

DEBRA THANA S.K.S. MAHAVIDYALAYA
BACHELOR OF VOCATIONAL
MAJOR IN AUTOMOBILE
(Under CCFUP, 2024)

Level	YR.	SEM	Course Type	Course Code	Course Title	Credit	L-T-P	Marks				
								CA	ESE	TOTAL		
B.Voc	1 st	I	SEMESTER-I									
			Major-1	MJ101	T: Basic of Automobile ; P: Practical			4	3-0-1	15	60	75
			SEC	SEC01	P: Welding Technology			3	0-0-3	10	40	50
			AEC	AEC01	Communicative English -1 (<i>common for all programmes</i>)			2	2-0-0	10	40	50
			MDC	MDC01	Multidisciplinary Course -1 (<i>to be chosen from the list</i>)			3	3-0-0	10	40	50
			VAC	VAC01	ENVS (<i>common for all programmes</i>)			4	2-0-2	50	50	100
		Semester-I Total						16				325
		II	SEMESTER-II									
			Major-2	MJ102	T: Automotive Engine I ; P: Practical			4	3-0-1	15	60	75
			SEC	SEC02	P: Engineering Drawing			3	0-0-3	10	40	50
			AEC	AEC02	MIL-1 (<i>common for all programmes</i>)			2	2-0-0	10	40	50
			MDC	MDC02	Multi Disciplinary Course-02 (<i>to be chosen from the list</i>)			3	3-0-0	10	40	50
			VAC	VAC02	Value Added Course-02 (<i>to be chosen from the list</i>)			4	4-0-0	10	40	50
		Summer Intern.	CS	Community Service			4	0-0-4	-	-	50	
		Semester-II Total						20				325
TOTAL of YEAR-1						44				650		

MJ = Major, MI = Minor Course, SEC = Skill Enhancement Course, AEC = Ability Enhancement Course, MDC = Multidisciplinary Course, VAC = Value Added Course; CA= Continuous Assessment, ESE= End Semester Examination, T = Theory, P= Practical, L-T-P = Lecture-Tutorial-Practical, MIL = Modern Indian Language, ENVS = Environmental Studies

SEMESTER-I

**BACHELOR OF VOCATIONAL
MAJOR IN AUTOMOBILE
AUTOMOBILE MAJOR 1**

MJ-1 : Basic of Automobile

MJ-1T: Basic of Automobile

Unit-I: Introduction to Automobiles

- 1.1 An introduction with Automobile [2L]
- 1.2 History of Automobile [2L]
- 1.3 General classification of Automobile [2L]
- 1.4 Anatomy of an Automobile [3L]
- 1.5 Engine operating system[3L]

Unit -II: Introduction to the Automobile Engines

- 2.1 Air Standard cycles[3L]
- 2.2 Engine operations[2L]
- 2.3 Details of construction in I.C Engine. [2L]
- 2.4 Classification of I.C Engine. [2L]
- 2.5 Two stroke Engine [2L]
- 2.6 Four stroke Engine. [2L]
- 2.7 Engine performance. [2L]
- 2.8 Engine troubles[2L]

Unit -III: Workshop Safety

- 3.1 Abbreviation & Symbols used in Automobile Technology[2L]
- 3.2 Introduction with Automotive Workshop & its Equipment [2L]
- 3.3 Safety Precaution [3L]
- 3.4 fire and fire fighting [2L]

Unit -IV : Workshop Tools & Equipment

- 4.1 Introduction with tools used in automotive workshop[3L]
- 4.2 Introduction with special tools and its uses[2L]
- 4.3 Basic function of workshop equipment [2L]

Total credit - 3

Contact Hours - 45

Suggested Readings:

1. AUTOMOBILE ENGINEERING –R.B GUPTA
2. AUTOMOBILE ENGINEERING – C.P.NEKRA
3. AUTOMOBILE ENGINEERING - Dr . KRIPAL SING.
4. Workshop technology-(vol.1& vol.2)-Gupta +Khurmi

Reference Reading:

1. Automobile engineering – G.B.S Nagra
2. A 2 Z AUTOMOBILE ENGG. -Dr . KRIPAL SING.
3. Automobile Engineering – A.K Babu & Sing Ajit Pal
4. AUTOMOBILE MECHANICS – N.K GIRI
5. Automobile engineering –K.K JAIN
6. Automobile engineering – S.K. Gupta

