LEVEL 4 & 5 HIGHER INTERNATIONAL DIPLOMA

IN

AUTOMOBILE ENGINEERING

Eduexcel.org.uk

www.eduexcell.org.uk

PROGRAMME OUTCOMES:

I. Apply the knowledge of technical science, applied mathematics and fundamental engineering in solving engineering problems occurring in automobile sectors.

II. Possess working knowledge of process, design, manufacture, safety and maintenance of major subsystems and technologies associated with automobiles.

III. Recognize, formulate and solve Automobile engineering complex problems using applied engineering mathematics, science and engineering principles.

IV. Communicate technical data effectively to various interface of an organization such as design, production, quality control and management.

V. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools and understand the limitations of complex engineering activities then develop the model.

VI. Understand the impact and safety practices of engineering solutions in societal, environmental, global and economic contexts.

VII. Apply the knowledge of basic principles and modern diagnostic tools in service, repair and subsystems assembly in automobiles.

VIII. Effective communication by reading blueprint designs and drawing, resource and material requirement according to automobile components manufacturing needs.

IX. Engage themselves in life-long learning by recognizing the need and technological changes.

X. Apply engineering and management principles to manage projects in multidisciplinary environments.

PROGRAMME GUIDELINES	
PROGRAMME TITLE	**Level 4 & 5 Higher International Diploma in Automobile Engineering**
QUALIFICATION CODE	**701/2023/2**
LEVEL	**LEVEL – 4**
TOTAL CREDITS	**240**
TOTAL LEARNING HOURS	**2400 HOURS**
GUIDED LEARNING HOURS	**960 HOURS**

Total learning hour 2400 Hours

1 Credit = 10 hours of effort (10 hours of learning time which includes everything a learner has to do to achieve the outcomes in a qualification including the assessment procedures and practicals).

Guided Learning Hour for first year is 480 hours and second year is 480 hours.
Total Guided Learning Hours for Higher International Diploma in Automobile Engineering is 960 hours.

`

HID -AUTOMOBILE ENGINEERING
COURSE STRUCTURE

YEAR	SCHEDULE	UNIT SPECIFICATION	NO. OF. UNITS	UNIT CREDIT	CREDIT/YEAR
I	SCHEDULE 1	Common unit	3	36	120
		Essential unit	2	24	
		Elective (or) Open unit	-	-	
	SCHEDULE 2	Common unit	-	-	
		Essential unit	3	36	
		Elective (or) Open unit	2	24	
II	SCHEDULE 3	Common unit	-	-	120
		Essential unit	2	30	
		Elective (or) Open unit	2	30	
	SCHEDULE 4	Common unit	-	-	
		Essential unit	1	15	
		Special Unit (Essential)*	1	30	
		Elective (or) Open unit	1	15	
				TOTAL	**240**

FIRST YEAR	Common unit carries	12 credit
	Essential unit carries	12 credit
	Elective unit carries	12 credit
SECOND YEAR	Essential unit carries	15 credit
	Elective unit carries	15 credit
	Special unit (Essential)* carries	30 credit

