



SCHEME OF STUDIES & EXAMINATIONS
Department: Automobile Engineering – 7th Semester

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	AE 401B	AUTOMOTIVE SAFETY	4	-		25	75	-	100	4	3
2	AE 403B	VEHICLE PERFORMANCES AND TESTING	4	-		25	75	-	100	4	3
3	AE 405B	VEHICLE DYNAMICS	3	1		25	75	-	100	4	3
4	AE 407B	VEHICLE MAINTANANCE	4	-		25	75	-	100	4	3
5	*	OPEN ELECTIVE	4	-		25	75	-	100	4	3
6	AE 409B	AUTO SCANING & VEHICLE TESTING LAB	-	-	2	20		30	50	1	3
7	AE 411B	VEHICLE MAINTANANCE & RECONDITIONING LAB	-	-	2	20		30	50	1	3
8	AE 413B	PROJECT	-	-	4	100	-	-	100	4	-
9	AE 415B	PROFESSIONAL TRAINING-II	-	-	2	50	-	-	50	2	-
Total			19	1	10	315	375	60	750	28	

*** List of Open Electives**

1	MEI 623B	ENTREPRENEURSHIP	6	BT 401B	BIOINFORMATICS
2	BME 451B	MEDICAL INSTRUMENTATION	7	AE 417B	MODERN VEHICLE TECHNOLOGY
3	ECE 305B	CONSUMER ELECTRONICS	8	CE 451B	POLLUTION & CONTROL
4	EE 451B	ENERGY AUDIT	9	CSE 411B	MANAGEMENT INFORMATION SYSTEM
5	EEE 457B	ENERGY RESOURCES & TECHNOLOGY	10	IT 413 B	CYBER SECURITY

Note:

- Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weight age of Sports is given in General Proficiency & Ethics Syllabus.
- Students will be permitted to opt for any one elective run by the other department. However, the department shall offer those elective for which they have expertise. The choice of the students for any elective shall not be binding for the department to offer, if the department does not have expertise. The minimum strength of the students should be twenty to run an elective course.
- Assessment of Professional Training-II, undergone at the end of VI semester, will be based on seminar, viva-voce, report and certificate of Professional Training obtained by the student from the industry, , institute, research lab, training center etc
- The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- Electronics gadgets including Cellular phones are not allowed in the examination
- The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher). Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her. The format of the cover page and the organization of the body of the report for all the B. Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.



Subject: Automotive Safety (Theory)

Subject Code: AE 401 B

Detailed Content

UNIT NO.1 Introduction & Safety Concepts

- Topic No.1: Design of the body for safety
- Topic No.2: Energy equation, engine location
- Topic No.3: Deceleration of vehicle inside passenger compartment
- Topic No.4: Deceleration on impact with stationary and movable obstacle
- Topic No.5: Concept of crumple zone & safety sandwich construction
- Topic No.6: Active safety, driving safety, conditional safety
- Topic No.7: Perceptibility safety, operating safety- passive safety
- Topic No.8: Exterior safety, interior safety
- Topic No.9: Deformation behaviour of vehicle body
- Topic No.10: Speed and acceleration characteristics of passenger compartment on impact.

UNIT NO.2 Safety Equipments

- Topic No.11: Seat belt & regulations
- Topic No.12: Automatic seat belt tightener system
- Topic No.13: Collapsible steering column
- Topic No.14: Tilttable steering wheel, air bags,
- Topic No.15: Electronic system for activating air bags
- Topic No.16: Bumper design for safety

UNIT NO.3 Collision Warning And Avoidance

- Topic No.17: Collision warning system
- Topic No.18: Causes of rear end collision
- Topic No.19: Frontal object detection
- Topic No.20: Rear vehicle object detection system
- Topic No.21: Object detection system with braking system interactions

UNIT NO.4 Comfort And Convenience System

- Topic No.22: Steering and mirror adjustment
- Topic No.23: Central locking system
- Topic No.24: Garage door opening system
- Topic No.25: Tyre pressure control system
- Topic No.26: Rain sensor system
- Topic No.27: Environment information system

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

TEXT BOOK:

1. Bosch - "Automotive Handbook" - 5th edition - SAE publication - 2000.

REFERENCES:

1. J.Powloski - "Vehicle Body Engineering" - Business books limited, London
2. Ronald.K.Jurgen - "Automotive Electronics Handbook" - Second edition- McGraw-Hill

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.



