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

Branch	AUTOMOBILE ENGINEERING	Semester	Sixth

Course Code	601	Course Name	Auto Maintenance Service & Repairs

Course Outcome 1	Student will be able to maintain /repair the given car engine	T-L Hrs	Marks
Learning Outcome 1	**Student will be able to practice checkup/ daily/ running maintenance the given car**	6	3
Contents	Need and importance of vehicle periodic maintenance and service, maintenance schedules, periodic checkup, daily/ running maintenance, daily inspection, check-up and top up-oil level, belt check-up, checking battery condition, engine cooling system, air conditioning system, tires		
Method of Assessment	Laboratory assignment		
Learning Outcome 2	**Student will be able to trouble-diagnosis the given problematic car engine**	7	10
Contents	• General Procedure of diagnosis cause of a problem • Common engine problems and their probable causes and solutions. • Introduction to engine On Board Diagnostic (OBD), Misfire detection, diagnosis for ignition faults, Fuel system and Injection system faults in SI and CI engines.		
Method of Assessment	Laboratory exam		
Learning Outcome 3	**Student will be able to plan repair for the given problem in the given car engine**	7	5
Contents	• Need for planning the repairs, breaking the repair procedure into small tasks; assessment of tools, equipments, devices, consumables, utilities, spare parts required to complete each task, format for repair plan • Preparation of repair plans for following repair activities after breaking them into small tasks		
Method of Assessment	Laboratory assignment		
Learning Outcome 4	**Student will be able to perform given car engine repair / maintenance related specific activity**	8	5
Contents	Car engine related following common repair/ maintenance related specific activities which are listed below*		
Method of Assessment	Laboratory assignment		

***Refer Format -4 for the list**

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 2/5

Branch	AUTOMOBILE ENGINEERING	Semester	Sixth

Course Code	601	Course Name	Auto Maintenance Service & Repairs

Course Outcome 2	To maintain / repair the given transmission and transaxle / Drive train and Axle	T-L Hrs	Marks
Learning Outcome 1	**Student will be able trouble-diagnosis the given problematic car transmission and transaxle / Drive and Axle**	**5**	**4**
Contents	Trouble diagnosis of Common problems in clutch, synchromesh gearbox, automatic transmission, transaxle , drive and differential listed below*		
Method of Assessment	Laboratory assignment		
Learning Outcome 2	**Student will be able to plan repair for the given problem in the given car transmission and transaxle / Drive train and Axle.**	**6**	**10**
Contents	Preparation of repair plan for following repairs related to clutch, synchromesh gearbox, automatic transmission, transaxle, drive and differential		
Method of Assessment	Laboratory exam		
Learning Outcome 3	**Student will be able to perform car transmission and transaxle / Drive train and Axle related given specific repair / maintenance activity.**	**6**	**5**
Contents	Car transmission and transaxle / Drive train and Axle related following common repair/ maintenance related specific activities which are listed below*		
Method of Assessment	Laboratory assignment		

***Refer Format -4 for the list**

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

Branch	AUTOMOBILE ENGINEERING	Semester	Sixth

Course Code	601	Course Name	Auto Maintenance Service & Repairs

Course Outcome 3	Student will be able to maintain / repair given car brake system	T-L Hrs	Marks
Learning Outcome 1	**Student will be able to maintain / repair the given problematic car brake system**	6	4
Contents	Trouble diagnosis of following common problems in car disc , drum and parking brake systems which are listed below*		
Method of Assessment	Laboratory assignment		
Learning Outcome 2	**Student will be able to plan repair for the given problem in the given car brake system**	5	10
Contents	Preparation of repair plans for following repairs related to car disc, drum and parking brake systems		
Method of Assessment	Laboratory exam		

