

2012-2013

MECHANICAL ENGINEERING

Odd semester

COURSE OBJECTIVES AND COURSE OUTCOMES FOR S7

MECHANICAL

08.701: PRINCIPLES OF MANAGEMENT AND DECISION MODELING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Examination of management theory and provide opportunities for application of these ideas in real world situations.	Evaluate the global context for taking managerial actions of planning, organizing and controlling.
2	This examination focuses on the managerial functions of Assessing, Planning, Organizing, and Controlling.	Assess global situation, including opportunities and threats that will impact management of an organization.
3	Both traditional and cutting-edge approaches are introduced and applied.	Integrate management principles into management practices.
4	Specific attention is paid throughout the course to the ethical implications of managerial action and inaction.	Assess managerial practices and choices relative to ethical principles and standards. Specify how the managerial tasks of planning, organizing, and controlling can be

		executed in a variety of circumstances.
5		Determine the most effective action to take in specific situations.
6		Evaluate approaches to addressing issues of diversity.

08.702: MECHATRONICS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Have a strong foundation in science and focus in mechanical, electronics, control, software, and computer engineering, and a solid command of the newest technologies.	Employ the knowledge of mathematics, science, and engineering.
2	Be able to design, analyze, and test “intelligent” products and processes that incorporate appropriate computing tools, sensors, and actuators.	Design and conduct experiments to evaluate the performance of a mechatronics system or component with respect to specifications, as well as to analyze and interpret data.
3	Be able to demonstrate professional interaction and communicate effectively with team members.	Design mechatronics component, system or process to meet desired needs.
4	Be able to work efficiently in multidisciplinary teams.	Define and solve engineering problems.
5	Be prepared for a variety of engineering careers, graduate studies, and continuing	Use the techniques, skills, and modern mechatronics engineering tools necessary for engineering practice.

	education	
6	Practice professional and ethical responsibility, and, be aware of the impact of their designs on human-kind and the environment.	Function effectively as members of multidisciplinary teams.

08.703: GAS DYNAMICS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To familiarize with behavior of compressible gas flow	To distinguish between various flow regimes
2	To understand the difference between subsonic and supersonic flow	To analyse the flow under different flow conditions
3	To familiarize with high speed test facilities	To assess the flow behavior and consequent loads due to flow
4	To understand the basic difference between incompressible and compressible flow.	To get the knowledge about the main properties which are used for analyzing or modeling of compressible flow.
5	Topics to be covered include conservation laws, propagation of disturbances, isentropic flow, compressible flow in ducts with area changes, normal and oblique shock waves and applications, Prandtl-Meyer flow and applications, simple flows such as Fanno flow and Rayleigh flow with applications to nozzles, and propulsion related	Formulate and solve problems in one - dimensional steady compressible flow including: isentropic nozzle flow, constant area flow with friction (Fanno flow) and constant area flow with heat transfer (Rayleigh flow).

	concepts.	
6	The method of characteristics will be described in one dimensional unsteady isentropic flow.	• Derive the conditions for the change in pressure, density and temperature for flow through a normal shock.
7	The emphasis will be on the physical understanding of the phenomena and basic analytical results.	• Determine the strength of oblique shock waves on wedge shaped bodies and concave corners.
		• Determine the change in flow conditions through a Prandtl-Meyer expansion wave.
		• Complete a numerical analysis to solve an unsteady one-dimensional flow problem.

08.704: REFRIGERATION & AIR-CONDITIONING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Students will learn the basic concepts and principles of air conditioning and refrigeration.	Students will demonstrate an ability to analysis psychrometric processes and cycles of air conditioning systems.
2	Students will learn the fundamental analysis methodology of air conditioning and refrigeration.	Students will demonstrate an ability to estimate the energy requirements of cooling and heat equipment for simple air conditioning applications.
3	Students will learn the basic process and systems of air conditioning and refrigeration.	Students will demonstrate an ability to analysis and heat loads, particularly from solar radiation.
4	Students will apply the course knowledge to do a design project of HVAC system.	Students will demonstrate an ability to estimate energy requirements for simple air conditioning processes.
5		Students will demonstrate an ability to apply principles of air conditioning to perform energy analysis of simple air conditioning applications.
6		Students will show an ability to apply the HVAC theory to design a HVAC system.

08.705: DESIGN OF MACHINE ELEMENTS II COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Develop an ability to apply knowledge of mathematics, science, and engineering Outcomes	Be able to analyze the stress and strain on mechanical components; and understand, identify and quantify failure modes for mechanical parts
2	To develop an ability to design a system, component, or process to meet desired needs within realistic constraints.	Demonstrate knowledge on basic machine elements used in machine design; design machine elements to withstand the loads and deformations for a given application, while considering additional specifications.
3	To develop an ability to identify, formulate, and solve engineering problems.	Be able to approach a design problem successfully, taking decisions when there is not a unique answer.
4	To develop an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	Be proficient in the use of software for analysis and design.
5		Students attended this course are able to analyse and design the basic mechanical

		systems.
6		At the end of this course, students should be able to recognize the formation and calculation methods of commonly used machine elements.

