

CHANDIGRAH UNIVERSITY GHARUAN

B.E. Automobile Engineering (Programme)



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Programme Outcomes (PO)

The students of Bachelor of Engineering in Automobile Engineering will have the ability to

1. Apply scientific techniques and engineering knowledge for identification, analysis and resolving automotive engineering problems.
2. Design and develop solutions for practical problems of Automobile systems and processes.
3. Use modern computing tools to design and develop automotive components and systems.
4. Apply skill and subject knowledge base to study and address the needs and impact on the society.
5. Offer solutions with reference to the social, legal and environmental issues and to maintain sustainability.
6. Understand the need for lifelong learning to update on latest technologies through self learning.
7. Understand ethical, social and professional responsibilities to practice in the right way.
8. Communicate effectively using graphical techniques, reports and presentations with a broad range of information technology skills.
9. Plan and execute projects with due considerations for quality, financial constraints and time schedules.
10. Identify the problem of interdisciplinary nature for lifelong learning.
11. Hone the soft skills perfectly and communicate efficiently.
12. Attain knowledge of upcoming issues related with day-to-day changed technology


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Programme Specific Objectives (PSO)

1. To prepare students for successful careers in automotive and ancillary industry that meet the needs of Indian and multinational companies.
2. To develop the ability among students to interpret the data and do the analysis for applications to automotive design.
3. To instill the values, skills, leadership, team spirit and professional ethics for comprehensive and wholesome personality and to promote entrepreneurial interest among the students so that they can compete globally in the field and to create a fervor for use of Engineering in addressing societal concerns.
4. To provide opportunity for students to work as part of teams on multidisciplinary projects.
5. To provide students with a sound foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems and to prepare them for graduate studies.
6. To promote student awareness of the life-long learning and to introduce them to professional ethics and codes of professional practice.



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1ST Semester

Course Outcome

Subject Name :- Innovation and inventions in Engineering

L	T	P
2	0	0

Subject Code:- AET-102

Course Outcome

1. Comprehensively classify innovation, recognize and understand the importance of various types of innovation
2. Analyze innovations the past and present and study the possibility of development of few of the innovations in Automobile Engineering.
3. Utilize available resources and aim at the development of a project and attempt to document, publish and participate in events which could showcase their contributions to make concept a reality
4. To be an innovation ponder and ability of the sustained development.

Subject Name :- Material Technology

L	T	P
3	0	0

Subject Code:- AET-101

1. To be able to understand the different types of materials and their properties
2. To be able to investigate the Structure and Properties of Ferrous and Nonferrous materials
3. To be able to understand the modern Engineering materials and their Characterizations
4. To be able to understand the principle and types of heat Treatment of Steels
5. To be able to understand the Principles of Iron- Carbon Equilibrium diagram


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Subject Name :- Manufacturing Practice

L	T	P
3	0	0

Subject Code:- AEP-160

1. To familiarize the students with various tools & safety precautions as per the floor shops
2. To impart practical knowledge to perform basic operations & prepare an accurate job.
3. To learn the applications of tools & processes in daily life routine tasks.

2nd Semester

Subject Name :- ENGINEERING GRAPHICS AND DRAWING

L	T	P
1	0	0

Subject Code:- AET-151

1. To make the students thorough in understanding and using the various concepts, elements and grammar of engineering graphics.
2. Enhancing imagination, visualization, presentation and interpretation skills.
3. To understand engineering drawing as a formal and precise way of communicating information about the shape, size, feature and precision of physical objects.
4. To accurately and unambiguously capture all the geometric features of a product or a component.
5. The conversion of 2D drawings into 3D and vice versa.

Subject Name :- ENGINEERING GRAPHICS AND DRAWING

L	T	P
0	0	4

Subject Code:- AEP-164

1. Thorough understanding and using the various concepts and elements of engineering graphics using CAD software
2. Understanding fundamental of CAD (computer aided drafting)

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3. Understanding engineering drawing as a formal and precise way of communicating information about the shape, size, feature and precision of physical objects.
4. Learning the conversion of 2D drawings into 3D and vice versa.
5. Learning to enhance imagination, visualization, presentation and interpretation skills.

