SCHEME OF STUDIES & EXAMINATIONS
Department: Automobile Engineering – 4th 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 201 B OR GES 201 B	ENGINEERING ECONOMICS (Except BT & BME) (Gr- B) ENVIRONMENTAL STUDIES (Gr-A)	4 3	- -		25 -	75 75*	-	100 75*	4 --	3
2	AE 202B	THEORY OF MACHINE	3	1		25	75	-	100	4	3
3	AE 204B	AUTOMOBILE PETROL ENGINES	3	1		25	75	-	100	4	3
4	AE 206B	AUTOMOBILE DIESEL ENGINES	3	1		25	75	-	100	4	3
5	AE 208B	COMBUSTION AND HEAT TRANSFER	3	1		25	75	-	100	4	3
6	AE 210B	AUTOMOBILE ENGINEERING MATERIALS	3	1		25	75	-	100	4	3
7	AE 212B	THEORY OF MACHINE LAB	-	-	2	20	-	30	50	1	3
8	AE 214B	AUTOMOBILE ENGINE COMPONENT LAB	-	-	2	20	-	30	50	1	3
9	AE 216B	COMBUSTION AND HEAT TRANSFER LAB	-	-	2	20	-	30	50	1	3
10	AE 218B	AUTOMOBILE ENGINEERING MATERIALS LAB	-	-	2	20	-	30	50	1	3
11	GES 203 B	ENVIRONMENTAL STUDIES FIELD WORK (Gr-A)	-	-	-	-	-	25*	25*	-	
12	GPAE 202B	GENERAL PROFICIENCY & ETHICS	1	-	-	-	-	75	75	2	3
		Total Gr-B	**20**	**5**	**9**	**230**	**450**	**195**	**875**	**30**	
		Gr-A	**19**	**5**	**9**	**205**	**375**	**195**	**775**	**26**	

Note:

1. Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency & Ethics Syllabus.
2. *The Environmental studies (GES-201 B & Environment Studies Field work (GES-203B) are compulsory & qualifying courses.
3. The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
4. Electronics gadgets including Cellular phones are not allowed in the examination
5. Each students has to undergo Professional Training of at least 4 weeks from the industry, institute, research lab, training center etc during summer vacation and its evaluation shall be carries out in the V semester
6. 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.

SYLLABUS: B Tech (Automobile Engineering)

Department: Automobile – 4th Semester

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: Internet and External economics and diseconomies of scale , Meaning of Market, Type of Marker
Topic No.14: Perfect Competition, Monopoly, Oligopoly, Monopolistic competition

UNIT NO.4 Supply , Econiomy 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 , Monitory 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 Ecomomic Theory" S. Chand Publication, New Delhi
2. Dewett K.K "Modern Ecomomic 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 Ecomomic 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 – 4th 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 awarenes

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 – Famility 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 Pllution, 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., Environmenal 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, Bomaby Natural History Scociety, 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, Wadsoworth 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 Mdiea (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. Philadelophia, 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 – 4th Semester

Subject: Theory Of Machine (Theory) **Subject Code: AE 202 B**

Detailed Content

UNIT NO.1 Mechanisms & Friction

Topic No.44: Machine Structure, Kinematic link, Pair and chain, Grueblers criteria
Topic No.45: Constrained motion, Degrees of freedom, Lider crank and crank rocker mechanisms
Topic No.46: Inversions, Applications , Kinematic analysis of simple mechanisms
Topic No.47: Determination of velocity and acceleration, Friction in screw and nut, Pivot and collar
Topic No.48: Thrust bearing , Plate and disc clutches, Flat , V Belt and rope drives
Topic No.49: Ratio of tensions, Effect of centrifugal and initial tension
Topic No.50: Condition for maximum power transmission , Open and crossed belt drive

UNIT NO.2 Gearing And Cams

Topic No.51: Gear profile and geometry, Nomenclature of spur and helical gears
Topic No.52: Gear trains: Simple, compound gear trains , Epicyclic gear trains
Topic No.53: Determination of speed and torque, Cams – Types of cams
Topic No.54: Design of profiles ,Knife edged, Flat faced and roller ended followers with and without offsets for Various types of follower motions

UNIT NO.3 Balancing

Topic No.55: Static and dynamic balancing, Single and several masses in different planes
Topic No.56: Balancing of reciprocating masses, Primary balancing and concepts of secondary balancing
Topic No.57: Single and multi cylinder engines (Inline) , Balancing of radial V engine
Topic No.58: Direct and reverse crank method

