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

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and components about given front axle /Steering System**
LO Description	**Student will be able to explain theory/construction/components/working of front axle & front wheel geometry with help of a labeled line diagram**

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 of front axle, functions of front axle, loads on front axle, construction details, types of front axle, directional stability, front wheel geometry: castor, camber, king pin inclination, toe-in, and toe-out.	Lecture method	Teacher will organize lecture inside the class based on his/her session plan. Discuss the topics with students, provide quiz, assignment etc.	5	2	• Automobile Engg. by R.B.Gupta SatyaPrakashan New Delhi • W.H. Crouse “Automotive mechanics”, Tata McGraw-Hill Publishing Co., New Delhi.	If necessary teacher will suggest more video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory exam	One theory questions related to the learned content will be asked in the university question paper	10	Question paper, Check list	External

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. 4
		A	0	3	4	0	2	1	2

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and components about given front axle / Steering System**
LO Description	**Student will be able to explain theory /construction / working / components of Steering System with help of a labeled line diagram**

SCHEME OF STUDY

S. No.	Learning Content	Teaching -Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Conditions for true rolling, Centre point steering, steering geometry, Ackermann and Davis steering system, construction, working and components of car steering system, constructional details of steering linkages, different types of steering gear boxes, wheel wobble, collapsible steering, and power assisted steering, electronic steering system	Lecture method	Teacher will organize lecture inside the class based on his/her session plan. Discuss the topics with students, provide quiz, assignment etc.	07	03	• Automobile Engg. Vol.1 by Singh, Kripal Standard publishers New-Delhi • Automobile Engg. by R.B.Gupta, SatyaPrakashan, New-Delhi	If necessary teacher will suggest more video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test	Two theory question related to the learned content will be asked in the test paper	10	Test paper Check list	Internal

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. 4
		A	0	3	4	0	2	1	3	

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and components about given front axle /Steering System**
LO Description	**Student will be able to identify various components of given front axle / steering 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	Study of locations, constructional features and functions of various components of front axles / steering systems	Lab demonstration method	Teacher will demonstrate the contents to the students. Students will practice under the guidance of teacher.	05	02	Cut-sectioned/ working models, disassembled front axle and steering system, different components and sub-assemblies	If necessary teacher will suggest more video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory test by observation	Examiner will ask the students five components in practical examination	10	Cut-sectioned/ working models, disassembled front axle and steering system, different components and sub-assemblies, rating scale	External

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

The assessment will be done on basis of following performance indicators:-

1- Correctness of identification of first component 2- Correctness of identification of second component 3- Correctness of identification of third component
4- Correctness of identification of fourth component 5- Correctness of identification of fifth component

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

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and components of the vehicle suspension system**
LO Description	**Student will be able to explain theory, construction and components of given suspension system with help of line diagram**

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Purpose of suspension, various elements of suspension system, theory and construction of helical and leaf springs, their comparison and uses, spring deflection, spring stiffness, energy stored, principle and construction of torsion bar spring, stabilizers	Traditional Lecture method	Teacher will explain different concepts and descriptions related to contents. He will give assignments and organize quizzes to ascertain their learning. Students will prepare assignments and attempt quizzes. Teacher will identify their weaknesses and provide necessary remedial and tutorials	06	02	• Automobile Engg. Vol.1 by Singh Kripal, Standard publishers N.Delhi • Vehicle suspension system and electromagnetic dampers by kashem, Nagarajah Publication Springer	If necessary teacher will suggest video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory exam	Two theory questions related to the learned content will be asked in the question paper	10	Question paper, Check list	External

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. 4
		A	0	3	4	0	3	2	2	

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and components of the suspension system**
LO Description	**Student will be able to explain various effects of spring-suspension on riding comfort and devices used to neutralize them with help of line diagram**

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract /Tut Hrs.	LRs Required	Remarks
1	Principle of shock absorbers, construction and working of telescopic shock absorber, study and comparison of different types of front axle suspension system, effect of driving, braking, side thrust &torque reaction on suspension, Hotchkiss drive & Torque tube drive. Anti squate and antidive system, Concept of air suspension.	Traditional Lecture method	Teacher will explain contents. He will give assignments and organize quizzes to ascertain their learning. Students will prepare assignments and attempt quizzes. Teacher will identify their weaknesses and provide necessary remedial and tutorials	07	03	• Automotive mechanics by William H Crouse, Tata McGraw-Hill Publishing Co., New Delhi • Vehicle suspension system and electromagnetic dampers by kashem, Nagarajah Publication : Springer	If necessary teacher will suggest video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test	Two theory questions related to the learned content will be asked in the test paper	10	Test paper Check list	Internal