3rd Semester

Subject Name :- Engineering Mechanics

L	T	P
3	1	0

Subject Code:- AET-201

1. To impart the knowledge of basic principles of mechanics and to familiarize with the concept of moment & couple & bodies in equilibrium.
2. To impart the knowledge of centroid & moment of inertia of complex figures.
3. To be able to analyze the concepts of simple stress strains on deforming bodies.
4. To be able to understand the concept of Shear force and bending moments in beams.
5. To be able to analyze concept of torsion.
6. To be able to analyze the effect of slope and deflection.

Subject Name :- Theory of Machines

L	T	P
3	1	0

Subject Code:- AET-202

1. To understand the fundamental concept of Kinematics of Machines
2. To understand the concept of mechanism and their inversion of kinematic chain
3. To understand the fundamental of engine dynamic & correlation to other machine
4. Able to understand the undesirable effect of unbalancing in rotor and engine
5. To impart knowledge of basics of gears & different types of Gears

Subject Name :- Applied Thermodynamics

L	T	P
3	1	0

Subject Code:- AET-203


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1. To be able to classify the Boiler, its mounting and accessories.
2. To analyze the concept of steam nozzle, its types and behavior of steam in different conditions.
3. To be able to apply knowledge to solve problems on steam turbines.
4. To identify the various types of condensers and its importance & their problems.
5. To recognize problems related to air compressors.

Subject Name :- CAD Modeling

L	T	P
0	0	2

Subject Code: - AEP-204

1. To be able to read and interpret Automobile Engineering drawings.
2. To be able to get familiar with CAD software to produce machine drawings.
3. To be able to use Fits and Tolerances in machine drawings.
4. To be able to prepare assembly drawing of various machine elements.

Subject Name :- Theory of Machine Lab

L	T	P
0	0	2

Subject Code: - AEP-205

1. To be able to read and interpret displacement, velocity and acceleration of Four bar mechanism and can draw Klein construction
2. To be able to determine coefficient of friction, gyroscopic couple, displacement of the follower and angle of cam.
3. To be able to understand the principle and working of compound gear trains and epicyclic gear trains
4. To be able to understand balancing of masses and pressure profile of journal bearing

Subject Name :- Applied Thermodynamics Lab

L	T	P
0	0	2

Subject Code: - AEP-206


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1. To be able to draw valve timing diagram of two and four stroke IC engine
2. To be able to determine the dryness fraction of steam and Performance of a diesel engine
3. To be able to determine the Performance of a compressor and condenser

Subject Name :- Industrial Applications of CAD

L	T	P
0	0	2

Subject Code: - AEY-201

1. To be able to differentiate between graphics and Machine Drawing.
2. To be able to get familiar with Solid-works software to produce machine drawings such as Part drawing, in 2D, 3D and their assembly.
3. To be able to use Fits and Tolerances in machine drawings.
4. To be able to prepare assembly drawing of various machine elements.

4th Semester

Subject Name :- Mechanics of Solids

L	T	P
3	1	0

Subject Code: - AET-251

1. To be able to calculate the strain energy and deflection in cantilever and simply supported beams.
2. To be able to design the shafts based on various theories of failure.
3. To be able to calculate the stresses and deflection in various types of springs.
4. To be able to design the columns and struts for various compression loads based on Euler's and Rankine Gordon Formula.
5. To be able to analyze effects of rotational stresses and curved beam.



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Subject Name :- Fluid Mechanics and Machinery

L	T	P
2	1	0

Subject Code: - AET-252

1. To understand and apply the basic concept of Bernoulli's Theorem, Dimensional analysis in real life problems.
2. To be able analyze the problem related to Hydraulics turbines and centrifugal pumps.
3. To be able to evaluate the similarity relations between model and prototype.
4. To be able to examine the role of reciprocating pump and other hydraulic devices.

Subject Name :- Manufacturing Techniques

L	T	P
3	0	0

Subject Code: - AET-253

1. To understand the concept of casting process
2. To understand the different welding techniques, processes and defects
3. Able to understand the usage of forging, rolling, drawing, extrusion & sheet metal forming processes
4. To understand the concept of different forming process.

