



**SCHEME OF STUDIES & EXAMINATIONS**  
**Department: Automobile Engineering – 3<sup>rd</sup> 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	MGT 201B	ENGINEERING ECONOMICS (Common for all branches Except BT & BME)	4	-	-	25	75	-	100	4	3
	GES 201 B	(Gr-A) OR ENVIRONMENTAL STUDIES (Common for all branches) (Gr-B)	3	-	-	-	75*	-	75*	-	3
2	AE 201B	BASICS OF AUTOMOBILE ENGINEERING	4	-	-	25	75	-	100	4	3
3	AE 203B	ENGINEERING THERMODYNAMICS	3	1	-	25	75	-	100	4	3
4	AE 205B	MECHANICS OF SOLIDS	3	1	-	25	75	-	100	4	3
5	ME205B	ENGINEERING MECHANICS (Common with ME & AER)	3	1	-	25	75	-	100	4	3
6	AE 207B	FLUID MECHANICS & MACHINERY	3	1	-	25	75	-	100	4	3
7	A E 209B	AUTOMOBILE ENGINEERING DRAWING LAB	1	-	4	40	60	-	100	4	3
8	AE 211B	MECHANICS OF SOLIDS LAB	-	-	2	20	-	30	50	1	3
9	AE 213B	COMPUTER AIDED DRAFTING LAB	-	-	2	20	-	30	50	1	3
10	AE 215B	FLUID MECHANICS & MACHINERY LAB	-	-	2	20	-	30	50	1	3
11	AE 217B	AUTOMOBILE WORKSHOP	-	-	2	50	-	-	50	2	3
12	GES 203B	ENVIRONMENTAL STUDIES FIELD WORK (Common for all branches) (Gr- B)	-	-	-	-	-	25*	25*	-	-
<b>Total</b>		<b>Gr-A</b>	<b>21</b>	<b>4</b>	<b>12</b>	<b>300</b>	<b>510</b>	<b>90</b>	<b>900</b>	<b>33</b>	
		<b>Gr-B</b>	<b>20</b>	<b>4</b>	<b>12</b>	<b>275</b>	<b>435</b>	<b>90</b>	<b>800</b>	<b>29</b>	

**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.
- \*The Environmental studies (GES-201 B & Environment Studies Field work (GES-203B) are compulsory & qualifying courses.
- 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
- All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.



Subject: Engineering Economics (Theory)

Subject Code: MGT 201B

#### Detailed Content

#### UNIT NO.1 Different Economics With Inter Relations

- Topic No.1: Introduction to various definitions of Economic, Nature of Economic problem
- Topic No.2: Micro and macro economics- their feature and scope , Production possibility curve
- Topic No.3: Economic laws and their nature, Relation between Science
- Topic No.4: Engineering Technology and Economics, Concept and measurement of utility
- Topic No.5: Law of Diminishing Marginal Utility, Law of equi-marginal utility – its practical application and importance

#### UNIT NO.2 Demand And Costs

- Topic No.6: Meaning of Demand, Individual and Market demand schedule , Law of demand, & shape of demand curve
- Topic No.7: Elasticity of demand & measurement of elasticity of demand, Factors effecting elasticity of demand
- Topic No.8: Practical importance & application of the concept of elasticity of demand, Various concepts of cost
- Topic No.9: Fixed cost, Variable cost, average cost, Marginal cost, Money cost, real cost, Opportunity cost
- Topic No.10: Shape of average cost, Marginal cost, total cost etc. in short run and long run.

#### UNIT NO.3 Production , Economy & Market

- Topic No.11: Meaning of production and factors of production, Law of variable proportions, & Law of Return to Scale
- Topic No.12: Lubrication principles, Bearing lubrication, Functions of lubricating system
- Topic No.13: Internal and External economics and diseconomies of scale , Meaning of Market, Type of Market
- Topic No.14: Perfect Competition, Monopoly, Oligopoly, Monopolistic competition

#### UNIT NO.4 Supply , Economy And Globe

- Topic No.15: Supply and Law of Supply, Role of Demand & Supply in Price Determination and
- Topic No.16: Effect of changes in Demand and supply on prices, Nature and characteristics of Indian economy
- Topic No.17: Privatization – meaning, merits and demerits , Globalization of India economy – merits and demerits
- Topic No.18: Elementary Concept of WTO & TRIPS agreement , Monetary Policy & Fiscal Policy

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 BOOKS:

1. Ahuja H.L "Micro Economic Theory" S. Chand Publication, New Delhi
2. Dewett K.K "Modern Economic Theory" S. Chand Publication, New Delhi
3. Jain T.R, Grover M.L, Ohri V.K Khanna O.P, "Economics for engineers" V.K .Publication ,New Delhi

#### SUGGESTED BOOKS:

1. Jhingan M.L "Micro Economic Theory" S.Chand Publication ,New Delhi
2. Chopra P.N "Principle of Economics" Kalyani Publishers, Delhi
3. Mishra S.K "Modern Micro Economics" Pragati Publication Mumbai.
4. Dwivedi D.N "Micro Economics " Pearson Education, New Delhi.

#### 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 – 3rd Semester**

**Subject: Environmental Studies (Theory)**

**Subject Code: GES 201B**

#### **Detailed Content**

##### **UNIT NO.1 Introduction To Environment**

- Topic No.19: The Multidisciplinary nature of environmental studies, Definition, scope and importance
- Topic No.20: Need for Public awareness

##### **UNIT NO.2 Natural Resources**

- Topic No.21: Natural resources and associated problems , Renewable and Non-renewable resources
- Topic No.22: Forest resources: Use and over-exploitation, Deforestation, case studies
- Topic No.23: Timber exploitation, mining, Dams and their effects and forests tribal people
- Topic No.24: Water resources: Use and over-utilization of surface and ground water, Floods, Drought
- Topic No.25: conflicts over water , Dams-benefits and problems, Mineral resources: Use and exploitation
- Topic No.26: Environmental effects of extracting ,And using mineral resources, case studies
- Topic No.27: Food resources: World food problems, Changes, caused by agriculture and Overgrazing
- Topic No.28: Effects of modern agriculture, fertilizer-pesticide problems, Water logging, salinity, case studies
- Topic No.29: Energy resources: Growing energy needs , Renewable and Non-renewable energy sources
- Topic No.30: Use of alternate energy sources; case studies, Land as a resource, land degradation
- Topic No.31: Man induced landslides, Soil erosion and desertification,
- Topic No.32: Role of an individual in conservation of natural resources
- Topic No.33: Equitable use of resources for sustainable lifestyles

##### **UNIT NO.3 Ecosystems**

- Topic No.34: Concept of an ecosystem, Structure and function of an ecosystem, Producers
- Topic No.35: Consumers and decomposer, Energy flow in the ecosystem, Ecological Succession
- Topic No.36: Food chains, food webs and ecological pyramids, Introduction, types, characteristic features
- Topic No.37: Structure and function of the Following eco-system: Forest ecosystem , Grassland ecosystem
- Topic No.38: Desert Ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans)

##### **UNIT NO.4 Biodiversity And Its Conservations**

- Topic No.39: Introduction – Definition: Genetic, species and ecosystem diversity
- Topic No.40: Biogeographically classification of India , Value of biodiversity: consumptive use, productive use
- Topic No.41: Social, Ethical aesthetic and option values , Biodiversity at global, National and local levels
- Topic No.42: India as a mega-diversity nation , Hot-spots of biodiversity, Threats : habitat loss, poaching of wildlife
- Topic No.43: Man-wildlife conflicts, Endangered and endemic species of India.

##### **UNIT NO.5 Environmental Pollution**

- Topic No.26: Definition, causes, effects and control, measures of: Air pollution, Water pollution  
Soil pollution Marine pollution, Noise pollution, Thermal Pollution Nuclear hazards
- Topic No.27: Solid waste management: Causes effects and control, measures of urban and Industrial wastes
- Topic No.28: Role of an individual in prevention of pollution, Pollution case studies
- Topic No.29: Disaster management: Floods, earthquake, cyclone and landslides

##### **UNIT NO.6 Social Issues And The Environment**

- Topic No.30: From unsustainable to sustainable development, Urban problems related to energy
- Topic No.31: Water conservation , rain water harvesting, watershed management
- Topic No.32: Resettlement and rehabilitation of people; its problems and concerns
- Topic No.33: Environmental ethics: Issues and possible solutions
- Topic No.34: Climate change, global warming, acid rain, ozone layer depletion, Nuclear accidents & holocaust, Case std.
- Topic No.35: Wasteland reclamation, Consumerism and waste products
- Topic No.36: Environment Protection Act, Air (Prevention and Control of Pollution Act,  
Water (Prevention and Control of Pollution) Act Wildlife Protection Act, Forest Conservation Act
- Topic No.37: Issues involved in enforcement of environmental legislation Public awareness

