



Saraswati College of Engineering
Department- Information Technology
Semester- III
Scheme (R-19)

Subject- thermodynamics

Subject Code-AEC 305

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1		1.2	1.2.1	1	1	Define the different thermodynamic terminologies
1		1.3	1.3.1	3	2	Apply the second law of thermodynamics to solve the basic problems in engineering
1		1.4	1.4.1	3	3	Apply availability on different grades of energy
1		1.2	1.2.1	2	4	Understanding the Vapour powercycle and its applications
2		2.4	2.4.1	5	5	Evaluate the performance of otto and diesel cycle
2		2.4	2.4.1	5	6	Evaluate the propogation of sound using compressibility concept.

Course Objectives

Sr. No.	Description
1	Describe the energy concept in general, heat and work
2	Extrapolate to apply the basic principle of thermodynamics
3	Illustrate the second law of thermodynamics
4	interpret the concept of grades of energy
5	Use the otto and diesel cycle to evaluate the effectiveness
6	Integrate the application of the concept of thermodynamics with compressible fluids

Subject- ENGINEERING MATHEMATICS-III Subject Code- AEC 301

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2,3,5		1.1	1.1.2	5	CO 1	Apply the concept of Laplace transforms and use to solve real integrals in engineering problems
1,2,3		2.1	2.1.2	3,4	CO 2	Identify the concept of inverse linear transform and compare to various functions and its applications
1,2,3,4		3.1	3.1.6	3	CO 3	Determine and develop Fourier series for real life problems and applications.
1,2,4		3.2	3.2.1	3	CO 4	Apply the properties of Complex analysis and select the application to orthogonal trajectories.
1,2		1.1	1.1.3	3	CO 5	Use the concept of matrices to solve problems in machine learning, computer graphics and in Google page ranking
1,2,3,12		12.1	12.1.1	3	CO 6	solve partial differential equations and analytical method for one dimensional heat and wave equations.

Course Objectives

Sr. No.	Description
1	To familiarize with the Laplace Transform and its properties.
2	To study Inverse Laplace Transform of various functions,theorems and its applications.
3	To acquaint with the concept of Fourier Series, its complex form and enhance the problem solving skills
4	To familiarize with the concept of complex variables, C-R equations with applications.
5	To study the application of concept of Eigen value and eigen vectors matrices
6	To study the applicationof numerical methods in complex engineering problems.

Subject- Production Processes**Subject Code- AEC303****Course Outcomes**

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO2		2.2	2.2.3	2 (Understand)	CO1	Demonstrate an understanding of casting process
PO2		2.2	2.2.4	4 (Analyze)	CO2	Demonstrate applications of various types of joining processes.
PO2		2.1	2.1.3	2 (Understand)	CO3	Illustrate principles of forming processes.
PO2		2.2.	2.2.2	2 (Understand)	CO4	Differentiate chip forming processes such as turning, milling, drilling, etc.
PO1		1.4	1.4.1	3 (Apply)	CO5	Illustrate principles and working of non-traditional manufacturing
PO1		1.2	1.2.1	4 (Analyze)	CO6	Illustrate the concept of producing polymer components and ceramic components.

Course Objectives

Sr. No.	Description
1	To familiarize with the various production processes used on shop floors
2	To study appropriate production processes for a specific application.
3	To familiarize with the various forming processes
4	To introduce to the learner various machine tools used for manufacturing
5	To familiarize with principle and working of non-traditional manufacturing
6	To introduce to them the Intelligent manufacturing in the context of Industry 4.0

Subject- Strength of Materials
AEC302

Subject Code-

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1		1.4	1.4.2	3	CO-1	Apply Concept of Stress to solve problems.
2		2.1	2.1.3	4	CO-2	Analyze the Shear Force and Bending Moment in Beams that applies to a given problem.
2		2.1	2.1.2	4	CO-3	Identify Stresses in Beams to solve the problems
2		2.4	2.4.1	4	CO-4	Apply Torsion and Strain Energy parameters to solve the problems
2		2.2	2.2.3	4	CO-5	Illustrate Thin Cylindrical and Spherical Shells for solving the problem.
3		3.1	3.1.6	5	CO-6	Determine Columns Stresses , functional requirements and arrive at solution.