***Refer Format -4 for the list**

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 4/5

Branch	AUTOMOBILE ENGINEERING	Semester	Sixth

Course Code	601	Course Name	Auto Maintenance Service & Repairs

Course Outcome 4	Student will be able to maintain / repair given car suspension and steering system / body or its component	T-L Hrs	Marks
Learning Outcome 1	Student will be able to diagnose the trouble in the given suspension and steering system / body or its component	9	10
Contents	Trouble diagnosis of common problems in car suspension system, steering system, car body and its components as listed below*		
Method of Assessment	Laboratory exam		
Learning Outcome 2	Student will be able to plan repair for the given problem in the given suspension and steering system / body or its component	10	10
Contents	Preparation of repair plan for following repairs related to suspension and steering system / body or its component		
Method of Assessment	Laboratory exam		
Learning Outcome 3	Student will be able to perform given suspension, steering system, body or its component related specific repair / maintenance related activity	11	5
Contents	Car suspension, steering system, body or its component related following specific repair/ maintenance related specific activities which are listed below*		
Method of Assessment	Laboratory assignment		

***Refer Format -4 for the list**

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

Branch	AUTOMOBILE ENGINEERING	Semester	Sixth

Course Code	601	Course Name	Auto Maintenance Service & Repairs

Course Outcome 5	Student will be able to maintain / repair given car electrical / electronic system	T-L Hrs	Marks
Learning Outcome 1	**Student will be able to diagnose the trouble in the given problematic car electrical / electronic system**	5	4
Contents	Trouble diagnosis of Common problems in car starting system, ignition system, charging system, lighting system and wiring and electronic systems as listed below*		
Method of Assessment	Laboratory assignment		
Learning Outcome 2	**Student will be able to plan repair for the given problem in the given car electrical / electronic system.**	7	10
Contents	Preparation of repair plan for following repairs related to car starting system, ignition system, charging system, lights & wiring system and electronic system		
Method of Assessment	Laboratory exam		
Learning Outcome 3	**Student will be able to perform given car electrical / electronic system related unique repair / maintenance activity**	7	5
Contents	Testing and repair /maintenance related specific activities for car starting system, ignition system, charging system, lights & wiring system and electronic system		
Method of Assessment	Laboratory assignment		

***Refer Format -4 for the list**

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	1	1	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain /repair the given car engine**
LO Description	**Student will be able to practice checkup/ daily/ running maintenance of the given car**

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 vehicle periodic maintenance and service, maintenance schedules, periodic checkup, daily/ running maintenance, daily inspection, check-up and top up-oil level, belt check-up, checking battery condition, engine cooling system, air conditioning system, tires	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content / activities to students, student will practice the activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	03	03	• Book:- Automotive mechanics by W.H.Crouse and Anglin or its equivalent • Related Engine Manuals, Charts • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory assignment	Student will be asked to perform given car periodic checkup related three specific activities in front of teacher	03	Rating scale	**Internal**

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of periodic maintenance / daily checkup activity to be learned:-

1. **Checking and maintaining engine oil and coolant levels**
2. **Checking battery condition**
3. **Checking engine cooling system /air conditioning system**
4. **Checking of car brakes**
5. **Checking of engine belt condition + air filter**
6. **Checking tires**

Assessment Criteria: - 1. Correctness of first activity (01 marks)

2. Correctness of second activity (01 marks)

3. Correctness of third activity (01 marks)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	1	2	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain /repair the given car engine**
LO Description	**Student will be able to trouble-diagnosis the given problematic car engine**

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs	Pract /Tut Hrs	LRs Required	Remarks
1	• General Procedure of diagnosis cause of a problem • Common engine problems and their probable causes and solutions. • Introduction to engine On Board Diagnostic (OBD), Misfire detection, diagnosis for ignition faults, Fuel system and Injection system faults in SI and CI engines.	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content / activities to students, student will practice the activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	04	03	• Book:- Automotive mechanics by W.H.Crouse and Anglin or its equivalent • Advanced Automotive Fault Diagnosis by Tom Denton 2011 • Related Engine Manuals, Charts • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory exam	Student will be asked to find the cause of problems in two given engine cases in front of external examiner	10	Rating scale	External

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of common engine problems for which diagnosis of cause is to be learned:-

1. **Coolant level is frequently reducing**
2. **engine is not starting**
3. **engine is overheating**
4. **excessive emissions from car**
5. **car is consuming too much oil**
6. **car fuel average is gradually reducing**
7. **Engine occasionally misfires**

Assessment criteria (for each case):-

1. Correctness of adopted procedure (3marks)
2. Correctness of identified cause (2 marks)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	1	3	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain /repair the given car engine**
LO Description	**Student will be able to plan repair for the given problem in the given car engine**