##### **UNIT NO.7 Human Population And Environment**

- Topic No.38: Population growth, variation among nations
- Topic No.39: Population explosion – Family Welfare Programme Environment and human health, Human Rights



Topic No.40 Value Education, HIV/ AIDS, Woman and Child Welfare

Topic No.41 Role of Information Technology in Environment and human health.Case Studies

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

### REFERENCES:

1. Agarwal, K.C. 2001, Environmental Biology, Nidi Pub. Ltd. Bikaner.
2. Bharucha, Franch, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380013, India .
3. Brunner R.C. 1989, Hazardous Waste Incineration, Mc. Graw Hill Inc. 480p.
4. Clark R.S., Marine Pollution, Slanderson Press Oxford (TB).
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Pub. House, Mumbai. 1195p.
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment ®.
8. Gleick, H.P., 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env. Institute, Oxford Univ., Press 473p.
9. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R).
10. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
11. H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Helhi 284p.
12. McKinney, M.L. & Schoch, RM 1996, Environmental Sciences Systems & Solutions, Web enhanced Edition 639p.
13. Mhaskar A.K., Mater Hazardous, Tekchno-Sciences Publications (TB).
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB).
15. Odum, E.P. 1971, Fundamentals of Ecology, W.B. Saunders Co. USA, 574p.
16. Rao M.N. & Dutta, A.K. 1987, Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd., 345p
17. Sharma, B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
18. Survey of the Environment, The Hindu (M).
19. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Sciences (TB).
20. Trivedi, R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II Enviro Mdia (R).
21. Trividi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II Enviro Media (R).
22. Trividi R.K. and P.K. Goel, Introduction to air pollution, Techno Sciences Pub. (TB).
23. Wagner K.D., 1998, Environmental Management, W.B. Saunders Co. Philadelphia, USA 499p.
24. A text bok environmental education G.V.S. Publishers by Dr. J.P. Yadav.  
(M) Magazine (R) Reference (TB) Textbook

### NOTE:

1. Examiner will set eight questions. Students will be required to attempt five Questions.
2. The awards of this paper shall not be counted in the award of the Degree/DMC.





### SYLLABUS: B Tech (Automobile Engineering)

Department: Automobile – 3<sup>rd</sup> Semester

Subject: Basics Of Automobile Engineering(Theory)

Subject Code: AE 201B

#### Detailed Content

##### **UNIT NO.1 Introduction To Automobiles**

- Topic No.1 Classification of Two Wheelers, Three Wheelers and Four Wheeled Vehicles
- Topic No.2 Application & Capacity, Study of Main Specifications
- Topic No.3 Classification, Components, Requirements of Automobile Body
- Topic No.4 Vehicle Frame, Separate Body & Frame, Unitised Body, Car Body Styles
- Topic No.5 Bus Body & Commercial Vehicle Body Types
- Topic No.6 Front Engine Rear Drive & Front Engine Front Drive Vehicles
- Topic No.7 Four Wheel Drive Vehicles
- Topic No.8 Safety considerations; Safety features of latest vehicle
- Topic No.9 Future trends in automobiles, Clutches : Requirement of Clutches
- Topic No.10 Principle of Friction Clutch , Wet Type & Dry Types; Single Plate Clutch
- Topic No.11 Diaphragm Spring Clutch
- Topic No.12 Multi plate Clutch, Centrifugal Clutches, Electromagnetic Clutch
- Topic No.13 Over Running Clutch, Clutch Linkages

##### **UNIT NO.2 Power Transmission**

- Topic No.14 Requirements of transmission system
- Topic No.15 General Arrangement of Power Transmission system
- Topic No.16 Object of the Gear Box; Different types of Gear Boxes
- Topic No.17 Sliding Mesh, Constant Mesh
- Topic No.18 Synchro- mesh Gear Boxes, Epi-cyclic Gear Box, Freewheel Unit
- Topic No.19 Overdrive unit-Principle of Overdrive
- Topic No.20 Advantage of overdrive, Transaxle, Transfer cases., Drive Lines, Universal Joint
- Topic No.21 Differential and Drive Axles
- Topic No.22 Effect of driving thrust and torque reactions, Hotchkiss Drive
- Topic No.23 Torque Tube Drive and radius Rods
- Topic No.24 Propeller Shaft, Universal Joints, Slip Joint
- Topic No.25 Constant Velocity Universal Joints
- Topic No.26 Front Wheel Drive, Principle, Function
- Topic No.27 Construction & Operation of Differential; Rear Axles
- Topic No.28 Types of load on Rear Axles
- Topic No.29 Full Floating, three quarter Floating and Semi Floating Rear Axles