08.706: NON-CONVENTIONAL MACHINING TECHNIQUES COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	The course aims in identifying the classification of unconventional machining processes.	After completion of course, the student shall understand the principle of working, mechanism of metal removal in the various unconventional machining process.
2	To understand the principle, mechanism of metal removal of various unconventional machining processes.	The student is able to identify the process parameters, their effect and applications of different processes.
3	To study the various process parameters and their effect on the component machined on various unconventional machining processes.	Upon completion of this course, the students can able to demonstrate different unconventional machining processes and know the influence of difference process parameters on the performance and their applications.
4	To understand the applications of different processes.	Ability to extend, through modeling techniques, the single point, multiple point and abrasive machining processes
5	To teach the machining surface finish and material removal rate	Estimate the material removal rate and cutting force, in an industrially useful manner, for practical machining processes

6	To teach the mechanics and thermal issues associated with chip formation	effects of tool geometry on machining force components and surface finish
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08.707: THERMAL ENGINEERING LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	The objective of the thermal engineering laboratory is to introduce the student the fundamental theories and the industrial applications of thermodynamics, heat transfer, and fluid mechanics.	Compute the property of fuels and lubricating oils using suitable tests.
2	This laboratory supports the courses for the undergraduate and graduate studies.	Demonstrate the performance of internal combustion engines and air compressors.
3	Moreover, this laboratory also supports the advanced research in the area of thermal engineering, heat transfer, and fluid mechanics.	Interpret the emission characteristics of internal combustion engines.
4	To provide knowledge on testing of properties of fuels and lubricating oils	Determine the efficiency and plot the characteristic curves of different types of Internal Combustion engines, compressors and blowers

5	To demonstrate and conduct experiments, interpret and analyze data and report results of IC Engine testing	Conduct experiments for the determination of viscosity, calorific value etc of petroleum products
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08.708: MECHANICAL ENGINEERING LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To apply various measurement techniques to inspect and test products	Describe the fundamental concepts in measurement methods, techniques.
2	To apply statistical tools for quality assurance purpose	Apply various instruments for measurements
3	To test and evaluate various components using various measuring instruments	Apply quality control tools to achieve defects free quality products
4		Take precise measurements using various instruments.
5		Develop data for engineering analysis.
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COURSE OBJECTIVES AND COURSE OUTCOMES FOR S5

MECHANICAL

08.501: ENGINEERING MATHEMATICS IV COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide a basic understanding of random variables and probability distributions.	After successful completion of this course, the students will be familiar with the large scale applications of linear programming techniques which require only a few minutes on the computer.
2	Mathematical programming techniques are introduced as a part of this course.	Also they will be familiar with the concepts of probability distributions which are essential in transportation engineering.
3	These techniques are concerned with the allotment of available resources so as to minimize cost or maximize profit subject to prescribed restrictions.	
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8.502: ELECTRICAL TECHNOLOGY COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	The objective of this course is to give a strong foundation on all electrical machines including dc machines, transformers, induction motors and synchronous motors. It also gives a basic idea about traction and welding.	The student will get a good grasp on working of electrical machines and transformers, and their applications.
2	To study the basic concepts involved in the operation of different types of electrical machines.	Know the working of DC generators and DC motor.
3	To analyze the different types of switching, controlling & protective devices.	Understand the details of Induction motors, synchro, servomotor, stepper motor.
4	To study the basic concepts of industrial heating & welding	Understand the working of Drives & braking, Switching &

		protective devices
5	To study the usage of appropriate electrical measuring instruments.	Know the details of Electrical measuring instruments, heating & welding
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08.503: THEORY OF MACHINES COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To understand the layout of linkages in the assembly of a system/machine. To study the application of friction in different devices.	Able to understand basic elements of mechanism
2	To study the principles involved in assessing the displacement, velocity and acceleration at any point in a link of a mechanism.	The students will be able to perform velocity analysis of mechanism
3	To analyse the motion resulting from a specified set of linkages in a mechanism.	The students will be able to perform acceleration analysis of mechanism
4	To study the power transmission devices.	The students will be able to perform dimensional synthesis of simple mechanisms mechanism
5		The students will be able to perform force analysis of belt drives
6		The students will be able to design clutch plate.

		The students will be able to perform analysis of gear trains
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08.504: INDUSTRIAL ELECTRONICS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To learn industrial electronics in applied manner with perspective of mechanical engineering.	After the completion of the course, the students will be familiar with the use of electronic devices and systems in the field of mechanical engineering
2	To introduce the design philosophy for mechanical processes control based on analog and digital electronics	Choose relevant thyristor for the given application
3	Develop an understanding of electrical relationships.	Troubleshoot AC & DC power control circuits employing thyristors
4	Develop familiarity with power distribution equipment and requirements.	Use photoelectric devices in relevant applications
5	Develop skills to identify proper electrical safety equipment and electrical safety procedures.	Use different types of timers in specific applications
6	Develop skills to calculate electrical	Maintain induction heating and dielectric



circuit parameters

heating equipment

08.505: MACHINE TOOLS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	The course provides students with fundamental knowledge and principles in material removal processes.	Apply cutting mechanics to metal machining based on cutting force and power consumption.
2	In this course, the students apply the fundamentals and principles of metal cutting to practical applications through multiple labs using lathes, milling machines, grinding machines, and drill presses, Computer Numerical Control etc.	Operate lathe, milling machines, drill press, grinding machines, etc.
	To demonstrate the fundamentals of machining processes and machine tools.	Select cutting tool materials and tool geometries for different metals.
4	To develop knowledge and importance of metal cutting parameters.	Select appropriate machining processes and conditions for different metals.
5	To develop fundamental knowledge	Learn machine tool structures and

	on tool materials, cutting fluids and tool wear mechanisms.	machining economics.
6	To apply knowledge of basic mathematics to calculate the machining parameters for different machining processes.	Write simple CNC programs and conduct CNC machining.