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. 4
		A	0	3	4	0	2	2	3	

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and components of the suspension system**
LO Description	**Student will be able to identify various components of given Suspension 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	Study of locations, constructional features, functions of various components of different types of suspension systems	Lab demonstration method	Teacher will demonstrate the contents to the students. Students will practice under the guidance of teacher.	05	02	Cut-sectioned/ working models, disassembled suspension systems, different components and sub-assemblies	If necessary teacher will suggest more video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory test by observation	Examiner will ask the students five components in practical examination	10	Cut-sectioned/ working models, disassembled suspension systems, different components and sub-assemblies, rating scale	External

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

The assessment will be done on basis of following performance indicators:-

1- Correctness of identification of first component 2- Correctness of identification of second component 3- Correctness of identification of third component

4- Correctness of identification of fourth component 5- Correctness of identification of fifth component

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

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and components of the Mechanical Brake System**
LO Description	**Student will be able to explain theory, construction and Component of Mechanical Brake System with help of line diagram**

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Theory of braking Classification of brakes, service & parking brake, theory and construction of disc & drum brakes, mechanical brake actuating system, leading & trailing shoes	Traditional Lecture method	Teacher will explain different concepts. He will give assignments and organize quizzes to ascertain their learning. Students will prepare assignments and attempt quizzes. Teacher will identify their weaknesses and provide necessary remedial and tutorials	06	03	• Automobile Engg. Vol.1 by Singh, Kripal Standard publishers New-Delhi • Automotive mechanics by William H Crouse, Tata McGraw-Hill Publishing Co., New Delhi	If necessary teacher will suggest video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory exam	Two theory questions related to the learned content will be asked in the university question paper	10	Question paper Check list	External

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. 4
		A	0	3	4	0	2	3	2	

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and components of the Mechanical Brake System**
LO Description	**Student will be able to explain the difference, merits and limitations of the given 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	Comparison between Disc & Drum brakes, merits and limitations of Mechanical brake actuating system	Traditional Lecture method	Teacher will explain different concepts. He will give assignments and organize quizzes to ascertain their learning. Students will prepare assignments and attempt quizzes. Teacher will identify their weaknesses and provide necessary remedial and tutorials	03	01	• Automobile Engg. by R.B.Gupta SatyaPrakashan New Delhi	If necessary teacher will suggest video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test	One theory questions related to the learned content will be asked in the test paper	05	Test paper Check list	Internal

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. 4
		A	0	3	4	0	2	3	3	

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and components of the Mechanical Brake System.**
LO Description	**Student will be able to identify various components of the Mechanical 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	Study of locations, constructional features, functions of various components of disc and drum brakes, parking brakes and Mechanical brake actuating system	Lab demonstration method	Teacher will demonstrate the contents to the students. Students will practice under the guidance of teacher.	04	02	Cut section / Working Models, disassembled braking systems and components of the braking systems	If necessary teacher will suggest video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory Test by Observation	Teacher will ask the student to identify five major components in a group or arrangement of variety of components	10	Rating scale	Internal

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

The assessment will be done on basis of following performance indicators:-

1- Correctness of identification of first component 2- Correctness of identification of second component 3- Correctness of identification of third component

3- Correctness of identification of fourth component 3- Correctness of identification of fifth component.

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

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and components of the Hydraulic / Pneumatic / Servo Brake System**
LO Description	**Student will be able to explain theory, construction and Component of Hydraulic / Pneumatic / Servo Brake System with help of line diagram**

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 hydraulic, pneumatic and servo brake actuating systems regarding their construction, working and components, brake lining material, brake fluid characteristics, purpose and theory of dual brake system, exhaust brakes, antilock braking, retarders, Eddy current retarders, permanent magnet retarders, hydraulic retarders.	Traditional Lecture method	Teacher will explain different concepts. He will give assignments and organize quizzes to ascertain their learning. Students will prepare assignments and attempt quizzes. Teacher will identify their weaknesses and provide necessary remedial and tutorials	10	04	• Automobile Engg. Vol.1 by Singh, Kripal Standard publishers New-Delhi • Automotive mechanics by William H Crouse, Tata McGraw-Hill Publishing Co., New Delhi	If necessary teacher will suggest video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory exam	Four theory questions related to the learned content will be asked in the university question paper	20	Question paper Check list	External