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 for planning the repairs, breaking the repair procedure into small tasks; assessment of tools, equipments, devices, consumables, utilities, spare parts required to complete each task, format for repair plan • Preparation of repair plans for following repair activities after breaking them into small tasks	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content / activities to students, student will practice to prepare plan under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	04	03	• Book:- Automotive mechanics by W.H.Crouse and Anglin Or its equivalent • Related Engine Manuals, Charts • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory assignment	Student will be asked to prepare repair plan for the two given repair works and submit them to teacher	05	Rating scale	Internal

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of repair works for which student will learn to prepare the repair plans:-

1. **Removing and installing coolant pump and radiator for the given engine**
2. **removing and installing the mechanical fuel pump for the given engine**
3. **removing the crankshaft from the given engine**
4. **installing pistons con-rods in the given engine**
5. **Changing cylinder head gasket of the given engine**

FORMAT FOR REPAIR PLAN (Lab assignment)

1	General Information	Date		LO No.	
		Name of student			
		Roll No.			
		Name of car sub-assembly			
		Name of component(s)			
2	Description of repair procedure and resources	A. Description of detailed repair procedure			
		B. Sketch related to repair			
		A. Measuring tools required			
		B. Repair tools required			
		C. Machines /devices / equipments required			
		D. Consumables required			
		E. Spare parts required			
		F. Approximate time required for repairs			
4	Additional information (if required)				
5.	Signature of student				

Assessment criteria:-

1. Extent of appropriateness of required tools, machines, devices (03 marks)
2. Extent of appropriateness of required consumables ,spare parts and time (02 marks)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	1	4	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain /repair the given car engine**
LO Description	**Student will be able to perform given car engine repair / maintenance related specific activity**

SCHEME OF STUDY

S. No	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract /Tut Hrs.	LRs Required	Remarks
1	Car engine related following common repair/ maintenance related specific activities which are listed below	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content / activities to students, student will practice the activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	03	05	• Book:- Automotive mechanics by W.H.Crouse and Anglin Or its equivalent • Related Engine Manuals, Charts • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory assignment	Student will be asked to perform given engine repair related two specific activities in front of the teacher	05	Rating scale	Internal

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of repair related activities to be learned by the student:-

1. **removing /installing coolant pump / radiator**

2. **removing and testing the thermostat valve**
3. **removing and replacing worn con rod bearing sleeves**
4. **installing piston con-rod assemblies in the given engine**
5. **Adjusting the valve timing and drive belt tension**
6. Changing cylinder head gasket

Assessment criteria* :-

1. Extent to which SOP has been followed (03 marks)
2. Extent to which student used appropriate tools (01marks)
3. Extent to which student used tools appropriately (01 marks)

***Note: - Give marks out of 5 for each activity and finally scale down the obtained sum of two activities to half and rounded to higher side whole number (if necessary).**

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	2	1

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain / repair the given transmission and transaxle / Drive train and Axle**
LO Description	**Student will be able to trouble-diagnosis the given problematic car transmission and transaxle / Drive and Axle**

SCHEME OF STUDY

S. No	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract /Tut Hrs	LRs Required	Remarks
1	Trouble diagnosis of Common problems in clutch, synchromesh gearbox, automatic transmission, transaxle , drive and differential listed below	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content / activities to students, student will practice the activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	3	2	• A Practical Approach to Motor Vehicle Engineering and Maintenance 3rd Edition by Allan Bonnick • Vehicle maintenance and garage practice by JigarA.DoshiDhruU.Panchal, JayeshP.Maniar. 2014. • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory assignment	Student will be asked to find the cause of problems in three given car transmission and transaxle / Drive and Axle cases in front of teacher	04	Rating scale	Internal

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of common problems of car transmission and transaxle / drive and Axle for which diagnosis of cause is to be learned:-

1. **Clutch slips while engaged**
2. **Clutch chatters or grabs while engaging**
3. **Clutch paddle pulsates**
4. **Clutch pedal stiff**
5. **Hard shifting in to gear**
6. **Gears clash while shifting**

Assessment criteria (for each case)*:-

1. Correctness of adopted procedure (2 marks)
2. Correctness of identified cause (2 marks)

***Note: - Give marks out of 4 for each trouble diagnosis and finally scale down the obtained sum of three activities to one third and rounded to higher side whole number (if necessary).**

