working of various non-conventional machining processes
			2. Apply the working principles and processing characteristics of non-conventional machining like EDM, ECM to the production of precision components
			3. Analyze mechanical, thermal and Electrochemical type non-conventional machining Processes
			4. Examine the effect of material removal rate (MRR), Tool Wear and Surface roughness on work piece
	ME444	Enterprise Resource Planning	1. Comprehend the technical aspects of ERP systems
			2. Learn concepts of reengineering and how they relate to ERP system implementations
			3. Understand the steps and activities in the ERP life cycle
			4. Be able to identify and describe typical functionality in an ERP system
			5. Understand current trends and issues related to Enterprise Systems.
	ME45#	Open Elective - Refer Annexure	
	ME451	Advanced	1. Explain the inner workings of a finite element code for linear

		Analysis	stress, displacement, temperature and modal analysis. 2. Provide the mathematical foundations of the finite element formulation for engineering applications (solids, heat, fluids). 3. Understand of the scope, principles, norms, accountabilities and bounds of contemporary engineering practice in the CFD. 4. Use commercial finite element analysis software to solve complex problems in solid mechanics and heat transfer 5. Interpret the results of finite element analyses and make an assessment of the resultsintermsofmodeling(physicsassumptions)errors,discretization(meshdensityandrefinement toward convergence) errors, and numerical (round-off) errors.
ME452	Intelligent & High Performance Robotics		1. ME452.CO.1: Classify different types of learning, planning and reasoning under AI methods. 2. ME452.CO.2: Identify appropriate AI methods to solve a given problem. 3. ME452.CO.3: Formalize a given problem in the language/framework of different AI methods. 4. ME452.CO.4: Explore and analyze diverse fields in robotic applications.
453	Supply Chain Management		1. ME452.CO.1: Identify the key elements and processes in supply chain. 2. ME452.CO.2: Discuss the designing, planning and operational decisions in Supply Chain Management. 3. ME452.CO.3: Predict the future developments in logistics and supply chain. 4. ME452.CO.4: Apply the critical components techniques in management in supply chain. 5. ME452.CO.5: Design supply chain network for manufacturing company.
HP405	Business Strategies		1. Rephrase business model and Identify additional customer segments 2. Identify channels and strategy for budgeting and planning. 3. Make use of Legal aspect, Mentors, Advisors, and Experts in startups 4. Analyze the growing revenues, sales planning, strengthening sales, improving margins 5. Estimate customer lifetime value, competitor and peer's financial models for venture growth 6. Formulate the all procedure for new venture ; Product market fit and A Pitch Deck

	HP401	Engineering Economics	1. The students would have understood the basic concepts of Economics. 2. The students would have acquired knowledge, with respect to concepts, principles and practical applications of Economics, which govern the functioning of a firm/organization under different market conditions 3. The course is designed to improve critical thinking, problem solving skills by using economic models and theories and predict economic relationships 4. Students entering any profession in the workforce today must be able to utilizethesebasiceconomicprinciples.Thecourseexpectedtodevelopcriticalunderstanding of current topics in economics and able to formulate their own opinions on economic issues

S. M. Bhagat
IQAC, coordinator

Dr. M. D. GOUDAR
IQAC, Chair-Person.