GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN AUTOMOBILE ENGINEERING

TEACHING SCHEME (w. e. f Jan' 12)

SEMESTER- VI

SR. NO	SUB. CODE	SUBJECT	TEACHING SCHEME (HOURS)			CREDITS
			THEORY	TUTORIAL	PRACTICAL	
1	**2360201**	Motor Vehicle Accident & Loss Assessment	3	0	0	3
2	**2360202**	Vehicle Air conditioning	3	0	0	3
3	**2360203**	Practice in Vehicle Air Conditioning	0	0	2	2
4	**2360204**	Tractor and Farm Equipments	3	0	0	3
5	**2360205**	Practice in Tractor and Farm Equipments	0	0	2	2
6	**2360206**	Automotive Pollution Control Engineering	3	0	0	3
7	**2360207**	Practice in Automotive Pollution Control Engineering	0	0	2	2
8	**2360209**	Project - II	0	0	12	12
		TOTAL	**12**	**0**	**18**	**30**

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER- VI

Subject Name: Motor Vehicle Accident & Loss Assessment
Subject Code: 2360201

Sr. No.	Subject Content	Total Hrs.
1	**INTRODUCTION TO INSURANCE.** 1.1 Purpose and need of Insurance. 1.2 How insurance work. 1.3 As a special security tool and Pooling the risk. 1.4 Role in economic development of the country. 1.5 Insurance legislation and IRDA act. 1.6 Market Structure. 1.7 GIC Reinsurance company/ Tariff Advisory Committee.	3
2	**PRINCIPLE OF GENERAL INSURANCE.** 2.1 Origin, history and development of insurance. 2.2 Utmost good faith. 2.3 Insurance interest. 2.4 Indemnity. 2.5 Subrogation and contribution. 2.6 Approximate and Remote cause.	4
3	**MOTOR INSURANCE.** 3.1 Motor vehicle act. 3.2 Types of vehicles. (i) Private cars (ii) Commercial vehicles (iii) Two wheelers (iv) Three wheelers (v) Miscellaneous type of vehicle.	5
4	**TYPES OF INSURANCE COVERED AND RATING.** 4.1 Act liability only 4.2 Third party only. 4.3 Comprehensive policy. 4.4 Policy term and condition.	5

5	**ANOTOMY OF VEHICLES.** 5.1 Two wheelers 5.2 Three wheelers 5.3 Four wheelers 5.4 Multi wheelers 5.5 Imported vehicles	**4**
6	**IMPACT ANALYSIS.** 6.1 The reasons for accidents. 6.2 Impact from any one side 6.3 Head on collision. 6.4 Vehicle toppel. 6.5 Failure of vehicle.	**5**
7	**INSURANCE SURVEY.** 7.1 Surveyor. 7.2 Licensing authority and controller of insurance. 7.3 Role of surveyor and loss adjustor. 7.4 Empanelment of surveyor.	**5**
8	**CONDUCTING SURVEY.** 8.1 Intimation. 8.2 Site visit. 8.3 Garage visit. 8.4 Photography. 8.5 Estimate and claim form 8.6 Passing of estimate (i) Cost of parts (ii) Cost of repairing (iii) Labour 8.7 Checking of documents (Paper pertaining to vehicle) 8.8 Important aspects of survey 8.9 Various types of loss assessment. 8.10 Preparation of survey reports and submission.	**8**
9	**INVESTINGATION OF CLAIMS.** 9.1 Fraud claims 9.2 Connected to Packet Policy- MACT	**3**
	TOTAL	**42**

Reference Books:

1. Motor vehicle acts and rules -
2. India motor tariff –
3. General Insurance –: - Insurance institute of India.
4. Financial Services -: - M.Y.Khan Tata Mc Graw hill.