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	2	2	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain / repair the given transmission and transaxle / drive train and axle**
LO Description	**Student will be able to plan repair for the given problem in the given car transmission and transaxle / drive train and axle.**

SCHEME OF STUDY

S. No	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract /Tut Hrs.	LRs Required	Remarks
1	Preparation of repair plan for following repairs related to clutch, synchromesh gearbox, automatic transmission, transaxle , drive and differential	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content /activities to students, student will practice the activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	3	3	• Book:- Automotive mechanics by W.H.Crouse and Anglin Or its equivalent • John Doke "Fleet Management", McGraw-Hill Co. 1984. • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory exam	Student will be asked to prepare repair plans for the two given repair works and submit them to teacher	10	Rating scale	External

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of repair works for which student will learn to prepare the repair plans:-

1. **Disassembling the given single plate friction clutch assembly**

2. **Disassembling the given synchromesh gearbox**
3. **Disassembling the given differential**

FORMAT FOR REPAIR PLAN (Lab assignment)

1	**General Information**	**Date**		**LO No.**	
		Name of student			
		Roll No.			
		Name of car sub-assembly			
		Name of component(s)			
2	**Description of repair procedure and resources**	**C. Description of detailed repair procedure**			
		D. Sketch related to repair			
		G. Measuring tools required			
		H. Repair tools required			
		I. Machines /devices / equipments required			
		J. Consumables required			
		K. Spare parts required			
		L. Approximate time required for repairs			
4	**Additional information (if required)**				
5.	**Signature of student**				

Assessment criteria (for each repair plan)* :-

1. Extent of appropriateness of required tools, machines, devices (05 marks)
2. Extent of appropriateness of required consumables ,spare parts and time (05marks)

***Note: - Give marks out of 10 for each repair plan and finally scale down the obtained sum of two into half and rounded to higher side whole number (if**

necessary).

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	2	3	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain / repair the given transmission and transaxle / Drive train and Axle**
LO Description	**Student will be able to perform car transmission and transaxle / Drive train and Axle related given specific repair / maintenance activity.**

SCHEME OF STUDY

S. No	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract /Tut Hrs.	LRs Required	Remarks
1	Car transmission and transaxle / Drive train and Axle related following common repair/ maintenance related specific activities which are listed below	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content /activities to students, student will practice the activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	03	03	• Book:- Automotive mechanics by W.H.Crouse and Anglin Or its equivalent • Automotive technology a system approach 5th edition by Jack Erjavec, Delmar USA • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory assignment	Student will be asked to perform given engine repair related two specific activities in front of the teacher	05	Rating scale	Internal

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of repair related activities to be learned by the student:-

1. **Adjustment of clutch paddle and clutch free travel**
2. **Replacing clutch plate with worn lining with new one**
3. **Removing the universal joint**
4. **Checking wheel bearing condition**
5. **Replacing axle bearing and seals**
6. **Adjustment of, shift-linkage of given gear-box, which is operated through gear shift lever**

Assessment criteria* :-

1. Extent to which SOP has been followed (03 marks)
2. Extent to which student used appropriate tools (01marks)
3. Extent to which student used tools appropriately (01 marks)

***Note: - Give marks out of 5 for each activity and finally scale down the obtained sum of two activities to half and rounded to higher side whole number (if necessary).**

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	3	1	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain / repair given car brake system**
LO Description	**Student will be able to maintain / repair the given problematic car brake 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	Trouble diagnosis of following common problems in car disc , drum and parking brake systems which are listed below	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content /activities to students, student will practice the activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	03	03	• Book:- Automotive mechanics by W.H.Crouse and Anglin Or its equivalent • Related Engine Manuals, Charts • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory assignment	Student will be asked to perform trouble diagnosis for the given three problem cases related to car braking system in front of teacher	04	Rating scale	Internal

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of common problems of car disc, drum and parking brake systems for which diagnosis of cause is to be learned:-