LIST OF UNITS

S. No.	SUBJECT CODE	UNIT	UNIT SPECIFICATION	CREDIT
1	CU001	Technical drawings with Engineering Graphics	Common unit	12
2	CU002	Workshop and General Safety	Common unit	12
3	CU003	IT Application for Engineers	Common unit	12
4	AEP001	Mechanical System in Automobile	Essential unit	12
5	AEP002	Applied Mathematics for Automobile Engineering	Essential unit	12
6	AEP003	Internal Combustion Engines	Essential unit	12
7	AEP004	Vehicle Body Engineering	Essential unit	12
8	AEP005	Automotive Transmission	Essential unit	12
9	AEP006	Material Science and Engineering	Essential unit	15
10	AEP007	Electrical and Electronics in Automobile	Essential unit	15
11	AEP008	Modeling and Simulation of Automotive Systems	Essential unit	15
12	SU001	Project	Special unit (Essential)*	30
I YEAR ELECTIVE UNITS				
13	AEP009	Production Drawing and Cost Estimation	Elective (or) Open unit	12
14	AEP010	Control Systems and Industrial Automation	Elective (or) Open unit	12
15	AEP011	Thermodynamics And Thermo fluids	Elective (or) Open unit	12
16	AEP012	Hydraulic and Pneumatic Systems	Elective (or) Open unit	12
17	AEP013	Vehicle Safety Engineering	Elective (or) Open unit	12
18	GU001	Professional Ethics and Human Values	Elective (or) Open unit	12
II YEAR ELECTIVE UNITS				
19	AEP014	Management Principles for Automotive Engineers	Elective (or) Open unit	15
20	AEP015	Economics of Automotive Systems and Value Engineering	Elective (or) Open unit	15
21	AEP016	Fitting Operations in Automobile	Elective (or) Open unit	15
22	MEP017	Power Plant Engineering	Elective (or) Open unit	15
23	AEP017	Advanced Vehicle Concepts	Elective (or) Open unit	15
24	AEP018	Automotive HVAC	Elective (or) Open unit	15
25	MEP010	Thermal Science for Mechanical Application	Elective (or) Open unit	15
26	AEP019	Environmental Science for Engineers	Elective (or) Open unit	15
27	GU003	Numerical Methods	Elective (or) Open unit	15

Schedule : I
Year : 1
Credit : 60

UNIT CODE	UNIT	UNIT SPECIFICATION	CREDIT
CU001	Technical drawings with Engineering Graphics	Common unit	12
CU002	Workshop and General Safety	Common unit	12
CU003	IT Application for Engineers	Common unit	12
AEP001	Mechanical System in Automobile	Essential unit	12
AEP002	Applied Mathematics for Automobile Engineering	Essential unit	12

Schedule : II
Year : 1
Credit : 60

UNIT CODE	UNIT	UNIT SPECIFICATION	CREDIT
AEP003	Internal Combustion Engines	Essential unit	12
AEP004	Vehicle Body Engineering	Essential unit	12
AEP005	Automotive Transmission	Essential unit	12
AEP009	Production Drawing and Cost Estimation	Elective (or) Open unit	12
GU001	Professional Ethics and Human Values	Elective (or) Open unit	12

Schedule : III
Year : 2
Credit : 60

UNIT CODE	UNIT	UNIT SPECIFICATION	CREDIT
AEP006	Material Science and Engineering	Essential unit	15
AEP007	Electrical and Electronics in Automobile	Essential unit	15
AEP014	Management Principles for Automotive Engineers	Elective (or) Open unit	15
AEP016	Fitting Operations in Automobile	Elective (or) Open unit	15

Schedule : IV
Year : 2
Credit : 60

UNIT CODE	UNIT	UNIT SPECIFICATION	CREDIT
AEP008	Modeling and Simulation of Automotive Systems	Essential unit	15
MEP017	Power Plant Engineering	Elective (or) Open unit	15
SU001	Project	Special unit(Essential)*	30

UNIT CODE : CUP001

UNIT TITLE : Technical drawings with Engineering Graphics

CREDIT : 12

SPECIFICATION : Common Unit

UNIT DESCRIPTION

This unit develops students to understand technical drawing and importance. This unit teaches the vital role of technical drawings in engineering documents and communication. This unit covers angle of projection, multi-view, section, detail drawing and symbol.

UNIT LEARNING OUTCOMES

ULO1 - Use appropriate tool to develop technical drawings

ULO2 - Ability to understand and interpret technical drawings.