Course Objectives

Sr. No.	Description
1	To apply Concept of Stress to solve problems.
2	To analyze the Shear Force and Bending Moment in Beams that applies to a given problem.
3	To identify Stresses in Beams to solve the problems.
4	To apply Torsion and Strain Energy parameters to solve the problems.
5	To illustrate Thin Cylindrical and Spherical Shells for solving the problem.
6	To determine Columns Stresses , functional requirements and arrive at solution.

Subject- CAD – Modeling**Subject Code- AESBL301****Course Outcomes**

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO3		3.2	3.2.2	Level-3 Apply	CO1	Pictorial the basic understanding of types of CAD model creation.
PO5		5.1	5.1.1	Level-6 Create	CO2	Construct 2D modeling of a given object using modelling software.
PO5		5.1	5.1.2	Level-6 Create	CO3	To develop solid model of a given object using 3D modeling software.
PO5		5.2	5.2.1	Level-6 Create	CO4	Genration of the surface model adding features on given object using modelling software.
PO5		5.3	5.3.2	Level-6 Create	CO5	To Generate assembly models of given objects using assembly tools of a modelling software
PO3		3.1	3.1.4	Level-5 Evaluate	CO6	Portrayal product data exchange among CAD systems

Course Objectives

Sr. No.	Description
1	Sketch basic understanding of types of CAD model creation.
2	Draw 2D modeling of a given object using modelling software.
3	To Construct solid model of a given object using 3D modeling software.
4	Demonstrate the surface model of a given object using modelling software.
5	To Generate assembly models of given objects using assembly tools of a modelling software
6	Delineation product data exchange among CAD systems

Subject-Materials and Metallurgy**Subject Code-AEC304****Course Outcomes**

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2		2.4	2.4.2	Level-2 Understand	CO1	Recognize the various classes of materials and comprehend their properties
PO4		4.1	4.1.3	Level-3 Apply	CO2	Implement the phase diagram concepts to engineering applications
PO4		4.2	4.2.1	Level-3 Apply	CO3	Execute particular heat treatment for required property development
PO2		2.4	2.4.3	Level-2 Understand	CO4	To Locate the probable mode of failure in materials and suggest measures to prevent them
PO2		2.3	2.3.2	Level-2 Understand	CO5	Prescribe new materials for better performance
PO4		4.1	4.1.2	Level-3 Apply	CO6	Formulate an appropriate method to evaluate different components in service

Course Objectives

Sr. No.	Description
1	To Classify the various classes of materials and comprehend their properties
2	To Interpret phase diagram concepts to engineering applications
3	Use/Apply particular heat treatment for required property development
4	To Classify/ Identify the probable mode of failure in materials and suggest measures to prevent them
5	Prescribe new materials and their applications
6	To investigate an appropriate method to evaluate different components in service

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO4		4.1	4.1.1	Level-2 Understand	CO1	Recognize problems based on societal /research needs.
PO7		7.1	7.1.2	Level-3 Apply	CO2	Implement Knowledge and skill to solve societal problems in a group.
PO9		9.2	9.2.1	Level-5 Evaluate	CO3	Investigate interpersonal skills to work as member of a group or leader.
PO4		4.3	4.3.4	Level-6 Create	CO4	Formulate the proper inferences from available results through theoretical/ experimental/simulations.
PO7		7.2	7.2.2	Level-4 Analyse	CO5	"Scrutiny the impact of solutions in societal and environmental context for sustainable development."
PO6		6.2	6.2.1	Level-3 Apply	CO6	.To utilize standard norms of engineering practices
PO10		10.2	10.2.2	Level-3 Apply	CO7	Proficient communication
PO12		12.2	12.2.2	Level-5 Evaluate	CO8	Personify capabilities of autodidact in a group, which leads to life long learning
PO11		11.3	11.3.2	Level-6 Create	CO9	To Manifeste project management principles during project work.

Course Objectives

Sr. No.	Description
1	To Illustrate /loacte problems based on societal /research needs.
2	Execute Knowledge and skill to solve societal problems in a group.
3	Evaluate interpersonal skills to work as member of a group or leader.
4	To Develop the proper inferences from available results through theoretical/ experimental/simulations.
5	" Investigation of the impact of solutions in societal and environmental context for sustainable development."
6	To Apply/Use standard norms of engineering practices
7	Accomplished in written and oral communication

8	To evince capabilities of self-determined learning in a group, which leads to life long learning
9	To exemplify project management principles during project work.