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER- VI

Subject Name: Vehicle Air Conditioning
Subject Code: 2360202

Sr. No.	Subject Content	Total Hrs.
1	**VEHICLE AIR-CONDITIONING FUNDAMENTALS.** 1.1 Fundamental principles (i) Heat and heat transfer (ii) Latent heat (iii) Refrigerant (iv) Air circulation and Humidity (v) Cooling the air (vi) Drying and cleaning the air 1.2 Air-conditioner principles (i) Schematic layout of a refrigeration system (ii) Compressor (iii)The crank action (iv) Compressor action 1.3 Basic Air-conditioning systems and operation of basic components (i) Magnetic clutch (ii) Types of compressors (iii) Condensers (iv) Cycling clutch air –conditioning systems (v) Different types of expansion valves and suction valves (vi) Automotive air-conditioning controls 1.4 Automotive Heaters. (i) Working of different automotive heaters.	**15**
2	**VEHICLE AIR-CONDITIONING SYSTEMS.** 2.1 Manually controlled air-conditioner heater systems. (i) Different types of air-conditioner heater systems (ii) Working and its operating modes 2.2 Automatically controlled air-conditioner heater systems. (i) Automatic temperature control (ii)Operating modes (iii) Different parts of auto controlled air conditioner	**9**

	2.3 Field installed air-conditioners. 2.4 Automatic climate control.	
3	**HEATER AND AIR-CONDITIONER TROUBLE SHOOTING.** 3.1 Safety in the shop. (i) Fire prevention (ii) Shop safety rules (iii) Air-conditioner service safety rules 3.2 Servicing heating system (i) Car heater system, trouble diagnosis chart 3.3 Causes of Air-conditioner failure 3.4 Trouble shooting the Air-conditioner heater system. (i) Checking out a trouble (ii) Air-conditioner trouble - diagnosis chart 3.5 Checking the refrigeration system. (i) Checking system with sight glass (ii) Using the Leak detector (iii) Checking pressures with the gauge set	**9**
4	**SERVICING OF VEHICLE AIR CONDITIONING HEATER SYSTEMS.** 4.1 Air-conditioner maintenance and service. (i) Periodic maintenance (ii) Vacuum pump service (iii) Discharging the system (iv) Adding oil (v) Evacuating the system (vi) Recharging the system with charging station (vii) Adding a partial charge 4.2 Different types air-conditioner service. 4.3 Removing and replacing components. (i) O - rings (ii) Hose clamps (iii) Compressor drive belts (iv) Removing and replacing the compressor (v) Removing and replacing other components 4.4 Servicing Air-conditioner compressors. (i) Servicing different types compressors (R-4, R-6, V-type etc.)	**9**
	TOTAL	**42**

Reference Books:

1. Automobile Engineering (Volume – VI) - Anil Chhikara
2. Automotive Air-conditioning - William H. Carouse &Donald L. Anglin
3. Automotive Air-conditioning - Clifford L.Samuels Prentice Hall Int.
4. Automotive Air-conditioning & Climate control system. - Steven Daly

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER- VI

Subject Name: Practice in Vehicle Air Conditioning
Subject Code: 2360203

NOTE:-
Following are the minimum experiences required, but the college can do more experiences if possible.

Sr. No.	Subject Content	Total Hrs.
1	Testing of refrigerant leaks in the systems.	3
2	Evacuating the Air-conditioner system.	5
3	Recharging the Air-conditioner system.	4
4	Trouble shooting the Air-conditioner system.	5
5	Servicing Air-conditioner.	4
6	Servicing Air-conditioner compressors.	3
7	Servicing Heating systems.	4
	TOTAL	**28**

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER- VI

Subject Name: Tractor and Farm Equipment
Subject Code: 2360204

Sr. No.	Subject Content	Total Hrs.
1	**CLASSIFICATION OF TRACTOR** 1.1 With respect to power. 1.2 With respect to running gear. 1.3 With respect to duty. 1.4 With respect to traction. 1.5 With respect to farming. 1.6 With respect to application. 1.7 With respect to position of engine. 1.8 With respect to lifting mounted implements.	2
2	**TRACTOR CLUTCHES** 2.1 Disc clutch 2.2 Power take off. 2.3 Steering turning brakes.	2
3	**TRACTOR TRANSMISSION** 3.1 Recall the transmission gear box. 3.2 Gears used for farming. 3.3 Chief use of high gear. 3.4 Gear ratio in first, second and third gear of tractor of any make. 3.5 Construction and working of power take off. 3.6 Installation of power take off and precautions.	2
4	**FINAL DRIVE** 4.1 With respect to degree of velocity reduction. 4.2 With respect to kind of gearing. 4.3 Final drive lubrication.	2