ULO3 - Ability to provide required information in technical drawing according to process and operation.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1		M			M			M	M	
ULO2		M			M			M		
ULO3		M			M			M		M

UNIT CODE : CUP002

UNIT TITLE : Workshop and General Safety

CREDIT : 12

SPECIFICATION : Common Unit

UNIT DESCRIPTION

This unit helps to know about tools used for diverse application in engineering workshop. This unit helps to learn skill-oriented experience in manufacturing process and production technology. This unit teaches safety procedure and workshop safety in various workshop practice.

UNIT LEARNING OUTCOME

ULO1 – Ability to select appropriate tool and process for required application

ULO2 – Ability to understand basic operation in manufacturing and production

ULO3 - Ability to maintain safety procedure and use safety tools and equipment in engineering practice.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1		M			M					M
ULO2		M						M		
ULO3	M	M				M				

UNIT CODE : CUP003

UNIT TITLE : IT Application for Engineers

CREDIT : 12

SPECIFICATION : Common Unit

UNIT DESCRIPTION

This unit covers foundation concept in Information technology and develop usage IT skills in engineering practices. This unit guide to simplify complex data work using IT software tools and helps in synthesis of information for engineering needs.

UNIT LEARNING OUTCOME

ULO1 - Ability to create, select or apply appropriate software tool to improve the performance.

ULO2 - Develop documents and report preparation skill for various engineering activity such as approval, quotation, design and estimation.

ULO3 - Ability to performance analytical calculation, synthesis and interpret the data.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1				M	M		M			
ULO2				M			M	M		
ULO3	M		M				M			

UNIT CODE : AEP001

UNIT TITLE : Mechanical System in Automobile

CREDIT : 12

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit covers classification of vehicles, mechanical fundamentals, automobile parts components and system. This unit guide to understand working of various automobile systems and configuration of automobile.

UNIT LEARNING OUTCOME

ULO1 - Ability to identify automobile mechanical system.

ULO2 - Locate mechanical system and components on modern motor vehicle.

ULO3 - Understand the technical information, function and operation.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M						
ULO2		M					M		M	
ULO3		M	M	M				M		

UNIT CODE : AEP002

UNIT TITLE : Applied Mathematics for Automobile Engineering

CREDIT : 12

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit aims to develop various analytical skills in applied mathematics and extensive experience with the tactics of problem solving and logical thinking applicable for the students of electrical engineering covers matrix theory, calculus of variations, probability, linear programming and Fourier series.

UNIT LEARNING OUTCOME

ULO1 – Develop problem solving skills.

ULO2 – To deal with matrix theory and calculus of variations

ULO3 – To deal with linear programming and Fourier series.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M	M						M	
ULO2				M						
ULO3			M							M

UNIT CODE : AEP003

UNIT TITLE : Internal Combustion Engines

CREDIT : 12

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit covers various components, construction details, operating characteristics, engine cycles, thermochemistry, air and fuel induction, exhaust flow and emission in IC engine. This unit explains the combustion process, power generation and calculation.

UNIT LEARNING OUTCOME

ULO1 – Ability to apply the thermodynamics to thermal systems.

ULO2 – Ability to understand the fluid flow and heat transfer concepts in engine system.

ULO3 – Assess performance of an internal combustion engine

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1		M	M				M			
ULO2		M	M				M		M	
ULO3		M	M							M

UNIT CODE : AEP004

UNIT TITLE : Vehicle Body Engineering

CREDIT : 12

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit covers various assumption made in designing a vehicle, calculation of frontal area, maximum speed, maximum acceleration and safety consideration in vehicle body design.

UNIT LEARNING OUTCOME

ULO1 – Ability to apply the basic design principle of vehicle.

ULO2 – Ability to draw the performance curve

ULO3 – Design the vehicle in safety point of view

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M	M				M			M
ULO2	M		M				M			
ULO3	M	M				M			M	

UNIT CODE : AEP005

UNIT TITLE : Automotive Transmission

CREDIT : 12

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit covers clutch and gear box, hydrodynamic drive, planetary gear boxes, automatic transmission applications, hydrostatic and electric drive.

