

SEMESTER III

S. No.	Course Code	Course Title	Category	Periods per week			Total contact periods	Credits
				L	T	P		
THEORY								
1.	MA3351	Transforms and Partial Differential Equations	BSC	3	1	0	4	4
2.	ME3393	Manufacturing Processes	PCC	3	0	0	3	3
3.	AU3301	Thermodynamics and Heat Transfer	ESC	3	0	0	3	3
4.	ME3351	Engineering Mechanics	ESC	3	0	0	3	3
5.	AU3302	Automotive Hydraulics and Machinery	ESC	3	0	0	3	3
6.	AU3303	Automotive Engines	PCC	3	0	0	3	3
PRACTICALS								
7.	AU3311	Mechanical Sciences Laboratory	ESC	0	0	4	4	2
8.	ME3382	Manufacturing Technology Laboratory	PCC	0	0	4	4	2
9.	GE3361	Professional Development [§]	EEC	0	0	2	2	1
TOTAL				18	1	10	29	24

§ Skill Based Course

SEMESTER IV

S. No.	Course Code	Course Title	Category	Periods per week			Total Contact Periods	Credits
				L	T	P		
THEORY								
1.	AU3401	Fuels and Lubricants	PCC	3	0	0	3	3
2.	AU3402	Automotive Chassis	PCC	3	0	0	3	3
3.	AU3403	Vehicle Body Engineering	PCC	3	0	0	3	3
4.	ML3391	Mechanics of Solids	ESC	3	0	0	3	3
5.	AU3404	Automotive Transmission	PCC	3	0	0	3	3
6.	GE3451	Environmental Sciences and Sustainability	BSC	2	0	0	2	2
7.		NCC Credit Course Level 2 [#]		3	0	0	3	3 [#]
PRACTICALS								
8.	AU3411	Vehicle Components Laboratory	PCC	0	0	4	4	2
9.	AU3412	Fuels and Lubricants Laboratory	PCC	0	0	4	4	2
TOTAL				17	0	8	25	21

[#] NCC Credit Course level 2 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

OUTCOMES: At the end of the course the students would be able to

1. Demonstrate the safety precautions exercised in the mechanical workshop and join two metals using GMAW.
2. The students able to make the work piece as per given shape and size using machining process such as rolling, drawing, turning, shaping, drilling and milling.
3. The students become make the gears using gear making machines and analyze the defects in the cast and machined components

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3						1		2			1	1	2	2
2	3						1		2			1	1	2	2
3	3						1		2			1	1	2	2
Low (1); Medium (2); High (3)															

AU3401

FUELS AND LUBRICANTS

L T P C

3 0 0 3

COURSE OBJECTIVES:

The objective of this course is to prepare the students to understand the role, properties and testing of various fuels and lubricants in the design and operation of IC engines

UNIT I REFINERY OF FUELS AND LUBRICANTS

9

Introduction to Structure of petroleum, refining Process-Distillation, cracking processes, Catalytic reforming, alkylation, isomerisation and polymerization, finishing process- blending, products of refining process. Manufacture of lubricating oil base stocks, manufacture of finished automotive lubricants.

UNIT II THEORY OF LUBRICATION

9

Engine friction: introduction, total engine friction, effect of engine variables on friction, hydrodynamic lubrication, elastic hydrodynamic lubrication, boundary lubrication, bearing lubrication, functions of the lubrication system, introduction to design of a lubricating system

UNIT III LUBRICANTS

9

Specific requirements for automotive lubricants, oxidation deterioration and degradation of lubricants, additives and additive mechanism, synthetic lubricants, classification of lubricating oils, properties of lubricating oils, tests on lubricants. Grease, classification, properties, test used in grease- lubricants for gearbox, brake, differential and steering systems

UNIT IV PROPERTIES AND TESTING OF FUELS

9

Properties and testing of fuels- density, calorific value, cetane and octane number, flash point, fire point, distillation, vapour pressure, spontaneous ignition temperature, viscosity, cloud and pour point, flammability, ignitability, diesel index, API gravity, aniline point, carbon residue, copper strip corrosion. Test on used lubricants. Bigfuel-properties and testing.

