

Department of mechanical Engineering

This program aims to create technical knowledge among the students who are capable to take on engineering responsibilities in the field of automobile industry, manufacturing industry, thermal power industry etc. A specialization in this field is growing in demand in the coming years. The program is designed to help the students to understand and apply the best and basic knowledge of mechanics.

➤ Course outcomes (COs)

1. To make the students understand the basic concepts of fluids and fluid flow which are essential in majority of the engineering applications. After undergoing this course the students will have the knowledge of various pressure measuring instruments, Fluid statics, Types of fluid motion, Fluid dynamics, Pipe flow, The concept of boundary layer, Lift and drag etc.
2. To make the students understand the basic concepts of mechanical operations which are essential in majority of the engineering applications. The operation like drilling, milling, forging, slot cutting, turning facing which are high demand in manufacturing industry. etc.
3. Mechanical industries has been playing important role in the development of a country in order to meet the basic needs of mankind. There has been continuous upgradation in technologies for improving the overall economy of the process. The aim of the course is to study process technologies, Availability of raw materials, Production trends, Material and energy balances, Flow sheets, Engineering problems pertaining to materials of construction, Waste regeneration/recycling, Environmental and energy conservation .
4. To teach students fundamental knowledge of mechanical engineering and application of this knowledge in the solving problems. After undergoing this course the students will have the knowledge of basics such as units and dimensions, application of material and Behaviour of ideal gases including the procedures for estimation of vapour pressure and heats of vaporization, Humidity and saturation along with the use of humidity chart and steam tables.
5. To expose students to heat transfer applications in industry. After undergoing this course the students will have the knowledge of heat transfer principles, Behavior of thermal systems, Development of the governing differential, Algebraic and finite difference

equations associated with thermal systems and to investigate the influences of boundary and initial conditions and system parameters on the resulting steady or transient response of the system.

6. To expose students to mass transfer fundamentals such as diffusion, Film theory, Mass transfer rate and mass transfer coefficients for various different systems. In this course analogy between momentum, Heat and mass transfer is also covered. Further different types of equipments have also been covered for more industrial exposure, How the basis mechanism behind this equipment they work.
7. The aim of this course is to understand of the laws of thermodynamics and their application in the analysis of Chemical and engineering problems. After undergoing this course the students will have the knowledge of equations of state for calculating thermodynamics properties of fluids and fluid mixtures, Equilibrium compositions of chemical reactions and two-phase liquid/vapor mixtures.

➤ **Program outcomes (POs) of Department of mechanical Engineering:**

1. To apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to get the solution of complex engineering problems.
2. To identify engineering problems related to mechanical industry and formulate it and solve it.
3. To understand the professional and ethical responsibility.
4. To recognize the need of industry and to engage in life-long learning.
5. To Demonstrate knowledge and understanding of the engineering and management principles and their application as a member and leader in a team, to manage projects in multidisciplinary environments.
6. To Use research-based knowledge and research methods to get logical and valid conclusions.

➤ **Program Specific Outcomes**

1. Programme Outcomes (POs) for UG Programme:

- With the help of Practical knowledge acquired during the 6 month internship, the students will be able to become a competent resource to the market.
- To prepare mechanical engineering graduates to meet with the current and future demands & challenge in mechanical industry and to pursue post-graduation and research in mechanical engineering and allied engineering disciplines.
- To provide graduates a basic knowledge of mathematics, science and engineering so that they can formulate, analyze and solve mechanical engineering and related problems.
- Mechanical engineering graduates will be able to provide environmental friendly engineering projects involving multidisciplinary aspects/ streams including its financial cost estimation etc.
- Mechanical engineering graduates will be able to create new innovative ideas, new innovative technologies so that they can use it in their advance studies.