08.506: NON-DESTRUCTIVE TESTING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To introduce the basic principles, techniques, equipment, applications and limitations of NDT methods.	Discuss the basic principles, techniques, equipments used in NDT
2	To enable selection of appropriate NDT methods.	The students will be able to differentiate various defect types.
	To identify advantages and limitations of non destructive testing methods.	Ability to apply scientific and technical knowledge to the field of non-destructive testing.
4	To make aware the developments and future trends in NDT.	Recognition of the need and ability to engage in lifelong learning, thought process and development
5		Ability to use the relevant non-destructive testing methods for various engineering practice.
6		Recognize and achieve high levels of professionalism in their work

08.507: PRODUCTION ENGINEERING LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To acquaint the basics of lathe and accessories, shaping and slotting machine, planning machines	At the end of the course, the students will be familiar with the various operations using lathe, shaping, slotting and planning machines.
2	To learn the different tools used for various operations of machines.	Do simple machining operations.
3	To impart training on plane turning, groove cutting, form turning, taper turning, facing and thread cutting.	Conduct cutting force measurements.
4	To physically study machine tools and basic machining processes like milling, grinding etc.	Know the fundamental settings of milling machines and drilling machines.
5	To practice metal cutting in milling machines, tool-grinder machines, cylindrical grinding machines and surface grinding machines.	Understand the working of gear cutting mechanism and indexing.
6	To conduct measurement of metal	Understand the machining operations like

cutting forces and understand their importance	grinding and planing.
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08.508: ELECTRICAL & ELECTRONICS LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To give a practical knowledge on the working of electrical machines including dc machines, transformers, induction motors and synchronous motors.	At the end of this course the students will be able to test and validate DC generators, DC motors and Transformers.
2	It also gives the basics about design and implementation of small electronic circuits	Students will have the basic knowledge on working of semiconductor devices.
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COURSE OBJECTIVES AND COURSE OUTCOMES FOR S3

MECHANICAL

08.301: ENGINEERING MATHEMATICS II COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	This course provides students a basic understanding of vector calculus, Fourier series and Fourier transforms which are very useful in many engineering fields.	At the end of the course, the students will have the basic concepts of vector analysis.
2	Partial differential equations and its applications are also introduced as a part of this course.	At the end of the course, the students will have the basic concepts of Fourier series, Fourier transforms which they can use later to solve problems related to engineering fields.
3		At the end of the course, the students will have the basic concepts of Partial differential equations
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08.302: HUMANITIES COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To explore the way in which economic forces operate in the Indian Economy.	The students will be acquainted with its basic concepts, terminology, principles and assumptions of Economics.
2	The subject will cover analysis of sectors, dimensions of growth, investment, inflation and the role of government will also be examined.	It will help students for optimum or best use of resources of the country
3	The principle aim of this subject is to provide students with some basic techniques of economic analysis to understand the economic processes with particular reference to India.	It helps students to use the understanding of Economics of daily life
4	To give basic concepts of book keeping and accounting	The students will get acquainted with the basics of book keeping and accounting
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08.303: FLUID MECHANICS AND MACHINES COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To acquire knowledge on hydraulic machines such as pumps and turbines	Calculate forces and work done by a jet on fixed or moving plate and curved plates.
2	To understand the working of air compressors and do the analysis	Discuss the characteristics of impulse and reaction turbines.
	To apply acquired knowledge on real life problems.	Know the working of turbines and select the type of turbine for an application.
4	To analyze existing systems in hydraulic machines and design new systems used in hydraulic machines.	Discuss the characteristics of centrifugal pump and reciprocating pumps.
5		Do the analysis of air compressors and select the suitable one for a specific application.
6		Apply principles of fluid mechanics to the operation, design, and selection of fluid machinery such as pumps, compressors, and turbines.

08.304: MECHANICS OF SOLIDS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To acquaint the basic concepts of stress and deformations in solids.	Understand the basic concepts of stress and strain in solids.
2	To practice the methodologies to analyse stresses and strains in simple structural members.	Determine the stresses in simple structural members such as shafts, beams, columns, etc.
3.	To solve advanced solid mechanics problems using classical methods.	To obtain stresses and deflections of beams on elastic foundations and to obtain solutions to column buckling and plate problems.
4	To apply commercial software on select, applied solid mechanics problems.	To develop a basic understanding and ability to use ANSYS for the modeling and solution of beam, frame, and shell structures;
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08.305: THERMODYNAMICS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To understand basic thermodynamic principles and laws	Understand the laws of thermodynamics and their significance
2	To develop the skills to analyze and design thermodynamic systems.	Apply the principles of thermodynamic for the analysis of thermal systems
	To enable students to be more aware of the behavior of materials in engineering applications and select the materials for various engineering applications based on their thermal properties.	Understand the applications of thermodynamics
4	To understand the thermal devices completely	Recognize the relations exhibited in thermodynamics.
5	To determine thermal properties of unknown materials and develop an awareness to apply this knowledge in material design.	Select materials for applications as per their thermal properties.
6		Apply core concepts in thermodynamics to

solve engineering problems.