Semester IV

**Subject- FEA
603**

Subject Code- AEC

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1		1.4	1.4.1	Level 3 Apply	CO1	Solve the differential equation using weighted residual method
PO2		2.1	2.1.3	Level 3 Apply	CO2	develop the finite element equations to model engineering problems govern by scnd order differential equationsto s
PO2		2.1	2.1.3	Level 3 Apply	CO3	apply the bsasic finite element formulation technique to solve engineering problems by using one dimensionl element
PO2		2.4	2.4.1	Level 3 Apply	CO4	apply the bsasic finite element formulation technique to solve engineering problems by using two dimensionl element
PO2		2.1	2.5.2	Level 3 Apply	CO5	apply basic of finite element formulation techniques to find natural frequency of single dimentional analysis
PO2		2.6	2.6.2	Level 3 Apply	CO6	use commertial software, to solve problem related to automobile engineering

Course Objectives

Sr. No.	Description
1	To Familiarize with consepts of FEM
2	To study the applicability of FEM to engineering problems
3	To acquaint with application of numerical theniques for solving problems
4	To study the basic finte element formulation theniques to solve engineering problems

5	To learn finite element equations to model engineering problems
6	To learn FEA application problem

Subject- FLID MECHANICS

Subject Code- AEC402

Course Outcomes

PO	PSO	Competency	PI	Bloom's Level	CO	Description
PO1		1.2	1.2.1	Level 1 Remember	CO1	Define properties of fluids, classify of fluids and evaluate hydrostatic forces on various surfaces.
PO2		2.4	2.4.1	Level 2 Understand	CO2	Differnciate velocity potential function and stream function and solve for velocity and accelerataion of fluid
PO1		1.4	1.4.1	Level 3 Apply	CO3	Apply Bernoulli's equation to various flow measuring devices
PO2		2.1	2.1.2	Level 2 Understand	CO4	Understand the basic concepts of laminar flow in circuler pipes
PO2		2.1	2.1.3	Level 3 Apply	CO5	Apply the concept of Major losses and Minor losses in pipes to solve problems.
PO2		2.1	2.1.2	Level 3 Apply	CO6	Apply the concept of Boundary layer formation to solve numerical on Boundary layer thickness

Course Objectives

Sr. No.	Description
1	Describe fluid statics and fluid dynamics
2	Demostrate, measurement as well as apply calibration principles
3	Verify the concepts learnt in theory course
4	Identify application of mass, momentum and energy equations in fluid flow
5	Compare various flow measurement techniques
6	Prescribe fundamentals of compressible fluid flow

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1,2,3	-	3.2	3.2.1	3	CO1	Apply the concept of Vector calculus to evaluate line integrals, surface integrals using Green's theorem, Stoke's theorem & Gauss Divergence theorem.
1,2,4	-	2.2	2.2.1	5	CO2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
1,2,3,12	-	3.1	3.1.6	3	CO3	Apply the concept of Correlation, Regression and curve fitting to the engineering problems in data science.
1,2,4,12	-	4.2	4.2.2	4	CO4	Illustrate understanding of the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
1,2,3,12	-	3.3	3.3.1	3	CO5	Apply the concept of probability distribution to engineering problems & Testing hypothesis of small samples using sampling theory
1,2,3,4	-	2.4	2.4.1	2	CO6	Apply the concepts of parametric and nonparametric tests for analysing practical problems

Course Objectives

Sr. No.	Description
1	To study the concept of Vector calculus & its applications in engineering.
2	To study Line and Contour integrals and expansion of complex valued function in a power series
3	To familiarize with the concepts of statistics for data analysis
4	To acquaint with the concepts of probability, random variables with their distributions and expectations
5	To familiarize with the concepts of probability distributions.
6	To study the sampling theory and its applications

Subject- Python Programming**Subject Code- AEL403****Course Outcomes**

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1		1.2	1.2.1	1	1	Define the different Application of Python
1		1.3	1.3.1	3	2	Apply slicing to identify set of words or a word
1		1.4	1.4.1	3	3	Apply conditional statement and loops till the desired input is attained
1		1.2	1.2.1	2	4	Understanding Matplot lib to plot the graphs in the format desired
2		2.4	2.4.1	5	5	Evaluate Pandas for ML
2		2.4	2.4.1	5	6	Evaluate Resberry PI performance into the electronic circuit

Course Objectives

Sr. No.	Description
1	Describe different Application of Python
2	Extrapolate technique to count the word repetition
3	Illustrate application of conditional statement and loops till the desired input is attained
4	interpret Matplot library to plot the graphs in the format desired
5	Use Panda lib in ML
6	To identify significance of sampling theory.

