

RGPV (Diploma Wing ) Bhopal		SCHEME FOR LEARNING OUTCOME				Branch Code			Course Code			CO Code	LO Code	Format No. <b>4</b>
						A	0	3	5	0	3	1	1	
<b>COURSE NAME</b>	<b>Vehicle Emissions &amp; Air Conditioning</b>													
<b>CO Description</b>	<b>Student will be able to demonstrate his / her knowledge about control of pollutants in engine exhaust emissions</b>													
<b>LO Description</b>	<b>Student will be able to explain the mechanism of formation of exhaust pollutants in SI and CI engines</b>													
<b>SCHEME OF STUDY</b>														
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	Pollutant formation in SI and CI Engines, mechanism of HC and CO formation, NO <sub>x</sub> formation, smoke and particulate emissions, effects of design and operating variables on engine emissions	Traditional Lecture method	Teacher will organize lecture inside the class based on his/her session plan. Discuss the topics with students, provide quiz, assignment etc., conduct remedial and tutorials	05	02	<b>B.P Pundir</b> “Engine Emissions”, Pub.: Alpha Science Int. Ltd. Or its equivalent	Teacher will suggest more video links, LRs to assist in learning							
<b>SCHEME OF ASSESSMENT</b>														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Theory exam	One question related to the learned content will be asked in the university question paper	10	Question paper, Check list	External									
<b>ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)</b>														
NIL														

RGPV (Diploma Wing ) Bhopal		SCHEME FOR LEARNING OUTCOME				Branch Code			Course Code			CO Code	LO Code	Format No. <b>4</b>
						A	0	3	5	0	3	1	2	
<b>COURSE NAME</b>	Vehicle Emissions & Air Conditioning													
<b>CO Description</b>	Student will be able to demonstrate his / her knowledge about control of pollutants in engine exhaust emissions													
<b>LO Description</b>	Student will be able to explain the construction /working /components of systems for recovery of leaked hydrocarbons and blow-by gases													
SCHEME OF STUDY														
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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.	Traditional Lecture method	Teacher will organize lecture inside the class based on his/her session plan. Discuss the topics with students, provide quiz, assignment etc., conduct remedial and tutorials	07	03	B.P Pundir “Engine Emissions”, Pub.: Alpha Science Int. Ltd. Or its equivalent	Teacher will suggest more video links, LRs to assist in learning							
SCHEME OF ASSESSMENT														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Theory exam	One and half question related to the learned content will be asked in the university question paper	15	Question paper, Check list	External									
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)														
NIL														

RGPV (Diploma Wing ) Bhopal		SCHEME FOR LEARNING OUTCOME				Branch Code			Course Code			CO Code	LO Code	Format No. <b>4</b>
						A	0	3	5	0	3	1	3	
<b>COURSE NAME</b>	<b>Vehicle Emissions &amp; Air Conditioning</b>													
<b>CO Description</b>	<b>Student will be able to demonstrate his / her knowledge about control of pollutants in engine exhaust emissions</b>													
<b>LO Description</b>	<b>Student will be able to identify major components of commonly used vapor recovery systems / PCV valve</b>													
<b>SCHEME OF STUDY</b>														
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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	Lab demonstration method	Teacher will demonstrate major components inside the lab to students, students will practice, provide quiz, assignment etc., teacher will conduct remedial and tutorials	05	03	Systems/ components/ diagrams/ charts/ posters	Teacher will suggest more video links, LRs to assist in learning							
<b>SCHEME OF ASSESSMENT</b>														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Practical exam	The student will be asked to identify five components and state their purpose, function and location in the system	10	Systems/ components/ diagrams/ charts/ posters	External									
<b>ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)</b>														
NIL														

RGPV (Diploma Wing ) Bhopal		SCHEME FOR LEARNING OUTCOME				Branch Code			Course Code			CO Code	LO Code	Format No. <b>4</b>
						A	0	3	5	0	3	2	1	
<b>COURSE NAME</b>	<b>Vehicle Emissions &amp; Air Conditioning</b>													
<b>CO Description</b>	<b>Student will be able to explain the various techniques to control pollutants in exhaust gases</b>													
<b>LO Description</b>	<b>Student will be able to explain different method to improve combustion quality and reduction in emission.</b>													
SCHEME OF STUDY														
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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.	Traditional Lecture method	Teacher will organize lecture inside the class based on his/her session plan. Discuss the topics with students, provide quiz, assignment etc., conduct remedial and tutorials	05	02	<b>B.P Pundir</b> “Engine Emissions”, Pub.: Alpha Science Int. Ltd. Or its equivalent	Teacher will suggest more video links, LRs to assist in learning							
SCHEME OF ASSESSMENT														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Theory exam	One question related to the learned content will be asked in the university question paper	10	Question paper, Check list	External									
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)														
NIL														

