ME – 421 AUTOMOBILE ENGINEERING	
CO1	Make students understand the basic concepts, requirements and working of various components of automobile.
CO2	Enable students to design basic systems like brakes, steering, and suspensions.
CO3	Make students understand construction and working of different systems like transmission, steering and suspensions.
CO4	Make students understand automotive electronics.
CO5	Aware students about recent technologies in automobile engineering and its working.
CO6	Reduce the pace between basic vehicle technology and technologies in modern vehicles.

List of Experiment (ME421-Automobile Engineering)		
Sr. No.	**Title**	**Course Outcomes**
1	Study of Chassis, Frame and Body in Automobile vehicles	CO1
2	Study of the steering mechanism and front axle	CO2
3	Study of different types of clutches	CO2
4	Study of transmission system	CO3
5	Study of the driveline	CO5
6	Study of different types of brakes	CO2
7	Study of different types of suspension system	CO2
8	Study of the wheel and tires	CO3
9	Study of radiator in automobile vehicles	CO2
10	Study of the electrical system related to automobile	CO4
11	Study of two wheeler automobile vehicles	CO5
12	Study modern automobile vehicles	CO5
13	To understand the actual operations in automobile garages and service stations	CO6

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY & ENGINEERING
CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421)

Sr. No.	Performance Date	Title	No. of Pages	Marks	Assessment Date	Sign of Faculty
1		Study of Chassis, Frame and Body in Automobile vehicles				
2		Study of the steering mechanism and front axle				
3		Study of different types of clutches				
4		Study of transmission system				
5		Study of the driveline				
6		Study of different types of brakes				
7		Study of different types of suspension system				
8		Study of the wheel and tires				
9		Study of radiator in automobile vehicles				
10		Study of the electrical system related to automobile				
11		Study of two wheeler automobile vehicles				
12		Study modern automobile vehicles				
13		To understand the actual operations in automobile garages and service stations				

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY & ENGINEERING
CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

LIST OF PRACTICAL FOR AUTOMOBILE LABORATORY

Practical: -1 Study of Chasis, Frame and Body in Automobile vehicles.

Practical: - 2 Study of the steering mechanism and front axle in the automobile vehicles.

Practical: -3 Study of different types of clutches.

Practical: -4 Study of transmission system.

Practical: -5 Study of the driveline.

Practical: -6 Study of different types of brakes.

Practical: -7 Study of different types of suspension system.

Practical: -8 Study of the wheel and tires.

Practical: -9 Study of radiator in automobile vehicles.

Practical: -10 Study of the electrical system related to automobile.

Practical: -11 Study of two wheeler automobile vehicles.

Practical: -12 Study modern automobile vehicles.

Practical: -13 To understand the actual operations in automobile garages and service stations.

Marks obtained:	**Signature of faculty:**	**Date:**

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

FACULTY OF TECHNOLOGY & ENGINEERING

CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

Practical No: - 1

AIM: Study of Chasis, Frame and Body in Automobile vehicles.

REVIEW QUESTION:

1. What are the main components of an automobile?
2. Draw a schematic diagram, which is showing the layout of transmission system of vehicles in your automobile laboratory.
3. Describes the main function of chasis, frame and body.
4. Describes in brief the function of various components of chasis.
5. Distinguish between the front wheel drive and rear wheel drive.
6. Make lists the various frame sections and with figure discuss the advantages & disadvantages of different sections.
7. Compare the merits & demerits of the frameless construction with those of the conventional construction.

QUESTION FOR VIVA:

1) To which loads are the vehicles chasis frames subjected?

2) What advantages are there in case of front wheel drive?

3) What are the main advantages of the four-wheel drive vehicles?

4) What are the materials are used for chasis, frame and body?

5) Which frame section has maximum resistance to (i) bending and (ii) torsion

6) What constructional modifications are adopted to make the conventional chasis more robust to withstand load and road thrust?

7) What types of stresses are produced in the side members while cornering?

8) Why is the frame narrow at the front?

Marks obtained:	Signature of faculty:	Date:

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

FACULTY OF TECHNOLOGY & ENGINEERING

CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

Practical No: - 2

AIM: Study of the front axle and steering mechanism in the automobile vehicles.

REVIEW QUESTION:

1. Explain the following terms with appropriate diagram. What are the effects of each on the steering characteristics of a vehicle?
    a. Camber
    b. Caster
    c. Steering axis inclination
    d. Toe-in/ and Toe-out
    e. Over steer and Under steer
    f. Converging power
    g. Slip angle
    h. Steering ratio
    i. Reversibility
2. State the function of steering system.
3. Describe in detail the rack and pinion type manual steering (with sketch).
4. Explain necessity of power steering in the automobile vehicles. Explain construction, working of any power steering (with diagram).
5. What is wheel alignment? Discuss the various factors of wheel alignment.
6. Explain about front axle and classified stub axle.

QUESTION FOR VIVA:

1) Why for front axles do we have I-section in the middle and elliptical section at the end?

2) Define the perfect steering.