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1 PO2	PSO1	1.3 2.1	1.31 2.1.2	L3	CO1	Demonstrate characteristic of various electrical and electronics Components.
PO2	PSO1	2.1	2.1.2	L4	CO2	Develop simple applications built around rectifiers and Inverters components
PO3	PSO2	3.2	3.2.1	L6	CO3	Create and build circuits built around op-amp parameters.
PO2	PSO1	2.2	2.2.2	L4	CO4	Identify and use of different basic gates and digital circuits for industrial applications
PO5	PSO1	5.1	5.1.1	L2	CO5	Understand and demonstrate basic parameters measurement using microcontroller
PO2	PSO2	2.1	2.1.2	L4	CO6	Test and Analyse speed torque characteristic of electrical machines for speed control

Course Objectives

Sr. No.	Description
1	To study characteristic of various electrical and electronics Components.
2	Examine working of controlled Rectifiers and Inverters
3	To familiarise operational characteristics of analog circuits and their applications
4	To study digital logic gates and their applications.
5	To Acquaint with basics of microcontroller based applications and its programming.
6	To impart knowledge of operational characteristics of industrial electricals motors .

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO5		5.1	5.1.1	Level 6 Create	CO1	Develop and execute part programing for any given specific operation
PO5		5.1	5.1.1	Level 6 Create	CO2	Build any given object using various CNC operations
PO1		1.4	1.4.1	Level 3 Apply	CO3	Demonstrate CAM Tool path and prepare NC- G code
PO5		5.1	5.1.1	Level 6 Create	CO4	Develop 3D model using available biomedical data
PO5		5.1	5.1.1	Level 6 Create	CO5	Build any given real life object using 3D printing process
PO1		1.4	1.4.1	Level 3 Apply	CO6	Convert 2D images into 3D model

Course Objectives

Sr. No.	Description
1	To develop and execute part programing for any given specific operation
2	To Build any given object using various CNC operations
3	To demonstrate CAM Tool path and prepare NC- G code
4	To develop 3D model using available biomedical data
5	To build any given real life object using 3D printing process
6	To convert 2D images into 3D model

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1	PSO1	1.3	1.3.1	L3	CO1	Illustrate constructional, working principles and applications of Power Electronics switches.
PO2	PSO2	2.2	2.2.2	L2	CO2	Understand working of controlled Rectifiers and Inverters for DC and AC motor speed control
PO4	PSO1	4.1	4.1.2	L4	CO3	Develop circuits using op-amp parameters.
PO2	PSO1	2.1	2.1.2	L1	CO4	Identify use of different basic gates and use digital circuits for industrial applications
PO5	PSO1	5.1	5.1.1	L3	CO5	Demonstrate the knowledge of basic functioning of microcontroller
PO2	PSO1	2.2	2.2.3	L4	CO6	Analyze speed torque characteristic of electrical machines for speed control

Course Objectives

Sr. No.	Description
1	To provide the basic knowledge, operational characteristic and application of Powerelectronic switches .
2	To study the controlled Rectifiers, Inverters and DC to DC converters.
3	To familiarise basic properties of analog circuits for the design of mechanical process control.
4	To explain the principles of digital electronics circuits for the design of mechanical process control.
5	To Acquaint with basics of microcontroller based applications and its programming.
6	To study structure working and characteristic of different types of industrial electric motors and their applications

