RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 1/5

Branch	AUTOMOBILE ENGINEERING	Semester	Fifth

Course Code	503	Course Name	Vehicle Emissions & Air Conditioning

Course Outcome 1	Student will be able to demonstrate his / her knowledge about control of pollutants in engine exhaust emissions	T-L Hrs	Marks
Learning Outcome 1	**Student will be able to explain the mechanism of formation of exhaust pollutants in SI and CI engines**	7	10
Contents	Pollutant formation in SI and CI Engines, mechanism of HC and CO formation, NOx formation, smoke and particulate emissions, effects of design and operating variables on engine emissions		
Method of Assessment	Theory exam		
Learning Outcome 2	**Student will be able to explain the construction /working /components of systems for recovery of leaked hydrocarbons and blow-by gases**	10	15
Contents	Sources of vapor leakages, vapor recovery systems, fuel vapor return line, charcoal canister, vapor separation from fuel, sealed fuel tanks, vapor storage in crank case, expansion tank. need of removing blow-by gases, Open & Closed crankcase ventilation system, function of PCV valve, Construction & working of PCV valve.		
Method of Assessment	Theory exam		
Learning Outcome 3	**Student will be able to identify major components of commonly used vapor recovery systems / PCV valve**	8	10
Contents	Study of major components of fuel vapor return line, charcoal canister, vapor separation from fuel, sealed fuel tanks, vapor storage in crank case, expansion tank. Open & Closed crankcase ventilation system, PCV valve regarding their location, construction and function		
Method of Assessment	Practical exam		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 2/5
Branch	AUTOMOBILE ENGINEERING	Semester	Fifth
Course Code	503	Course Name	Vehicle Emissions & Air Conditioning

Course Outcome 2	Student will be able to explain the various techniques to control pollutants in exhaust gases	T-L Hrs	Marks
Learning Outcome 1	**Student will be able to explain different method to improve combustion quality and reduction in emission.**	7	10
Contents	Various methods to improve combustion quality, efficient control of A/F Ratio, faster acting choke, reducing combustion chamber surface area, compression ratio, increasing combustion temperature, valve overlap, control of vacuum advance, Electronic engine control and microprocessor based engine control, Non conventional vehicles.		
Method of Assessment	Theory exam		
Learning Outcome 2	**Student will be able to explain the theory/ construction / working /components of electronic engine control system and various types of catalytic convertors**	10	20
Contents	Study of electronic engine control systems, micro-processor based systems and various types of catalytic converters regarding their theory/construction/ working/ components		
Method of Assessment	Theory assignment		
Learning Outcome 3	**Student will be able to identify major components of electronic engine control systems and commonly used catalytic converters**	8	10
Contents	Study of main components of Electronic engine control and microprocessor based engine control, commonly used catalytic converters		
Method of Assessment	Practical exam		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 3/5
Branch	AUTOMOBILE ENGINEERING	Semester	Fifth
Course Code	503	Course Name	Vehicle Emissions & Air Conditioning

Course Outcome 3	Student will be able to measure the exhaust emissions of given vehicle	T-L Hrs	Marks
Learning Outcome 1	**Student will be able to explain the theory / construction / working / components of commonly used gas analyzers and smoke meters**	**8**	**15**
Contents	Concept of exhaust measurement for S.I and C.I engines, smoke testing for S.I and C. I. engines. Measurement of CO, HC and NOx. Study of commonly used gas analysers and smoke meters regarding their theory/ construction/ working/ components		
Method of Assessment	Theory exam		
Learning Outcome 2	**Student will be able to measure the exhaust emissions of given vehicle using gas analyzer / smoke meter**	**8**	**10**
Contents	Concept of exhaust measurement for S.I and C.I engines, gas analysis and smoke testing for S.I and C. I. engines, measurement of CO, HC and NOx. and opacity using the available gas analyzer and smoke meter		
Method of Assessment	Practical assignment		
Learning Outcome 3	**Student will be able to identify the causes of pollutants in given exhaust measurement report and suggest the appropriate treatment to reduce the level of pollutants**	**9**	**10**
Contents	Assessment of nature and composition of pollutants in exhaust through study of available data such as color of the exhaust, measured values of CO, HC and NOx. and opacity, recommending treatment required to reduce the pollutants in the exhaust		
Method of Assessment	Theory assignment		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 4/5
Branch	AUTOMOBILE ENGINEERING	Semester	Fifth
Course Code	503	Course Name	Vehicle Emissions & Air Conditioning

Course Outcome 4	Student will be able to explain the construction/working/components/control mechanism of a car air conditioning system.	T-L Hrs	Marks
Learning Outcome 1	**Student will be able to explain the construction/working/components of a car air-conditioning system.**	**8**	**10**
Contents	Human comfort, air conditioning, variables to be controlled, theory of air conditioning, theory, construction, working and components of basic air conditioning system, theory, construction, working, components of common car air conditioning system.		
Method of Assessment	Theory exam		
Learning Outcome 2	**Student will be able to identify the main components of the given car air conditioning system.**	**7**	**10**
Contents	Study of major components of common car air conditioning system regarding their location, purpose, function and relative position with other neighbor components		
Method of Assessment	Practical exam		

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 5/5
Branch	AUTOMOBILE ENGINEERING	Semester	Fifth
Course Code	503	Course Name	Vehicle Emissions & Air Conditioning

Course Outcome 5	Student will be able to recharge the refrigerant in the given car air conditioning system	T-L Hrs	Marks
Learning Outcome 1	**Student will be able to explain the important characteristics of commonly used refrigerants for car AC system**	**6**	**10**
Contents	Need and importance of refrigerants, important characteristics of refrigerants, types of refrigerants and their codes, study of important characteristics of refrigerants used in common car AC system		
Method of Assessment	Theory exam		
Learning Outcome 2	**Student will be able to follow the SOP for testing and recharging the given car AC system**	**9**	**10**
Contents	Introduction to refrigerant charging and re-charging, tools and equipments required for re-charging the refrigerant in car AC system, SOP for recharging the car AC system		
Method of Assessment	Practical assignment		