##### **UNIT NO.3 Suspension Systems**

- Topic No.30 Need of Suspension System, Types of Suspension
- Topic No.31 Factors influencing ride comfort, Suspension Spring
- Topic No.32 Constructional details and characteristics of leaf springs
- Topic No.33 Steering System : Front Wheel geometry
- Topic No.34 Wheel alignment viz. Caster, Camber, King pin Inclination
- Topic No.35 Toe-in/Toe-out, Conditions for true rolling
- Topic No.36 Motions of Wheels during steering
- Topic No.37 Different types of Steering Gear Boxes
- Topic No.38 Steering linkages and layout
- Topic No.39 Power steering ,Rack & Pinion Power Steering Gear
- Topic No.40 Electronics steering



### UNIT NO.4 Brakes, Tyres , Wheels & Emission Control System

Topic No.41	Classification of Brakes
Topic No.42	Principle and constructional details of Drum Brakes
Topic No.43	Disc Brakes , Brake actuating systems
Topic No.44	Mechanical, Hydraulic, Pneumatic Brakes
Topic No.45	Factors affecting Brake performance
Topic No.46	Power & Power Assisted Brakes
Topic No.47	Tyres of Wheels; Types of Tyre
Topic No.48	Their constructional details, Wheel Balancing
Topic No.49	Tyre Rotation; Types of Tyre wear & their causes.
Topic No.50	Sources of Atmospheric Pollution from the automobile
Topic No.51	Emission Control Systems Construction
Topic No.52	Operation of Positive Crank Case Ventilation ( PVC) Systems
Topic No.53	Evaporative Emission Control
Topic No.54	Heated Air Intake System, Exhaust Gas Recirculation ( ECR ) Systems
Topic No.55	Air Injection System , Catalytic Converters
Topic No.56	Purpose construction & operation of lead acid Battery
Topic No.57	Capacity Rating & Maintenance of Batteries
Topic No.58	Purpose and Operation of Charging Systems
Topic No.59	Purpose and Operations of the Starting System
Topic No.60	Vehicle Lighting 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 BOOKS:

1. Automobile Engineering by Anil Chhikara, Satya Prakashan, New Delhi.
2. Automobile Engineering by Dr. Kirpal Singh, Standard Publishers Distributors.

### REFERENCE BOOKS:

1. Automotive Mechanics by Crouse / Anglin, TMH.
2. Automotive Technology by H.M. Sethi, TMH, New Delhi.
3. Automotive Mechanics by S.Srinivasan, TMH, New Delhi.
4. Automotive Mechanics by Joseph Heitner, EWP.

### 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 – 3<sup>rd</sup> Semester

Subject: Engineering Thermodynamics(Theory)

Subject Code: AE 203B

#### Detailed Content

#### UNIT NO.1 Basic Concepts

Topic No.44: Zeroth law, First law. Steady flow energy equation, Heat and work transfer in flow and non- flow processes

Topic No.45: Second law, Kelvin Planks and Clausius statements, Concept of entropy, Clausius inequality

Topic No.46: Entropy changes in non-flow processes, Properties of gases and vapours, Rankine cycle

#### UNIT NO.2 Air Standard Cycles & One Dimensional Fluid Flow

Topic No.47: Otto, Diesel Dual combustion and Brayton cycles, Air standard efficiency, Mean effective PR.

Topic No.48: Reciprocating air compressors, Application of continuity and energy equations

Topic No.49: Isentropic flow of ideal gases through nozzles, Simple jet propulsion system

#### UNIT NO.3 Refrigeration And Air-Conditioning

Topic No.50: Principles of refrigeration, air-conditioning and heat pumps, Vapour compression

Topic No.51: Vapour absorption systems, Co-efficient of performance and Properties of refrigerants

#### UNIT NO.4 Heat Transfer

Topic No.52: Conduction in parallel, radial and composite wall, Convective heat transfer with laminar

Topic No.53: Turbulent flows, Overall heat transfer co-efficient, Flow through heat exchangers

Topic No.54: Fundamentals of radiative heat transfer

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

#### TEXT & REFERENCE BOOKS:

1. Nag P.K. Engineering Thermodynamics, Tata McGraw Hill Co Ltd
2. Mayhew and Rogers, Engineering Thermodynamics, Longman Green & Co Ltd., London, E.L.B.S
3. Van Wylen.G.J. and Sonntag. R.E., Fundamentals of Classical Thermodynamics
4. D.H.Bacon, Engineering Thermodynamics, Butterworth & Co., London
5. M.A.Sadd Thermodynamics for Engineers, Prentice Hall of India Pvt Ltd
6. Reynolds, Thermodynamics, Int.Student Edn, McGraw Hill Book Co Ltd.