08.306: ENGINEERING DRAWING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide a general idea about basic sketching, dimensioning and BIS	The students will be familiar with the preparation of drawings of machine components.
2	To provide an overview in preparing drawings of machine components	The students will be able to prepare freehand sketches of different machine components
3	To provide an insight into detailed drawings of building components, preparation of drawings and estimation of small residential/industrial buildings.	The students will be able to prepare estimation of small residential/industrial buildings
4		The students will be able to prepare drawings of small residential/industrial buildings
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08.307: CIVIL ENGINEERING LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To demonstrate the basic principles and important concepts in the area of strength and mechanics of materials and structural analysis to the students through a series of experiments.	This subject will lay foundation to study subjects like mechanics of materials, machine design etc.
2	To give an introduction to the use of Levelling instruments and Theodolites	It also provides students a feel for how various engineering properties of materials are applied in engineering practice.
3		The students will have the basic awareness of survey using level and theodolite.
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08.308: COMPUTER AIDED DRAFTING AND MODELING LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To develop skill to use software to create 2D and 3D models.	Ability to use the software packers for drafting and modeling
2	To train the students in Solid Modelling	Ability to create 2D and 3D models of Engineering Components
3		At the end of the course, students shall be able to understand various phases in engineering design process through modelling
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COURSE OBJECTIVES AND COURSE OUTCOMES FOR S1&S2 MECHANICAL

08.101: ENGINEERING MATHEMATICS I COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	This course provides students an insight into the various applications of differentiation, partial differentiation techniques	At the end of the course, the students will be familiar with various concepts of calculus which are essential for engineering.
2	The methods for solving differential equations and the concept of linear algebra are also introduced as a part of this course.	They'll also become acquainted with the basic ideas of Laplace transforms and linear algebra
3	This course provides students an insight into the various applications of multiple integrals	
4	This course provides students an insight into the various applications of Laplace transforms.	
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08.102: ENGINEERING PHYSICS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Dynamics of mechanical and electrical oscillation using Fourier series and integrals; time and frequency representations for driven damped oscillators, resonance; one-dimensional waves in classical mechanics and electromagnetism; normal modes.	Solve for the solutions and describe the behavior of a damped and driven harmonic oscillator in both time and frequency domains. Damped and Forced Oscillations oscillating system problems.
2	The fundamental principles of photonics that complement the topics in the optics and laser courses and to help students develop problem-solving skills applicable to real-world photonics problems.	Define and explain the propagation of light in conducting and non-conducting media.
3	This course equip the students to	Define and explain the physics governing

	<p>assimilate engineering and technology through the exposure of fundamentals of Physics</p>	<p>laser behaviour and light matter interaction and non-conducting media.</p>
4		<p>Apply wave optics and diffraction theory to a range of problems</p>
5		<p>Explain and calculate the physical effects of acoustic reflections, absorption, scattering, diffusion, diffraction, and propagation losses.</p>
6		<p>Use advanced theoretical, numerical, and experimental techniques to model and analyze acoustical elements in musical instruments, the human voice, room acoustics, and audio.</p>

08.103: ENGINEERING CHEMISTRY COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To impart sound knowledge in the different fields of theoretical chemistry so as to apply it to the problems in engineering field.	The confidence level of students will be improved to tackle problems in engineering field related to chemical aspects.
2	To develop analytical capabilities of students so that they can characterize, transform and use materials in engineering and apply knowledge gained in solving related engineering problems.	The students gain capability in fabricating novel materials with properties that find various engineering applications
3	To acquire knowledge about desalination of brackish water and treatment of municipal water.	The students will be equipped to take up chemistry related topics as part of their project works during higher semesters of the course.
4	To gain the knowledge of conducting polymers, bio-degradable polymers and fibre reinforced plastics.	Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.

5	To understand mechanism of corrosion and preventive methods.	Substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution. Design economically and new methods of synthesis nano materials.
6	To have an idea and knowledge about the Chemistry of Fuels.	Have the knowledge of converting solar energy into most needy electrical.

08.104: ENGINEERING GRAPHICS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Enable the students to effectively communicate graphic representation as per standards	Able to prepare the orthographic projections of points and straight lines placed in various quadrants
2	To develop imagination skill in students and represent them effectively in a paper	Demonstrate the ability to draw orthographic projections of various solids.
3	Learn to sketch and take field dimensions.	Ability to draw and interpret the sectioned views of solids
4	Learn to take data and transform it into graphic drawings.	Ability to draw the developments of various solids
5		Will be confident in preparing the isometric and perspective views of various solids.
6		Ability to draw the projections of intersection of solids and perform free hand sketching.