SYLLABUS: B Tech (Automobile Engineering)

Department: Automobile – 7th Semester

Subject: Vehicle Performances And Testing (Theory)

Subject Code: AE 403 B

Detailed Content

UNIT NO.1 Vehicle Performance Parameters, Drive Train And Testing

- Topic No.1: Vehicle Performance parameters, Fuel economy
- Topic No.2: Acceleration, deceleration, grad ability, top speed
- Topic No.3: Handling, comfort, life durability, EGR systems & Vehicular systems
- Topic No.4: Suspension steering, Brakes & carriage unit testing, test procedure
- Topic No.5: Catalytic converters function & construction
- Topic No.6: Lambda close loop control system for gasoline vehicles
- Topic No.7: Vehicular transmission performance
- Topic No.8: Characteristics and comparison of automotive clutches
- Topic No.9: Epicyclic transmission, Torque converter
- Topic No.10: Testing of clutch, final drive and differential
- Topic No.11: Test procedure for gear box noise and shifting force

UNIT NO.2 Vehicle Testing

- Topic No.12: Vehicle Testing - Road test, Free acceleration test
- Topic No.13: Coast down test, Passer by noise test
- Topic No.14: Wheel alignment and balancing test
- Topic No.15: Test tracks û proving ground testing, high speed track
- Topic No.16: Pavement track, corrugated track, mud track
- Topic No.17: Steering pad, gradient track, deep wading through shallow water
- Topic No.18: Laboratory testing û testing on chassis dynamometer transition testing
- Topic No.19: Euro III onwards, accelerated testing
- Topic No.20: Virtual testing, Evaporative emission testing
- Topic No.21: Oil consumption testing

UNIT NO.3 Safety Systems And Auxiliaries

- Topic No.22: Motor vehicle safety standards, active safety, passive safety
- Topic No.23: Bio-mechanics Structural safety, Energy absorption, ergonomic consideration in safety
- Topic No.24: Occupants safety systems like seat belts, Head restrain, air bags, GPS
- Topic No.25: Roll-over protection system, Electronic stability program
- Topic No.26: Particulate traps Function & construction

UNIT NO.4 Collisions And Crash Testing, Noise Vibration And Emi

- Topic No.27: Crash testing: Human testing, Dummies, Crashworthiness
- Topic No.28: Pole crash testing, Rear crash testing, Vehicle to vehicle impact, Side impact testing
- Topic No.29: Crash test sensors, Sensor mounting, Crash test data acquisition
- Topic No.30: Braking distance test, Noise & vibration: Mechanism of noise generation
- Topic No.31: Engine noise & vibration, causes and remedies
- Topic No.32: Road shocks wind noise & measurement, vehicle measurement testing
- Topic No.33: Automobile testing instrumentation : Sensors types and selection
- Topic No.34: Instrumentation for functional tests, Battery testing
- Topic No.35: Endurance test, model test and full scale

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week		Internal Assessment		External Assessment (Examination)			
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	