Subject Name :- Mechanics of Solids Lab

L	T	P
0	0	2

Subject Code: - AEP-254

1. To be able to conduct the tensile test, Shear test and compression test and can draw stress-strain curve for each case
2. To be able to determine the hardness number by different methods
3. To be able to determine stiffness and the modulus of rigidity of spring material
4. To be able to determine the Buckling load of column
5. To perform Fatigue test and verification of MAXWELL Reciprocal theorem


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Subject Name :- Fluid Mechanics and Machinery Lab

L	T	P
0	0	2

Subject Code: - AEP-255

1. To be able to determine the Metacentric height of a floating vessel so as to find the stability conditions of Floating Bodies, coefficient of discharge of venturimeter and Orifice meter.
2. To be able to measure the Coefficient of velocity, discharge and energy variations at different section of pipe flow and will be able to determine major and minor losses in pipe flow.
3. To understand the basic concept of turbo machine and its components, details of impulse and reaction turbines.
4. To aware the students about centrifugal pumps and its operational failures.
5. To make familiarize about the different Hydraulic Devices

Subject Name :- Manufacturing Techniques Lab

L	T	P
0	0	2

Subject Code: - AEP-256

1. To be able to determine the Moisture content & Shatter index Green strength & clay content of Sand.
2. To be able to fabricate butt, lap and T joint by using MIG Welding and a lap joint with the help of spot welding
3. To be able to understand the effect of quenching, normalizing and tempering on steel component and hardenability of steel specimen by Jominy END quench test

Subject Name :- Introduction to MATLAB

L	T	P
0	0	2

Subject Code: - AEY-253

1. To understand the basic of MATLAB
2. To experimentally analyzed the arithmetic and trigonometric functions
3. To understand the concept of array and various operation on array

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Subject Name :- Measurement and Metrology

L	T	P
2	0	0

Subject Code: - AEY-254

1. To understand the basic concept of mechanical measurement and to impart knowledge about errors in measurement.
2. To Study the basic principles of different measuring instruments.
3. It will ease the individuals in selection of gauges according to the process requirements
4. To learn how to measure surface roughness of the surface
5. To measure temperature by different techniques
6. To learn to measure the Shaft Power

Subject Name :- Measurement and Metrology Lab

L	T	P
0	0	2

Subject Code: - AEY-255

1. To be able to measure linear dimensions using Vernier Calliper, Micrometer and slip gauges.
2. To be able to measure the angular dimensions using Sine Bar and Bevel protector.
3. To be able to measure surface roughness and gear element.
4. To be able to measure the effective diameter of thread using different instruments
5. To be able to measure the speed of shaft, velocity of flowing fluid and temperature using different instruments.



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5th Semester

Subject Name :- Heat Transfer

L	T	P
2	1	0

Subject Code: - AET-301

1. To understand the basic concept of heat transfer and to aware the students about various modes of heat transfer.
2. To impart knowledge about heat extended surfaces (fins) and concept of convection
3. To familiarize the concept of thermal radiations and impart knowledge about heat exchangers

Subject Name :- Design of Automotive Components

L	T	P
2	1	0

Subject Code: - AET-302

1. Nomenclature and Design of shaft
2. To be able to differentiate between various renewable and non renewable energy resources.
3. To be able to understand the various Designs of cylinder and piston
4. To be able to solve the problems based on Design of connecting rod
5. To be able to understand Design of Crankshaft and Design of Cylinder Head and Valve Actuating Mechanisms
6. To be able to understand the Design of Cylinder Head and Valve Actuating Mechanisms

Subject Name :- Basics of Automobile Engineering

L	T	P
2	0	0

Subject Code: - AET-303


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1. To understand the basic concept of Automobile and Internal Combustion Engines with the help of different parts.
2. To aware the students about control systems of automobiles by imparting knowledge about transmission and suspension system, brakes and steering etc.
3. To make familiarize about the new advancements in Automobile with the help of new Alternative Energy Sources and about the concept of emission control.