08.105: ENGINEERING MECHANICS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To apply the principles of mechanics to practical engineering problems.	Understand the fundamental concepts of mechanics.
2	To identify appropriate structural system for studying a given problem and isolate it from its environment.	Students would be able to apply and demonstrate the concepts of resultant and equilibrium of force system.
	To develop simple mathematical model for engineering problems and carry out static analysis.	Students would be able to determine the properties of planes and solids.
4	To develop simple mathematical model for engineering problems and carry out static analysis.	Understand the concepts of moment of inertia.
5		Students would be able to apply fundamental concepts of dynamics to practical problems.
6		Understand the basic elements of vibration.

08.106: BASIC CIVIL ENGINEERING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	This course imparts to the students, the fundamentals of civil engineering and creates awareness on various issues related to our living environment and their remedies	At the end of the course, the students will be familiar with the different stages of building construction, various materials used for construction and environmental issues
2	To inculcate the essentials of civil engineering field to the students of all branches	The students will be able to illustrate the fundamental aspects of civil engineering
3	To provide the students an illustration of the significance of the civil engineering profession satisfying societal needs.	The students should able to plan a building
4	To inculcate the essentials of civil engineering field to the students of all branches	Students will be able to explain about surveying for making horizontal and vertical measurements.
5	.	They will able to illustrate the uses of various building materials and construction of different components of a building.

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The students will be able to illustrate the fundamental aspects of civil engineering

08.107: BASIC MECHANICAL ENGINEERING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To expose the students to the thrust areas in Mechanical Engineering and their relevance by covering the fundamental concepts	The student will be able to understand the inter dependence of the thrust areas in Mechanical Engineering and their significance leading to the development of products, processes and systems.
2	This subject covers wide areas of Mechanical Engineering and is intended for exposing the students to the various theoretical and practical aspects of thermal engineering, fluid mechanics and machines, manufacturing and power transmission.	The student can able to understand the inter dependence of the thrust areas in Mechanical Engineering and their significance leading to the development of products and systems.
3		The students can able to understand working of automobiles.
4		Able to understand about various mechanical processes.
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08.108: BASIC ELECTRICAL & ELECTRONICS ENGINEERING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To impart a basic knowledge in Electrical Engineering with an understanding of fundamental concepts.	Gain preliminary knowledge in basic concepts of Electrical Engineering.
2	To impart the basic knowledge about the Electric and Magnetic circuits.	Discuss the working of various dc and ac machines
	To inculcate the understanding about the AC fundamentals.	To predict the behavior of any electrical and magnetic circuits.
4	To understand the working of various Electrical Machines.	To identify the type of electrical machine used for that particular application.
5		To wire any circuit depending upon the requirement.
6		Understand working principle of various analogue electrical measuring instruments.

08.109: BASIC COMMUNICATION AND INFORMATION

ENGINEERING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To get basic idea about types, specification and common values of passive components.	Student can identify the active and passive electronic components.
2	To familiarise the working and characteristics of diodes transistors, MOSFET and some measuring instruments.	Student can setup simple circuits using diodes, transistors and other electronic components.
	To understand working of diodes in circuits and in rectifiers.	Student will get fundamental idea about basic communication and entertainment electronics.
4	To understand the concept of mobile networks.	Student will get fundamental idea about mobile operation.
5	To get basic idea about types, specification and common values of passive components.	Student will get fundamental idea about different electronic circuits.
6		Student can identify the active and passive

electronic components.

08.110: ENGINEERING WORKSHOP COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	The Engineering Workshop Practice for engineers is a training lab course spread over entire semester.	Student will be able to make various joints in the given object with the available work material.
2	The modules include training on different trades like Fitting, Carpentry, etc... which makes the students to learn how various joints are made using wood and other metal pieces.	Student will be able to know how much time a joint will take for the assessment of time
3	Familiarization of basic manufacturing hand tools and equipment like files, hacksaw, spanner chisel hammers, etc.	Knowledge achieved to explain the various manufacturing process in the basic mechanical engineering workshop sections- smithy, carpentry, assembling, welding etc.
4	Familiarization of various measuring devises like vernier height gauge, vernier caliper, micrometer, steel	Identify the various hand tools used in the basic mechanical engineering workshop sections-smithy, carpentry, assembling,

	rule etc.	welding etc.
5		Able to choose different measuring devises according to the work.
6		Skill achieved to construct models by using basic mechanical workshop sections like welding, moulding, smithy, carpentry etc.

2012-2013

Even Semester

COURSE OBJECTIVES AND COURSE OUTCOMES FOR S8

MECHANICAL

08.801: ENERGY MANAGEMENT COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Familiarizing with management, especially with management in energy sector engineering.	Understanding basics of demand side management and mechanisms (technical, legal or financial) that influence energy consumption.
2	Fundamentals of product strategy management.	Recognizing opportunities for increasing rational use of energy.
3	Describe energy supply pressures and government actions	Learning the basics of energy auditing with application on different sectors.
4	Explain effective energy management as a multi-dimensional activity	
5	Studying methods of energy accounting and energy auditing in energy sector, industry and final	

	consumption.	
6	Finding opportunities to increase the rational use of energy.	