#### NOTE:

5. 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.
6. 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 – 3<sup>rd</sup> Semester

Subject: Mechanics Of Solids(Theory)

Subject Code: AE 205B

#### Detailed Content

#### UNIT NO.1 Stress, Strain And Deformation Of Solids Stress

- Topic No.55: Rigid and Deformable bodies – Strength, Stiffness and Stability , Stresses; Tensile, Compressive
- Topic No.56: Shear Deformation of simple and compound bars under axial load , Thermal stress
- Topic No.57: Elastic constants , Strain energy and unit strain energy
- Topic No.58: Strain energy in uni axial load.

#### UNIT NO.2 Beams - Loads And Stresses

- Topic No.59: Types of beams: Supports and Loads , Shear force and Bending Moment in beams
- Topic No.60: Cantilever, Simply supported and Overhanging beams , Stresses in beams
- Topic No.61: Theory of simple bending , Stress variation along the length and in the beam section
- Topic No.62: Effect of shape of beam section on stress induced ,Shear stresses in beams , Shear flow

#### UNIT NO.3 Torsion

- Topic No.63: Analysis of torsion of circular bars ,Shear stress distribution , Bars of Solid
- Topic No.64: Hollow circular section , Stepped shaft – Twist and torsion stiffness , Compound shafts
- Topic No.65: Fixed and simply supported shafts , Application to close-coiled helical springs
- Topic No.66: Maximum shear stress in spring section including Wahl Factor
- Topic No.67: Deflection of helical coil springs under axial loads , Design of helical coil springs
- Topic No.68: Stresses in helical coil springs under torsion loads

#### UNIT NO.4 Beam Deflection & Analysis Of Stresses In 2D

- Topic No.69: Elastic curve of Neutral axis of the beam under normal loads
- Topic No.70: Evaluation of beam deflection and slope, Double integration method
- Topic No.71: Macaulay Method , Moment-area Method , Columns – End conditions
- Topic No.72: Equivalent length of a column , Euler equation & Slenderness ratio
- Topic No.73: Rankine formula for columns, Biaxial state of stresses
- Topic No.74: Thin cylindrical and spherical shells ,Deformation in thin cylindrical and spherical shells
- Topic No.75: Biaxial stresses at a point ,Stresses on inclined plane – Principal planes and stresses
- Topic No.76: Mohr's circle for biaxial stresses ,Maximum shear stress
- Topic No.77: Strain energy in bending and torsion

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	

#### TEXT BOOKS:

1. Popov E.P, "Engineering Mechanics of Solids", Prentice-Hall of India, New Delhi
2. Beer F. P. and Johnston R," Mechanics of Materials", McGraw-Hill Book Co, Third Edition

#### REFERENCES:

1. Nash W.A, "Theory and problems in Strength of Materials", Schaum Outline Series, McGraw-Hill Book Co, New York
2. Kazimi S.M.A, "Solid Mechanics", Tata McGraw-Hill Publishing Co., New Delhi
3. Ryder G.H, "Strength of Materials, Macmillan India Ltd"

#### 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 – 3<sup>rd</sup> Semester**

**Subject: Engineering Mechanics (Theory)**

**Subject Code: ME 205B**

#### **Detailed Content**

#### **UNIT NO.1 Review Of Basic Force Systems & Equilibrium**

- Topic No.78: Dimensions and units of mechanics
- Topic No.79: Idealization of mechanics, laws of mechanics
- Topic No.80: Vector algebra review, Moment of a force about a point and axis
- Topic No.81: The couple and couple moment, Addition and subtraction of couples
- Topic No.82: Moment of a couple about a line, Translation of a force to a parallel position
- Topic No.83: Resultant of a force system, Problems, Introduction, free body diagram
- Topic No.84: Control volumes, general equations of equilibrium
- Topic No.85: Two point equivalent loading, static in-determinacy
- Topic No.86: Simple truss, method of joints, method of sections, Problems