MJ-1P: Basic of Automobile(Practical)

Course Outline:

1. Safety precaution of Automobile workshop [2P]
2. Identification of various workshop tools and equipments [2P]
3. To practice the dismantling and reassembling of the parts of the crank shaft. [2P]
4. To practice fitting of the valves and to adjust tappet clearance. [2P]
5. To practice of piston and connecting rod in cylinder bore using piston ring compressor. [2P]
6. To practice decarbonisation of cylinder head by taking it out from the engine . [2P]
7. To practice dismantling of the cylinder head valve. [2P]
8. Measure the cylinder bore by bore gauge or vernier caliper. [2P]
9. To measure diameter of the piston. [1P]
10. To measure the flatness of cylinder head. [1P]
11. To practice of dismantling of engine for cleaning and reassembling all the parts of the engine after inspecting . [2P]
12. To learn and uses of various fire extinguisher. [1P]
13. To measure the capacity of an engine . [3P]
14. To measured the engine vacuum using a vacuum gauge [1P]
15. To measured the wheel base and wheel track by using a measuring tape [1P]
16. To practice the cutting of thread on bolt , nut and stud. [2P]
17. To measured the engine compression using a compression gauge [2P]

Total credit - 1

Contact Hours – 30(15)

Suggested Readings:

1. Mechanic Motor Vehicle Practical- Manish Sharma
2. Automobile engineering practical – N K Malhotra
3. Automotive Machanics-Crouse & Angline

**BACHELOR OF VOCATIONAL
MAJOR IN AUTOMOBILE
AUTOMOBILE**

SKILL ENHANCEMENT COURSE (SEC) SEC 1

SEC 1: Welding Technology

1. Study on welding technology [5P]
2. Join the metal sheet by various welding process. [5P]
3. Practice on arc welding . [7P]
4. Gas welding process. [7P]
5. Study on various welding equipment. [5P]
6. Introduction to MIG welding [5P]
7. Special practice class [6P]

Total credit - 3

Contact Hours - 40

Suggested Readings:

1. Workshop technology 1(Manufacturing proces)- Hazra & Chowdhuri
2. Workshop technology 1(Manufacturing proces)- Khurmi & Gupta
3. Welding technology – NIMI / Asian

Reference Book :

1. Machine – B.S. Raghubanshi

SEMESTER-II

BACHELOR OF VOCATIONAL MAJOR IN AUTOMOBILE

MAJOR 2

MJ-2: Automotive Engine I

MJ-2T: Automotive Engine I

Unit-I: Petrol Engine Construction and its Operating System

- 1.1 Basic petrol engine components [2L]
- 1.2 Cylinder Block , Gaskets & Oil Seals, Cylinder Head [2L]
- 1.3 Function of piston, piston rings, connecting rod, and piston pins, measurement and fitting of piston rings [2L]
- 1.4 Crankshaft, Camshaft and Rocker arm, Cam chain, Connecting Rod, Engine Bearing [2L]
- 1.5 Valve & valve trains, trouble shooting of excess smoke, overheating, knocking, timing chain noise etc [2L]

Unit -II: Ignition System

- 2.1 Introduction with components of ignition system [2L]
- 2.2 Battery ignition system and magneto ignition system [2L]
- 2.3 Introduction with electronic ignition system [2L]

Unit -III: Lubrication System

- 3.1 Introduction & Purpose of Lubrication [2L]
- 3.2 Properties of Lubrication & Types of Lubricants [2L]
- 3.3 Parts of Lubricating System[2L]
- 3.4 Engine Lubricating System [2L]

Unit -IV : Cooling System

- 4.1 Properties and Method of Cooling System [2L]
- 4.2 Air Cooling System and Water Cooling System [2L]
- 4.3 Components of Water Cooling [2L]
- 4.4 Liquid and Steam Cooling [2L]

Unit –V : Engine Fuel Feed System

- 5.1 S I Engine Fuel System [2L]
- 5.2 C I Engine Fuel System [2L]
- 5.3 Fuel Tank, Filtration Arrangement, & Fuel lines[2L]
- 5.4 Fuel Injection Pump [2L]
- 5.5 Fuel Gauges [1L]
- 5.6 Carburetor & Its Operation System and its different circuits [1L]
- 5.7 MPFI system with new EFI (ELECTRONIC FUEL IGNITION SYSTEM) [1L]
- 5.8 Difference between carburetor & EFI System[1L]
- 5.9 introduction of sensors, actuator and ECM[1L]

Total credit - 3

Contact Hours - 45

Suggested Readings:

1. AUTOMOBILE ENGINEERING –R.B GUPTA
2. AUTOMOBILE ENGINEERING – C.P.NEKRA
3. AUTOMOBILE ENGINEERING(vol 1 & vol 2) - Dr . KRIPAL SING.