S.NO	Course Code	Course Title	Course Outcomes
FIRST SEMESTER			
1.	BS-101	ENGINEERING PHYSICS-I	The objective of teaching engineering physics is to give an understanding of the basic knowledge and impart quality education in physical sciences to the budding engineers. To strengthen the skills in basic measurements by exposing the students to well equipped labs and enhance the problem solving ability through interactive classes.
2.	BS-103	ENGINEERING MATHEMATICS-I	An effective knowledge of mathematics for all engineering students is a necessary requirement for the education of qualified engineering graduates capable both of innovation and of adaptation to changing technology. After completing the syllabus, Students can better understand the mathematical terms used to solve the engineering problems under different conditions.
3.	BS-105	ENGINEERING CHEMISTRY	Introduction to water treatment, Types of hardness, Units of Hardness, Degree of Hardness, Determination of Hardness by EDTA method, Boiler troubles, Scale and sludge formation, Caustic Embrittlement, Softening methods, Lime Soda process, Zeolite (Permutit

			process) process, Demineralization (Ion Exchange process), Desalination, BOD, COD and their significance, Surface water pollution and self purification, Waste water treatment, Sedimentation and biological methods
4	ES-101	ENGINEERING GRAPHICS & DRAWING	The objective of this course is to accurately and unambiguously capture all the geometric features of a product or a component and convey all the required information that will allow a manufacturer to produce that component
5	ES-103	FUNDAMENTALS OF COMPUTERS AND PROGRAMMING	To know the components of a Computer System, To understand basic Concepts of Operating System and Computer Networks, To have an overview of different types of operating systems like DOS, UNIX/LINUX Operating System, Windows XP, To have a thorough knowledge of various System Software and Programming languages, To study different kinds of Number system, To know the concepts of Problem Solving, To have a thorough knowledge of C language and its programming
6	ES-105/106	BASICS OF ELECTRICAL ENGINEERING	Students will be able to learn the fundamentals of Electrical Engineering in Circuit Analysis, Measurements & electrical machines. This will help students of all disciplines to understand the basics of Electrical Engineering
7.	ES-111	WORKSOP PRACTICE-I	The main objective of the course is to make the engineering students familiar with the basic problems related to manufacturing which may come across during their career and their day to day life too
8.	ELGA-101*	ENGLISH LANGUAGE AND GENERAL AWARENESS -I	The course is specifically focused on laying a firm foundation for English language proficiency by helping students build a strong base in Grammar and vocabulary
9.	BS-102	ENGINEERING PHYSICS-II	The objective of this course is to give an understanding of the basic knowledge and impart quality education in physical sciences to the budding engineers. To strengthen the skills

			in basic measurements by exposing the students to well equipped labs and enhance the problem solving ability through interactive classes.
10.	BS-104	ENGINEERING MATHEMATICS-II	The aim of the course is to solve the applications based on real industrial problems. Uncertainty is an essential feature of the engineering environment and for this reason the fields of probability and statistics are also included.
11.	ES-104	INTRODUCTION TO CADD	The objective of this course is to introduce the students about how computer help in industrial designing, Basics of computer graphics, knowledge about AutoCAD software.
12.	ES-105/106	BASICS OF ELECTRONICS ENGINEERING	This course enables the students to understand the concept and behavior of passive electrical components in DC and AC circuits, Structure, Functionality and characteristics of electronic devices and their usage in designing analog and digital circuits. It also describes some advanced applications and how electronic circuits can interact with outside world.
13.	ES-108	BASICS OF MECHANICAL ENGINEERING	The main objective of the course is to understand and identify the problems related to mechanical engineering, Which may come across to the students, Irrespective of any branch of engineering during their career. In present industrial scenario engineers of every field are employed, Therefore the students of every branch must know the basic concepts of mechanical engineering
14.	ES-112	WORKSHOP PRACTICE-II	The main objective of the course is to make the engineering students familiar with the basic problems related to manufacturing which may come across during their career and their day to day life too
15.	ES-114	CAD LAB	To introduce the student to basic drafting skills with CAD software, Necessary for an engineer.
16.	EGA-102*	ENGLISH AND GENERAL AWARENESS-II	The course aims at helping the students enhance their quality of English communication by