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. 4
		A	0	3	4	0	2	4	2	

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and components of the Hydraulic / Pneumatic /Servo Brake System**
LO Description	**Student will be able to explain the difference, merits and limitations of the given 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	Comparison between hydraulic & Pneumatic / servo brake actuating systems	Traditional Lecture method	Teacher will explain different concepts. He will give assignments and organize quizzes to ascertain their learning. Students will prepare assignments and attempt quizzes. Teacher will identify their weaknesses and provide necessary remedial and tutorials	03	02	• Automobile Engg. by R.B.Gupta SatyaPrakashan New Delhi • Automotive Braking System. By Thomas W Birch. Publisher : S.Chand (G/L) & Company Ltd; 3rd edition	If necessary teacher will suggest video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test	One theory question related to the learned content will be asked in the test paper	05	Test paper Check list	Internal

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. 4
		A	0	3	4	0	2	4	3	

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and components of the Hydraulic / Pneumatic/ Servo Brake System**
LO Description	**Student will be able to identify various components of the Hydraulic / Pneumatic / Servo 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	Study of locations, constructional features, functions of various components of Hydraulic/ Pneumatic/ servo brake actuating systems	Lab demonstration	Teacher will demonstrate the contents to the students. Students will practice under the guidance of teacher.	06	02	Cut sectioned / Working Models, disassembled the braking systems and components of the braking systems	If necessary teacher will suggest video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory Test by Observation	Examiner will ask the student to identify five major components in a group or arrangement of variety of components	10	Rating scale	External

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

The assessment will be done on basis of following performance indicators:-

1- Correctness of identification of first component 2- Correctness of identification of second component 3- Correctness of identification of third component - Correctness of identification of fourth component - Correctness of identification of fifth component

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

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and working the battery electric and hybrid electric vehicles.**
LO Description	**Student will be able to explain theory, construction and Component of electric and hybrid Electric Vehicle with help of line diagram**

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Environmental concerns with traditional vehicles, need of electric vehicles, benefits of electric vehicles, types of electric vehicles, brief history of electric vehicles, theory, construction and working of battery electric and hybrid electric vehicles*, additional infrastructure needed for transportation system based on electric vehicles	Traditional Lecture method	Teacher will explain different concepts. He will give assignments and organize quizzes to ascertain their learning. Students will prepare assignments and attempt quizzes. Teacher will identify their weaknesses and provide necessary remedial and tutorials	10	03	M. Ehsani, Y. Gao, S. Gay and Ali Emadi, Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design, CRC Press, 2005	If necessary teacher will suggest video link, learning resources *two & four wheelers

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory exam	One theory questions related to the learned content will be asked in the question paper	10	Question paper	External

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. 4
		A	0	3	4	0	2	5	2	

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and working of the battery electric vehicle and hybrid electric vehicle.**
LO Description	**Student will be able to explain theory and working of different types of hybrid electric vehicle drive trains**

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 hybrid electric vehicle drive trains, different types of hybrid drive trains, types by degree of hybridization, types by the power source, Architecture of hybrid electric drive trains, Series and parallel hybrid electric drive trains	Traditional Lecture method	Teacher will explain different concepts. He will give assignments and organize quizzes to ascertain their learning. Students will prepare assignments and attempt quizzes. Teacher will identify their weaknesses and provide necessary remedial and tutorials	09	03	• Iqbal Husain, Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, • Electric and hybrid electric vehicle: By Tom Denton published by Routledge	If necessary teacher will suggest video link, learning resources which will help the students to solve quiz, prepare assignments etc.

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory exam	One theory question related to the learned content will be asked in the question paper	10	Question paper	External

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. 4
		A	0	3	4	0	2	5	3	

COURSE NAME	**AUTO CHASSIS – II**
CO Description	**Student will be able to explain theory, construction and working of the electric and hybrid electric vehicle.**
LO Description	**Student will be able to compare electric / hybrid vehicle with traditional engine operated vehicle regarding construction, working, merits and limitations**

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Comparison of electric / hybrid vehicle* with traditional engine operated vehicle regarding construction, working, merits and limitations, brief case study of commercially available 2/4 wheeled electric hybrid vehicles	Lab demonstration	Teacher will demonstrate the contents to the students. Students will practice under the guidance of teacher	03	02	M. Ehsani, Y. Gao, S. Gay and Ali Emadi, Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design, CRC Press, 2005	If necessary teacher will suggest video link, learning resources *two and four wheelers

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test + Assessment of short report	(1) Teacher will ask one question related with learned content in the test (5 marks) (2) Teacher will assess the short report submitted by student on commercial 2/4 wheeled hybrid vehicles (5 marks)	10	Teat paper, rating scale	Internal

INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Criteria for assessment of short report: - 1. Extent of quality in study (03 marks) 2. Extent of quality in reporting (02 marks)