UNIT LEARNING OUTCOME

ULO1 – Understand the purpose of clutch, gear box and drive train

ULO2 – Compare various types of transmission system

ULO3 – Understand the various types of drives

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M			M					
ULO2		M								
ULO3	M	M		M	M	M			M	

UNIT CODE : AEP006

UNIT TITLE : Material Science and Engineering

CREDIT : 15

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit covers atomic arrangement and phase diagram, structure of metals and alloys, heat treatment process of steels. This unit helps in selection of material based on application and provides sound knowledge on phase diagram and heat treatment of materials.

UNIT LEARNING OUTCOME

ULO1 – Understand about the Fe & Non-Fe alloys, Non-metallic materials and modern materials

ULO2 – Select the materials for particular engineering application

ULO3 – Understand the various heat treatments process

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M			M					
ULO2		M					M			
ULO3		M			M	M				

UNIT CODE : AEP007

UNIT TITLE : Electrical and Electronics in Automobile

CREDIT : 15

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit covers basic electrical and electronic principles, electronic components and circuits, digital electronics, diagnostic tools and test equipment. This unit also explains charging system, starting system, ignition systems, electronic fuel control and management system.

UNIT LEARNING OUTCOME

ULO1 – Understand working of electrical and electronic system in automobile.

ULO2 – Ability to handle diagnostic tools and test equipment

ULO3 – Understand the necessary of sensor and management system in automobile.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M			M						
ULO2							M		M	
ULO3	M				M	M	M		M	M

UNIT CODE : AEP008

UNIT TITLE : Modeling and Simulation of Automotive Systems

CREDIT : 15

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit covers basic concepts of modeling and simulation. Evaluate designs and simulate the impacts of alternative approaches. Practice on designing a model representation, verification and validation process of the automobile components.

UNIT LEARNING OUTCOME

ULO1 – Ability to develop real life systems and in order to visualize dynamic behavior.

ULO2 – Develop the skill to use simulation packages; to study the response of system.

ULO3 – Apply the simulation techniques to develop and optimize the automobile system and components

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1					M					M
ULO2				M	M		M			
ULO3	M				M				M	

UNIT CODE : SU001

UNIT TITLE : Project

CREDIT : 30

SPECIFICATION : Special unit (Essential)*

UNIT DESCRIPTION

This unit supports the students to identify, formulate, organize, develop and implement a successful project by applying the skills and knowledge that they acquired through various units finished in previous and current SCHEDULE.

UNIT LEARNING OUTCOME

ULO1 - Ability to define, plan, organize and implement a project.

ULO2 - Ability to formulate a project to find out problem solution.

ULO3 - Ability to perform a plan of work in stipulated time period.

ULO4 – Ability to communicate idea, result and outcomes in both written and oral mode.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M	M			M	M			M
ULO2	M	M	M				M			
ULO3				M						M
UL04				M	M			M	M	M

UNIT CODE : AEP009

UNIT TITLE : Production Drawing and Cost Estimation

CREDIT : 12

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit covers production documentation, arrangement drawing, drafting standards geometric dimension and tolerance. This unit help to estimate various cost incurred in manufacturing components.

UNIT LEARNING OUTCOME

ULO1 - Ability to impart the knowledge of engineering drawing rules and manufacturing details.

ULO2 - Ability to perform tolerance analysis.

ULO3 - Ability to calculate manufacturing cost and time.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1				M				M		
ULO2		M						M		
ULO3	M	M	M							

UNIT CODE : AEP010

UNIT TITLE : Control Systems and Industrial Automation

CREDIT : 12

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit will provide understanding of a range of control systems that are used in industrial and domestic environments and enable them to produce specifications for mechatronic products thereby obtaining the ability to design and implement simple automated systems in industrial context.

UNIT LEARNING OUTCOME

ULO1 - Understand the analysis of linear continuous time system.