3) What is the 'lock' position in steering?

4) Why is it easier to steer a vehicle in reverse than in forward?

5) What is the purpose of ball joints in the steering linkage?

6) Which is the most popular steering gear for cars?

7) What do you mean by the terms wander and shimmy in steering?

8) What do you mean by the terms dynamic balance and wheel tramp in case of steering?

9) What type of steering system and axle in your laboratory vehicles?

Marks obtained:	**Signature of faculty:**	**Date:**

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY & ENGINEERING
CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

Practical No: - 3

AIM: Study of different types of clutches.

REVIEW QUESTION:

1. What is purpose of clutch in automobile vehicles?
2. Give the detail classification of clutch used in automobile vehicles and make their comparison.
3. Give the function of following components of clutch,
    a. Pressure plate
    b. Driven plate
    c. Torsional spring
    d. Coil springs
    e. Clutch disc.
4. Explain with neat sketch following types of clutch,
    a. Cone clutch
    b. Single plate
    c. Multi plate
    d. Diaphragm spring type
    e. Centrifugal
    f. Semi-centrifugal.

QUESTION FOR VIVA:

1) What are the disadvantages of cone clutch?
2) What is the function of thrust bearing in a clutch?
3) Why do we have cushioning springs in the clutch friction plate?
4) What are materials for clutch facing?
5) What happens when the driver is in the habit of keeping his foot on the clutch pedal constantly during driving?

Marks obtained:	**Signature of faculty:**	**Date:**

6) What happens if clutch free pedal play is excessive?

7) What is likely result if clutch free pedal play is less?

Practical No: - 4

AIM: Study of transmission system.

REVIEW QUESTION:

1. What are functions of transmission?
2. What are general requirements of transmission? What are the various components of transmission system? Describes their role.
3. Sketch the layout of the complete transmission system for passenger car.
4. Make the list of different type of transmission systems?
5. What are necessities of gear box in automobile?
6. Describe the construction, working with neat sketch of gearbox with selector mechanism of your laboratory vehicles.
7. State relative merits and demerits of sliding-mesh gearbox and syncromesh gearbox.
8. Describe power flow through a three-speed gearbox.

QUESTION FOR VIVA:

1) What is the necessity of gearbox at all in the automobile when the engine speed can be varied by means of accelerator?

2) What is the approximate gear ratio provided in a three forward speed gearbox?

3) Why syncromesh device is usually not employed for the reverse gear?

4) What are possible causes of hard gear?

5) What is an overdrive? What are its advantages?

6) What is the basic difference between a fluid flywheel and torque converter?

Marks obtained:	**Signature of faculty:**	**Date:**

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY & ENGINEERING
CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

Practical No: - 5

AIM: Study of the driveline.

REVIEW QUESTION:

1. Explain with the help of neat sketch the construction of a propeller shaft.
2. Discuss the common source of trouble in the propeller shaft. Describe the appropriate remedies in each case.
3. Explain the necessity of a differential in an automobile. Discuss in detail the construction and operation of the differential.
4. Describe clearly the constructional details and operation of various rear axle drives.
5. Discuss in detail different methods of supporting live rear axle shaft. Describe also the advantages and disadvantages of each.

QUESTION FOR VIVA:

1) Why propeller shaft kept hollow and made of two-piece in heavy-duty automobile vehicles.
2) How is the length of the propeller shaft varied automatically?
3) Which type of propeller shaft is used in case of Ashok Leyland's heavy vehicles?
4) What is the advantage of hook joint?
5) Which type of final drive is used most commonly?
6) What are the various loads acting on the rear axle?
7) How many universal joints are used with a torque tube drive? How many on Hotchkiss drive? Why?
8) Which type of rear axle is best suited for cheap, light vehicles?
9) Which type of rear axle is best suited for cheap, heavy vehicles?

Marks obtained:	Signature of faculty:	Date:

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY & ENGINEERING
CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

Practical No: - 6

AIM: Study of different types of brakes.

REVIEW QUESTION:

1. Describe the function of brake system.
2. Discuss the classification of brake from different consideration.
3. Draw the diagrams of disc & drum brake and compare the disc & drum brake.
4. Explain the actuating mechanism of brake system with layout of braking system for your laboratory vehicles.
5. List out the main components of hydraulic brake and explain with diagram.
6. Explain with line diagram of power-assisted brake.
7. Explain the operations with diagram of air hydraulic brake.
8. Explain emergency and parking brakes (hand brake).

QUESTION FOR VIVA:

1) What is 'fading' of brake?
2) What is difference between power assisted and power operated brake?
3) Out of the disc and drum brakes, which is better? Why?
4) Which car in India has the distinction of using the disc brake first?
5) Why do we not fill the master cylinder completely with brake fluid?
6) Approximately what minimum amount of free pedal pay is allowed in case of car brake?
7) Name any three firms manufacturing automobile brakes.
8) Which materials use for brake lining?

Marks obtained:	Signature of faculty:	Date:

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY & ENGINEERING
CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

Practical No: - 7

AIM: Study of different types of suspension system.