Subject- CAD/CAM

Subject Code- AEC 404

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1		1.4	1.4.1	Level 3 Apply	CO1	Apply computer graphics techniques for geometric modelling
PO1		1.4	1.4.1	Level 3 Apply	CO2	Apply transformation concepts to manipulate objects as well as store and manage data
PO5		5.1	5.1.1	Level 6 Create	CO3	Develop 3D model using various types of available biomedical data
PO1		1.4	1.4.1	Level 3 Apply	CO4	Apply CAM concepts to prepare NC- G code
PO5		5.2	5.2.2	Level 2 Understand	CO5	Discuss rapid prototyping and tooling concepts
PO5		5.2	5.2.2	Level 2 Understand	CO6	Explain concept of Virtual Manufacturing

Course Objectives

Sr. No.	Description
1	To apply computer graphics techniques for geometric modelling
2	To apply transformation concepts to manipulate objects as well as store and manage data
3	To develop 3D model using various types of available biomedical data
4	To apply CAM concepts to prepare NC- G code
5	To discuss rapid prototyping and tooling concepts
6	To explain concept of Virtual Manufacturing

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2		2.3	2.3.1	2 (Understand)	CO1	Identify various components of mechanisms
PO4		4.2	4.2.1	3 (Apply)	CO2	Develop mechanisms to provide specific motion
PO5		5.1	5.1.2	4 (Analyze)	CO3	Draw velocity and acceleration diagrams of various mechanisms
PO5		5.1	5.1.2	4 (Analyze)	CO4	Choose a cam profile for the specific follower motion
PO4		4.2	4.2.2	4 (Analyze)	CO5	Predict condition for maximum power transmission in the case of a belt and chain drive
PO2		2.2	2.2.3	4 (Analyze)	CO6	Illustrate requirements for an interference-free gear pair

Course Objectives

Sr. No.	Description
1	To acquaint with basic concept of kinematics and kinetics of machine elements
2	To familiarize with basic and special mechanisms
3	To study functioning of motion and power transmission machine elements
4	To familiarize with different type of cam and followers
5	To familiarize with power transmission devices.
6	To study the gear and gear train

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO4		4.1	4.1.1	Level-2 Understand	CO1	To Identify problems based on societal /research needs.
PO7		7.1	7.1.2	Level-3 Apply	CO2	To Apply Knowledge and skill to solve societal problems in a group.
PO9		9.2	9.2.1	Level-5 Evaluate	CO3	To Develop interpersonal skills to work as member of a group or leader.
PO4		4.3	4.3.4	Level-6 Create	CO4	To Draw the proper inferences from available results through theoretical/ experimental/simulations.
PO7		7.2	7.2.2	Level-4 Analyse	CO5	"To Analyse the impact of solutions in societal and environmental context for sustainable development."
PO6		6.2	6.2.1	Level-3 Apply	CO6	To Use standard norms of engineering practices
PO10		10.2	10.2.2	Level-3 Apply	CO7	Excel in written and oral communication
PO12		12.2	12.2.2	Level-5 Evaluate	CO8	To Demonstrate capabilities of self-learning in a group, which leads to life long learning
PO11		11.3	11.3.2	Level-6 Create	CO9	To Demonstrate project management principles during project work.

Course Objectives

Sr. No.	Description
1	To Identify problems based on societal /research needs.
2	To Apply Knowledge and skill to solve societal problems in a group.
3	To Develop interpersonal skills to work as member of a group or leader.
4	To Draw the proper inferences from available results through theoretical/ experimental/simulations.
5	"To Analyse the impact of solutions in societal and environmental context for sustainable development."

6	To study structure working and characteristic of different types of industrial electric motors and their applications
7	.To Use standard norms of engineering practices
8	Excel in written and oral communication
9	To Demonstrate capabilities of self-learning in a group, which leads to life long learning

Semester-V

**Subject- MMC
501**

Subject Code- AEC

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO1 PO2 PO4		1.2 2.1 4.1	1.2.1 2.1.2 4.1.3	4	CO-1	IdentifyJ15:J20Distinguish various standards of Measurement and Errors in Measurements.
PO2 PO4		2.2 4.1	2.2.3 4.1.3	1	CO-2	Define and choose Principle of Interference and Describe various Measurements Instruments .
PO4 PO5		4.1 5.2	4.1.3 5.2.2	4	CO-3	Classify various types of Mechanical Measurement and Identify Significance of Mechanical Measurements
PO2 PO5		2.2 5.2	2.2.4. 5.2.2	1	CO-4	Recognize and Choose proper measuring instrument for pressure , temperature ,Strain , Displacement and Flow Measurement to meet society need .
PO1 PO2 PO4	PSO1	1.2 2.1 4.1	1.2.1 2.1.2 4.1.3	2	CO-5	Estimate and Discuss Mathematical Modeling , Time Respoense Analysis and Distinguish various types of control systems
PO3 PO2 PO4	PSO1	3.4 2.4.4 4.3	3.4.1 2.4.4 4.3.3	5	CO-6	Determine and Justify the stability analysis in the Control system .