RGPV (Diploma Wing ) Bhopal		SCHEME FOR LEARNING OUTCOME				Branch Code			Course Code			CO Code	LO Code	Format No. <b>4</b>
						A	0	3	5	0	3	2	2	
<b>COURSE NAME</b>	Vehicle Emissions & Air Conditioning													
<b>CO Description</b>	Student will be able to explain the various techniques to control pollutants in exhaust gases													
<b>LO Description</b>	Student will be able to explain the theory/ construction / working /components of electronic engine control system and various types of catalytic convertors													
SCHEME OF STUDY														
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	Study of electronic engine control systems, micro-processor based systems and various types of catalytic converters regarding their theory/construction/working/ components	Traditional Lecture method	Teacher will organize lecture inside the class based on his/her session plan. Discuss the topics with students, provide quiz, assignment etc., conduct remedial and tutorials	07	03	B.P Pundir “Engine Emissions”, Pub.: Alpha Science Int. Ltd. Or its equivalent	Teacher will suggest more video links, LRs to assist in learning							
SCHEME OF ASSESSMENT														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Theory assignment	Two questions related to the learned content will be asked in the theory assignment	20	Assignment question, rating scale	Internal									
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						A	0	3	5	0	3	2	3	
<b>COURSE NAME</b>	Vehicle Emissions & Air Conditioning													
<b>CO Description</b>	Student will be able to explain the various techniques to control pollutants in exhaust gases													
<b>LO Description</b>	Student will be able to identify major components of electronic engine control systems and commonly used catalytic converters													
<b>SCHEME OF STUDY</b>														
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	Study of main components of Electronic engine control and microprocessor based engine control, commonly used catalytic converters	Lab demonstration method	Teacher will demonstrate major components inside the lab to students, students will practice, provide quiz, assignment etc., teacher will conduct remedial and tutorials	05	03	Systems/ components/ diagrams/ charts/ posters	Teacher will suggest more video links, LRs to assist in learning							
<b>SCHEME OF ASSESSMENT</b>														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Practical exam	The student will be asked to identify five components and state their purpose, function and location in the system	10	Systems/ components/ diagrams/ charts/ posters	External									
<b>ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)</b>														
NIL														

RGPV (Diploma Wing ) Bhopal		SCHEME FOR LEARNING OUTCOME				Branch Code			Course Code			CO Code	LO Code	Format No. <b>4</b>
						A	0	3	5	0	3	3	1	
<b>COURSE NAME</b>	Vehicle Emissions & Air Conditioning													
<b>CO Description</b>	Student will be able to measure the exhaust emissions of given vehicle													
<b>LO Description</b>	Student will be able to explain the theory / construction / working / components of commonly used gas analyzers and smoke meters													
SCHEME OF STUDY														
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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	Traditional Lecture method	Teacher will organize lecture inside the class based on his/her session plan. Discuss the topics with students, provide quiz, assignment etc., conduct remedial and tutorials	06	02	B.P Pundir “Engine Emissions”, Pub.: Alpha Science Int. Ltd. Or its equivalent	Teacher will suggest more video links, LRs to assist in learning							
SCHEME OF ASSESSMENT														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Theory exam	One and half questions related to the learned content will be asked in the university question paper	15	Question paper, rating scale	External									
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)														
NIL														