UNIT V TESTING INSTRUMENTS

9

Working principles and types – viscometers, calorimeters, flash and fire point apparatus, cloud and pour point apparatus, distillation apparatus, penetrometer, carbon residue apparatus, CFR engine, vapour pressure testing equipment, copper strip equipment, Aniline point apparatus - Ash content testing equipment - specifications of fuels. ASTM and SAE standards - FTIR-GCMS analysers

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Identify the fuels and lubricants for automotive applications
- Understand the properties of fuels and lubricants and its testing equipment
- Evaluate the properties of fuels and lubricants
- Select suitable fuel and lubricant testing equipment
- Analyse the behaviour of fuels and lubricants

TEXT BOOKS:

1. Ganesan.V., "Internal Combustion Engines", Tata McGraw-Hill Publishing Co., New Delhi, 2017
2. George E. Totten, Editor, Fuels and Lubricants Handbook: Technology, Properties, Performance, and Testing, ASTM International.

REFERENCES:

1. Paul Richards "Automotive fuels reference book" SAE International, Third edition 2014
2. Roger Frederick Haycock, John Hillier, Arthur J. Caines "Automotive lubricants Reference book", SAE International, Second edition 2004
3. Wilfrid Francis– Fuels and Fuel Technology, Vol. I & II

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	2	2			3	2					2		1	3
2	1	2	2			3	2					2		1	3
3	1	2	2			3	2					2		1	3
4	1	2	2			3	2					2		1	3
5	1	2	2			3	2					2		1	3
Avg.	1	2	2			3	2					2		1	3

PROGRESS THROUGH KNOWLEDGE

AU3402

AUTOMOTIVE CHASSIS

L T P C

3 0 0 3

COURSE OBJECTIVES:

The objective of this course is to prepare the students to understand the basics of various vehicle frames, front axles, steering, suspension and braking systems used in automobile.

UNIT I INTRODUCTION, FRAME, STEERING SYSTEM 9

Types of Chassis layout, with reference to Power Plant location and drive, various types of frames, Loads acting on vehicle frame, Constructional details and materials for frames, Testing of frames, Types of Front Axles and Stub Axles, Front Wheel Geometry, Condition for True Rolling Motion of Wheels during Steering, Ackerman's and Davis Steering Mechanisms, Steering Error Curve, Steering Linkages, Different Types of Steering Gears, Slip Angle, Over-Steer and Under-Steer, Reversible and Irreversible Steering, EPAS.

UNIT II PROPELLER SHAFT AND FINAL DRIVE 9

Effect of Driving Thrust, torque reactions and side thrust, Hotchkiss drive, torque tube drive, radius rods and stabilizers, Propeller Shaft, Universal Joints, Constant Velocity Universal Joints, Front Wheel drive, Final drive, different types, Double reduction and twin speed final drives, Multi-axled vehicles, Differential principle and types, Differential housings, limited speed differential, Differential locks.

UNIT III AXLES AND TYRES 9

Construction and Design of Drive Axles, Types of Loads acting on drive axles, Full – Floating, Three-Quarter Floating and Semi-Floating Axles, Axle Housings and Types – Lift axle, Dead axle, Types and Constructional Details of Different Types of Wheels and Rims, Different Types of Tyres and their constructional details.

UNIT IV SUSPENSION SYSTEM 9

Need for Suspension System, Types of Suspension Springs, Constructional details and characteristics of Single Leaf, Multi-Leaf, Coil, and Torsion bar, Rubber, Pneumatic and Hydro – elastic Suspension Spring Systems, Independent Suspension System, Shock Absorbers, Types and Constructional details.

UNIT V BRAKING SYSTEM 9

Theory of Automobile Braking, Stopping Distance Time and Braking Efficiency, Effect of Weight Transfer during Braking, Theory of Drum Brakes, Leading and Trailing Shoes, Braking Torque, Constructional Details of Drum Brake and its Activators, Disc Brake Theory, Types and Construction, Hydraulic Braking System, Mechanical Braking System, Pneumatic Braking System, Power-Assisted Braking System, Anti-Lock Braking System, Constructional Details.