UNIT NO.4 Vibration

Topic No.59: Free, forced and damped vibrations of single degree of freedom systems
Topic No.60: Force transmitted to supports
Topic No.61: Vibration isolation – Vibration absorption
Topic No.62: Torsional vibration of shaft
Topic No.63: Single and multi rotor systems , Geared shafts , Critical speed of shaft

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. Rattan.S.S, “Theory of Machines”, Tata McGraw–Hill Publishing Co., New Delhi
2. Ballaney.P.L, “Theory of Machines”, Khanna Publishers, New Delhi
3. R.S. Khurmi and J.K. Gupta, “Theory of Machines”, S.Chand&co

REFERENCES:

1. Rao, J.S and Dukkipati, R.V, “Mechanism and Machine Theory”, Second Edition, Wiley Eastern Ltd.
2. Malhotra, D.R and Gupta, H.C., “The Theory of Machines”, Satya Prakasam, Tech. India Publications
3. Gosh, A. and Mallick, A.K., “Theory of Machines and Mechanisms”, Affiliated East West Press
4. Shigley, J.E. and Uicker, J.J., “Theory of Machines and Mechanisms”, McGraw-Hill

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 – 4th Semester

Subject: Automobile Petrol Engine (Theory) **Subject Code: AE 204B**

Detailed Content

UNIT NO.1 Engine Construction And Operation

Topic No.64: Constructional details of four stroke petrol engine
Topic No.65: Working principle, air standard Otto cycle, actual indicator diagram
Topic No.66: Two stroke engine construction and operation
Topic No.67: Comparison of four stroke and two stroke engine operation
Topic No.68: Firing order and its significance, Port Timing, Valve Timing of petrol engines

UNIT NO.2 Si Engine Fuel System

Topic No.69: Carburetor working principle , Requirements of an automotive Carburetor starting
Topic No.70: Idling, acceleration and normal circuits of carburetors, Compensation, maximum power devices
Topic No.71: Constant choke and constant vacuum carburetors, Fuel feed systems
Topic No.72: Mechanical and electrical fuel feed pumps, Petrol injection, MPF

UNIT NO.3 Ignition, Cooling And Lubrication System

Topic No.73: Types and working of battery coil and magneto ignition systems
Topic No.74: Relative merits and demerits, centrifugal and vacuum advance mechanisms
Topic No.75: Types and construction of spark plugs, electronic ignition systems
Topic No.76: Need for cooling system, Types of cooling system
Topic No.77: Air cooling system, liquid cooling system, Forced circulation system
Topic No.78: Pressure cooling system, Lubrication system; mist, wet sump lubrication system
Topic No.79: Properties of lubricants

UNIT NO.4 Combustion And Combustion Chambers

Topic No.80: Combustion in SI engine; stages of combustion
Topic No.81: Flame propagation, rate of pressure rise, abnormal combustion
Topic No.82: Detonation, effect of engine variables on knock, knock rating
Topic No.83: Combustion chambers; different types
Topic No.84: Factors controlling combustion chamber design

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. Ganesan.V, “Internal Combustion Engines”, Tata McGraw-Hill Publishing Co., New Delhi
2. M.L.Mathur and R.P.Sharma, “A course in Internal combustion engines”, Dhanpat Rai & Sons Publications, New Delhi
3. K.K.Ramalingam, “Internal Combustion Engines”, SciTech Publications, Chennai

REFERENCES:

1. Heldt P.M., “High Speed Combustion Engines”, Oxford IBH Publishing Co., Calcutta
2. Obert E.F., “Internal Combustion Engines Analysis and Practice”, International Text Books Co Scrantron, Pennsylvania
3. William H.Crouse., “Automotive Engines”, McGraw-Hill Publishers
4. Ellinger H.E., “Automotive Engines”, Prentice Hall Publishers

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 – 4th Semester

Subject: Automobile Diesel Engine (Theory) **Subject Code: AE 206B**

Detailed Content

UNIT NO.1 Basic Theory

Topic No.85: Diesel engine construction and operation
Topic No.86: Two stroke and four stroke diesel dual cycle engines
Topic No.87: Diesel cycle, fuel-air and actual cycle analysis
Topic No.88: Diesel fuel, ignition quality, cetane number
Topic No.89: Laboratory tests for diesel fuels, standards and specifications