REVIEW QUESTION:

1. What are functions of suspension system?
2. Give the classification of suspension system in automobile vehicles.
3. What is the function of spring? Classified springs with neat sketch.
4. Explain 8in detail the function and construction of the leaf spring and show how it is mounted on rear and front.
5. Explain the construction and working of a telescopic type shock absorber with help of diagram.
6. Draw the schematic diagram showing the layout of suspension system in your automobile laboratory vehicles.
7. What is independent suspension system? Give the classification or different type of front wheel and rear wheel independent suspension system. Also discuss main constructional future.
8. What is interconnected suspension system? Discuss the main constructional future and working of any one type of system.

QUESTION FOR VIVA:

1) What do you under stand by pitching and rolling of a vehicle?
2) What is the function of a shackle with leaf springs?
3) Which materials use for leaf springs?
4) What is the effect of moisture on the leaf springs?
5) What is the helper springs?
6) State the advantage of the tapered leaf spring.
7) Which type of independent suspension is mostly used for front drive vehicles?
8) Which type of independent suspension is used in your automobile laboratory vehicles?

Marks obtained:	Signature of faculty:	Date:

9) What is the function of an anti-roll device?

Practical No: - 8

AIM: Study of the wheel and tyres.

REVIEW QUESTION:

1. Describe the requirements of an automobile wheel. Explain with help of a suitable sketch the construction the disc type and wire type wheel.
2. State the various functions performed by an automobile tyre and draw cross section of truck tyre. Give the classification of tyre.
3. Describe in detail constructional features of the tube and tubeless tyres for automobile use. Discuss also their relative merits and demerits.
4. Discuss in detail various factors affecting tyre life. Explain regarding tyre wear.

QUESTION FOR VIVA:

1) How is the vehicle weight supported in case of a wire wheel?
2) Why can't you use wire wheel to mount a tubeless tyre?
3) How do you specify a car wheel?
4) What is ply rating of a tyre?
5) How a radial ply tyre does contribute to saving of fuel?
6) Why does a radial tyre give comfortable ride at high speed and a cross ply tyre at low speed?
7) Why the steering characteristics of radial ply tyres are better than those of cross ply tyres?
8) How do you designate a tyre?
9) What are the specified inflation pressures for different vehicles?

Marks obtained:	**Signature of faculty:**	**Date:**

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY & ENGINEERING
CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

Practical No: - 9

AIM: Study of radiator in automobile vehicles.

REVIEW QUESTION:

1. Why it is important to remove excess heat from the engine?
2. Explain about radiator with respect to location of radiator, types of radiator, and materials for radiator.
3. Explain construction, working of engine radiator in your automobile laboratory vehicles.
4. Describe the purpose of thermostat valve and explain Bi-metallic thermostat with schematic diagram.

QUESTION FOR VIVA:

Marks obtained:	**Signature of faculty:**	**Date:**

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY & ENGINEERING
CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

Practical No: - 10

AIM: Study of the electrical system related to automobile.

REVIEW QUESTION:

1. Draw a simplified wiring circuit for the lighting system of car and discuss the same.
2. Giving constructional detail of battery discuss defects and method for rectification.

QUESTION FOR VIVA:

1) How is an electrical wire specified?
2) Why is headlight dimmering necessary?

Marks obtained:	Signature of faculty:	Date:

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY & ENGINEERING
CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

Practical No: - 11

AIM: Study of two wheeler automobile vehicle.

REVIEW QUESTION:

1. Give detail classification of two wheelers.
2. Give the technical specification of your laboratory two wheeler vehicles.

QUESTION FOR VIVA:

Marks obtained:	Signature of faculty:	Date:

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY & ENGINEERING
CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

Practical No: - 12

AIM: Study modern automobile vehicles.

REVIEW QUESTION:

1. Give the detail technical specification of any five modern four wheel automobile vehicles (car, bus, truck, tractor, etc.).
2. Give the detail technical specification of any five modern two wheel automobile vehicles (moped, scooter, bike etc.).

QUESTION FOR VIVA:

Marks obtained:	Signature of faculty:	Date:

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY & ENGINEERING
CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

Practical No: - 13

AIM: To understand the actual operations in automobile garages and service stations.

Note: students have to write the visit report of service station or garages. It should be includes following points.

SERVICE STATION / GARAGE VISIT REPORT

1. Name of garages/service station.

   _____

2. Types of garages/service station.

   _____

3. Lists Equipments uses in garages/service station.

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

4. Services carried out in garage/service station.

   _____

   _____

   _____

   _____

Marks obtained:	Signature of faculty:	Date:

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

FACULTY OF TECHNOLOGY & ENGINEERING

CHAMOS Matrusanstha Department of Mechanical Engineering

Automobile Engineering (ME-421) **Date:**

_____

_____

_____

_____

_____

5. Layout and flow diagram of vehicle movement and operation sequences in the service station or garage.

Marks obtained:	**Signature of faculty:**	**Date:**