			developing an understanding of correct usage of words and phrases. It also helps them frame grammatically as well as logically correct sentences
17.	ME-201	MATERIAL SCIENCE AND METTALURGY	To make the students understand the relationship between the structures of materials at atomic and molecular scales and their properties. The knowledge of material properties is must for various engineering applications
18.	ME-203	STRENGTH OF MATERIALS-I	To make the students understand the strength, Stability and rigidity of various structural or machine members. The students, Upon completion of this course, Will be able to calculate stress, Strain and deformation for basic geometries subjected to various types of loadings.
19.	ME-205	MACHINE DRAWING	To make the students understand the principles and requirements of production drawings. The students after undergoing this course will be able to understand the various symbols used in the drawings and assemble the various parts like jigs and fixtures, Lathe tail stock, Piston, Piston rods, Bearings, Valves etc.
20.	ME-207	MANUFACTURING TECHNOLOGY-I	To make the students understand the various types of manufacturing process and tool materials , tool angles etc
21.	ME-209	MECHANICS OF FLUIDS	To make the students understand the basic concepts of fluids and fluid flow which are essential in majority of the engineering applications. After undergoing this course the students will have the knowledge of various pressure measuring instruments, Fluid statics, Types of fluid motion, Fluid dynamics, Pipe flow, The concept of boundary layer, Lift and drag etc.
22.	HS-201	ESSENTIALS OF MANGEMENT AND ORGANISATIONAL BEHAVIOUR	To help the students lay a foundation to an understanding of Management and Organizational behavior which are essential fields of study to make a success of both their professional and personal lives.

23.	ELGA-201	ENGLISH LANGUAGE AND GENERAL AWARENESS-III	The course is designed to help students develop effective communication skills, and hence, it lays emphasis on their spoken and listening skills.
24.	ME-202	THERMODYNAMICS	To make the students understand the basic principles, Laws of thermodynamics, Thermodynamics relations and various properties of fluids. The knowledge of this subject is essential for analysis of practical problems relating to heat and work and their mutual inter conversions, Types of fluid motion, Fluid dynamics, Pipe flow, The concept of boundary layer, Lift and drag etc.
25.	ME-204	STRENGTH OF MATERIALS-II	To make the student understand the strength, Stability and rigidity of various structural or machine members such as beams, Columns, Shafts, Springs, Cylinders etc. The knowledge of this subject is essential for designing structural or machine members that are safe, Durable and economical
26.	ME-206	FLUID MACHINES	to make the students understand the various types, Working and performance of the hydraulic turbines which are used as prime movers in hydraulic power plants. The students also learn about power absorbing machines like centrifugal pumps and reciprocating pumps and various other hydraulic machines /systems which have widespread applications.
27	ME-208	MANUFACTURING TECHNOLOGY-II	To make the students understand the various types of manufacturing process and tool materials , tool angles, metrology of the specimens etc
28.	ME-210	KINEMATICS OF MACHINES	To make the student understand the basic concepts of machine and mechanism which have wide applications to practical and engineering problems. The students after undergoing this course will be able to understand the velocity and acceleration diagrams of all basic mechanisms. They will develop understanding of lower pairs, Importance of friction in various machines and

			knowledge of various power drives
29.	HS-202	FUNDAMENTALS OF BUSINESS & ECONOMICS	To provide the students a basic understanding of Business and Economics which are vital constituents of the overall professional environment of an Engineer
30.	ME-301	ENERGY CONVERSION	To make the student understand the complete working of a steam turbine which is the most important part of any thermal power plant. The students learn about the fuels used, Various types of boilers, Mountings and accessories of boilers, Vapour power cycles, Steam nozzles, Types, Working & performance of steam turbines, Steam condensers and air compressors
31.	ME-303	MACHINE DESIGN -I	To make the students understand the prerequisites of design and accordingly conceptualise a good, Feasible and economic design. The students also learn the design of riveted, Welded joints, Bolt joints, Pipe joints, Keys, Cotter and knuckle joints, Shafts, Couplings, Levers, Screws etc.
32.	ME-305	MECHATRONICS	Mechatronics is a multidisciplinary field of science that includes a combination of mechanical engineering, electronics, computer engineering, telecommunications engineering, systems engineering and control engineering
33.	ME-307	INDUSTRIAL ENGINEERING	To impart knowledge on productivity, Forecasting demand, Aggregate and capacity planning and control functions, Inventory models
34.	ME-309	IC ENGINES AND GAS TURBINES	To make the students understand the complete working of internal combustion engines and gas turbines which have widespread applications in propulsions of vehicles, Jet aircrafts, Large ships, Helicopters etc
35.	ME-311	DYNAMICS OF MACHINES	To make the students understand the basic concepts of machine and mechanism which have wide applications to practical and engineering problems. The students after undergoing this course will develop understanding of static and dynamic forces in mechanisms, Flywheels, Gears, Gear trains,