Reference Reading:

1. Automobile engineering – G.B.S Nagra
2. A 2 Z AUTOMOBILE ENGG. -Dr . KRIPAL SING.
3. Automobile Engineering – A.K Babu & Sing Ajit Pal
4. AUTOMOBILE MECHANICS – N.K GIRI
5. Automobile engineering –K.K JAIN
6. Automobile engineering – S.K. Gupta

MJ-2 P: Automotive Engine I (Practical)

Course Outline:

1. To identify different components of four stroke petrol engine . [2P]
2. Assemble and disassemble of petrol engine . [2P]
3. To inspect the leakage of valve seat. [1P]
4. To disassemble the rocker arm , inspect the gap and fit them again.. [2P]
5. To inspect and measure the cam shaft. [1P]
6. To inspect and clean the cylinder block. [1P]
7. Measure the compression of each cylinder by using compression gauge . [1P]
8. To practice and overhauling of engine lubrication pump. [1P]
9. To practice servicing of oil filter . [1P]
- 10.To practice setting the oil pressure relief valve for correct pressure. [1P]
11. To practice changing the engine oil. [1P]
12. Identify the all components of engine lubrication system. [1P]
13. Identify the all components of engine water , air and steam cooling system. [2P]
- 14.To inspect the pressure cap by using special tools. [1P]
15. To inspect the coolant by refractometer. [1P]
- 16.To study testing of thermostate valve and ECT sensor. [1P]
- 17.To practice the dismantling of water pump. [1P]
- 18.To study dismantling the radiator for cleaning ,checking leakage and repair. [1P]
- 19.To practice removing the fuel feed pump from fuel tank and inspect it [2P]
20. To practice of replacement of fuel filter. [1P]
21. To disassemble and assemble the carburetor and inspect it. [2P]
22. To identify the all components of ignition system. [1P]
- 23.To check and replace the spark plug from engine . [1P]
- 24.To practice the correct ignition timing after checking.. [1P]

Total credit - 1

Contact Hours – 30(15)

Suggested Readings:

- 1.Mechanic Motor Vehicle Practical- Manish Sharma
- 2.Automobile engineering practical – N K Malhotra

BACHELOR OF VOCATIONAL

MAJOR IN AUTOMOBILE

SKILL ENHANCEMENT COURSE (SEC) SEC 2

SEC 2: Engineering Drawing

SEC2 P: Engineering Drawing

1. Scale [5P]
2. Line [5P]
3. Projection – orthographic[5P], plane surface[5P], 1st angle[5P], solid projection[5P], section & development[5P].
4. Isometric projection[5P]
5. Special practical class [5P]

Total credit - 3

Contact Hours - 45

Suggested Readings:

1. Engineering Drawing – Bhatt & Panchal
2. Engineering Drawing – M. L. Mathur & R.S.Vaishwanar
3. Engineering Drawing – Basant Agarwal & C.M.Agarwal