Subject Name :- Automotive Engines

L	T	P
3	0	0

Subject Code: - AET-304

1. To understand the construction and working of IC engines
2. To understand the concept of combustion process
3. To understand the combustion process in SI engines
4. To understand about the combustion process in CI engines
5. To understand and evaluate the performance of IC engines

Subject Name :- Automotive Transmission

L	T	P
3	0	0

Subject Code: - AET-305

1. To understand the basic concept of Transmissions and Power Drives
2. To impart knowledge about Transmission Box Design
3. To familiarize the concept of Gear Ratios and Torque and Speed Variations.

Subject Name :- Heat Transfer Lab

L	T	P
0	0	2

Subject Code: - AEP-306

1. To understand the fundamental principles of heat transfer conduction, convection and radiation in practice.
2. To understand the convection heat transfer in natural and forced convection
3. To understand the designing and testing of practical heat transfer systems like heat exchangers, condensers, evaporation

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4. Develop empirical correlations for predicting heat and mass transfer rates for a given system.

Subject Name :- Automotive Engine Lab

L	T	P
0	0	2

Subject Code: - AEP-307

1. To understand valve timing diagram of 04 stroke petrol and diesel engine
2. To understand determination of brake power, indicated power, friction power and mechanical efficiency of a multi-cylinder petrol engine running at constant speed
3. To understand analysis of different fuel injection system in Indian make of vehicles
4. To understand the troubleshooting of the engine and analyse the emission norms

6th Semester

Subject Name :- Chassis Suspension & Vehicle Body Safety

L	T	P
3	0	0

Subject Code: - AET-351

1. Understand Steering linkages and their layouts, Wheel Alignment. Steering geometry and their practical implementation.
2. To Understand the concept of car and bus body design
3. To impart knowledge about special purpose vehicle design and safety in vehicles

Subject Name :- AUTOMOTIVE ELECTRONIC

L	T	P
3	0	0

Subject Code: - AET-352

1. Various power generation sources used in automobile and their architecture.
2. Applications of various gauges and sensors and their applications
3. Various controls in engine management system and communication networks

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Subject Name :- Chassis Suspension & Vehicle Body Safety Lab

L	T	P
0	0	2

Subject Code: - AEP-353

1. To understand analysis of automobile Chassis, such as Tata, Leyland, Mahindra Logan
2. To understand trouble shooting in different types of friction clutches (Single Plate and Multi Plate Wet Clutch)
3. To understand trouble Shooting -cooling system like pumps, radiators and hardware
4. To understand working of Suspension system of a four wheel vehicle leaf springs and Shock Absorbers

Subject Name :- AUTOMOTIVE ELECTRONIC Lab

L	T	P
0	0	2

Subject Code: - AEP-354

1. To understand Throttle Position Sensors, Interfacing of analog sensors with Micro Controllers
2. To understand working principles of electronic fuel injection & ignition system
3. To understand Implementation of gates and Logic Operations like, NOT, AND, OR
4. To understand testing of Starting Motors and Alternators


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Professional Electives
(Group A: Sales and Services)

Subject Name :- HYBRID ELECTRIC VEHICLES

L	T	P
3	0	0

Subject Code: - AEA-351

1. To be able to understand Hybrid Electric Vehicles.
2. To be able to solve the mathematical models of Electric Vehicles.
3. To be able to demonstrate the various types of Drive Trains.
4. To be able to solve the problems based on Hybrid Electric Drive Trains.
5. To be able to understand energy management of a Electric Vehicle.
6. To be able to analyze various types of engineering issues related to Battery Vehicles.

Subject Name :- Production and Management Operation

L	T	P
3	0	0

Subject Code: - AEA-352

1. To be understanding of the concept of aggregate planning.
2. To be understanding of the problems involved in inventory management.
3. To be understanding of the principles underlying materials requirements planning.
4. To be materials requirement schedules.
5. To be understanding of the concepts of operations scheduling.