			Brakes, Governors, Automatic controls etc.
36.	ELGA-301	ENGLISH LANGUAGE AND GENERAL AWARENESS-V	The course facilitates the learning of the principles of effective formal and business communication.
37.	ME-302	OPERATIONS RESEARCH	The objective of this subject as a mathematical discipline is to establish theories and algorithms to model and solve mathematical optimization problems that translate to real life decision making problems.
38.	ME-304	INDUSTRIAL QUALITY CONTROL	Quality control is systematic control by management of variables in the manufacturing process that affect goodness of end-product. These variables result from the application of men, material and machines.
39.	ME-306	REFRIGERATION AND AIR CONDITIONING	To make the students learn the basic concepts, Principles and working of refrigeration and air conditioning. The students also learn to compute the cooling load, Design and select refrigeration and air conditioning equipments
40.	ME-308	MACHINE DESIGN – II	To enable the students to design various gears, Belt sand chain drives, Clutches, Springs, Bearings, Piston, Crankshaft, Flywheel etc.
41.	ME-310	MEASUREMENTS AND INSTRUMENTATION	Objective of this subject is the repetition of a unit amount that maintains its size within allowance range of error no matter which instrument intended to measure the variable of interest is used .
42.	ME-312	HEAT & MASS TRANSFER	To make the students understand the exchange of thermal energy from one physical system to another system. The students learn about three modes of heat transfer: conduction convection and radiation in detail. The various types of heat exchangers, Which find applications in auto sector, Power plants and various process industries, Are also discussed in detail.
43.	ME-320	SEMINAR	The student is required to deliver an independent seminar on any of emerging areas/ application of Mechanical Engineering courses. Senior faculty will supervise the students in selecting and preparation of the same. The student will submit two copies of seminar

			report (at least one week prior to the presentation) and shall make oral presentation as per time schedule decided by the faculty concerned. Internal Evaluation will be made on the basis of report, presentation and the discussion during the presentation
44.	ELGA-302	ENGLISH LANGUAGE AND GENERAL AWARENESS-VI	The purpose of the course is to make the students confident of using English in formal as well as informal communication for business and all other purposes.
45.	ME-421/422/423/424	POWER PLANT ENGINEERING	To make the students aware about the working of various types of power plants based on conventional as well as non conventional sources of energy. The students also learn about fluctuating loads on power plants, Its economic analysis and the tariff methods for electric energy
46.	ME-421/422/423/424	AUTOMOBILE ENGINEERING	Objective Automobile Engineering contains concept coverage and objective questions and answers on the subject of automobile engineering . It can also serve as a good preparation material for candidates studying for competitive exams that test their knowledge in automobile engineering .
47.	ME-421/422/423/424	MODERN MACHINING PROCESSES	There is a need for machine tools and processes which can accurately and easily machine the most difficult-to-machine materials and workpieces with intricate and accurate shapes.
48.	ME-421/422/423/424	NON-DESTRUCTIVE TESTING	Nondestructive testing or non-destructive testing (NDT) is a wide group of analysis techniques used in science and technology industry to evaluate the properties of a material, component or system without causing damage
49.	ME-421/422/423/424	ENTREPRENEURSHIP	The capacity and willingness to develop, organize and manage a business venture along with any of its risks in order to make a profit. The most obvious example of entrepreneurship is the starting of new businesses
50.	ME-441/442	INDUSTRIAL TRAINING/PROJECT	Each student is expected to undergo one complete semester of industrial/field/Lab training in order to connect the class room teaching with real time practical applications. A supervisor (faculty from the Department) shall