UNIT NO.1 Fuel Injection System

Topic No.90: Requirements, air and solid injection, functions of components
Topic No.91: Jerk and distributor type pumps common rail system
Topic No.92: PTFI system pressure waves, injection lag, unit injector
Topic No.93: Mechanical and pneumatic governors, Fuel injector, types of injection nozzle
Topic No.94: Nozzle tests, spray characteristics, Injection timing, pump calibration

UNIT NO.3 Air Motion, Combustion And Combustion Chambers

Topic No.95: Importance of air motion, swirl, squish, turbulence, Swirl ratio, fuel air Mixing
Topic No.96: Stages of combustion, delay period, factors affecting delay period
Topic No.97: Knock in CI engines, Combustion chamber; design requirements
Topic No.98: Direct and indirect injection Combustion chambers, M type combustion C.C.

UNIT NO.4 Supercharging And Turbocharging, Diesel Engine Testing And Performance

Topic No.99: Necessity and limitations, Types of supercharging, turbo charging, relative merits
Topic No.100: Matching of turbocharger, exhaust gas recirculation, charge cooling.
Topic No.101: Automotive and stationary diesel engine testing & related emission standard
Topic No.102: Engine performance and emission characteristics
Topic No.103: Variables affecting engine performance and emission
Topic No.104: Methods to improve engine performance, heat balance, performance maps

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. Ganesan.V, “Internal Combustion Engines”, Tata McGraw-Hill Publishing Co., New Delhi
2. M.L.Mathur and R.P.Sharma, “A course in Internal combustion engines”, Dhanpat Rai & Sons Publications, New Delhi
3. K.K.Ramalingam, “Internal Combustion Engines”, SciTech Publications, Chennai

REFERENCES:

1. Heldt P.M., “High Speed Combustion Engines”, Oxford IBH Publishing Co., Calcutta
2. Obert E.F., “Internal Combustion Engines Analysis and Practice”, International Text Books Co Scrantron, Pennsylvania
3. William H.Crouse., “Automotive Engines”, McGraw-Hill Publishers
4. Ellinger H.E., “Automotive Engines”, Prentice Hall Publishers
5. John B.Heywood., “Internal Combustion Engine Fundamental”, McGraw-Hill

NOTE:

7. 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.
8. 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 – 4th Semester

Subject: Combustion And Heat Trasfer (Theory) **Subject Code: AE 208 B**

Detailed Content

UNIT NO.1 Introduction To Combustion Processes

Topic No.105: Combustion in premixed and diffusion flames
Topic No.106: Combustion process in IC engines

UNIT NO.2 Normal, Abnormal Combustion In Si Engines

Topic No.107: Stages of combustion & Flame propagation
Topic No.108: Rate of pressure rise & Cycle to cycle variation
Topic No.109: Abnormal combustion & Theories of detonation
Topic No.110: Effect of engine operating variables on combustion

UNIT NO.3 Combustion And Knock In Ci Engines

Topic No.111: Droplet and spray combustion theory
Topic No.112: Stages of combustion, delay period & peak pressure
Topic No.113: Heat release, Gas temperature & Diesel knock

UNIT NO.4 (A) Heat Transfer In Ic Engines

Topic No.114: Basic definitions, Conduction heat transfer
Topic No.115: Convective heat transfer, Radiation heat transfer
Topic No.116: Temperature distribution and thermal stresses in piston
Topic No.117: Cylinder liner - Cylinder head , Fins and values

UNIT NO.4 (B) Experimental Investigation Of Combustion And Heat Transfer In Ic Engines:

Topic No.118: Photographic studies of combustion processes
Topic No.119: P-θ diagram in SI and CI engines, Anemometry
Topic No.120: Temperature measurement in piston
Topic No.121: Cylinder liner, cylinder head and engine valves

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. SPALDING.D.B., “Some fundamental of Combustion ", Butterworth Science Publications, London

REFERENCES:

1. Lewis.B., Pease.R.N. and Taylor.H.S., " Combustion Process High Speed Gas dynamics and Jet Propulsion Series ", Princeton University Press, Princeton, New Jersey.
2. Taylor.E.F. " The Internal Combustion Engines ", International Text Book Co., Pennsylvania
3. Ganesan.V. " Internal Combustion Engines ", Tata McGraw Hill Co
4. Holman J.P “Heat and Mass Transfer” Tata McGraw-Hill
5. Obert E.F., “Internal Combustion Engines Analysis and Practice”, International Text Books Co Scrantron, Pennsylvania
6. William H.Crouse., “Automotive Engines”, McGraw-Hill Publishers