08.802: INDUSTRIAL ENGINEERING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Apply engineering principles to the work environment	An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities
2	Use quality tools and data to anticipate and solve issues in the engineering process	An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies
3	Work collaboratively	An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes

4	<p>Be employed as a practicing engineer in fields such as design, research, development, testing, manufacturing, operations and service systems</p>	<p>An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives</p>
5	<p>Assume positions of leadership and responsibility within an organization</p>	<p>An ability to function effectively as a Member or leader on a technical team</p>
6		<p>An ability to identify, analyze, and solve broadly-defined engineering technology problems</p>

08.803: AUTOMOBILE ENGINEERING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	The anatomy of the automobile in general	Identify the different parts of the automobile
2	The location and importance of each part	Explain the working of various parts like engine, transmission, clutch, brakes
3	The functioning of the engine and its accessories, gear box, clutch, brakes, steering, axles and wheels	Describe how the steering and the suspension systems operate.
4	Suspension, frame, springs and other connections	Understand the environmental implications of automobile emissions
5	Emissions, ignition, controls, electrical systems and ventilation	Develop a strong base for understanding future developments in the automobile industry
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08.804: COMPUTER INTEGRATED MANUFACTURING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	This course aims to acquaint the students with principles, concepts and techniques that are essential in Computer Integrated Manufacturing.	Students will develop an understanding of CAD systems and graphical modeling.
2	Understanding of the scope, principles, norms, accountabilities and bounds of contemporary engineering practice in the specific discipline	Students will get acquainted with data bases and numerical analysis related to CIM
3	Application of established engineering methods to complex engineering problem solving	Students will have understanding of Computer Aided Manufacturing (CAM) systems
4	Fluent application of engineering techniques, tools and resources	Students will have an introduction to Computer Aided Process Planning (CAPP) Systems, Robotic

		Systems, Group Technology and Cellular Manufacturing Systems
5		Students will cultivate understanding about Automated Material Handling Systems, Automated Inspection System
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08.805: CRYOGENIC ENGINEERING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide the knowledge of evolution of low temperature science	Discuss properties of material at cryogenic temperatures.
2	To provide knowledge on the properties of materials at low temperature	Discuss various liquefaction systems
3	To familiarize with various gas liquefaction systems and to provide design aspects of cryogenic storage and transfer lines.	Explain cryogenic heat exchangers
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08.806: PROPULSION ENGINEERING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide the students with an overview of various air craft engines	Apply the knowledge in the fields of aircraft and rocket propulsion
2	To provide students with an overview of various rocket technologies and applications..	Perform thermodynamic analysis of aircraft engines
3	To provide students with knowledge of the tools to analyze various rocket propulsion systems such as liquid propellant rocket engines, solid propellant rocket motors, multi-stage launch vehicles, arcjets, solid core nuclear thermal rocket motors, and ion thrusters.	Carry out performance analysis of aircraft systems and components
4	To provide the students with an overview of the testing of rocket	Formulate and solve rocket engine problems.

	engines	
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08.807: INDUSTRIAL SEMINAR COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	The main objective of this course is to provide experience in presentations and to improve their communication skills.	Acquire the basic skills to perform literature survey and present papers
2		Acquire communication skills
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13.808: PROJECT, VIVA-VOCE AND INDUSTRIAL VISIT COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To do a detailed study on a selected topic based on current journals or published papers.	Acquire the basic skills to perform literature survey and present papers
2	To impart the ability to perform as an individual as well as a team member in completing a project work.	Acquire communication skills and improve their leadership quality as well as the ability to work in groups.
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COURSE OBJECTIVES AND COURSE OUTCOMES FOR S6

MECHANICAL

08.601: METROLOGY & INSTRUMENTATION COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To understand the basic principles of measurements.	To know about quality control and quality assurances.
2	To learn the various linear and angular measuring equipments, their principle of operation and applications.	To design a sensors and transducers used for measurements.
3	To learn about various methods of measuring Mechanical parameters.	To understand the importance of quality in engineering products.
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08.602: DYNAMICS OF MACHINES COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To impart knowledge on force analysis of machinery,	Develop the design and practical problem solving skills in the area of mechanisms
2	To impart knowledge on balancing of rotating and reciprocating masses	The students will be able to perform dynamic force analysis
3	To impart knowledge on Gyroscopes, Energy fluctuation in Machines.	The students will be able to design fly wheels
4	To introduce the fundamentals in vibration, vibration analysis of single degree of freedom systems.	The students will be able to design governors. The students will be able to analyze gyroscopic effect in various real world problems
5	To understand the physical significance and design of vibration systems with desired conditions	The students will be able to perform dynamic balancing of rotating as well as reciprocating parts of machines.
6		Understand the basics of vibration and apply the concepts in design

problems of mechanisms.

