

GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Diploma Engineering				Branch	Automobile Engineering			
Semester	IV				Version	1.0.0.0			
Effective from Academic Year			2019-20		Effective for the batch Admitted in			June 2018	
Subject code	1AU2403	Subject Name			MODERN VEHICLE TECHNOLOGY				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

Pre-requisites:

Course Learning Outcomes:

The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes:

- Describe construction, functions and applications of various sensors and actuators used in modern vehicle
- Explain latest advancement in Engine technology
- Demonstrate various safety features and equipment used in modern vehicle
- Identify various modern features for better functioning of vehicle

Name of Unit	Unit Content	Unit Learning Outcomes	Marks	Hrs
Unit – I Applications of Transducers, Sensors & Actuators	1a.	Concept of general measurement system & Difference between Mechanical and electrical/ electronic instruments Measurement of Temperature:	18	13
	1b.	Working of Thermocouple and Thermister Measurement of Speed: Contact		
	1c.	less electrical tachometer, Inductive, Capacitive type tachometer, Stroboscope		
	1d.	Measurement of Force: Strain gauge load cell		
	1e.	Electrical method for moisture measurement		
		1.1a	Differentiate working principle of Mechanical and Electrical measuring systems	
		1.2b	Explain various equipments working on the principle of electrical energy for measurement of various quantities	
		1.3c	List various sensors and actuators applicable in automobile vehicle with neat sketch	

	1f. 1g. 1h.	Electromechanical Type Transducer – Potentiometric resistance type, Inductive, Capacitive, Piezometric; Photoelectric Basic requirement of Sensors, Functions, Applications and Circuitry arrangement of various Sensors such as Mass Air flow rate sensor, Exhaust gas Oxygen concentration, Throttle plate angular position, Crankshaft angular position, Coolant temperature, Intake air temperature, Manifold absolute pressure (MAP), Vehicle speed Sensor. Transmission gear selector position, Methanol sensor, Rain Sensor & Rain sensing wiper Working Principal and Functions of various Actuators such as Solenoid Actuators, Motorized Actuators, and Stepper motors	1.4d	Describe construction, functions and applications of various sensors and actuators with neat sketch		
Unit– II Advance Ignition system	2a. 2b. 2c. 2d.	Electrical & electronics ignition system Modern Spark Ignition system (e.g. D.T.S.I, T.D.S.I., Multi electrode etc. System) Insulated coils Concept of Non-battery Energy Storage: Ultra capacitors and Flywheels	2.1a 2.2b	Differentiate working principle of electrical and electronics ignition system Explain modern Ignition systems in S.I. and C.I. Engines with neat sketch	7	4
Unit– III Advancemen t in Engine and related components	3a. 3b. 3c. 3d. 3e. 3f.	Introduction & types of hybrid vehicle Hybrid drives systems Compressed air car Solar Cars Hydrogen operated Engine Basic concepts of Blue Motion Technologies like DSG, TSI, TDI, GDI variable valve timing system	3.1a 3.2b 3.3c	Explain need of advancement in Engine technology. Explain alternative power sources Describe Blue Motion Technology for Green Vehicle Technology	12	9
Unit– IV Modernizati on in Peripheral systems	4a. 4b. 4c.	Security Systems ,Remote keyless entry, Anti-theft system, Alarm system Entertainment and peripheral systems. Integrated communications, Proximity sensors Global positioning satellites(GPS)	4.1a 4.2b	Explain importance of application of peripheral systems in automobiles Explain advanced peripheral system in automobile with neat sketch	6	5
Unit– V	5a.	Seat Belts, Seat Belts pre-	5.1a	Explain an importance of	7	6