ULO2 – To Explain the role or sensors and actuators in control systems

ULO3 – To Demonstrate understanding of State-space control design and analysis of feedback control systems

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M			M	M					M
ULO2				M	M					
ULO3		M		M	M				M	M

UNIT CODE : AEP011

UNIT TITLE : Thermodynamics and Thermo fluids

CREDIT : 12

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit aims to create Advanced knowledge in principles underlying a range of engineering applications of thermodynamics and thermo fluids systems and aims to Predict failure load and stresses in components due to a range of failure criteria including buckling.

UNIT LEARNING OUTCOME

ULO1 – Advanced knowledge of the principles underlying a range of engineering applications of thermodynamics and thermo fluids systems

ULO2 – Model and analyze various dynamic systems and predict their response to numerous forms of disturbance.

ULO3 – Design from first principles a range of psychrometric and heat transfer systems.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M									M
ULO2			M		M				M	
ULO3					M					M

UNIT CODE : AEP012

UNIT TITLE : Hydraulic and Pneumatic Systems

CREDIT : 12

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit covers fluid power control, selection of hydraulic and pneumatics circuits components, circuit design and fluid power elements. This unit also explains application of hydraulics and pneumatics circuits in automobile.

UNIT LEARNING OUTCOME

ULO1 - Ability to read and interpret graphical representation of pneumatic and hydraulic system.

ULO2 - Ability to develop pneumatic and hydraulic circuits.

ULO3 - Understand the operation of pneumatic and hydraulic system in automobile.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1				M				M		M
ULO2	M	M	M			M				
ULO3	M	M							M	

UNIT CODE : AEP013

UNIT TITLE : Vehicle Safety Engineering

CREDIT : 12

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit help us to develop the concept of vehicle safety and describe the safety considerations pertaining to infrastructure design and develops a healthy discussion of social and economic impacts in road accidents.

UNIT LEARNING OUTCOME

ULO1 – Ability to develop the concept of vehicle safety

ULO2 – To demonstrate the technical aspects of vehicle and road safety

ULO3 - Analyze and discuss the relevance of driver behavior and attitudes towards road safety.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M	M		M	M				
ULO2	M		M			M	M			M
ULO3		M				M	M		M	

UNIT CODE : GU001

UNIT TITLE : Professional Ethics and Human values

CREDIT : 12

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit aims to create an awareness on Engineering Ethics and Human Values to impart Moral and Social Values and Loyalty and to appreciate the rights of others.

UNIT LEARNING OUTCOME

ULO1 - Ability to create an awareness on Engineering Ethics and Human Values.

ULO2 - Ability to create an awareness on Human Values.

ULO3 - Ability to follow Social Values and Loyalty and to appreciate the rights of others

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M	M							M
ULO2			M						M	
ULO3	M	M		M					M	M

UNIT CODE : AEP014

UNIT TITLE : Management Principles for Automotive Engineers

CREDIT : 15

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit helps to apply fundamental theories and concepts of management in engineering organizations also it applies project management context in automotive engineering applications and carry out project initiation, planning, execution and closing of projects and finally it Assess the impact of health and safety, industrial, labor and consumer laws and regulations on organization productivity and functionality.

UNIT LEARNING OUTCOME

ULO1 - Ability to apply and analyze fundamental theories and concepts of management in engineering organizations.

ULO2 - Ability to relate strategic management to automotive engineering domain through various approaches such as new product and process design and manufacture

ULO3 - Reflect on progress and plan for personal and career development

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M	M	M				
ULO2	M			M			M			
ULO3		M		M		M	M		M	

UNIT CODE : AEP015

UNIT TITLE : Economics of Automotive Systems and Value Engineering

CREDIT : 15

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit helps us to Identify different costs associated with design, development, manufacture, use, maintenance and disposal of vehicles. It explains the importance of cost optimization in automobiles manufacturing sector. Carry out a basic survey on vehicle economics and cost studies

UNIT LEARNING OUTCOME

ULO1 – Identify different costs associated with design, development, manufacture, use, maintenance and disposal of vehicles

ULO2 – It explains the importance of cost optimization in automobiles manufacturing sector.