TOTAL = 45 PERIODS

COURSE OUTCOMES:

At the end of this course, the student will be able to

1. Identify the different types of frame and chassis used in Automotive.
2. Classify the different types of drivelines and drives used in Automotive.
3. Acquire knowledge about different types of front axle and rear axles used in motor vehicles.
4. Examine the working principle of conventional and independent suspension systems.
5. Apply knowledge on working principles of brake and its subsystems.

TEXT BOOKS:

1. Kirpal Singh, Automobile Engineering, Standard Publisher, New Delhi , 2017
2. K.K. Ramalingam, "Automobile Engineering", sci-tech publication (India), 2011.
3. R.K. Rajput, A Text–Book of Automobile Engineering, Laxmi Publications Private Limited, 2015

REFERENCES:

1. Heinz Hazler, Modern Vehicle Technology, Butterworth, London, 2005.
2. Heldt P.M., Automotive Chassis, Chilton Co., New York, 1990
3. Newton Steeds and Garret, Motor Vehicles, 13th Edition, Butterworth, London, 2005.
4. N.K. Giri, Automotive Mechanics, Kanna Publishers, 2007
5. William. H. Crows – Work shop Manuel – 2005

C O	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	2	1		3	2					2		1	3
2	1	1	2	1		3	2					2		1	3
3	1	1	2	1		3	2					2		1	3
4	1	1	2	1		3	2					2		1	3
5	1	1	2	1		3	2					2		1	3
Av g.	1	1	2	1		3	2					2		1	3

AU3403

VEHICLE BODY ENGINEERING

L T P C
3 0 0 3

COURSE OBJECTIVES:

The objective of this course is to prepare the students with the knowledge on the body construction details of light, heavy and commercial vehicles, along with the vehicle aerodynamics and body materials

UNIT I CAR BODY DETAILS

9

Types of Car body - Saloon, convertibles, Limousine, Estate Van, Racing and Sports car –car body terminology - Visibility- regulations, driver’s visibility, improvement in visibility and tests for visibility. Driver seat design -Car Body Construction -Various panels in car bodies. Safety: Safety design, safety equipment for cars.

UNIT II BUS BODY DETAILS

9

Types of bus body: based on capacity, distance travelled and based on construction. – Bus body lay out, floor height, engine location, entrance and exit location. Types of metal sections used – Regulations – Constructional details: Conventional and integral.

UNIT III COMMERCIAL VEHICLE DETAILS

8

Types of commercial vehicle bodies - Light commercial vehicle body. Construction details of Flat platform body, Tipper body and Tanker body – Dimensions of driver’s seat in relation to controls – Driver’s cab design.

UNIT IV VEHICLE AERODYNAMICS 9

Objectives, Vehicle drag and types. Various types of forces and moments. Effects of forces and moments. Side wind effects on forces and moments. Various body optimization techniques for minimum drag. Wind tunnels – Principle of operation, Types. Wind tunnel testing such as: Flow visualization techniques, Airflow management test – measurement of various forces and moments by using wind tunnel balance.

UNIT V BODY MATERIALS, TRIM, MECHANISMS AND BODY REPAIR 9

Types and properties of materials used in body construction and insulation -Such as steel sheet, timber, plastics and GRP, Insulation materials. Body trim items-body mechanisms. Hand tools-power tools for body repair. Vehicle corrosion-Anticorrosion methods-Modern painting process procedure.

TOTAL = 45 PERIODS

COURSE OUTCOMES:

Upon completion of the course, the student will be able to

1. Understand the different aspects of car body
2. Differentiate the bus and commercial vehicle bodies.
3. Describe the role of various aerodynamic forces and moments, measuring instruments in vehicle body design.
4. Identify the materials used in body building,
5. Select hand tools for body repairs and maintenance.

TEXT BOOKS:

1. Dieler Anselm., The passenger car body, SAE International, 2000
2. James E Duffy, Body Repair Technology for 4-Wheelers, Cengage Learning, 2009.
3. Powloski, J., Vehicle Body Engineering, Business Books Ltd., 1998.