			be assigned to the student approved by the competent authority. The training and placement officer (TPO) will facilitate the students for the purpose with the consent of his/her supervisor and also considering the interests of the student. During training the student will undertake a project involving design/experimental/analytical/computational work including case studies etc. The progress of the project work will be evaluated by the concerned supervisor and TPO by visiting the site/industry/lab etc.
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2. (A). Programme Outcomes (POs) for PG Programme in manufacturing system engineering, production engineering etc:

- Mechanical Engineering students will be able to use research methodologies, techniques and tools to design and conduct experiments, analyze data and contribute to the development of scientific/technological knowledge in the chosen field of specialization.
- A post graduate should be able to give Technical & Engineering solution for thermal Engineering problems using knowledge of science, mathematics etc.
- Students will participate in seminars, consultancy projects, case studies and research projects. They will develop the ability to write technical paper, technical reports in their research field and will acquire a good communication skill by giving oral presentation and seminar during their course of study.
- Students will understand, acquire knowledge and use latest computer technologies, such as computer aided modeling and simulation software to solve complex engineering problems.
- Students will be able to communicate ideas, reason critically and exercise independence of mind and thought in conducting research.

S.NO.	Course Code	Course Title	Course Outcomes
1	MSE -411	Computer Integrated Manufacturing Systems	Computer-integrated manufacturing (CIM) is the manufacturing approach of using computers to control the entire production process. This integration allows individual processes to exchange information with each other and initiate action
2.	MSE -412	Production Planning and Control	Production control is the activity of controlling the workflow in the production. It is partly complementary to production planning

3.	MSE -413	Advanced Manufacturing Processes	Use of Technology to Improve Products and Processes. One of the most widely used definitions of advanced manufacturing involves the use of technology to improve products and/or processes, with the relevant technology being described as "advanced," "innovative," or "cutting edge."
4.	MSE -414	Industrial Robotics	An industrial robot is a robot system used for manufacturing. Industrial robots are automated, programmable and capable of movement on two or more axes
5.	MSE -513	Industrial Inspection and Non Destructive Testing	Nondestructive testing or non-destructive testing (NDT) is a wide group of analysis techniques used in science and technology industry to evaluate the properties of a material, component or system without causing damage
6.	MSE -421	Product Design and Development	Product design. Product design as a verb is to create a new product to be sold by a business to its customers. A very broad concept, it is essentially the efficient and effective generation and development of ideas through a process that leads to new products. Thus, it is a major aspect of new product development.
7.	MSE -422	Mechatronics	Mechatronics is a multidisciplinary field of science that includes a combination of mechanical engineering, electronics, computer engineering, telecommunications engineering, systems engineering and control engineering
8.	MSE -423	Maintenance and Reliability Engineering	Maintenance Engineering is the discipline and profession of applying engineering concepts for the optimization of equipment, procedures, and departmental budgets to achieve better maintainability, reliability, and availability of equipment.
9.	MSE -424	Materials Management	Materials management is the function responsible for the coordination of planning, sourcing, purchasing, moving, storing and controlling materials in an optimum manner in order to provide a pre decided service to the customer at a minimum cost.
10.	MSE -431	Total Quality Management	Total quality management (TQM) consists of organization-wide efforts to install and make a permanent climate in which an organization continuously improves its ability to deliver high-quality products and services to customers.
11.	MSE -432	Design of Experiments & Research Methodology	There are three basic types of experimental research designs . These include pre-experimental designs, true experimental designs, and quasi-experimental designs. The degree to which the researcher assigns subjects to conditions and groups distinguishes the type of experimental design.
12.	MSE -433	Seminar	The student is required to deliver a seminar on some emerging topics of concern Engineering. Senior