#### **UNIT NO.2 Properties Of Surfaces & Moments & Products Of Inertia**

- Topic No.87: First moment of an area and the centroid
- Topic No.88: Principal axes, formal definition of inertia quantities
- Topic No.89: Relation between mass-inertia terms and area-inertia terms
- Topic No.90: Translation of coordinate axes, Transportation properties of the inertia terms
- Topic No.91: Brief introduction to tensors, the inertia of ellipsoid, Principal moments of inertia, Problems

#### **UNIT NO.3 Kinematics Of Particles And Rigid Bodies**

- Topic No.92: Velocity and acceleration in path and cylindrical coordinates
- Topic No.93: Motion of a particle relative to a pair of translating axes
- Topic No.94: Translation and rotation of rigid bodies, Chasles theorem, moving reference
- Topic No.95: Velocity and acceleration for different references, Inertia and coriolis forces, Problems

#### **UNIT NO.4 Particle Dynamics, Energy Methods & Momentum Methods**

- Topic No.96: Newton's law for rectangular coordinates, Newton's law for cylindrical coordinates
- Topic No.97: Rectifier translation, central force motion, Newton's law for path variables
- Topic No.98: Work energy equations for a systems of particles
- Topic No.99: Linear and angular momentum equations for a systems of particles, Problems

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. Engineering Mechanics - Statics & Dynamics by I.H. Shames, PHI, New Delhi.
2. Engineering Mechanics – Timoschenko.

#### **REFERENCE BOOKS:**

1. Statics & Dynamics by J.L. Meriam, JohnWiley & Sons (P) Ltd. New York.
2. Statics & Dynamics by Beer & Johnson, MGH, New Delhi.

#### **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 – 3<sup>rd</sup> Semester

Subject: Fluid Mechanics & Machinery (Theory)

Subject Code: AE 207B

#### Detailed Content

##### **UNIT NO.1 Basic Concepts And Properties**

- Topic No.1: Fluid; definition, distinction between solid and fluid, Units and dimensions  
Topic No.2: Properties of fluids; density, specific weight, specific volume, Specific gravity, temperature  
Topic No.3: Viscosity, compressibility, Vapour pressure, capillary and surface tension  
Topic No.4: Fluid statics- concept of fluid static pressure, Absolute and gauge pressures  
Topic No.5: Pressure measurements by manometers and pressure gauges

##### **UNIT NO.2 Fluid Kinematics And Fluid Dynamics**

- Topic No.6: Fluid Kinematics; Flow visualization, Lines of flow; types of flow  
Topic No.7: Velocity field and acceleration, Continuity equation (one and three dimensional differential forms)  
Topic No.8: Equation of streamline, Stream function; velocity potential function, Circulation; flow net  
Topic No.9: Fluid dynamics, Equations of motion; Euler's equation along a streamline  
Topic No.10: Bernoulli's equation; applications, Venturi meter; Orifice meter, Pitot tube  
Topic No.11: Dimensional analysis; Buckingham's theorem; applications, Similarity laws and models

##### **UNIT NO.3 Incompressible Fluid Flow**

- Topic No.12: Viscous flow; Navier - Stoke's equation (Statement only)  
Topic No.13: Shear stress, pressure gradient relationship, Laminar flow between parallel plates  
Topic No.14: Laminar flow through circular tubes (Hagen poiseuille's), Hydraulic and energy gradient  
Topic No.15: Flow through pipes, Darcy; weisback's equation, Pipe roughness; friction factor  
Topic No.16: Moody's diagram; minor losses, Flow through pipes in series and in parallel  
Topic No.17: Power transmission, Boundary layer flows, boundary layer thickness,  
Topic No.18: Boundary layer separation; drag and lift coefficients.