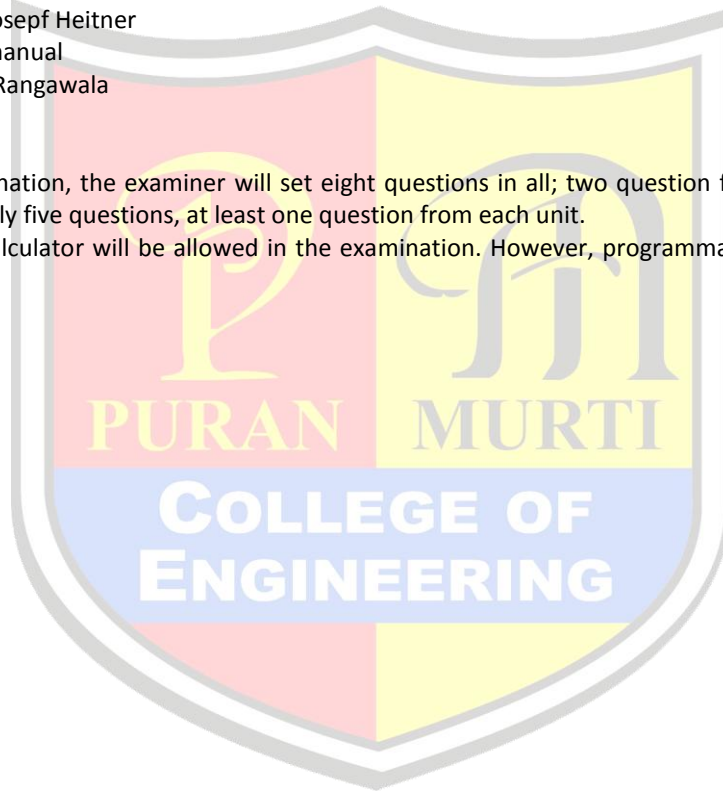


REFERENCES:

1. Wolt, Heinrich Hucho, Aerodynamics of road vehicles
2. Bosch, Automotive Handbook
3. George Pieters Barbara Pieters, Automotive Vehicle Safety
4. Michel Plint Engine Testing Theory and Practice
5. Gousha H. M., Engine performance Diagnosis & Tune Up Shop Manual
6. J.G .Giles, Vehicle Operation & Performance.
7. W. H. Crouse & D. L. Anglin, Motor Vehicle Inspection.
8. SAE Transaction Papers 831814/820346/820367/820371/820375
9. SAE handbook vol 2 & 3
10. Automobile Engineering by Ramlingam
11. Automobile engineering by Kripal Singh
12. Automotive Mechanics by Josepf Heitner
13. ARAI vehicle emission test manual
14. Automobile Engineering by Rangawala

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.





SYLLABUS: B Tech (Automobile Engineering)

Department: Automobile – 7th Semester

Subject: Vehicle Dynamics (Theory)

Subject Code: AE 405B

Detailed Content

UNIT NO.1 Introduction & Multi Degree Freedom Systems

- Topic No.28: Single degree of freedom, two degree of freedom
- Topic No.29: Free, forced and damped vibrations modelling and simulation studies
- Topic No.30: Model of an automobile, magnification factor
- Topic No.31: Transmissibility & vibration absorber
- Topic No.32: Closed and coupled far system
- Topic No.33: Orthogonality of mode shapes & modal analysis

UNIT NO.2 Stability Of Vehicles

- Topic No.34: Load distribution
- Topic No.35: Stability on a curved track slope and a banked road
- Topic No.36: Calculation of tractive effort and reactions for different drives

UNIT NO.3 Suspension Tyres And Vehicles Handling

- Topic No.37: Requirements, sprung mass frequency, wheel hop
- Topic No.38: Wheel wobble, wheel shimmy
- Topic No.39: Choice of suspension spring rate
- Topic No.40: Calculation of effective spring rate, vehicle suspension in fore and aft
- Topic No.41: Roll axis and vehicle under the action of side forces
- Topic No.42: Tyre, dynamics, ride characteristics power consumed by a tyre
- Topic No.43: Over steer, under steer, steady state cornering
- Topic No.44: Effect of braking & driving torques on steering
- Topic No.45: Effect of camber, & transient effects in cornering

UNIT NO.4 Numerical Methods

- Topic No.46: Approximate methods for determining fundamental frequency
- Topic No.47: Dunkerleys lower bound
- Topic No.48: Rayleighs upper bound
- Topic No.49: Holzer method for closed coupled system and branched system

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week		Credits	Internal Assessment	External Assessment (Examination)			
L	T		Max. Marks	Max. Marks	Exam Duration		
3	1	-	4	25	75	3 hours	100

TEXT BOOKS:

1. Giri N.K – Automotive Mechanics, Khanna Publishers
2. Rao J.S and Gupta. K “Theory and Practice of Mechanical Vibrations”, Wiley Eastern Ltd

REFERENCES:

1. Heldt.P.M -”Automotive Chassis”- Chilton Co., New York
2. Ellis.J.R - “Vehicle Dynamics”- Business Books Ltd., London
3. Giles.J.G.Steering - “Suspension and Tyres”, Illiffe Books Ltd., London

NOTE:

3. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
4. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.