			faculty will supervise the students in selecting and preparation of the same. The student will submit one copy of seminar report and shall make oral presentation as per time schedule decided by the faculty concerned. Internal Evaluation will be made on the basis of report, presentation and the discussion during the presentation.
13.	MSE -434	Minor Project	The student is required to deliver a seminar on some emerging topics of concern Engineering. Senior faculty will supervise the students in selecting and preparation of the same. The student will submit one copy of Minor project seminar report spiral binding and shall make oral presentation as per time schedule decided by the faculty concerned. Internal Evaluation will be made on the basis of report, presentation and the discussion during the presentation.
14.	MSE -441	Dissertation	The primary objective of this course is to enhance the student ability to analyze and carry out independent investigations etc. Each student will carry out independent work which should involve creativity, innovation and ingenuity. A dissertation supervisor (s) having at least post- graduate qualification, having minimum three experience after post graduation and published papers in international journal of repute in his/her credentials OR Doctorate degree with published papers in international journal of repute in his/her credentials, may be from industry/research organization shall be assigned to the student approved by the competent authority. In no case, the candidate can have more than two dissertation supervisors. Dissertation work shall comprise of literature survey, problem formulation, methodology used, S/W, H/W tools used, Results and discussion followed by the conclusions & further scope of work in that area. Industry oriented projects may be encouraged for the purpose. Finally, student must have published at least one international paper before submission of dissertation. The submission of dissertation shall be allowed only after ensuring that the research work carried out by the candidate has attained the level of satisfaction of the 'Dissertation Supervisor (s)' and proof of communication/acceptance of the research paper (if any, and certified in the report) in the relevant refereed journal/ conference. The final dissertation external examination in 4th semester shall be taken by a panel of examiners comprising of concerned Supervisor (s), one external examiner (from the relevant field) nominated/approved by the competent authority. Hard copies of dissertation, one for each supervisor (s), examiner and the university/ department, are required to be submitted by the

			student before the final dissertation external examination. The candidate shall appear before the examining committee for oral examination and presentation on the scheduled date.
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3. (B). Programme Outcomes (POs) for PG Programme in thermal engineering

S.NO.	Course Code	Course Title	Course Outcomes
1	TE-411	Applied Mathematics	Applied mathematics is the application of mathematical methods by different fields such as science, engineering, business, computer science, and industry.
2	TE -412	Computational Methods in Fluid flow and Heat transfer	Computational fluid dynamics (CFD) is a branch of <u>fluid mechanics</u> that uses <u>numerical analysis</u> and <u>data structures</u> to solve and analyze problems that involve <u>fluid flows</u> . Computers are used to perform the calculations required to simulate the interaction of liquids and gases with surfaces defined by <u>boundary conditions</u> . With high-speed <u>supercomputers</u> , better solutions can be achieved
3	TE -413	Analysis of Thermal Power Cycles	To make the students understand the basic principles, Laws of thermodynamics, Thermodynamics relations and various properties of fluids. The knowledge of this subject is essential for analysis of practical problems relating to heat and work and their mutual inter conversions, Types of fluid motion, Fluid dynamics, Pipe flow, The concept of boundary layer, Lift and drag etc.
4	TE -414	Solar Energy	Solar energy is radiant light and heat from the Sun that is harnessed using a range of ever-evolving technologies such as solar heating, photovoltaics, solar thermal energy, solar architecture, molten salt power plants and artificial photosynthesis.
5	TE -511-	Materials Management	Materials management is the function responsible for the coordination of planning, sourcing, purchasing, moving, storing and controlling materials in an optimum manner in order to provide a pre decided service to the customer at a minimum cost.
6	TE -421	Advanced Fluid Mechanics	to make the students understand the various types, Working and performance of the hydraulic turbines which are used as prime movers in hydraulic power