08.603: COMPUTER AIDED DESIGN COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To equip students with fundamentals of computer aided design and to provide elementary algorithms in computer graphics and finite element analysis for basic engineering problems	Students successfully completing this course are expected to have basic knowledge in computer aided design, capability to prepare fundamental graphics algorithms and solve basic structural problems using finite element method.
2	To introduce the student to the basic tools of computer-aided design (CAD) and computer-aided manufacturing (CAM).	Be able to use a commercial CAD/CAM software package as an engineering tool
3	To expose the student to contemporary computer design tools for aerospace and mechanical engineers.	Integrate the role of graphic communication in the engineering design process
4	To prepare the student to be an effective user of a CAD/CAM system.	Generate and interpret engineering technical drawings of parts and assemblies

		according to engineering design standards.
5		Use CAD software to generate a computer model and technical drawing for a simple, well-defined part or assembly.
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08.604: HEAT AND MASS TRANSFER COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To introduce a basic study of the phenomena of heat and mass transfer, to develop methodologies for solving a wide variety of practical engineering problems,	Understand the basic laws of heat transfer.
2	To apply analytical and numerical methods to solve conduction problems.	Apply principles of heat and mass transfer to basic engineering systems
3	To combine thermodynamics and fluid mechanics principles to analyze heat convection processes.	Demonstrate general knowledge of heat transfer [conduction, convection, radiation], and general knowledge of mass transfer [molecular diffusion, convection].
4	To provide useful information concerning the performance and design complex heat transfer	Analyse the performance and design of heat exchangers.

	applications, such as heat exchangers and fins	
5	To integrate radiation aspects into real-world global heat transfer problems.	Design heat and mass transfer processes and equipment
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08.605: DESIGN OF MACHINE ELEMENTS I COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide basic knowledge on the design considerations and methodology of various machine elements.	demonstrate the fundamentals of stress analysis and theories of failure in the design of machine components.
2	At the end of this course, students will be able to formulate and analyze stresses and strains in machine elements and structures in 3-D subjected to various loads	make proper assumptions with respect to material, factor of safety, static and dynamic loads for various machine components.
3	At the end of this course, students will be able to do tolerance analysis and specify appropriate tolerances for machine design applications	Be able to analyze the stress and strain on mechanical components; and understand, identify and quantify failure modes for mechanical parts
4	At the end of this course, students will be able to apply multidimensional static failure criteria in the analysis and design of mechanical components	Demonstrate knowledge on basic machine elements used in machine design; design machine elements to withstand the loads and deformations for a given application, while considering additional specifications.

5	To develop an ability to design a system, component, or process to meet desired needs within realistic constraints.	Be able to approach a design problem successfully, taking decisions when there is not a unique answer.
6		Be proficient in the use of software for analysis and design.

08.606: NEW ENERGY SYSTEMS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide an overview of various energy sources and its applications.	To explain the use of newer energy sources and their applications.
2	To aware about the need of newer energy sources to meet the extending demands.	To design and develop various bio-gas plants. .
3	To understand the theories and principles behind various energy systems.	To understand the various practical fuel cells
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08.607: COMPUTER AIDED MODELLING & ANALYSIS LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To train the students in Solid Modelling and Assembly of machine parts.	At the end of the course, students shall be able to understand various phases in engineering design process through modelling, assembly and finite element analysis.
2	To practice finite element approach in the design of engineering systems.	
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08.608: MACHINE TOOLS LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To acquaint with milling machines, grinding machines and drilling machines and to impart training on these machines.	At the end of the course, the students will be familiar with the various operations using milling machines, grinding machines, drilling machines and CNC machines.
2	To acquaint with CNC machines and to impart training on these machines.	Students will be able to develop practical knowledge in advanced machine tools like Shapping machine, Milling machine etc
3	To introduce the students to various welding techniques.	Students will be able to apply fundamental knowledge and principles in material removal processes
4		Ability to develop fundamental knowledge in indexing process for manufacturing gears and cutting slots
5		Students will create models using Milling, Shapping and Slotting processes as per the design
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COURSE OBJECTIVES AND COURSE OUTCOMES FOR S4

MECHANICAL

08.401: ENGINEERING MATHEMATICS III COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To introduce the basic notion in complex analysis such as Analytic Functions, Harmonic functions and their applications in fluid mechanics and differentiations and integration of complex functions, transformations and their applications in engineering fields.	After successful completion of this course, the students will be able to use numerical methods to solve problems related to engineering fields. This course helps students to master the basic concepts of complex analysis which they can use later in their career.
2	Numerical techniques for solving differential equations are also introduced as a part of this course.	
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08.402: COMPUTER PROGRAMMING AND NUMERICAL METHODS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To equip students with fundamentals of computer programming and to provide fundamental idea about the use of computer programming and numerical methods for analyzing the basic engineering problems	Students successfully completing this course are expected to have capability to prepare fundamental computer programs and programs for numerical solutions for basic engineering problems like system of equations and heat equations.
2	To introduce the students about fundamentals of computers, introduction to algorithms and flowcharts, basic computer programming concept	The students will be able to write algorithms and corresponding flowcharts.
3	Introduction control statements, arrays and functions	The students will be able to write computer programs using arrays.
4	Basics pointers, introduction to Class and Object	The students will be able to write application level computer programs using pointers and function.
5	Concepts of errors and approximations, curve fitting,	The students will be able to write application level computer programs using

	Solution of Partial differential equations, Numerical problems and preparation of computer programs.	object oriented features.
6		The students will be able to write computer programs for numerical solutions for engineering problems like system of equations and heat equations.