1. **Pedal goes to floor, loss of paddle reserve**

2. **Car pulls to one side when applying brakes**
3. **Soft or spongy pedal**
4. **Poor braking, requiring excessive paddle force**
5. **Brakes grab**
6. **Noisy brakes**
7. **One or all brakes drag**
8. **Car tends to move even after applying parking brakes**

Assessment criteria (for each case)*:-

1. Correctness of adopted procedure (2 marks)
2. Correctness of identified cause (2 marks)

***Note: - Give marks out of 4 for each trouble diagnosis and finally scale down the obtained sum of three activities to one third and rounded to higher side whole number (if necessary).**

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	3	2	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain / repair given car brake system**
LO Description	**Student will be able to plan repair for the given problem in the given car brake 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	Preparation of repair plans for following repairs related to car disc, drum and parking brake systems	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content/ activities to students, student will practice the activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	03	02	• Book:- Automotive mechanics by W.H.Crouse and Anglin Or its equivalent • Related Engine Manuals, Charts • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory exam	Student will be asked to perform given car brake system repair / maintenance related two specific activities in front of examiner	10	Rating scale	External

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of repair works for which student will learn to prepare the repair plans:-

1. **Remove, inspect and /or replace brake shoes/ pads , lubricate and re-assemble**

2. **Remove, inspect brake drum /caliper assembly; measure and compare with specifications, take corrective actions if necessary**
3. **Retract and re-adjust caliper piston / Pre-adjust brake shoes and parking brake; install brake drums /disc caliper, brake pads /hub assemblies and wheel bearings; make final checks and adjustments**
4. **Bleed and/ or flush brake system and adjust pedal travel**

FORMAT FOR REPAIR PLAN (Lab assignment)

1	**General Information**	**Date**		**LO No.**	
		Name of student			
		Roll No.			
		Name of car sub-assembly			
		Name of component(s)			
2	**Description of repair procedure and resources**	**E. Description of detailed repair / inspection procedure**			
		F. Sketch related to repair / inspection			
		M. Measuring tools required			
		N. Repair tools required			
		O. Machines /devices / equipments required			
		P. Consumables required			
		Q. Spare parts required			
		R. Approximate time required for repairs			
4	**Additional information (if required)**				
5.	**Signature of student**				

Assessment criteria (for each repair plan)* :-

1. Extent of appropriateness of required tools, machines, devices (05 marks)

2. Extent of appropriateness of required consumables ,spare parts and time (05marks)

***Note: - Give marks out of 10 for each repair plan and finally scale down the obtained sum of two into half and rounded to higher side whole number (if necessary).**

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	4	1

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain / repair given car suspension and steering system / body or its component**
LO Description	**Student will be able to diagnose the trouble in the given suspension and steering system / body or its component**

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract /Tut Hrs.	LRs Required	Remarks
1	Trouble diagnosis of common problems in car suspension system, steering system, car body and its components as listed below	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content activities to students, student will practice the content activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	05	04	• Book:- Automotive mechanics by W.H. Crouse and Anglin Or its equivalent • Related Engine Manuals, Charts • Related tool, devices and equipment's	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory exam	Student will be asked to find the cause of problems in two given engine cases in front of external examiner	10	Rating scale	External

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Trouble diagnosis of following problems will be learned by the student:-

1. **Hard steering**

2. **Excessive play in steering**
3. **Wandering of the car**
4. **One brake drags**
5. **Soft or spongy brake pedal**
6. **Requires excessive brake pedal force**
7. **Improper suspension height**
8. **Suspension topping or bottoming out**
9. **Noise / vibrations from body component or their joints**
10. **Removal of paint strips from surface of body parts**

Assessment criteria (for each case):-

1. Correctness of adopted procedure (3 marks)
2. Correctness of identified cause (2 marks)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code	Course Code	CO Code	LO Code	Format No. 4
		A 0 3	6 0 1	4	2	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain/repair given car suspension and steering system / body or its component**
LO Description	**Student will be able to plan repair for the given problem in the given suspension and steering system / body or its component**

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract /Tut Hrs.	LRs Required	Remarks
1	Preparation of repair plan for following repairs related to suspension and steering system / body or its component	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content activities to students, student will practice the content activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	05	05	• Book:- Automotive mechanics by W.H.Crouse and Anglin Or its equivalent • Related Engine Manuals, Charts • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory exam	Student will be asked to prepare repair plans for the two given repair works and submit them to external examiner	10	Rating scale	External