			plants. The students also learn about power absorbing machines like centrifugal pumps and reciprocating pumps and various other hydraulic machines /systems which have widespread applications
7	TE -422	I C Engine Theory and Performance	To make the students understand the complete working of internal combustion engines and gas turbines which have widespread applications in propulsions of vehicles, Jet aircrafts, Large ships, Helicopters etc
8	TE -423	Turbo machines	Turbomachines are wide group of machines (e.g. steam turbines, gas turbines, turbocompressors, centrifugal pumps/rotodynamic pumps, water turbines and etc.). Their characteristic feature is a rotor with blades on its circumference, which is usually called an impeller or a runner.
9	TE -424	Non Conventional Energy Systems	Renewable energy is energy that is collected from renewable resources, which are naturally ...Renewable energy systems are rapidly becoming more efficient and Cellulosic biomass, derived from non-food sources such as trees
10	TE -523	Thermal and Nuclear Power Plants	To make the students aware about the working of various types of power plants based on conventional as well as non conventional sources of energy. The students also learn about fluctuating loads on power plants, Its economic analysis and the tariff methods for electric energy
11	TE -431	Air Conditioning Systems	To make the students learn the basic concepts, Principles and working of refrigeration and air conditioning. The students also learn to compute the cooling load, Design and select refrigeration and air conditioning equipments
12	TE -432	Design of Thermal Systems	To state the requirements of a design problem and show that a potential solution meets those requirements. To develop models of components of thermal systems using fundamental physics or curve fits to tabular or experimental data. To combine models of various components to simulate the performance of a complete thermal system. To apply optimization tools to a system to find the best set of operating or design

			parameters.
13	TE -433	Seminar	The student is required to deliver a seminar on some emerging topics of concern Engineering. Senior faculty will supervise the students in selecting and preparation of the same. The student will submit one copy of seminar report and shall make oral presentation as per time schedule decided by the faculty concerned. Internal Evaluation will be made on the basis of report, presentation and the discussion during the presentation.
14	TE -434	Minor Project	The student is required to deliver a seminar on some emerging topics of concern Engineering. Senior faculty will supervise the students in selecting and preparation of the same. The student will submit one copy of Minor project seminar report spiral binding and shall make oral presentation as per time schedule decided by the faculty concerned. Internal Evaluation will be made on the basis of report, presentation and the discussion during the presentation.
15	TE -441	Dissertation	The primary objective of this course is to enhance the student ability to analyze and carry out independent investigations etc. Each student will carry out independent work which should involve creativity, innovation and ingenuity. A dissertation supervisor (s) having at least post- graduate qualification, having minimum three experience after post graduation and published papers in international journal of repute in his/her credentials OR Doctorate degree with published papers in international journal of repute in his/her credentials, may be from industry/research organization shall be assigned to the student approved by the competent authority. In no case, the candidate can have more than two dissertation supervisors. Dissertation work shall comprise of literature survey, problem formulation, methodology used, S/W, H/W tools used, Results and discussion followed by the conclusions & further scope of work in that area. Industry oriented projects may be encouraged for the purpose. Finally, student must have published at least one international paper before submission of dissertation. The submission of dissertation shall be allowed only after ensuring that the research work carried out by the candidate has attained the level of satisfaction of the 'Dissertation Supervisor (s)' and proof of communication/acceptance of the research paper (if any, and certified in the report) in the relevant refereed journal/ conference. The final dissertation external examination in 4th semester shall

			be taken by a panel of examiners comprising of concerned Supervisor (s), one external examiner (from the relevant field) nominated/approved by the competent authority. Hard copies of dissertation, one for each supervisor (s), examiner and the university/department, are required to be submitted by the student before the final dissertation external examination. The candidate shall appear before the examining committee for oral examination and presentation on the scheduled date.
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4. Programme Outcomes (POs) for Ph.D Programme:

- The Doctor of Philosophy in Engineering is highly research-intensive. Its aim is to provide students with advanced training in research that leads to the highest level of scholarly achievement, and enable them to conduct research independently to address new challenges as innovators.
- Some of the major thrust areas covered under the Ph.D programme is as

Convective heat transfer, Turbulence, Computational Fluid Dynamics, A

erodynamics and Environmental and biological fluid mechanics, discipline concerned with the planning, design, implementation, improvement, and management of complex production systems of people, materials, and equipment for all kinds of manufacturing and service operations