08.403: METALLURGY AND MATERIAL SCIENCE COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To impart knowledge on engineering materials, deformation of materials, equilibrium diagrams of selected alloy systems, heat treatment of steels, properties of steels, cast iron and other alloys and their applications.	The property classifications of materials that determine their applicability.
2	To provide fundamental science relevant to materials.	The mechanisms of elastic and plastic deformations and thereby be able to modify the mechanical properties of materials.
	To provide physical concepts of atomic radius, atomic structure, chemical bonds, crystalline and non-crystalline materials and defects of crystal structures, grain size, strengthening mechanisms, heat treatment of metals with	Heat treatment processes and how to select suitable heat treatments for specific applications.

	mechanical properties and changes in structure.	
4	To enable students to be more aware of the behavior of materials in engineering applications and select the materials for various engineering applications.	Different failure mechanisms and thereby how to decide steps to avoid failures.
5	To understand the causes behind metal failure and deformation.	Different alloy systems and their applications, so that proper selection of material can be made.
6	To determine properties of unknown materials and develop an awareness to apply this knowledge in material design.	Newer engineering materials like Composites, smart materials, nanomaterials.

08.404: MANUFACTURING PROCESS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	The subject will enable the students to understand the basic manufacturing process of engineering materials and products including the modern manufacturing methods.	The students will understand the various aspects of moulding, casting, forming and welding.
2	Understand modern manufacturing operations, including their capabilities, limitations, and how to design for lowest cost.	The students will be able to identify the features of different manufacturing processes and to select suitable process for a specific material.
3	Gain insight into how designers influence manufacturing schedule and cost.	Explain the difference between industrial and engineering design with reference to familiar products; and for specific products explain whether it is the product's form or its function that enhances its value in the marketplace
4	Learn how to analyze products and be able to improve their	Understand the concept of a product design specification (PDS), and be able to indicate

	manufacturability and lower costs.	some to the factors which should be included in producing one. Describe the role of marketing in developing the PDS for a product
5	Understand the relationship between customer desires, functional requirements, product materials, product design, and manufacturing process selection	Classify products simply in terms of their basic shape
6		Describe the difference between the hot and cold working of metals and give the advantages of each

08.405: THERMAL ENGINEERING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide the students with a elementary ideas of applications of thermodynamics in engineering	After the completion of this course, students will get knowledge in the areas of engines, Gas turbine for a complete understanding of energy and other related engineering systems.
2	Be able to have the basic concepts of thermal sciences and their application to in formulating the thermal engineering problems.	It also provides students a feel for how thermal sciences are applied in engineering practice.
3	Have a good understanding of first and second laws of thermodynamics and will be in	Define the basic concepts of units and dimensions, systems(open and closed systems and control volumes) and its boundaries, properties, state, process, cycle, quasi-static process etc.- required as foundation for development of principles and laws of thermodynamics
4	Be in a position to check the feasibility of proposed processes and	The students will be able to design I. C. Engines depending upon the requirements.

	cycles using the ideas of second law of thermodynamics and entropy.	
5	Have the understanding of basic principles of heat transfer and related simple problems	They also will be able to do final year project on such highly demanding subject area
6		

08.406: MACHINE DRAWING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide general overview on fits and tolerance	Students will be able to understand Linear tolerance.
2	To familiarize modeling softwares	Students will be able to understand Geometric tolerance.
3	To equip the students to prepare assembly and working drawings of machine components.	Students will be able to prepare detailed drawing of machine parts with fits and tolerance.
4		Students will be able to prepare assembly drawings.
5		Students will be able to prepare part drawings from assembly drawings
6		At the end of the course, Students will be able to prepare detailed drawing of machine parts with fits and tolerances.

08.407: FLUID MECHANICS & MACHINES LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide practical knowledge in verification of principles of fluid flow.	To provide the students with a solid foundation in fluid flow principles.
2	To impart knowledge in measuring pressure, discharge and velocity of fluid flow.	To provide the students knowledge in calculating performance analysis in turbines and pumps and can be used in power plants.
3	To understand Major and Minor Losses.	Students can able to understand to analyze practical problems in all power plants and chemical industries.
4	To gain knowledge in performance testing of Hydraulic Turbines and Hydraulic Pumps at constant speed and Head.	Conduct experiments (in teams) in pipe flows and open-channel flows and interpreting data from model studies to prototype cases.
5		Analyze a variety of practical fluid-flow devices and utilize fluid mechanics principles in design.

6

Given the required flow rate and pressure rise, select the proper pump to optimize the pumping efficiency.

08.408: IC ENGINES LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To study the various types IC engines and their parts	Determine the efficiency and plot the characteristic curves of different types of Internal Combustion engines.
2	To conduct the performance test on IC engines	Conduct experiments for the determination of viscosity, calorific value etc of petroleum products.
3	To familiarize equipment used for measuring viscosity, flash and fire point and Calorific value of petroleum products	Recognize and understand reasons for differences among operating characteristics of different engine types and designs
4		Given an engine design specification, predict performance and fuel economy trends with good accuracy
5		Learn to compare and contrast experimental results with theoretical trends, and to attribute observed discrepancies to either measurement error or modeling

		limitations
6		Through the use of both theoretical techniques and experimentation, develop an appreciation for theoretical and practical limits to engine performance and fuel economy