Subject Name :- Manufacturing And Cost Estimation

L	T	P
3	0	0

Subject Code: - AEA-401


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1. Understand the various manufacturing processes planning.
2. Learn to estimate various cost elements
3. Learn to estimate production cost
4. Learn to fix foundry cost
5. Learn the find machining time estimation

Subject Name :- Vehicle Maintenance and Diagnostics

L	T	P
3	0	0

Subject Code: - AEA-402

1. Concepts and Importance and requirements of maintenance strategies.
2. Workshop layout of vehicle Maintenance service station
3. To be able to understand the various Vehicle maintenance tools and equipments
4. To be able to solve the problems based on Maintenance and Overhauling
5. To be able to understand the Electrical system maintenance
6. To be able to understand the Ignition System

Subject Name :- Customer Relation Management

L	T	P
3	0	0

Subject Code: - AEA-403

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Subject Name :- Marketing Strategic Management

L	T	P
3	0	0

Subject Code: - AEA-451

1. Students will understand concepts of Business strategy.
2. Students will understand about how to do competitor analysis.
3. Students will understand about Market and its analysis.
4. Students will understand about Economic and Technology Trends.
5. Students will understand about building and managing brands.

Subject Name :- Marketing Research

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L	T	P
3	0	0

Subject Code: - AEA-452

1. To understand the scope and focus of the marketing research industry
2. To identify the differences between qualitative and quantitative data
3. To understand the role of secondary data in the research process.
4. To solve marketing problems using systematic processes.
5. To understand the various data collection methods.

Subject Name :- Composite Materials

L	T	P
3	0	0

Subject Code: - AEA-453

1. Understanding of composite materials, matrix materials and reinforcements.
2. Understanding PMC's and their processing.
3. Understanding MMC's and their processing.
4. Understanding of various aspects of Ceramic matrix composites.
5. To be able to understand the knowledge of advanced composite materials.
6. To understand the designing of composites, and applications in real world.



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PROFESSIONAL ELECTIVES

(Group B: Design and Manufacturing Engineering)

Subject Name :- DESIGN FOR SAFETY & COMFORT

L	T	P
3	0	0

Subject Code: - AEA-355

1. The student should be able to understand the design of automotive body.
2. The student should be able to understand the crash & collision resistance
3. The student should be able to Apply the basic of comfort components in Automobiles

Subject Name :- Computer Aided Vehicle Design

L	T	P
3	0	0

Subject Code: - AEA-356

1. To be able to draw the performance curves pertain to engine and chassis
2. To be able the design the vehicle dynamic motions
3. To be able the design the crank and its calculations.

Subject Name :- BIOFUELS

L	T	P
3	0	0

Subject Code: - AEA-357

1. To be able to understand Environmental impact of global warming.
2. To be able to differentiate between various renewable and non renewable energy resources.
3. To be able to understand the various types of bio-diesel production methods.
4. To be able to solve the problems based on biodiesel production.
5. To be able to understand Hydrogen production by fermentation.
6. To be able to understand the bioreactors and their designs.


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Subject Name :- Automation and Robotics

L	T	P
3	0	0

Subject Code: - AEA-405

1. Production concepts and automation strategies.
2. To be able to learn Fixed Automation
3. To be able to understand the various Assembly Systems and Line Balancing
4. To be able to solve the problems based on Automated Assembly Systems
5. To be able to understand the Automated Materials Handling
6. To be able to understand the Automated Storage Systems

Subject Name :- Vehicle Maintenance and Diagnostics

L	T	P
3	0	0

Subject Code: - AEA-406

1. Concepts and Importance and requirements of maintenance strategies.
2. Workshop layout of vehicle Maintenance service station
3. To be able to understand the various Vehicle maintenance tools and equipments
4. To be able to solve the problems based on Maintenance and Overhauling
5. To be able to understand the Electrical system maintenance
6. To be able to understand the Ignition System

Subject Name :- Product Design and Development

L	T	P
3	0	0

Subject Code: - AEA-407

1. The student should be able to understand the need & basic concept of product design and development.
2. The student should be able to know the basics of product modelling and costing structure.
3. Recent developments in product design should be clear to the students.


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Subject Name :- HYDROGEN FUEL CELL TECHNOLOGY

L	T	P
3	0	0

Subject Code: - AEA-455

1. To be able to analyze the Fuel Cell Reaction and Energy production.
2. To be able to solve the problems based on Fuel Cell.
3. To be able to demonstrate the various types of Fuel Cells
4. To be able to solve the problems based on Fuel Cell.
5. To be able to understand losses and efficiency of a fuel cell.
6. To be able to identify various types of engineering issues related to fuel cell.