RGPV (Diploma Wing ) Bhopal		SCHEME FOR LEARNING OUTCOME				Branch Code			Course Code			CO Code	LO Code	Format No. <b>4</b>
						A	0	3	5	0	3	3	2	
<b>COURSE NAME</b>	Vehicle Emissions & Air Conditioning													
<b>CO Description</b>	Student will be able to measure the exhaust emissions of given vehicle													
<b>LO Description</b>	Student will be able to measure the exhaust emissions of given vehicle using gas analyzer / smoke meter													
SCHEME OF STUDY														
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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	Lab demonstration method	Teacher will demonstrate the method of exhaust measurement to students, students will practice, teacher will conduct remedial and tutorials to improve their performance	05	03	Exhaust measuring instruments and accessories, vehicles	Teacher will suggest more video links, LRs to assist in learning							
SCHEME OF ASSESSMENT														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Practical assignment	The student will be asked to measure any two parameters related to exhaust using appropriate instrument for given vehicle	10	Exhaust measuring instruments and accessories, vehicles	Internal									
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						A	0	3	5	0	3	3	3	
<b>COURSE NAME</b>	Vehicle Emissions & Air Conditioning													
<b>CO Description</b>	Student will be able to measure the exhaust emissions of given vehicle													
<b>LO Description</b>	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													
<b>SCHEME OF STUDY</b>														
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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	Traditional Lecture method	Teacher will organize lecture inside the class based on his/her session plan. Discuss the topics with students, provide quiz, assignment etc., conduct remedial and tutorials	06	03	B.P Pundir “Engine Emissions”, Pub.: Alpha Science Int. Ltd. Or its equivalent	Teacher will suggest more video links, LRs to assist in learning							
<b>SCHEME OF ASSESSMENT</b>														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Theory assignment	A set of data regarding pollution level measured in a given vehicle, will be provided to the student group and they will analyze and interpret the data to find the causes and suggest the treatment	10	Case study, rating scale	Internal									
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						A	0	3	5	0	3	4	1	
<b>COURSE NAME</b>	<b>Vehicle Emissions &amp; Air Conditioning</b>													
<b>CO Description</b>	<b>Student will be able to explain the construction/working/components/control mechanism of a car air conditioning system.</b>													
<b>LO Description</b>	<b>Student will be able to explain the construction/working/components of a car air- conditioning system.</b>													
SCHEME OF STUDY														
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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.	Traditional Lecture method	Teacher will organize lecture inside the class based on his/her session plan. Discuss the topics with students, provide quiz, assignment etc., conduct remedial and tutorials	06	02	<b>Book:</b> Refrigeration & Air Conditioning by R. S. Khurmi OR equivalent	Teacher will suggest more video links, LRs to assist in learning							
SCHEME OF ASSESSMENT														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Theory exam	One question related to the learned content will be asked in the university question paper	10	Question paper, rating scale	External									
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RGPV (Diploma Wing ) Bhopal		SCHEME FOR LEARNING OUTCOME				Branch Code			Course Code			CO Code	LO Code	Format No. <b>4</b>
						A	0	3	5	0	3	4	2	
<b>COURSE NAME</b>	Vehicle Emissions & Air Conditioning													
<b>CO Description</b>	Student will be able to explain the construction/working/components/control mechanism of a car air conditioning system.													
<b>LO Description</b>	Student will be able to identify the main components of the given car air conditioning system.													
<b>SCHEME OF STUDY</b>														
S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	Study of major components of common car air conditioning system regarding their location, purpose, function and relative position with other neighbor components	Lab demonstration method	Teacher will demonstrate major components inside the lab to students, students will practice, provide quiz, assignment etc., teacher will conduct remedial and tutorials	04	03	System/ components/ diagrams/ charts/ posters	Teacher will suggest more video links, LRs to assist in learning							
<b>SCHEME OF ASSESSMENT</b>														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Practical exam	The student will be asked to identify five components and state their purpose, function and location in the system	10	System/ components/ diagrams/ charts/ posters	External									
<b>ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)</b>														
NIL														

RGPV (Diploma Wing ) Bhopal		SCHEME FOR LEARNING OUTCOME				Branch Code			Course Code			CO Code	LO Code	Format No. <b>4</b>
						A	0	3	5	0	3	5	1	
<b>COURSE NAME</b>	<b>Vehicle Emissions &amp; Air Conditioning</b>													
<b>CO Description</b>	<b>Student will be able to recharge the refrigerant in the given car air conditioning system</b>													
<b>LO Description</b>	<b>Student will be able to explain the important characteristics of commonly used refrigerants for car AC system</b>													
SCHEME OF STUDY														
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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	Traditional Lecture method	Teacher will organize lecture inside the class based on his/her session plan. Discuss the topics with students, provide quiz, assignment etc., conduct remedial and tutorials	04	02	<b>Book:</b> Refrigeration & Air Conditioning by R. S. Khurmi OR equivalent	Teacher will suggest more video links, LRs to assist in learning							
SCHEME OF ASSESSMENT														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Theory exam	One question related to the learned content will be asked in the university question paper	10	Question paper, Check list	External									
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NIL														

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						A	0	3	5	0	3	5	2	
<b>COURSE NAME</b>	Vehicle Emissions & Air Conditioning													
<b>CO Description</b>	Student will be able to recharge the refrigerant in the given car air conditioning system													
<b>LO Description</b>	Student will be able to follow the SOP for testing and recharging the given car AC system													
SCHEME OF STUDY														
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1.	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	Laboratory demonstration method	Teacher will demonstrate the procedure of recharging the car AC system, he will explain the purpose / function of various tools and equipments used in re-charging, students will practice to re-charge under guidance of teacher, teacher will correct /improve their performance through feedback / suggestions.	06	03	Car AC system/ related tools and equipments	Teacher will suggest more video links, LRs to assist in learning							
SCHEME OF ASSESSMENT														
S. No.	Method of Assessment	Description of Assessment	Max. Marks	Resources Required	External / Internal									
1.	Practical assignment	Student will be asked to demonstrate the SOP to recharge the given car AC system	10	Car AC system/ related tools and equipments	Internal									
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)														
NIL														