NOTE:

9. 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.
10. 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 – 4th Semester

Subject: Automobile Engineering Materials (Theory) **Subject Code: AE 210 B**

Detailed Content

UNIT NO.1 Crystal Structure, Consitituion Of Alloys And Phase Diagrams

Topic No.122: Crystal structure – BCC, FCC and HCP structure
Topic No.123: Unit cell – crystallographic planes and directions, miller indices
Topic No.124: Crystal imperfections, point, line, planar and volume defects
Topic No.125: Grain size, ASTM grain size number; Constitution of alloys
Topic No.126: Solid solutions, substitutional and interstitial
Topic No.127: Phase diagrams, Isomorphism, eutectic, peritectic
Topic No.128: Eutectoid and peritectroid reactions
Topic No.129: Iron carbide equilibrium diagram
Topic No.130: Classification of steel and cast Iron microstructure, properties and application

UNIT NO.2 Heat Treatment

Topic No.131: Full annealing, stress relief, recrystallisation and spheroidizing
Topic No.132: Normalizing, hardening and Tempering of steel
Topic No.133: Isothermal transformation diagrams
Topic No.134: Cooling curves superimposed on I.T. diagram CCR
Topic No.135: Hardenability, Jominy end quench test
Topic No.136: Austempering, martempering
Topic No.137: Case hardening, carburizing, nitriding, cyaniding
Topic No.138: Carbonitriding ,Flame and Induction hardening

UNIT NO.3 Selection Of Materials

Topic No.139: Criteria of selecting materials for automotive components
Topic No.140: Viz cylinder block, Cylinder head, piston, piston ring
Topic No.141: Gudgeon pin, connecting rod, crank shaft, crank case, cam, cam shaft
Topic No.142: Engine valve, gear wheel , clutch plate, axle, bearings
Topic No.143: Chassis, spring, body panel, radiator, brake lining etc.

UNIT NO.4 Non-Metallic Materials, Control Of Emissions From Si And Ci Engines

Topic No.144: Types of polymer, commodity and engineering polymers
Topic No.145: Properties and applications of PE, PP, PS, PVC
Topic No.146: PMMA, PET, PC, PA, ABS, PI
Topic No.147: PAI, PPO, PPS, PEEK, PTFE Polymers
Topic No.148: Urea and Phenol formal deliydes
Topic No.149: Engineering Ceramics
Topic No.150: Properties and applications of Al2O3, SiC,Si3, N4, PSZ and Sialon
Topic No.151: Fibre and particulate reinforced composites
Topic No.152: Mechanism of plastic deformation, slip and twinning
Topic No.153: Types of fracture – Testing of materials under tension
Topic No.154: Compression and shear loads
Topic No.155: Hardness tests (Brinell, Vickers and Rockwell)
Topic No.156: Impact test Izod and charpy
Topic No.157: Fatigue and creep test

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. Kenneth G.Budinski and Michael K.Budinski “Engineering Materials” Prentice-Hall of India Private Limited

REFERENCES:

1. William D Callsber “Material Science and Engineering”, John Wiley and Sons
2. Raghavan.V.Materials Science and Engineering, Prentice Hall of India Pvt. Ltd
3. Sydney H.Avner “Introduction to Physical Metallurgy” McGraw-Hill Book Company
4. Khanna.O.P., “Material Science and Metallurgy ", Dhanapat Rai & Sons
5.Dieter.G.E. Mechanical Metallurgy, McGraw Hill, New York
6. Avner.S.H. Introduction to physical metallurgy, McGraw Hill, New York
5. Raghavan.V.Physical Metallurgy, Principle and Pratice, Prentice Hall, 1995.
6. Bawa.H.S.Materials Metallurgy, McGraw Hill, 1986.