ULO3 – Ability to carry out a basic survey on vehicle economics and cost studies

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M	M	M	M					
ULO2	M		M	M						
ULO3				M		M			M	

UNIT CODE : AEP016

UNIT TITLE : Fitting Operations in Automobile

CREDIT : 15

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit covers work safe's expectations, removal and fitting of mechanical and electrical components, hydraulic brake and air brake fitting operation, lifting equipment and material handling.

UNIT LEARNING OUTCOME

ULO1 – Understand various tools required in fitting operation

ULO2 – Ability to remove and fit automobile system and components

ULO3 – Utilize the safety and operating knowledge in material handling

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M			M		M			
ULO2	M									
ULO3	M					M	M		M	

UNIT CODE : MEP017

UNIT TITLE : Power Plant Engineering

CREDIT : 15

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit covers principle, operations, process and component of different types of power plant. Also, it is designed to understand the energy science and its applications in industry context and to develop the ability to carry out an energy audit in power plant independently.

UNIT LEARNING OUTCOME

ULO1 - Understand various application, operations and components of power plant and different types of energy sources

ULO2 - Understand principle, process of energy sources and conversion technologies.

ULO3 - Familiar with the basic concepts of energy audit and energy management

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M						
ULO2		M	M						M	
ULO3				M		M	M			M

UNIT CODE : AEP017

UNIT TITLE : Advanced Vehicle Concepts

CREDIT : 15

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit explains the operational deficiencies of traditional IC engines such as fuel efficiency, wastage of energy environmental pollution and noise etc. It defines the performance characteristics applicable for hybrid and electric drive trains and carry out vehicle performance tests.

UNIT LEARNING OUTCOME

ULO1 – Explain the operational deficiencies of traditional IC engines such as fuel efficiency, wastage of energy environmental pollution and noise etc.

ULO2 – Illustrate the construction and operations of electric drive trains.

ULO3 - Define performance characteristics applicable for hybrid and electric drive trains and carry out vehicle performance tests.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M	M		M					
ULO2	M	M	M				M			
ULO3		M				M	M		M	

UNIT CODE : AEP018

UNIT TITLE : Automotive HVAC

CREDIT : 15

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit covers refrigeration cycle, method, system and application in passengers, isolated and transport vehicle, psychometry properties, tables and charts, air conditioning systems and load analysis. This unit also describes air conditioning service and control operation.

UNIT LEARNING OUTCOME

ULO1 – Ability to design and implement standard HVAC system for automobiles

ULO2 – Understand the psychometry and perform heating cooling load for automobiles

ULO3 – Ability to diagnose and troubleshoot automobile HVAC system

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M					M			
ULO2	M	M		M		M	M		M	
ULO3				M			M			

UNIT CODE : MEP010

UNIT TITLE : Thermal Science for Mechanical Application

CREDIT : 15

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit covers heat transfer fundamental, heat exchangers, heat pipes – types, fluids and applications, operating principle, direct contact heat transfer, cooling towers and performance evaluation. Also, it helps to understand laws of thermodynamics and thermo fluids and their application to engineering thermodynamic systems

UNIT LEARNING OUTCOME

ULO1 - Ability to identify, formulate and solve thermal science problems.

ULO2 - Understand various thermodynamics process in mechanical system.

ULO3 - Ability to Analyze steady and turbulent fluid flow

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M	M		M					
ULO2	M	M	M				M			
ULO3		M				M	M		M	

UNIT CODE : AEP019

UNIT TITLE : Environmental Science for Engineers

CREDIT : 15

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

This unit covers ecosystems and biodiversity, roles of an individual in conservation of natural resources, social issues and the environment. This unit also explains environmental pollution causes, effects and control measures.

