

GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Diploma Engineering	Branch	AUTOMOBILE ENGINEERING			
Semester	III	Version	1.0.0.0			
Effective from Academic Year	2019-20	Effective for the batch Admitted in	June 2018			
Subject code	1AU2306	Subject Name	AUTOMOBILE POLLUTION CONTROL ENGINEERING			
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:

- Use appropriate Emission Control Device & Systems as per country prevailing Emission-norms.
- Test and analyse various Emission Control Devices to reduce air pollutant.
- Select suitable alternative fuels for controlling pollution.

Course Content

Name of UNIT	Unit Content	Unit Learning Outcomes	Marks	Hrs
UNIT – 1 Introduction To Automotive Pollution	1 a The atmosphere 1 b Air pollutants. 1c Pollutants produced by automobiles. 1 d Emission control norms- International & Indian norms.(BS 4 & BS 6) 1 e Noise and sound pressure. Measurement of noise. Causes of automobile noise and its reduction	1.1 Explain different kind of pollutant produced by automobiles. 1.2 Explain Noise pollution, its effects on human & ways to reduce noise pollution. 1.3 Explain Different Pollution Norms.	7	6
UNIT – 2 Principle Of Production Of Exhaust Gases.	2 a Theoretical air-fuel ratio. 2 b Carbon monoxide (CO) gas. 2 c Hydro Carbon (HC) gas. 2 d Oxides of Nitrogen (NOx). 2 e Driving conditions and exhaust gases.	2.2 Describe various pollutants produced under Different driving conditions.	08	6

<p>UNIT – 3 Emission Control Systems.</p>	<p>3a Emission control components layout and drawing. 3b Necessity and operation of Positive Crankcase Ventilation (PCV) system. 3c Necessity and operation of fuel evaporative emission control (EVAP) system for Carburetted & MPFI engines. 3d Operation of Charcoal Canisters 3e Necessity and operation of Throttle Positioner (TP) system & Throttle Positioner sensor 3f Catalytic converters. 3g Oxygen (O₂) sensor. 3h Necessity and operation of High Altitude Compensation (HAC) system. 3i Manifold Absolute Pressure Sensor (MAPS). 3j Spark timing emission control systems. 3k Knock (Detonation) sensor. 3l Exhaust gas re-circulation (EGR) system. 3m ECM controlled EGR valves. 3n Necessity and operation of Mixture Control (MC) system.</p>	<p>3.1 Describe various system used for emission control. 3.2 Explain construction & working of different Emission control systems.</p>	<p>26</p>	<p>20</p>
<p>UNIT – 4 Principle Methods Of Exhaust Gas Analysis.</p>	<p>4a. Measuring CO and CO₂ concentrations. 4b. Measuring HC concentrations. 4c. Measuring NO_x concentrations 4d. Prevalent Automotive emission control norms in India. 4e. Construction & working of Exhaust Gas analyser. 4f. Construction & working of Diesel Smoke meter.</p>	<p>4.1 Describe method of Measuring various pollutants. 4.2 Describe automotive emission control norms in India.</p>	<p>7</p>	<p>6</p>
<p>UNIT – 5 LPG and CNG Conversion</p>	<p>5a. Merits of LPG's 5b. LPG conversion kit. 5c. LPG kit installation. 5d. Maintenance of LPG kit components. 5e. Merits of CNG's. 5f. CNG conversion kit and CNG kit installation. 5g. Maintenance of CNG kit components.</p>	<p>5.1 Describe conversion, installation & maintenance of LPG & CNG kit</p>	<p>12</p>	<p>7</p>

List of Practical (Any seven)		
No.	Unit	Name of Practical
1	II	Measure CO, HC emission from petrol engines on exhaust gas analysis
2	II	Measure diesel exhaust smoke of diesel engine on diesel smoke meter
3	III	Service Positive Crankcase ventilation system.
4	III	Test Spark timing control system.
5	III	Service muffler.
6	III	Service Catalytic converter.
7	III	Demonstrate Exhaust gas re-circulation (EGR) system
8	V	Study of LPG kit inspection, testing and setting.
9	V	Study of CNG kit inspection, testing and setting.

List of Instruments / Equipment / Trainer Board	
1	Smoke meter (PUC machine)
2	Exhaust gas analyzer
3	Catalytic converter
4	LPG & CNG kit
5	Different types of muffler.

List of Text Books			
No	Title of Reference Books	Authors	Publication
1	Anil Chhikara	Automobile Engineering (Vol- I)	Satya Praktion, New Delhi

List of Reference Books			
No	Title of Reference Books	Authors	Publication
1	William H. Carouse, Donald L. Anglin	Automotive Mechanics	Tata McGraw-Hill Co., Ltd., New Delhi
2	William H. Carouse ,Donald L. Anglina	Automotive Emission Control	Tata McGraw-Hill Co., Ltd., New Delhi
3	James D. Halderman, James Linder	Automotive Fuel and Emissions Control Systems	Prentice Hall
4	Richard K. DuPuy, Steven D. Schaefer, William E. Renke	Fuel systems and emission controls	Chek-Chart Publications

Link of Learning Web Resource	
1	http://www.youtube.com/watch?v=qB7h7ftdsQA (How to install LPG on your car)
2	http://www.youtube.com/watch?v=1zH22Qpe2GA (Understanding Catalytic Converters and How They Work)
3	http://nc-ti.org/Program%20Area/Automotive/Emission%20Controls[1].ppt (Emission Controls.ppt)
4	http://academic.cengage.com/resource_uploads/downloads/1111128618_2767_27.ppt (Emission Controls.ppt)
5	http://grewal.wikispaces.com/file/view/Emission+Control.ppt (Emission Controls.ppt)
6	https://www.railelectrica.com/environment-and-pollution-control-sseje-test-papers/multiple-choice-questions-on-environment-and-pollution-control-and-practice-test-1/ (MOCK TEST)

CO'S AND PO'S MAPPING

PO'S		CO1	CO2	CO3
PO1	An ability to apply knowledge of mathematics and engineering science.	SLI	SLI	SLI
PO2	An ability to demonstrate, develop and conduct experiments, as well as to analyze and interpret data.	SUB	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
PO4	An ability to perform with multidisciplinary teams.	MED	MED	SUB
PO5	Use of appropriate modern tool and application software that pertain to Automobile engineering technology systems.	NONE	SUB	MED.
PO6	An ability to identify, formulates, execute and solve engineering problems.	SLI.	SUB	MED.
PO7	An ability to communicate and present effectively in both verbal and written forms.	SLI	MED.	SUB
PO8	The broad education necessary to understand the impact of engineering solutions in global, economic, environmental and societal context.	MED.	SUB.	SUB.
PO9	Recognition of need for self-improvement, and an ability to engage in life-long learning.	SLI	NONE	NONE
PO10	Ability to aware about the contemporary issues.	SLI	SLI	SLI
PO11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	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.