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Level	YR.	SEM	Course Type	Course Code	Course Title	Credit	L-T-P	Marks				
								CA	ESE	TOTAL		
B.Voc. (Automobile)	2 nd	III	SEMESTER-III									
			Major-3	MJ03	T: Automotive Engine II P: Practical	4	3-0-1	15	60	75		
			Major-4	MJ04	T:Automotive Chassis I P: Practical	4	3-0-1	15	60	75		
			SEC	SEC03	AUTOCAD	3	0-0-3	10	40	50		
			AEC	AEC03	Communicative English -2 (<i>common for all programmes</i>)	2	2-0-0	10	40	50		
			MDC	MDC03	Multidisciplinary Course -3 (<i>to be chosen from the list</i>)	3	3-0-0	10	40	50		
		Semester-III						Total	16			300
		IV	SEMESTER-IV									
			Major-5	MJ05	T: Automotive Chassis II P: Practical	4	3-0-1	15	60	75		
			Major-6	MJ06	T: Automotive Transmission P: Practical	4	3-0-1	15	60	75		
			Major-7	MJ07	T:Basic Automotive Electrical and Electronic System ; P: Practical	4	3-0-1	15	60	75		
			AEC	AEC04	MIL-2 (<i>common for all programmes</i>)	2	2-0-0	10	40	50		
			Summer Intern.	INT	Internship/ Apprenticeship - activities to be decided by the Colleges following the guidelines to be given later	4	0-0-4	-	-	50		
		Semester-IV						Total	18			325
								TOTAL of YEAR-2	34			625

MJ = Major, SEC = Skill Enhancement Course, AEC = Ability Enhancement Course, MDC = Multidisciplinary Course, CA= Continuous Assessment, ESE= End Semester Examination, T = Theory, P= Practical, L-T-P = Lecture-Tutorial-Practical, MIL = Modern Indian Language

SEMESTER-III

**BACHELOR OF VOCATIONAL
MAJOR IN AUTOMOBILE
AUTOMOBILE MAJOR 3**

MJ-3 : Automotive Engine II

MJ-3T: Automotive Engine II

Unit-I: Diesel Engine Construction and its Operating Systems

- 1.1 Basic diesel engine components [2L]
- 1.2 Cylinder Block , Gaskets & Oil Seals, Cylinder Head[3L]
- 1.3 Function of piston, piston rings, connecting rod ,injector, and piston pins, measurement and fitting of piston rings[4L]
- 1.4 Crankshaft, Camshaft and Rocker arm, Cam chain, Connecting Rod, Engine Bearing[4L]
- 1.5 Valve & valve trains, trouble shooting of excess smoke, overheating, knocking, timing chain noise etc. [3L]
- 1.6. Trouble shooting of diesel engine. [3L]

Unit-II: Turbo Charger & Super Charger

- 2.1 Introduction. [1L]
- 2.2 Working & operation of turbo charger. [2L]
- 2.3 Working & operation of super charger. [2L]
- 2.4 Effect of supercharging on performance of the engine. [2L]
- 2.5 Types of supercharger. [2L]
- 2.6 Methods of supercharging. [2L]
- 2.7 Trouble shooting of turbocharger. [1L]
- 2.8 Difference between turbocharger and supercharger[1L]

Unit-III: Engine performance

- 3.1 Bore & stroke . [1L]
- 3.2 Engine Displacement. [1L]
- 3.3 Compression ratio. [1L]
- 3.4 Purpose of testing an I.C engine. [2L]
- 3.5 Engine Performance parameters. [2L]
- 3.6 Efficiencies of I.C Engine. [2L]
- 3.7 Morse Test. [1L]
- 3.8 Heat balance sheet[1L]
- 3.9 Numerical problems [1L]

Total credit – 03 Full Marks: 75 Contact Hours - [45L]

Suggested Readings:

5. AUTOMOBILE ENGINEERING –R.B GUPTA
6. AUTOMOBILE ENGINEERING – C.P.NEKRA
7. AUTOMOBILE ENGINEERING - Dr . KRIPAL SING.
8. I.C engine – V. Ganesan
9. I.C engine- Mathur & Sharma
10. Workshop technology-(vol.1& vol.2)-Gupta +Khurmi

Reference Reading:

7. Automobile engineering – G.B.S Nagra
8. A 2 Z AUTOMOBILE ENGG. -Dr . KRIPAL SING.
9. Automobile Engineering – A.K Babu & Sing Ajit Pal
10. AUTOMOBILE MECHANICS – N.K GIRI
11. Automobile engineering –K.K JAIN
12. Automobile engineering – S.K. Gupta

MJ-3P: Automotive Engine II (Practical)

Course Outline:

1. To study how to disassemble and assemble the diesel engine .[1P]
2. To practice the cleaning, checking and testing of diesel engine. [1P]
3. To practice servicing of fuel filter in diesel engine. [1P]
4. To practice air bleeding of fuel supply system in diesel engine[1P]
5. To practice removing the fuel feed pump form diesel engine, cleaning ,observing and refitting it. [1P]
6. To practice the opening and cleaning of fuel injection pump, changing lubricating oil and fitting on it. [1P]
7. To test the piston protrusion . [1P]
8. Measurement of air supply to I.C engine . [1P]
9. How to measured B.H.P in an engine. [1P]
10. How to measured brake thermal efficiency , indicated thermal efficiency, air standard efficiency and indicated mean effective pressure . [2P]
- 11.To study how to disassemble and assemble the turbocharger and super charger. [1P]
12. Cleaning and inspection of turbocharger and supercharger . [1P]
13. Dynamo test and find out of B.P by using dynamometer [1P]

Total credit - 01

Contact Hours – 30(15L)

Suggested Readings:

1. Mechanic Motor Vehicle Practical- Manish Sharma
2. Automobile engineering practical – N K Malhotra
3. Automotive Mechanics-Crouse & Angline

BACHELOR OF VOCATIONAL MAJOR IN AUTOMOBILE AUTOMOBILE MAJOR 4

MJ-4 : Automotive Chassis I

MJ-4T: Automotive Chassis I

Unit-I: Vehicle Clutch System

- 1.1 Function of clutch[1L]
- 1.2 Requirement of clutch[1L]
- 1.3 Clutch and its application[2L]
- 1.4 Clutch construction, Types of Clutches(single plate clutch, multi plate clutch,cone clutch,centrifugal clutch,diaphragm clutch, dog and spline clutch,electromagnetic clutch, vacuum clutch,hydraulic clutch)[5L]
- 1.5 clutch adjustment and inspection[3L]
- 1.6 Clutch Faults, Causes & Remedies[3L]
- 1.7 Fluid coupling

Unit-II:Braking System

- 2.1 Function & requirement of brake[1L]
- 2.2 Classification of brake. [1L]
- 2.3 Mechanical brake [3L]
 - a) Disc brake
 - b)Drum brake.
 - c) Hand Brake.
 - d) difference between disc brake and drum brake.

- 2.4 Hydraulic brake[3L]
 - a) Master cylinder.
 - b) wheel cylinder
- 2.5 Hand Brake / Parking Brake. [2L]
- 2.6 Brake fluid, brake shoes, brake clearance ,brake pedal travel. Characteristic of brake fluid [3L]
- 2.7 Power brake (air brake, air hydraulic brake, vacuum brake, electric brake. [2L]
- 2.8 Brake adjustment & brake bleeding. [2L]
- 2.9 Trouble shooting . [2L]

Unit-III: Vehicle Frame & Body

- 3.1 Chassis[3L]
 - a) Classification of chassis
 - b)Front wheel drive & rear wheel drive
 - c)Advantages & disadvantages
- 3.2 Frame[2L]
 - a) Classification of frame
 - b) Function of frame
 - c) Bumper & sub frame.
- 3.3 Body[3L]
 - a)Types of body
 - b)body construction & repair.
 - b) Body painting.
- 3.4 Aerodynamic consideration in body profiling [1L]
- 3.4. Troubleshooting of body components[2L]

Total credit – 03 Full Marks: 75

Contact Hours - 45L

Suggested Readings:

1. AUTOMOBILE ENGINEERING –R.B GUPTA
2. AUTOMOBILE ENGINEERING – C.P.NEKRA
3. AUTOMOBILE ENGINEERING - Dr . KRIPAL SING.
4. Workshop technology-(vol.1& vol.2)-Gupta +Khurmi

Reference Reading:

1. Automobile engineering – G.B.S Nagra
2. A Z Z AUTOMOBILE ENGG. -Dr . KRIPAL SING.
3. Automobile Engineering – A.K Babu & Sing Ajit Pal
4. AUTOMOBILE MECHANICS – N.K GIRI

5. Automobile engineering –K.K JAIN
6. Automobile engineering – S.K. Gupta

MJ-4P: Automotive Chassis I(Practical)

Course Outline:

1. How to inspect clutch lining thickness by vernier caliper. [2P]
2. Assembling and disassembling the single plate clutch from vehicle. [2P]
3. Assembling and disassembling the multi plate clutch from vehicle. [2P]
4. To practice the clutch bleeding. [1P]
5. Assembling and disassembling the disc brake and drum from vehicle. [2P]
6. Study on air braking system. [1P]
7. How to adjust free play , and inspect the brake pedal travel of braking system[1P]
8. To check and practice the overhauling of tandem master cylinder and wheel cylinder. [1P]
9. How to do the air bleeding process of hydraulic braking system. [1P]
10. Study how to replace brake pad and brake shoe. [1P]
11. Study how to measure wheel base and wheel track[1P]

Total credit - 1

Contact Hours – 30(15)

Suggested Readings:

1. Mechanic Motor Vehicle Practical- Manish Sharma
2. Automobile engineering practical – N K Malhotra

BACHELOR OF VOCATIONAL

MAJOR IN AUTOMOBILE

SKILL ENHANCEMENT COURSE (SEC) SEC 3

SEC 3: AUTOCAD

SEC3 P: AUTOCAD

1. INTERDICTION OF AUTOCAD (AutoCAD versions Interface) [1P]
2. Control the Drawing CHANGE VIEWS(Function keys AutoCAD basics) [1P]
3. Cartesian coordinate system (ABSOLUTE COORDINATE SYSTEM RELATIVE COORDINATE SYSTEM) [2P]
4. Draw commands (Line command Poly line command Rectangle command)[1P]
5. Modify commands (Move ,Rotate, Scale, copy, Mirror, erase, trim, extend) [2P]
6. Annotate Dimension Style Manager (Linear, Aligned, Radius Angular, Arc length)[2P]
7. Text command Layers blocks(Single line text Multiline text Layer properties Insert blocks) [2P]
8. Parametric (Geometric, Dimensional Manage) [2P]
9. Isometric views(Isometric top, left, right Isometric diagrams) [2P]
- 10.Isometric drawings (Isometric diagrams exercise) [2P]
- 11.2D Fundamentals (Drawing units Sheet settings) [2P]
- 12.Mechanical diagrams (knuckle joint) [1P]
- 13.2d drawings (Idler plate Hook drawing) [1P]
- 14.2d diagram (fork) [2P]
15. Create and Save Auto CAD(Save files Export pdf plot) [2P]
16. Use the AutoCAD visual reference commands (Drawing Area Setup Visual reference) [2P]
17. Interactive Input method (grid snap mode) [2P]
18. Assembly and detailed drawings of a mechanical assembly, such as a plummer block, tool head of a shaping machine, tail stock of a lathe,simple gearbox [2P]
- 19.Practicing AutoCAD or similar graphics software and making orthographic and isometric projections of different components. [2P]
20. Learning different tools of modeling software with exercise – Piston,Piston Pin [2P]

21. Modelling of Connecting Rod. [2P]
22. Modelling of Bush big end, Bush small end [2P]
23. electrical drawings (Circuit,transistor symbols) [2P]
24. electrical plans (exercises) [2P]
25. introduction to 3d interface (AutoCAD workspaces are sets of menus) [2P]

Total credit - 3

Contact Hours - 45

Suggested Readings:

1. Learn AutoCAD in a easy way- Sunil Kumar Pandey
2. Engineering Drawing with an Introduction to AutoCAD by D.A. Jolhe,
3. Tata-McGrawHill Co.
4. Cadcim.com

SEMESTER – IV

**BACHELOR OF VOCATIONAL
MAJOR IN AUTOMOBILE
AUTOMOBILE MAJOR 5**

MJ-5 : Automotive Chassis II

MJ-5T: Automotive Chassis II

Unit-I: Vehicle Steering system.

- 1.1 Requirement and function of steering system. [2L]
- 1.2 Types of steering system. [1L]
- 1.3 Types of steering box. [5L]
- 1.4 Steering geometry. [3L]
 - a) Camber
 - b) Caster
 - c) Toe in and toe out
 - d) King pin inclination.
 - e) Combined angle
 - f) Slip angle
- 1.5** Power steering and fault of power steering [2L]
- 1.6 Steering gear ratio and turning radius. [1L]
- 1.7 Steering linkage[1L]
- 1.8 Wheel alignment and balancing. [2L]
- 1.9 Under steer and over steer [1L]
- 1.10 Correct the steering angle [1L]