Course Objectives

Sr. No.	Description
1	To study the principles of precision measuring instruments & their significance.
2	To familiarize with the handling & use of precision measuring instruments/ equipment's.
3	To impart knowledge of architecture of the measurement system.
4	To deliver working principle of mechanical measurement system.
5	To study concept of mathematical modelling of the control system.
6	To acquaint with control system under different time domain.

**Subject- Optimization Techniques
AEDLO5011**

Subject Code-

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1		1.2	1.2.1	1	1	Define the different optimization techniques
1		1.3	1.3.1	3	2	Apply Linear programming methods to solve engineering problems
1		1.4	1.4.1	3	3	Apply Integer programming methods to solve engineering problems
1		1.2	1.2.1	2	4	Understanding the Multi Objective decision making to formulate the right decision.
2		2.4	2.4.1	5	5	Evaluate the Multi criteria decision
2		2.4	2.4.1	5	6	Evaluate the Robust Decision methods using Taguchi techniques.

Course Objectives

Sr. No.	Description
1	Describe different optimization techniques
2	Extrapolate Linear programming methods to solve engineering problems
3	Illustrate Integer programming methods to solve engineering problems
4	interpret Multi Objective decision making to formulate the right decision.
5	Use Multi criteria decision method
6	Integrate Robust Decision methods using Taguchi techniques.

**Subject- Machine Design
AEC503**

Subject Code-

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO2		2.2	2.2.3	2 (Understand)	CO1	Demonstrate understanding of various design considerations
PO4		4.3	4.3.4	3 (Apply)	CO2	Design various machine elements for static loading
PO4		4.3	4.3.1	4 (Analyze)	CO3	Design of power transmission machine element shaft, key and coupling
PO4		4.3	4.3.2	4 (Analyze)	CO4	Design machine elements on the basis of strength/ rigidity concepts
PO4		4.3	4.3.4	4 (Analyze)	CO5	Design machine elements for fluctuating loading
PO4		4.3	4.3.1	3 (Apply)	CO6	Design of spring under Static and Variable loads

Course Objectives

Sr. No.	Description
1	To study basic principles of machine design
2	To acquaint with the concepts of design based on strength & rigidity
3	To familiarize with use of design data books & various codes of practice
4	To make conversant with preparation of working drawings based on designs
5	Infer conversant with preparation of working drawings based on designs.
6	Estimate endurance limit

**Subject- DESIGN OF EXPERIMENTS
AEDLO5012**

Subject Code-

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO-3	1	2.1	2.1.3	2	CO-1	Plan, design, and conduct experimental investigations efficiently and effectively;
PO-3	2	4.3	4.3.2	4	CO-2	Analysing the experimental investigations effectively.
PO-6	1	4.3	4.3.4	3	CO-3	Understand strategy in planning and conducting experiments;
PO-6	2	5.1	5.1.2	4	CO-4	Improving the function of product or process by reducing variation through Robust designing of experiments.
PO-2	2	5.3	5.3.2	5	CO-5	Evaluating the effects of multiple factors and their interactions using optimization techniques like RSM.
PO-2	2	5.2	5.2.1	5	CO-6	Choose an appropriate experimentation scheme to evaluate a new product design or process improvement through experimentation strategy, data analysis, and interpretation of experimental results.