NOTE:

11. 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.
12. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

SYLLABUS: B Tech (AE)

Department: Automobile Engineering – 4th Semester

Subject: Theory Of Machine Lab **Subject Code: AE 212B**

Detailed Content

List of Experiments:

1. To study various types of Kinematic links, pairs, chains and Mechanisms.
2. To study inversions of 4 Bar Mechanisms, Single and Double slider crank mechanisms.
3. To plot slider displacement, velocity and acceleration against crank rotation for Single slider crank mechanism.
4. Draw Klein's construction for Single slider crank mechanism.
5. To study the different type of the belt drives.
6. To study various type of cam and follower arrangements.
7. To plot follower displacement v/s cam rotation for various Cam Follower systems.
8. To study various types of gears-Spur, Helical, Double helical, Spiral, Bevel gear, Hypoid
9. To study various types of gear trains – Simple, Compound and Epicyclic
10. To find co-efficient of friction between belt and pulley.
11. To study the working of Screw Jack and determine its efficiency.
12. Draw the involute and cycloidal teeth profile.
13. To perform the experiment for static balancing on Static Balancing Machine
14. To perform the experiment for dynamic balancing on Dynamic Balancing machine
15. Determine the turning moment on crank shaft neglecting weight of the connecting rod in the reciprocating parts of an engine
16. To determine experimentally the unbalance forces and couples of reciprocating parts

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 (AE)

Department: Automobile Engineering – 4th Semester

Subject: Automobile Engine Component Lab **Subject Code AE 214B**

Detailed Content

List of Experiments:

1. Dismantling of 4 cylinder petrol engine.
2. Assembling of 4 cylinder petrol engine.
3. Dismantling of 6 cylinder diesel engine.
4. Assembling of 6 cylinder diesel engine.
5. Study of oil filter, fuel filter, fuel injection system, carburetor, MPFI
6. Study of ignition system components – coil, magneto and electronic ignition systems.
7. Study of engine cooling system components
8. Study of engine lubrication system components
9. Ovality and taper measurement of cylinder bore and comparison with standard specifications
10. Ovality and taper measurement of engine crank shaft and comparison with standard specification

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 (AE)

Department: Automobile Engineering – 4th Semester

Subject: Combustion And Heat Transfer Lab **Subject Code AE 216B**

Detailed Content

List of Experiments:

1. Experiments on Thermal conductivity of solids, liquids and liquids
2. Experiments on Natural convection and forced convection
3. Experiments on Boiling heat transfer and cooling tower
4. Experiments on emissivity and absorvity
5. Experiments on Heat exchangers
6. Experiments on LMTD methods
7. Experiments on mass transfer
8. Experiments on temperature distribution, thermal stresses and Heat transfer in piston, Cylinder liner, Cylinder head, fins and values.
9. Experimental investigation of combustion and heat transfer in IC engines
10. Experimental Photographic studies of combustion processes, P-θ diagram in SI and CI engines
11. Experimental Anemometry

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 (AE)

Department: Automobile Engineering – 4th Semester

Subject: Automobile Engineering Material Lab **Subject Code AE 218B**

Detailed Content

List of Experiments:

1. To study crystal structures with the help of ball model.
2. To study crystal structures and crystals imperfections using ball models.
3. To study microstructures of metals/ alloys through microscopic observation.
4. To study hardening (by quenching) of steel specimen by Jominy Test.
5. To observe effect of tempering temperature on the property of given steel specimen.
6. To study microstructure of heat-treated steel through microscopic observation.
7. To study thermo-setting of plastics.
8. To study the creep behavior of a given specimen.
9. To study the mechanism of chemical corrosion and its protection.
10. To study the properties of various types of plastics.
11. To study Bravais lattices with the help of models.

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 (Auto)
Department: Automobile Engineering–4th 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).
-

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

SYLLABUS: B Tech (Auto)
Department: Automobile Engineering–4th Semester

Subject: General Proficiency **Subject Code: GPAE- 202B**

Detailed Content

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him /her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

A. The student will present a written report before the committee with following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

I.	Academic Performance	--------
II.	Extra Curricular Activities / Community Service, Hostel Activities	(8 Marks)
III	Technical Activities / Industrial, Educational tour	(8 Marks)
IV	Sports/games	(14 Marks)
V	Moral values & Ethics	(15 Marks)

NOTE: Report submitted by the students should be typed on both sides of the paper.

B. A student will support his/her achievement and verbal & communicative skill through presentation before the Committee. (30 Marks)

C. Moral values & Ethics

Syllabus - Process for Value Education, self-evaluation concept and process.

A minor test will be conducted during the semester and It will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.

The evaluation of this course will be made by the following Committee.

University Departments:

1	Chairperson of the Department	Chairman
2	Senior Most Faculty Counselor	Member
3	Vice- Chancellor's Nominee	Member

Affiliated Colleges:

1	Director/Principal	Chairman
2	Head of the Department/Sr. Faculty	Member
3	External Examiner to be appointed by the University	Member

Note: Remuneration will be paid to the external examiner only (at par with the other practical examinations).

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	-	75	-	75