##### **UNIT NO.4 Hydraulic Turbines & Hydraulic Pumps**

- Topic No.19: Fluid machines, definition and classification, Exchange of energy - Euler's equation for turbo machines  
Topic No.20: Construction of velocity vector diagram's, Head and specific work  
Topic No.21: Components of energy transfer; degree of reaction, Hydro turbines: definition and classifications  
Topic No.22: Pelton turbine, Francis turbine, Propeller turbine, Kaplan turbine, Working principles; velocity triangles  
Topic No.23: Work done; specific speed; efficiencies; performance curve for turbines  
Topic No.24: Pumps: definition and classifications, Centrifugal pump: classifications, working principles  
Topic No.25: Velocity triangles, specific speed, Efficiency and performance curves, Reciprocating pump  
Topic No.26: Classification, working principles, Indicator diagram, work saved by air vessels and  
Topic No.27: Performance curves, cavitations in pumps, Rotary pumps: working principles of gear and vane pumps

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	

##### **TEXT BOOKS:**

1. Streeter, V.L., and Wylie, E.B., "Fluid Mechanics", McGraw-Hill.
2. Kumar, K.L., "Engineering Fluid Mechanics", Eurasia Publishing House (P) Ltd., New Delhi.
3. Varanasi, V.P., "Hydraulic Machines - Theory and Design", Khanna Publishers.

##### **REFERENCE BOOKS:**

1. Bansal, R.K., "Fluid Mechanics and Hydraulics Machines", (5th edition), Laxmi publications(P) Ltd., New Delhi.
2. White, F.M., "Fluid Mechanics", Tata McGraw-Hill, 5th Edition, New Delhi.
3. Ramamirtham, S., "Fluid Mechanics and Hydraulics and Fluid Machines", Dhanpat Rai and Sons, Delhi



### SYLLABUS: B Tech (AE)

Department: Automobile Engineering – 3<sup>rd</sup> Semester

Subject: Automobile Engineering Drawing Lab

Subject Code: AE 209B

#### Detailed Content

#### List of Experiment:

##### UNIT I

**JOINTS AND PULLEYS:** Universal Joint, Slip Joint, Stepped or Cone Pulley, V-Belt Pulley.

**ENGINE BEARINGS :** Bush Bearing; Split Bearing; Thrust Bearing; Ball Bearing; Roller Bearing; Straight and Needle.

##### UNIT II

**ENGINE COMPONENTS:** Four Stroke Petrol Engine Piston; Two Stroke Petrol Engine Piston; Four Stroke Diesel Engine Piston; Connecting Rod; Crank Shaft of 4 Cylinder Engines; Crank Shaft of Single Cylinder Engines.

##### UNIT II

**GEARS:** Drawing of Gear Tooth Profile for Spur Gear, Nomenclature and Profiles Approximate and Unwin's Method

**CAM PROFILES:** Different Types of Cams and Followers; Types of Motion of Follower; Uniform Velocity Motion; Simple Harmonic Motion; Uniformly Accelerated and Retarded Motion; Drawing of Cam Profiles for the Above Motions

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
1		4	4	40	60	3 hours	100

#### NOTE:

- For class work, the students shall be assigned to prepare at least ten drawing sheets covering all units and each topic of the syllabus.
- For theory examination, the examiner will set a question paper containing total six questions, two questions from each unit covering each topic of the syllabus; students are required to attempt three questions at least one from each unit. Each question will carry equal marks

#### RECOMMENDED BOOKS:

- Engineering Drawing by RB Gupta; Satya Parkasan, New Delhi
- Machine Drawing by PS Gill; BD Kataria and Sons, Ludhiana
- Machine Drawing by Lakshminarayan; Jain Brothers, New Delhi



**SYLLABUS: B Tech (AE)**

**Department: Automobile Engineering – 3<sup>rd</sup> Semester**

**Subject: Mechanics Of Solids Lab**

**Subject Code: AE 211B**

**Detailed Content**

**List of Experiments:**

1. To study the Brinell hardness testing machine & perform the Brinell hardness test.
2. To study the Rockwell hardness testing machine & perform the Rockwell hardness test.
3. To study the Vickers hardness testing machine & perform the Vickers hardness test.
4. To study the Erichsen sheet metal testing machine & perform the Erichsen sheet metal test.
5. To study the Impact testing machine and perform the Impact tests (Izod & Charpy).
6. To study the Universal testing machine and perform the tensile test.
7. To perform compression & bending tests on UTM.
8. To perform the shear test on UTM.
9. To study the torsion testing machine and perform the torsion test.
10. To draw shear Force, Bending Moment Diagrams for a simply Supported Beam under Point and Distributed Loads.

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

**NOTE:**

1. At least 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 department as per the scope of the syllabus.





**SYLLABUS: B Tech (AE)**

**Department: Automobile Engineering – 3<sup>rd</sup> Semester**

**Subject: Computer Aided Drafting Lab**

**Subject Code: AE 213B**

**Detailed Content**

The students will be required to carry out the following exercises using any one of the educational CAD softwares like Latest version of AUTOCAD, I-DEAS, CATIA, SOLID EDGE, PRO-ENGINEER etc).