Subject Name :- CAD/CAM-Technology in Automobile Engineering

L	T	P
3	0	0

Subject Code: - AEA-456

1. Understand the importance of CAD/CAM principles in the Product development.
2. Develop programs related to manufacturing using codes.
3. Analyze the importance of networking in manufacturing environment.

Subject Name :- Automotive System Design

L	T	P
3	0	0

Subject Code: - AEA-457

1. Select and design specific gear pairs for given conditions.
2. Design various Engine components.
3. Design Cam and follower for given requirement

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PROFESSIONAL ELECTIVES
(Group C: Alternate Fuel & Engine Technology)

Subject Name :- Hybrid Electric Vehicles

L	T	P
3	0	0

Subject Code: - AEA-359

1. To be able to understand Hybrid Electric Vehicles.
2. To be able to solve the mathematical models of Electric Vehicles.
3. To be able to demonstrate the various types of Drive Trains.
4. To be able to solve the problems based on Hybrid Electric Drive Trains.
5. To be able to understand energy management of a Electric Vehicle.
6. To be able to analyze various types of engineering issues related to Battery Vehicles.

Subject Name :- Off Road Vehicles

L	T	P
3	0	0

Subject Code: - AEA-360

1. Understanding the Classification and Requirements of off road Vehicles
2. To be able to differentiate between various Farm Equipment's, Military and Combat Vehicles.
3. To be able to understand the Power and capacity of earth moving machine

Subject Name :- Product Design and Development

L	T	P
3	0	0

Subject Code: - AEA-361

1. To analyze Basic concepts of Product design methodology
2. To be able to understand rapid prototyping.
3. To be able to understand Methods of designing for Manufacturing & Assembly


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Subject Name :- Automotive Fuels and Emissions

L	T	P
3	0	0

Subject Code: - AEA-409

1. To understand the need for alternate fuel resources
2. To understand the production techniques and availability of different alternate fuels
3. To understand the modifications required in engines for different fuels
4. To understand the term emission control and its methods
5. To impart the knowledge of different types of emissions from automobiles.

Subject Name :- Fuels And Combustion Technology

L	T	P
3	0	0

Subject Code: - AEA-410

1. The student should be able to understand the concept of basics of combustion
2. The student should be able to understand the process of combustion and various fuel characteristics
3. The student should be able to understand the need of exploring the alternate fuels

Subject Name :- Vehicle Maintenance and Diagnostics

L	T	P
3	0	0

Subject Code: - AEA-411

1. Concepts and Importance and requirements of maintenance strategies.
2. Workshop layout of vehicle Maintenance service station
3. To be able to understand the various Vehicle maintenance tools and equipments
4. To be able to solve the problems based on Maintenance and Overhauling
5. To be able to understand the Electrical system maintenance
6. To be able to understand the Ignition System



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Subject Name :- Hydrogen Fuel Cell Technology

L	T	P
3	0	0

Subject Code: - AEA-459

1. To be able to analyze the Fuel Cell Reaction and Energy production.
2. To be able to solve the problems based on Fuel Cell.
3. To be able to demonstrate the various types of Fuel Cells
4. To be able to solve the problems based on Fuel Cell.
5. To be able to understand losses and efficiency of a fuel cell.
6. To be able to identify various types of engineering issues related to fuel cell.

Subject Name :- Advanced IC Engines

L	T	P
3	0	0

Subject Code: - AEA-460

1. To understand the fundamental concept of ignition system
2. To understand the concept of exhaust emission control.
3. To understand the fundamental of recent trends in IC engines.
4. Able to understand the importance of engine management.
5. To impart knowledge of alternate fuels used.

Subject Name :- Composite Materials

L	T	P
3	0	0

Subject Code: - AEA-461

1. Understanding of composite materials, matrix materials and reinforcements.
2. Understanding PMC's and their processing.
3. Understanding MMC's and their processing.
4. Understanding of various aspects of Ceramic matrix composites.
5. To be able to understand the knowledge of advanced composite materials.
6. To understand the designing of composites, and applications in real world.


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