Advance Safety Equipments	5b.	tensioners , Smart seatbelt reminder Concepts of Crash test, Crash sensors		safety with respect to Automobile vehicle		
	5c.		5.2b	Describe various safety features and equipments used in automobile		
	5d.	Air bags -Introduction of air bags, Dual stage air bags, Side Airbags				
	5e.	Tire pressure monitoring system Pedestrian Protection & Night vision with pedestrian detection				
Unit– VI Modern Features in Automobile	6a.	Power Sliding doors	6.1a	Explain requirement of modern features in automobiles	10	8
	6b.	Electronic stability / Skid-control system, Traction control system				
	6c.	Telescopic steering wheel / adjustable pedals	6.2b	List various modern features for better functioning of vehicle		
	6d.	Rear mounted Radar & Cameras				
	6e.	Electromagnetic suspension and levitation				
	6f.	Automatic Lift Axle				
	6g.	Regenerative Braking Systems				
	6h.	Continuous Variable Transmission				
	6i.	Intelligent Parking Assist System, Self Parking				

List of Practical			
No.	Unit	Name of Practical	
1	I	Measure shaft speeds by using Speed measurement device	
2	II	Use strain gauge as sensing element for different types of sensors	
3	II	Identification and demonstration of different sensors and actuators	
4	III	Study of Hybrid motor vehicle	
5	IV	Demonstration of Peripheral system	
6	IV	Identify and demonstrate various safety systems used in vehicle	
7	V	Study of various modern features used in vehicle. Also prepare write up regarding benefits of these features	
List of Instruments / Equipment / Trainer Board			
1	Charts for various electronic components like sensors, diodes, LEDs etc.		
2	Stroboscope		
3	Strain gauge		
4	Working model of various automotive mechanisms operated through modern technology.		
5			
List of Text Books			
No	Title of Reference Books	Authors	Publication
1	Modern Vehicle Technology		
2	Automobile Electrical and electronic systems	Tom Denton	Arnold ISBN-0750662190

List of Reference Books			
No	Title of Reference Books	Authors	Publication
1	Fundamentals of Electrical and Electronics Engineering	Theraja BL	Nlrja Construction & Development Co Ltd
2	Automotive Electrical Equipments	P L Kohli	Tata Mc-Graw Hill
Link of Learning Web Resource			
1	http://en.wikipedia.org/wiki/Mass_flow_sensor mass flow rate sensor		
2	http://en.wikipedia.org/wiki/Oxygen_sensor exhaust gas o2 sensor		
3	http://en.wikipedia.org/wiki/Crankshaft_position_sensor crank shaft position		
4	http://en.wikipedia.org/wiki/Engine_coolant_temperature_sensor coolant temp sensor		
5	http://en.wikipedia.org/wiki/MAP_sensor MAP sensor		
6	For mock test https://www.objectivebooks.com/2015/05/automobile-engineering-objective_14.html		

CO'S AND PO'S MAPPING

PO'S		CO1	CO2	CO3	CO4
PO1	An ability to apply knowledge of mathematics and engineering science.	SLI	SLI	SLI	SLI
PO2	An ability to demonstrate, develop and conduct experiments, as well as to analyze and interpret data.	SUB	SLI	SLI	SLI
PO3	An ability to design a system component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.	MED	MED	SUB	MED
PO4	An ability to perform with multidisciplinary teams.	MED	MED	SUB	MED
PO5	Use of appropriate modern tool and application software that pertain to Automobile engineering technology systems.	NONE	SUB	MED	SUB
PO6	An ability to identify, formulates, execute and solve engineering problems.	SLI	SUB	MED	MED
PO7	An ability to communicate and present effectively in both verbal and written forms.	SLI	MED	SUB	MED
PO8	The broad education necessary to understand the impact of engineering solutions in global, economic, environmental and societal context.	MED	SUB	SUB	SLI
PO9	Recognition of need for self-improvement, and an ability to engage in life-long learning.	SLI	NONE	NONE	SLI
PO10	Ability to aware about the contemporary issues.	SLI	SLI	SLI	MED
PO11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	MED	MED	MED	MED
PO12	Demonstrate to analyse and apply unconventional processes, automation, robotics Nanotechnology, Computer-Aided-Design & Manufacturing and knowledge in Automobile Engineering, Thermodynamics, Refrigeration & Air Conditioning and Jet Propulsion & Rocket Engineering to analyse and solve complex problems and to work professionally in such systems and plants.	SLI	MED	MED	SLI