**List of Experiments:**

**UNIT I**

1. Start a New Drawing, Name the Drawing Sheet, Set the Drawing Units, Drawing Precision, Drawing Limits, Grid, Snap and Draw the Margin and Title Block as given in Exercise Problems Sheet.
2. Redraw the 2D Figures including dimensions as given in Exercise Problems Sheet using various Fundamental of 2D commands in Draw and Modify Toolbars
3. Redraw the 2D Figures including dimensions as given in Exercise Problems Sheet using various Advance commands in Osnap, Grip, Block, Layers, Attributes, Edit Toolbars

**UNIT II**

4. Draw Front, Top, and Right Side Orthogonal view of each of the objects in given Exercise Problems Sheet using View Port commands
5. Draw 3D Surface Models of the Objects as given in Exercise Problems Sheet, using fundamental of 3D Drawing and Surface commands
6. Draw 3D Solid Models of the Objects as given in Exercise Problems Sheet, using fundamental of 3D Drawing and Solid commands

**UNIT III**

7. Draw 3D Models of different types of Joints, Pulleys and Engine Bearings as given in Exercise Problems Sheet.
8. Draw 3D Models of different types of Engine Piston, Connecting Shafts and Crank Shafts as given in Exercise Problems Sheet.  
Draw 3D Models of Simple Automobile Assemblies of Gears & Cam Followers as given in Exercise Problems Sheet for the Above Motions

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. For class work, the students should be assigned to prepare at least ten drawing sheets covering all units and each topic/experiment/exercise of the syllabus.
2. For practical examination, the examiner should set a question paper containing total three questions, one question from each unit covering all units and each topic/experiment/exercise of the syllabus; students are required to attempt all the three questions.



### SYLLABUS: B Tech (AE)

Department: Automobile Engineering – 3<sup>rd</sup> Semester

Subject: Fluid Mechanics & Machinery Lab

Subject Code: AE 215B

### Detailed Content

#### List of Experiments:

1. Determination of the Coefficient of discharge of given Orifice meter.
2. Determination of the Coefficient of discharge of given Venturi meter.
3. Calculation of the rate of flow using Rotameter.
4. Determination of friction factor of given set of pipes.
5. Conducting experiments and drawing the characteristic curves of centrifugal pump /submergible pump
6. Conducting experiments and drawing the characteristic curves of reciprocating pump.
7. Conducting experiments and drawing the characteristic curves of Gear pump.
8. Conducting experiments and drawing the characteristic curves of Pelton wheel.
9. Conducting experiments and drawing the characteristics curves of Francis turbine.
10. Conducting experiments and drawing the characteristic curves of Kaplan turbine.

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. At least 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 department as per the scope of the syllabus.



### SYLLABUS: B Tech (AE)

Department: Automobile Engineering – 3<sup>rd</sup> Semester

Subject: Automobile Workshop Lab

Subject Code: AE 217B

### Detailed Content

#### List of Experiments:

1. Work on Lifting Equipment.
2. Work on Wheel Care Equipment.
3. Work on Body Shop Equipment.
4. Work on Weld Shop Equipment.
5. Work on Cleaning Equipment.
6. Work on Paint Shop Equipment.
7. Work on Power Tools.
8. Work on Injector Diagnostic, Testing & servicing Equipment.
9. Work on A/C Recharging, Recovery & Recycling Equipment.
10. Work on Battery Tester, Brake Bleeder & Coolant Flush-N-Fill Equipment.
11. Work on Gas & Smoke Analyzer Equipment.

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

#### NOTE:

1. At least 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 department as per the scope of the syllabus.



**SYLLABUS: B Tech (Auto)**

**Department: Automobile Engineering–3<sup>rd</sup> Semester**

**Subject: Environmental Studies Field Work**

**Subject Code: GES 203B**

**Detailed Content**

**Field Work:**

- Visit to a local area to document environmental assets – river/ forest/ grassland/ hill/ mountain.
- Visit to a local polluted site-Urban/ Rural/ Industrial/ Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems – pond, river, hill slopes, etc. (Field work equal to 5 lectures hours).
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**Note:** The awards of this paper shall not be counted in the award of the Degree/DMC.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
-	-	-	0	25	-	-	25