REFERENCES:

1. Braithwaite, J.B., Vehicle Body building and drawing, Heinemann Educational Books Ltd., London, 1997.
2. Giles, G.J., Body construction and design, Illiffe Books Butterworth & Co., 1991.
3. John Fenton, Vehicle Body layout and analysis, Mechanical Engg. Publication Ltd., London, 1992.

C O	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	2	1		3	2					2		1	3
2	1	1	2	1		3	2					2		1	3
3	1	1	2	1		3	2					2		1	3
4	1	1	2	1		3	2					2		1	3
5	1	1	2	1		3	2					2		1	3
Av g.	1	1	2	1		3	2					2		1	3

COURSE OBJECTIVES:

The main learning objective of this course is to prepare students for:

1. Applying the principle concepts behind stress, strain and deformation of solids for various engineering applications.
2. Analyzing the transverse loading on beams and stresses in beam for various engineering applications.
3. Understanding the torsion principles on shafts and springs for various engineering applications.
4. Acquiring knowledge on the deflection of beams for various engineering applications.
5. Interpreting the thin and thick shells and principal stresses in beam for various engineering applications

UNIT I STRESS, STRAIN AND DEFORMATION OF SOLIDS 9

Rigid and Deformable bodies – Strength, Stiffness and Stability – Stresses and Strains: Tensile, Compressive and Shear – Material Behaviour- Elastic Vs Plastic – Response of Real Materials: Tensile Test, Compressive Test, Shear Test, Cyclic Tests - strain gauges and rosettes – Deformation of Statically determinate and In-determinate bars of variable cross-section & Composite section under axial load – Thermal stress – Elastic constants – Plane Strain – Volumetric Strain.

UNIT II TRANSVERSE LOADING ON BEAMS AND STRESSES IN BEAM 9

Beams – types transverse loading on beams – Shear force and bending moment in beams – Cantilevers – Simply supported beams and over – hanging beams. Theory of simple bending– Bending stress distribution – Flitched beams – Shear stress distribution.

UNIT III TORSION 9

Torsion formulation stresses and deformation in circular and hollow shafts – Stepped shafts – Deflection in shafts fixed at the both ends – Stresses in helical springs – Deflection of helical springs, – Closed and Open Coiled helical springs – springs in series and parallel, carriage springs.

UNIT IV DEFLECTION OF BEAMS 9

Slope, Deflection and Radius of Curvature – Methods of Determination of Slope and Deflection- Double Integration method – Macaulay's method – Area moment Theorems for computation of slopes and deflections in beams - Conjugate beam and strain energy – Maxwell's reciprocal theorems.

UNIT V THICK & THIN SHELLS & PRINCIPAL STRESSES 9

Stresses in thin cylindrical shell due to internal pressure, circumferential and longitudinal stresses and deformation in thin cylinders – spherical shells subjected to internal pressure – Deformation in spherical shells – Lamé's theory – Application of theories of failure – Stresses on inclined planes – principal stresses and principal planes – Mohr's circle of stress.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

1. Apply the principle concepts behind stress, strain and deformation of solids for various engineering applications.
2. Analyze the transverse loading on beams and stresses in beam for various engineering applications.
3. Solve problems based on the torsion principles involved in shafts and springs for various engineering applications.
4. Interpret the results of the deflection of beams.
5. Analyze the thin and thick shells and principal stresses in beam for various engineering applications

TEXT BOOKS:

1. Egor P. Popov, Toader A. Balan., "Engineering Mechanics of Solids", Pearson India Education Services, 2018.
2. Ferdinand P. Beer, E. Russell Johnston, Jr., John T. DeWolf, David Mazurek "Mechanics of Materials", McGraw-Hill Education, 2015.

REFERENCES:

1. R. K. Bansal, "A Textbook of Strength of Materials" Laxmi Publications 2010.
2. R. K. Rajput, "Strength of Materials", Shree Publishers, 2015.
3. Hibbeler, R.C., Mechanics of Materials, Pearson Education, 2018.
4. Subramanian R., Strength of Materials, oxford University Press, Oxford Higher Education Series, 2010
5. Nash, W.A., "Theory and Problems in Strength of Materials", 6th Edition, Schaum Outline Series, McGraw-Hill Book Co, 2013.