Unit-II: Vehicle front and rear axle

- 2.1 Introduction of front axle [1L]
- 2.2 Types of front axle [2L]
- 2.3 Types of stub axle. [2L]
- 2.4 Study about C.V joint[1L]
- 2.5 Introduction of rear axle. [1L]
- 2.6 Types of rear axle . [1L]
- 2.7 Load calculation on rear axle. [2L]

- 2.8 Axle housing[1L]
- 2.9 Axle lubrication. [2L]

Unit-III: Vehicle Suspension System

- 3.1 Introduction of suspension system. [1L]
- 3.2 Function of suspension system. [2L]
- 3.3 Requirement of suspension system. [1L]
- 3.4 Types of suspension system. [2L]
- 3.5 Torque rod and stabilizer bar[2L]
- 3.6 Shock absorber[1L]
- 3.7 Air suspension system [1L]

Total credit - 3

Contact Hours - 45

Suggested Readings:

- 5. AUTOMOBILE ENGINEERING –R.B GUPTA
- 6. AUTOMOBILE ENGINEERING – C.P.NEKRA
- 7. AUTOMOBILE ENGINEERING - Dr . KRIPAL SING.
- 8. Workshop technology-(vol.1& vol.2)-Gupta +Khurmi

Reference Reading:

- 7. Automobile engineering – G.B.S Nagra
- 8. A 2 Z AUTOMOBILE ENGG. -Dr . KRIPAL SING.
- 9. Automobile Engineering – A.K Babu & Sing Ajit Pal
- 10. AUTOMOBILE MECHANICS – N.K GIRI
- 11. Automobile engineering –K.K JAIN
- 12. Automobile engineering – S.K. Gupta

MJ-5P: Automotive Chassis II(Practical)

Course Outline:

1. Assembling and disassembling of rack and pinion type steering box. [2P]
2. Assembling and disassembling of recirculating ball type steering box. [2P]
3. Practice on steering linkage . [1P]
4. Study how to measure caster, camber, toe-in and toe-out in a vehicle . [1P]
5. Disassemble electronic power steering and study about components of EPS. [1P]
6. Disassemble hydraulic power steering and study about components of HPS. [1P]
7. How to inspect alignment of a vehicle. [1P]
8. Assembling and disassembling of rear axle and front axle. [1P]
9. Assembling and disassembling of telescopic shock absorber and how to replace strut bush and greasing bearings. [2P]
10. Assembling and disassembling of leaf spring suspension. [1P]
11. Assembling and disassembling of air bag suspension. [1P]
12. Study how to replace stabilizer bar bush. [1P]

Total credit - 1

Contact Hours – 30(15)

Suggested Readings:

- 1.Mechanic Motor Vehicle Practical- Manish Sharma
- 2.Automobile engineering practical – N K Malhotra

BACHELOR OF VOCATIONAL

MAJOR IN AUTOMOBILE

AUTOMOBILE MAJOR 6

MJ-6 : Vehicle transmission system

MJ-6T: Vehicle transmission system

Unit-I: Gear and gear train

- 1.1.Introduction about gear and gear train[2L]
- 1.2.Types of gear[1L]
- 1.3.Details about a gear [3L]
- 1.4.Types of gear train[3L]

Unit-II: Gear box

- 2.1. Introduction and purpose of gearbox [1L]
- 2.2. Types of gearbox[6L]
- 2.3 Advantage and disadvantage of different type of gear box [1L]
- 2.4. Gear shifting mechanism[1L]
- 2.5. Transfer box [1L]
- 2.6. Transaxle [1L]
- 2.7. Torque converter [2L]
- 2.8. Over drive [1L]
- 2.9. Lubrication of gearbox [1L]
- 2.10. Troubles of gear box [2L]

Unit-III: Propeller shaft

- 3.1 Introduction of propeller shaft. [1L]
- 3.2 Purpose of propeller shaft [1L]
- 3.3 Universal joint and slip joint [2L]
- 3.4 Troubles of propeller shaft [2L]

Unit-IV: Differential

- 4.1 Introduction of differential [1L]
- 4.2. Purpose of differential [1L]
- 4.3 Construction of differential [4L]
- 4.4 Self-locking differential [1L]

4.5 LSG [1L]

4.6 Differential troubleshooting [2L]

Total credit - 3

Contact Hours - 45

Suggested Readings:

1. AUTOMOBILE ENGINEERING –R.B GUPTA
2. AUTOMOBILE ENGINEERING – C.P.NEKRA
3. AUTOMOBILE ENGINEERING - Dr . KRIPAL SING.
4. Workshop technology-(vol.1& vol.2)-Gupta +Khurmi

Reference Reading:

1. Automobile engineering – G.B.S Nagra
2. A 2 Z AUTOMOBILE ENGG. -Dr . KRIPAL SING.
3. Automobile Engineering – A.K Babu & Sing Ajit Pal
4. AUTOMOBILE MECHANICS – N.K GIRI
5. Automobile engineering –K.K JAIN
6. Automobile engineering – S.K. Gupta

MJ-6P: Automotive Chassis II(Practical)

Course Outline:

1. Identify the different types of gear used in automobile. [1P]
2. Practice how to remove gear box from vehicle. [1P]
3. Assembling and disassembling of sliding mesh gear box. [1P]
4. Assembling and disassembling of constant mesh gear box. [1P]
5. Assembling and disassembling of synchromesh gear box. [1P]
6. Replace the defective gear and bearing from the gear box by overhauling the gear box. [1P]
7. Assembling and disassembling of transaxle . [1P]
8. Practical on torque converter and overdrive. [1P]
9. Practice how to lubricate gearbox. [1P]
10. Gear box trouble shooting. [1P]
11. Practice how to remove propeller shaft from vehicle. [1P]
12. Assembling and disassembling the universal joint from propeller shaft and replace the spider and bearings. [1P]

13. Practice how to remove differential from vehicle. [1P]
14. Assembling and disassembling of differential . [1P]
15. Inspect the differential side gear free play. [1P]
16. Differential trouble shooting. [1P]

Total credit - 1

Contact Hours – 30(15)

Suggested Readings:

1. Mechanic Motor Vehicle Practical- Manish Sharma
2. Automobile engineering practical – N K Malhotra

**BACHELOR OF VOCATIONAL
MAJOR IN AUTOMOBILE
AUTOMOBILE MAJOR 7**

MJ-7 : Basic automotive electrical systems

MJ-7T: Basic automotive electrical systems

Unit-I: Basic electric theory

- 2.1. What is voltage , current and resistance ? [1L]
- 2.2. What is conductor and insulator? [1L]
- 2.3. Ohm's law and joule's law [1L]
- 2.4. What is electric power? [1L]
- 2.5. Types of circuit? [1L]
- 2.6. Components of a circuit (switch ,load, fuse etc) [1L]
- 2.7. What is the purpose of relay[1L]
- 2.8. Horn and vehicle lighting system. [1L]

Unit-II: Battery

- 1.1. Introduction to the battery[1L]
- 1.2. Types of battery [3L]
- 1.3. Specific gravity [1L]
- 1.4. Charging procedure[1L]
- 1.5. State of charge [1L]
- 1.6. Battery voltage and capacity[1L]
- 1.7. Battery rating and efficiency [1L]
- 1.8. Battery testing[1L]

Total credit - 3

Contact Hours - 45

Suggested Readings:

9. AUTOMOBILE ENGINEERING –R.B GUPTA
10. AUTOMOBILE ENGINEERING – C.P.NEKRA
11. AUTOMOBILE ENGINEERING - Dr . KRIPAL SING.
12. Workshop technology-(vol.1& vol.2)-Gupta +Khurmi

Reference Reading:

13. Automobile engineering – G.B.S Nagra
14. A 2 Z AUTOMOBILE ENGG. -Dr . KRIPAL SING.
15. Automobile Engineering – A.K Babu & Sing Ajit Pal
16. AUTOMOBILE MECHANICS – N.K GIRI
17. Automobile engineering –K.K JAIN
18. Automobile engineering – S.K. Gupta

MJ-7P: Basic automotive electrical systems (Practical)

Course Outline:

1. How to test battery[1P]
2. How to check current, voltage and resistance in a circuit[1P]
3. How to check fuse and relay[1P]
4. How to repair and check the horn [2P]

5. How to repair and check all the lights in a vehicle . [3P]

Total credit - 1

Contact Hours – 30(15)

Suggested Readings:

- 1.Mechanic Motor Vehicle Practical- Manish Sharma
- 2.Automobile engineering practical – N K Malhotra
3. Automotive Electrical Technology – P.L.Koholi