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of repair works for which student will learn to prepare the repair plans:-

1. **Check, adjust /align the steering geometry of the given car wheels**

2. **Remove, inspect, replace, rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.**
3. **Remove, inspect, replace the given leaf spring/ coil spring**
4. **Remove, inspect, and repair given shock absorber.**
5. **Remove, inspect and paint the given car body panel**
6. **Remove, inspect and remove the dent from the given car body panel**

FORMAT FOR REPAIR PLAN (Lab assignment)

1	**General Information**	**Date**		**LO No.**	
		Name of student			
		Roll No.			
		Name of car sub-assembly			
		Name of component(s)			
2	**Description of repair procedure and resources**	• **Description of detailed repair / inspection procedure**			
		• **Sketch related to repair / inspection**			
		• **Measuring tools required**			
		• **Repair tools required**			
		• **Machines /devices / equipments required**			
		• **Consumables required**			
		• **Spare parts required**			
		• **Approximate time required for repairs**			
4	**Additional information (if required)**				
5.	**Signature of student**				

Assessment criteria (for each repair plan)* :-

1. Extent of appropriateness of required tools, machines, devices (05 marks)

2. Extent of appropriateness of required consumables ,spare parts and time (05marks)

***Note: - Give marks out of 10 for each repair plan and finally scale down the obtained sum of two into half and rounded to higher side whole number (if necessary).**

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	4	3	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain/repair given car suspension and steering system / body or its component**
LO Description	**Student will be able to perform given suspension, steering system, body or its component related specific repair / maintenance related activity**

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract /Tut Hrs.	LRs Required	Remarks
1	Car suspension, steering system, body or its component related following specific repair/ maintenance related specific activities which are listed below	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content activities to students, student will practice the content activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	06	05	• Book:- Automotive mechanics by W.H.Crouse and Anglin Or its equivalent • Related Engine Manuals, Charts • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory assignment	Student will be asked to perform given engine repair / maintenance related two specific activities in front of teacher	05	Rating scale	**Internal**

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of repair related activities to be learned by the student:-

1. **Remove, inspect, replace, and/or adjust power steering pump drive belt.**

2. **Inspect and replace power steering hoses and fittings.**
3. **Inspect, remove, and/or replace upper and lower control arms, bushings, shafts, and rebound bumpers**
4. **Remove, inspect, replace, and/or adjust suspension system coil springs/leaf springs.**
5. **Inspect, remove, and/or replace strut rods and bushings.**
6. **Inspect, remove, and/or replace upper and/or lower ball joints.**
7. **Inspect, remove, and/or replace steering knuckle assemblies.**
8. **Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly.**
9. **Perform tyre rotation in a given vehicle**
10. **Remove/refinish car body dents**

Assessment criteria* :-

1. Extent to which SOP has been followed (03 marks)
2. Extent to which student used appropriate tools (01marks)
3. Extent to which student used tools appropriately (01 marks)

***Note: - Give marks out of 5 for each activity, sum them and reduce the sum by multiplying it by ½ and round off to next whole number (if necessary).**

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	5	1	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	**Student will be able to maintain / repair given car electrical / electronic system**
LO Description	**Student will be able to diagnose the trouble in the given problematic car electrical / electronic 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	Trouble diagnosis of Common problems in car starting system, ignition system, charging system, lighting system and wiring and electronic systems as listed below	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content activities to students, student will practice the content activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	03	02	Book:- • Automotive mechanics by W.H.Crouse and Anglin • Automotive electrical and electronics By PL KOHLI Or its equivalent • Related Engine Manuals, Charts • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory assignment	Student will be asked to diagnose trouble for the two given problems in the car electrical and / or electronic system in front of teacher	04	Rating Scale	Internal

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of common problems of car electrical and electronic systems for which diagnosis of cause is to be learned:-

1. **No cranking, lights stay bright/dim heavily/dim slightly/go out/ no lights at all**
2. **Charging system is under-charging /over charging the battery**
3. **Battery does not stay charged / corroded terminals**
4. **Malfunctioning of sensors in ECU**
5. **Engine fails to start but cranks normally/ backfires**
6. **Engine runs but misses/ backfires**
7. **Lights/ Horn/windshield wipers are not working**