SYLLABUS: B Tech (Automobile Engineering)

Department: Automobile – 7th Semester

Subject: Suspension Tyres And Vehicles Handling (Theory)

Subject Code: AE 407 B

Detailed Content

UNIT NO.1 Maintenance Of Records And Schedules, Engine Maintenance, Repair And Overhauling

- Topic No.1: Importance of maintenance
- Topic No.2: Preventive (scheduled) and breakdown(unscheduled) maintenance
- Topic No.3: Requirements of maintenance
- Topic No.4: Preparation of check lists
- Topic No.5: Inspection schedule, maintenance of records, log sheets and other forms
- Topic No.6: Safety precautions in maintenance
- Topic No.7: Dismantling of engine components and cleaning
- Topic No.8: Cleaning methods, visual and dimensional inspections
- Topic No.9: Minor and major reconditioning of various components
- Topic No.10: Reconditioning methods, Engine assembly
- Topic No.11: Special tools used for maintenance overhauling, Engine tune up

UNIT NO.2 Chassis Maintenance, Repair And Overhauling

- Topic No.12: Mechanical and automobile clutch and gear box
- Topic No.13: Servicing and maintenance
- Topic No.14: Maintenance servicing of propeller shaft and differential system
- Topic No.15: Maintenance servicing of suspension systems
- Topic No.16: Brake systems, types and servicing techniques
- Topic No.17: Steering systems, overhauling and maintenance
- Topic No.18: Wheel alignment, computerized alignment and wheel balancing

UNIT NO.3 Electrical System Maintenance, Servicing & Repairs

- Topic No.19: Testing methods for checking electrical components
- Topic No.20: Checking battery, starter motor
- Topic No.21: Charging systems, DC generator and alternator
- Topic No.22: Ignitions system, lighting systems
- Topic No.23: Fault diagnosis and maintenance of modern electronic controls
- Topic No.24: Checking and servicing of dash board instruments

UNIT NO.4 Maintenance Of Fuel System, Cooling Systems, Lubrication System And Vehicle Body

- Topic No.25: Servicing and maintenance of fuel system of different types of vehicles
- Topic No.26: Calibration and tuning of engine for optimum fuel supply
- Topic No.27: Cooling systems, water pump, radiator, thermostat
- Topic No.28: Anticorrosion and antifreeze additives
- Topic No.29: Lubrication maintenance, lubricating oil changing, greasing of parts
- Topic No.30: Vehicle body maintenance, minor and major repairs
- Topic No.31: Door locks and window glass actuating system maintenance

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

TEXT BOOK:

1. John Doke "Fleet Management", McGraw-Hill Co
2. James D Halderman - Advanced Engine Performance Diagnosis
3. Service Manuals from Different Vehicle Manufacturers.



SYLLABUS: B Tech (Auto)

Department: Automobile Engineering– 7th Semester

Subject: Pollution & Control (Theory)

Subject Code: CE 451B

Detailed Content

UNIT NO 1: Water Pollution:

- Topic No.1 Classification of water pollutants
- Topic No.2 Water characteristics
- Topic No.3 Effluent standards
- Topic No.4 Primary treatment, Secondary treatment
- Topic No.5 Aerobic (activated sludge, aerated lagoons, trickling filter, roughing filter rotating biological contactor)
- Topic No.6 Anaerobic (contact process, UASB).

UNIT NO.2 Air Pollution & Hydrocarbons:

- Topic No.7 Classification of air pollutants
- Topic No.8 Particulates: Physical characteristics
- Topic No.9 Mode of formation
- Topic No.10 Setting properties, Control measures.
- Topic No.11 HYDROCARBONS: Nature; sources, control
- Topic No.12 Carbon Monoxide: Source, harmful effects on human health
- Topic No.13 Control measures
- Topic No.14 Oxides of Sulphur and Nitrogen Sources
- Topic No.15 Effects on human health and plants, Control measure

UNIT NO.3 Solid Waste Management:

- Topic No.16 Types, sources and properties of solid waste
- Topic No.17 Methods of solid waste treatment and disposal
- Topic No.18 SOLID WASTE MANAGEMENT – Generation
- Topic No.19 Collection and techniques for ultimate disposal
- Topic No.20 Elementary discussion on resource and energy recovery

UNIT NO.4 Pollution Treatment:

- Topic No.21 Elementary treatment of nuclear pollution
- Topic No.22 Metal pollution
- Topic No.23 Noise pollution their effects & control.
- Topic No.24 Trace element: Mechanism of distribution
- Topic No.25 Essential and non essential elements
- Topic No.26 Trace of element in marin environment
- Topic No.27 Its ecological effects and biological effects.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
4	-	-	4	25	75	3 hours	100

Suggested Books:

1. Environmental Engg.: by Howard s. Peavy & Others, MGH International.
2. Metacaf – EDDY – Waste-water engineering revised by George Teholonobus (TMH)
3. Environmental Chemistry by B.K. Sharma, Goel Publishing, Meerut.
4. Environmental Chemistry, A.K.DE, Wiley Eastern.
5. Air Pollution: H.C. Perking – Mc Graw Hill



SYLLABUS: B Tech (AE)

Department: Automobile Engineering – 7th Semester

Subject: Auto Scanning & Vehicle Testing Lab

Subject Code AE 409B

LIST OF EXPERIMENTS:

1. Computerized engine analyzer study and practice
2. Computerized wheel balancing machine study and practice
3. Computerized wheel alignment machine study and practice
4. Exhaust emission test of petrol and diesel engine
5. Two wheeler chassis dynamometer study and practice
6. Road worthiness test: Acceleration, Gradability, Maximum speed,
7. Constant Speed fuel consumption, City drive fuel consumption tests
8. Head light focusing test
9. Visibility test;
- 10 Braking distance test

Study Scheme				Evaluation Scheme			Total Marks
L	T	P	Credits	Internal Assessment Max. Marks	External Assessment (Examination) Max. Marks	Exam Duration	
		2	1	20	30	3 hours	50

NOTE:

1. Ten experiments are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.



SYLLABUS: B Tech (AE)

Department: Automobile Engineering – 7th Semester

Subject: Vehicle Maintenance & Reconditioning Lab

Subject Code AE 411B

LIST OF EXPERIMENTS:

VEHICLE MAINTENANCE LABORATORY

1. Study and Layout of Automobile Repair Shop.
2. Study and Preparation of Workshop Statements.
3. Study and List of Tools and Instruments.
4. Minor and Major Tuning Of Diesel and Petrol Engines.
5. Fault Diagnosis of Ignition, Starting And Charging System.
6. Fault Diagnosis of Petrol and Diesel Fuel System And Filters & Air Cleaners.
7. Fault Diagnosis of Lighting System Horn & Wiper.
8. Performing Body Repair Works.
9. Adjustment Of Pedal Play In Clutch Brake, Hand Brake And Steering Wheel.
10. Bleeding Of Hydraulic Brake System and Diesel Fuel System.

RE-CONDITIONING LABORATORY

1. Cylinder reboring – checking the cylinder bore.
2. Valve grinding, valve lapping.
3. Setting the valve angle and checking for valve leakage Calibration of fuel injection pump
5. Wheel alignment – testing of camber, caster.
6. Testing kingpin inclination, toe-in and toe-out.
7. Brake adjustment
8. Brake bleeding

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
		2	1	20	30	3 hours	50

NOTE:

1. Ten experiments are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.



SYLLABUS: B Tech (Auto)

Department: Automobile Engineering– 7th Semester

Subject: Project

Subject Code: AE 413B

Detailed Content

The project started in VII Semester will be completed in VIII Semester and will be evaluated through a panel of examiners consisting of the following:

Chairperson of Department : Chairperson
Project coordinator : Member
External expert : To be appointed by the University

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).

Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.

The format of the cover page and the organization of the body of the report for all the B. Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
-	-	8	8	75	125	3Hrs	200



SYLLABUS: B Tech (Auto)

Department: Automobile Engineering– 7th Semester

Subject: Professional Training II

Subject Code: AE 415B

Detailed Content

- At the end of 6th semester each student would undergo four weeks Professional Training in an Industry/ Institute/ Professional / Organization/ Research Laboratory etc. with the prior approval of the Training and Placement Officer of the University and submit in the department a typed report along with a certificate from the organization.
- The typed report should be in a prescribed format.
- The report will be evaluated in the VII Semester by a Committee consisting of three teachers from different specialization to be constituted by the Chairperson of the department. The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization.
- The student will interact with the committee through presentation to demonstrate his/her learning.
- Teachers associated with evaluation work will be assigned 2 periods per week load.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
-	-	2	2	50	-	-	50