Course Objectives

Sr. No.	Description
1	To obtain clear understanding of use of statistics in experimentation.
2	To obtain clear understanding of scheme of experimentation and its effect on accuracy of experimentation.
3	To obtain knowledge of how to analyze results from such investigations to obtain conclusions.
4	To become familiar with methodologies that can be used in conjunction with experimental designs for optimization.
5	
6	

Subject- Internal Combustion Engines

Subject Code- AEC502

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1		1.4	1.4.1	3	CO-1	Apply SI Engine, CI engine , Fuel-Air and Actual Cycles concepts to solve problems.
2		2.1	2.1.3	4	CO-2	Analyze the SI Engine components, Ignition system and Combustion process that applies to a given problem.
2		2.1	2.1.2	4	CO-3	Identify CI Engine variables and parameters to solve the CI Engine problems
2		2.4	2.4.1	4	CO-4	Apply engine lubrication and cooling system and parameters to solve the problems
2		2.2	2.2.3	4	CO-5	Illustrate engine performance characteristics processes for solving the problem,
3		3.1	3.1.6	5	CO-6	Determine IC Engine design objectives, functional requirements and arrive at specifications

Course Objectives

Sr. No.	Description
1	To apply SI Engine, CI engine , Fuel-Air and Actual Cycles concepts to solve problems.
2	To analyze the SI Engine components, Ignition system and Combustion process that applies to a given problem.
3	To identify CI Engine variables and parameters to solve the CI Engine problems
4	To apply engine lubrication and cooling system and parameters to solve the problems
5	To illustrate engine performance characteristics processes for solving the problem,
6	To determine IC Engine design objectives, functional requirements and arrive at specifications

Subject- Measurement and Engine Testing Lab Subject Code- AEL501

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
1		1.4	1.4.1	3	CO-1	Apply Air Standard, Fuel-Air and Actual Cycles concepts to solve problems.
2		2.1	2.1.3	4	CO-2	Analyze the SI Engine components, Ignition system and Combustion process that applies to a given problem.
2		2.1	2.1.2	4	CO-3	Identify CI Engine variables and parameters to solve the CI Engine problems
2		2.4	2.4.1	4	CO-4	Apply engine lubrication and cooling system and parameters to solve the problems
2		2.2	2.2.3	4	CO-5	Illustrate engine performance characteristics processes for solving the problem,
3		3.1	3.1.6	5	CO-6	Determine IC Engine design objectives, functional requirements and arrive at specifications

Course Objectives

Sr. No.	Description
1	To apply Air Standard, Fuel-Air and Actual Cycles concepts to solve problems.
2	To analyze the SI Engine components, Ignition system and Combustion process that applies to a given problem.
3	To identify CI Engine variables and parameters to solve the CI Engine problems
4	To apply engine lubrication and cooling system and parameters to solve the problems
5	To illustrate engine performance characteristics processes for solving the problem,
6	To determine IC Engine design objectives, functional requirements and arrive at specifications

Subject- Mini Project – 2A Subject Code- AEPBL501

Course Outcomes

PO	PSO	Competancy	PI	Bloom's Level	CO	Description
PO4		4.1	4.1.1	Level-2 Understand	CO1	To Identify problems based on societal /research needs.
PO7		7.1	7.1.2	Level-3 Apply	CO2	To Apply Knowledge and skill to solve societal problems in a group.
PO9		9.2	9.2.1	Level-5 Evaluate	CO3	To Develop interpersonal skills to work as member of a group or leader.
PO4		4.3	4.3.4	Level-6 Create	CO4	To Draw the proper inferences from available results through theoretical/ experimental/simulations.
PO7		7.2	7.2.2	Level-4 Analyse	CO5	To Analyse the impact of solutions in societal and environmental context for sustainable development.
PO6		6.2	6.2.1	Level-3 Apply	CO6	To Use standard norms of engineering practices
PO10		10.2	10.2.2	Level-3 Apply	CO7	Excel in written and oral communication
PO12		12.2	12.2.2	Level-5 Evaluate	CO8	To Demonstrate capabilities of self-learning in a group, which leads to life long learning

PO11		11.3	11.3.2	Level-6 Create	CO9	To Demonstrate project management principles during project work.
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Course Objectives

Sr. No.	Description
1	To Identify problems based on societal /research needs.
2	To Apply Knowledge and skill to solve societal problems in a group.
3	To Develop interpersonal skills to work as member of a group or leader.
4	To Draw the proper inferences from available results through theoretical/ experimental/simulations.
5	To Analyse the impact of solutions in societal and environmental context for sustainable development.
6	.To Use standard norms of engineering practices
7	Excel in written and oral communication
8	To Demonstrate capabilities of self-learning in a group, which leads to life long learning
9	To Demonstrate project management principles during project work.