Assessment criteria (for each case)*:-

1. Correctness of adopted procedure (2 marks)
2. Correctness of identified cause (2 marks)

***Note: - Give marks out of 4 for each trouble diagnosis and finally scale down the obtained sum of two activities to half and rounded to higher side whole number (if necessary).**

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	5	2	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	Student will be able to maintain / repair given car electrical / electronic system
LO Description	Student will be able to plan repair for the given problem in the given car electrical / electronic 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	Preparation of repair plan for following repairs related to car starting system, ignition system, charging system, lights & wiring system and electronic system	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content activities to students, student will practice the content activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	04	03	• Book:- Automotive mechanics by W.H.Crouse and Anglin • Automotive electrical and electronics By PL KOHLI Or its equivalent • Related Engine Manuals, Charts • Related tool, devices and equipments	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory exam	Student will be asked to prepare repair plans for the two given repair works and submit them to examiner	10	Rating scale	External

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of repair works for which student will learn to prepare the repair plans:-

1. **Inspect and clean battery; fill battery cells; check battery cables, connectors and clamps**
2. **Removing and installing starting motor /alternator**
3. **Removing and installing distributor /head lamp /horn**
4. **Inspect, test, repair or replace components, connectors, terminals, harnesses and wiring in car electrical /electronic system**
5. **Inspect, remove, replace A.C. compressor drive belt, pulley and tensioners**

FORMAT FOR REPAIR PLAN (Lab assignment)

1	**General Information**	**Date**		**LO No.**	
		Name of student			
		Roll No.			
		Name of car sub-assembly			
		Name of component(s)			
2	**Description of repair procedure and resources**	• **Description of detailed inspection/test/ repair procedure**			
		• **Sketch related to inspection/test / repair**			
		• **Measuring tools required**			
		• **Repair tools required**			
		• **Machines /devices / equipments required**			
		• **Consumables required**			
		• **Spare parts required**			
		• **Approximate time required for repairs**			
4	**Additional information (if required)**				
5.	**Signature of student**				

Assessment criteria (for each repair plan)* :-

1. Extent of appropriateness of required tools, machines, devices (05 marks)

2. Extent of appropriateness of required consumables ,spare parts and time (05marks)

***Note: - Give marks out of 10 for each repair plan and finally scale down the obtained sum of two into half and rounded to higher side whole number (if necessary).**

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. 4
		A	0	3	6	0	1	5	3	

COURSE NAME	**Auto Maintenance Service & Repairs**
CO Description	Student will be able to maintain / repair given car electrical / electronic system
LO Description	Student will be able to perform given car electrical / electronic system related unique repair / maintenance activity

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract /Tut Hrs.	LRs Required	Remarks
1	Testing and repair /maintenance related specific activities for car starting system, ignition system, charging system, lights & wiring system and electronic system	Lab demonstration + Guided student practice	Teacher will explain and demonstrate the content activities to students, student will practice the content activities under guidance of teacher, teacher will identify their weaknesses and will provide necessary remedial and tutorials	04	03	• Book:- Automotive mechanics by W.H.Crouse and Anglin • Automotive electrical and electronics By P L Kohli Or its equivalent • Related Engine Manuals, Charts • Related tool, devices and equipment	Teacher will provide online available learning material like videos, diagrams, animations, photographs etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory assignment	Student will be asked to perform given car electrical electronics related two specific activities in front of the teacher	05	Rating scale	Internal

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

List of repair related activities to be learned by the student:-

1. **Perform tests for knowing battery condition**
2. **Perform tests for knowing starter motor condition**
3. **Perform leak test in car air conditioning system**
4. **Timing the distributor to the engine; adjusting initial timing for starting and idling; adjusting spark advance;**
5. **Perform to set and adjust ignition timing with the help of timing light**
6. **Perform head light aiming**

Assessment criteria* :-

1. Extent to which SOP has been followed (03 marks)
2. Extent to which student used appropriate tools (01marks)
3. Extent to which student used tools appropriately (01 marks)

***Note: - Give marks out of 5 for each activity and finally scale down the obtained sum of two activities to half and rounded to higher side whole number (if necessary).**