	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	1	1							1	3	2	1
CO2	3	3	3	2	2							1	3	2	1
CO3	3	3	3	2	2							1	3	2	1
CO4	3	3	3	2	2							1	3	2	1
CO5	3	3	3	2	2							1	3	2	1
Avg	3	3	3	1.8	1.8							1	3	2	1



AU3404

AUTOMOTIVE TRANSMISSION

L T P C
3 0 0 3

COURSE OBJECTIVES:

The objective of this course is to prepare the students to gain knowledge in the construction and principle of mechanical transmission components, hydrodynamic devices, hydrostatic devices, automatic transmission system, Electric drive used in road vehicles.

UNIT I CLUTCH

9

Requirement of transmission system, Types of transmission system, Requirement of Clutches – Functions-Types of clutches, construction and operation of Single plate, multi plate and Diaphragm spring clutches. Centrifugal clutch, Electronic clutch.

UNIT II GEAR BOX 9

Purpose of gear box. Construction and working principle of sliding, constant and synchromesh gear boxes, Automatic manual transmission. Introduction to epicycle gear trains, Numerical examples on performance of automobile such as Resistance to motion, Tractive effort, Engine speed & power and acceleration. Determination of gear ratios for different vehicle applications.

UNIT III HYDRODYNAMIC TRANSMISSION 9

Fluid coupling – principles - Performance characteristics – advantages – limitations – drag torque – reduction of drag torque. Torque converter - principles - Performance characteristics – advantages – limitations – multistage and polyphase torque converters.

UNITIV HYDROSTATIC DRIVE 9

Hydrostatic drive; various types of hydrostatic systems – Principles of Hydrostatic drive system. Advantages and limitations. Comparison of hydrostatic drive with hydrodynamic drive, construction and working of typical Janny hydrostatic drive.

UNIT V AUTOMATIC TRANSMISSION AND ELECTRIC DRIVE 9

Wilson gear box- Cotal electric transmission. Chevrolet “Turboglide” transmission. – Four speeds longitudinally mounted automatic transmission -Hydraulic control systems of automatic transmission. Continuously Variable Transmission (CVT) — types – Operations. Electric drive-types- Principle of early and modified Ward Leonard Control system-Advantages & limitations - Automated Manual Transmission (AMT) - Modern electric drives.

TOTAL= 45 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able to:

1. Understand the construction and working of various types of clutches
2. Determine the gear ratio for different vehicle applications
3. Describe the types and principle of hydrodynamic transmission
4. Compare Hydrostatic and hydrodynamics drives
5. Identify the differences among various automatic transmissions.

TEXT BOOKS:

1. Heinz Heisler, Advanced Vehicle Technology, 2nd Edition, 2002, Butterworth-Heinemann
2. Motor Vehicle, T. K. Garrett K. Newton W. Steeds, 13th Edition, 2000, Butterworth-Heinemann

REFERENCES:

1. Crouse, W.H., Anglin, D.L., Automotive Transmission and Power Trains construction, McGraw Hill, 1976.
2. Held't, P.M., Torque converters, Chilton Book Co., 1962.
3. Iqbal Husain, Electric and Hybrid Vehicles Design Fundamentals, CRC PRESS Boca Raton London New York Washington, D.C.

C O	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	2	1	3		2					2		1	3
2	1	1	2	1	3		2					2		1	3
3	1	1	2	1	3		2					2		1	3
4	1	1	2	1	3		2					2		1	3
5	1	1	2	1	3		2					2		1	3
Avg.	1	1	2	1	3		2					2		1	3

COURSE OBJECTIVES:

1. To study the nature and its impacts on human life.
2. To study the environmental pollution, its types, control methods and protection acts
3. To provide the knowledge of about the energy management and energy resources
4. To study the concepts of Sustainability, global warming and Management
5. To study the Sustainability Practices and socio economical changes

UNIT I ENVIRONMENT AND BIODIVERSITY 9

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

UNIT II ENVIRONMENTAL POLLUTION 9

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts .

UNIT III RENEWABLE SOURCES OF ENERGY 9

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

UNIT IV SUSTAINABILITY AND MANAGEMENT 9

Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

UNIT V SUSTAINABILITY PRACTICES 9

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles-carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio-Economical and technological change.

TOTAL: 30 PERIODS

OUTCOMES:

At the end of the course the students would be able to

1. Understand the nature and its impacts on human life.
2. The students have the knowledge and awareness of Environmental Pollution.
3. Understanding of the energy sources and scientific concepts/principles behind them
4. Understand the concepts of the Sustainability and Management
5. Understand the Sustainability Practices and socio economical changes

TEXT BOOKS:

1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers ,2018.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.

REFERENCES:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38 .
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.
5. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.

AU3411

VEHICLE COMPONENTS LABORATORY

**L T P C
0 0 4 2**

COURSE OBJECTIVES:

The objective of this course is to prepare the students to acquire skill in identify, dismantling and assembling the parts of an IC engine and its subcomponents like Clutch, Front/Rear axle, steering system, gear boxes and suspension systems.

LIST OF EXPERIMENTS

1. Dismantling, Measurement and Assembling of 1000CC engine
2. Dismantling, Measurement and Assembling of Bus engine
3. Dismantling, Measurement and Assembling of V8 engine
4. Dismantling, Measurement and Assembling of CRDI engine
5. Dismantling, Measurement and Assembling of MPFI engine
6. Dismantling, Measurement and Assembling of Single plate, Diaphragm Clutch.
7. Dismantling, calculation of gear ratio and Assembling of Constant and Sliding mesh gear boxes
8. Dismantling and Assembling of Transfer case.
9. Dismantling, calculation of gear ratio and Assembling of Differential assembly.
10. Dismantling, Measurement and Assembling of Front and Rear axle.
11. Study of different chassis layouts.
12. Study of different braking systems.
13. Study of Steering system
14. Study of Suspension system

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able to:

1. Dismantle and Assemble the automobile chassis and Engine components
2. Identify & differentiate components of SI & CI engines
3. Understand working of braking, steering, clutch, transmission, Suspension systems.
4. Develop skills in Dismantling and assembling of chassis components.
5. Correct minor repairs and trouble shoots the breakdowns

C O	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	2	3	1		2		1	1		2		1	3
2	1	1	2	3	1		2		1	1		2		1	3
3	1	1	2	3	1		2		1	1		2		1	3
4	1	1	2	3	1		2		1	1		2		1	3
5	1	1	2	3	1		2		1	1		2		1	3
Av g.	1	1	2	3	1		2	39	1	1		2		1	3

COURSE OBJECTIVE:

The objective of this course is to prepare the students to attain practical skills during the properties testing procedure for automotive fuels and Lubricants.

LIST OF EXPERIMENTS:

1. Determination of viscosity of lubricating oil by Redwood Viscometer.
2. Determination of viscosity of lubricating oil by Saybolt Viscometer
3. Determination of Flash and Fire points of given sample of fuel and lubricants
4. Determination of Cloud and pour point of given oil.
5. Conduct of ASME distillation test of fuels (gasoline / diesel).
6. Determination of Carbon residue on given sample of lubrication oil.
7. Determination of Calorific value of liquid fuel by using bomb calorimeter.
8. Conduct of Penetration test for the given sample.
9. Determination of Density test of different fuels

TOTAL: 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students will be able to:

Develop skills and understand various testing methods adopted to assess quality of fuels and lubricants like

1. Viscosity
2. Importance of flash, fire point
3. Cloud and pour point
4. Calorific value
5. Density

www.binils.com

C O	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	2	3	1	2	2		1	1		2		1	3
2	1	1	2	3	1	2	2		1	1		2		1	3
3	1	1	2	3	1	2	2		1	1		2		1	3
4	1	1	2	3	1	2	2		1	1		2		1	3
5	1	1	2	3	1	2	2		1	1		2		1	3
Av g.	1	1	2	3	1	2	2		1	1		2		1	3