UNIT LEARNING OUTCOME

ULO1 – Inspect the impact of engineering solutions in global, societal and environmental context.

ULO2 – Understand the important of health environment and conservation of resources

ULO3 – Ability to examine sustainable development and environmental issues in professional undertakings

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M					M				M
ULO2	M	M				M				M
ULO3						M			M	M

UNIT CODE : GU003

UNIT TITLE : Numerical Methods

CREDIT : 15

SPECIFICATION : Elective (or) Open unit

UNIT DESCRIPTION

The aim of this unit is to solve numerical Differentiation and integration in various engineering discipline.

UNIT LEARNING OUTCOME

ULO1 – To introduce solutions of equations and Eigen values.

ULO2 – To acquaint knowledge of finite differences and interpolation

ULO3 – To introduce numerical differentiation and integration.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1					M	M				M
ULO2			M						M	
ULO3	M				M	M				M

ASSESSMENT METHODS AND TECHNIQUES FOR HID IN AUTOMOBILE ENGINEERING

Assessment technique	Type of Assessment	Description	Formative or Summative
Case studies	Oral/ Problem based/ Practical	Students are required to work through a case study to identify the problem(s) and to offer potential solutions; useful for assessing students' understanding and for encouraging students to see links between theory and practice. Case studies could be provided in advance of a time-constrained assessment.	**Formative**
Concept maps	Written/ Oral	Students map out their understanding of a particular concept. This is a useful (and potentially quick) exercise to provide feedback to staff on students' understanding.	**Formative**
'Doing it' exam	Written	An exam which requires students to do something, like read an article, analyze and interpret data etc.	**Formative / Summative**
Field report	Written/ Oral	Students are required to produce a written/ oral report relating to a field/ site visit.	**Formative**
Laboratory books / Reports	Practical/ Written	Students are required to write a report for all (or a designated sample) of practical's in a single lab book. A sample of lab books will be collected each week to mark any reports of labs done in previous weeks; this encourages students to keep their lab books up to date. Each student should be sampled the same number of times throughout the module with a designated number contributing to the assessment mark.	**Summative**
Multiple choice questions (MCQs)	Written	Can be useful for diagnostic, formative assessment, in addition to summative assessment. Well-designed questions can assess more than factual recall of information, but do take time to design.	**Formative / Summative**
Online discussion boards	Written	Students are assessed on the basis of their contributions to an online discussion for example, with their peers; this could be hosted on a virtual learning environment (VLE).	**Formative**
Open book exams	Written	Students have the opportunity to use any or specified resources to help them answer set questions under time constraints. This method removes the over-reliance on memory and recall and models the way that professionals manage information.	**Summative**
	Oral / Written	Students are asked to give an oral presentation on a particular topic for a specified length of time and could also be	**Summative**

Oral presentations		asked to prepare associated handout(s). Can usefully be combined with self- and peer-assessment.	
Problem sheets	Written	Students complete problem sheets, e.g. on a weekly basis. This can be a useful way of providing students with regular formative feedback on their work and/or involving elements of self- and peer assessment.	**Formative**
Research projects / Group projects	Written/ Practical/ Oral/ Performance/ Problem based/ Work placement	Potential for sampling wide range of practical, analytical and interpretative skills. Can assess wide application of knowledge, understanding and skills.	**Formative / Summative**
Short answer questions	Written	Useful to assess a wide range of knowledge/skills across a module.	**Summative**
Simulations	Practical/ Written/ Oral/ Problem-based	Text or virtual computer-based simulations are provided for students, who are then required to answer questions, resolve problems, perform tasks and take actions etc. according to changing circumstances within the simulation. Useful for assessing a wide range of skills, knowledge and competencies.	**Formative**
Viva voce	Oral	Often used for assessing 'borderline' degree classifications but also useful to explore students' understanding of a wide range of topics. Depending on class size however, they can be time consuming for staff.	**Summative**