5	**TRACTOR RUNNING GEAR** 5.1 Axle front and rear. 5.2 Wheels 5.3 Tyres 5.4 Brakes 5.5 Over hauling of final drive assembly. 5.6 Interchanging or rear wheels. 5.7 Procedure of changing rear wheel tread. 5.8 Removal and installation of tractor tyres. 5.9 Tyre inflation of rear wheel.	**5**
6	**TRACTOR FRONT AXLE AND STEERING GEAR** 6.1 Steering gear of three wheel tractor. 6.2 Steering gear of four wheel tractor.	**2**
7	**TRACTOR REAR AXLE AND STEERING GEAR** 7.1 Brakes. 7.2 Purpose of rear wheel differential brake. 7.3 Necessity of satisfactory operation of brakes. 7.4 Brake adjustments.	**2**
8	**INSTRUMENTS AND MECHANICAL CONTROL** 8.1 Recall the instruments like ammeter, starter switch ignition and listing switch, temp. gauge, oil pressure gauge tachometer, regulator. 8.2 Recall the mechanical control like throttle control, clutch pedal, gear shift lever, brake pedal. 8.3 Power take off lever. 8.4 Right and left brake.	**2**
9	**TRACTOR HYDRAULIC CONTROL** 9.1 Ram cylinder. 9.2 Constant draft control 9.3 Implements. 9.4 Transport position. 9.5 Sequence or events in position control. 9.6 Hydraulic unit replacement. 9.7 Hydraulic control adjustment. 9.8 Condition of transport position. 9.9 Front wheel entry in a depression. 9.10 Variation in soil texture.	**6**

	9.11 Hydraulic unit replacement. 9.12 Removal and installation of lift cover assembly.	
10	**HITCHES** 10.1 Hitches physico construction. 10.2 Kinds of hitch adjustment. 10.3 Condition of hill side work. 10.4 Most common hitches. 10.5 Hiting of obstruction. 10.6 Avoidancer accidents.	**5**
11	**IMPLEMENTS** 11.1 Define combine, coulter, cultivator, disc plough. 11.2 Define draft, dump rakes, harrow, harrow plough, middle buster, mould board, mulch, plough. 11.3 Plough foot, plow head, plow share, rotary plough silage harvester, thresher, weeder mulcher.	**5**
12	**IMPLEMENTS HOOK UPS** 12.1 Mounting plough on tractor. 12.2 Adjustment of width cut, coulter and jointer djustment. 12.3 Vertical adjustment, plough share. 12.4 Sharping or steel shares, C.I. Shares. 12.5 Plough lubrication. 12.6 Operating instructions and adjustment or hitch control, automatic depth control, lifting transporting, level of lough out of ground, coulter depth adjustment, disc gang, rear wheel, direction or rear wheel, alignment of plough, adjustment for penetration rear level, lubrication.	**2**
13	**OPERATING INSTRUCTION OF TRACK TRACTOR.** 13.1 Controls : Like engine shut off, starter pedal, throttle level, clutch operating level, gear shifting level, steering control, parking brake lock, air heater push button, air heater pump. 13.2 Instruments : Engine temp. gauge, oil pr. Gauge, ammeter, hour meter, avoidance of prolonged idling. 13.3 Driving instructions : starting, gear shifting, steering, stopping operating in mud, daily attention of tractor cold weather operation.	**2**

14	**TRACTOR LUBRICATION AND MAINTENANCE** 14.1 Purpose of lubrication. 14.2 Periodic lubrication service, like 10hr. 60 hour,120 hour service, yearly service. 14.3 Use of maintenance chart and lubrication chart.	**3**
	TOTAL	**42**

Reference Book:

1. Truck and tractor guide -: - F.D. Graham, D.B. Toraporwala & Sons

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER- VI

Subject Name: Practice in Tractor and Farm Equipment
Subject Code: 2360205

NOTE:-
Following are the minimum experiences required, but the college can do more experiences if possible.

Laboratory Experiences:

Sr. No.	Subject Content	Total Hrs.
1	Demonstration layout and operation of hydraulic system in tractor.	2
2	Overhauling of hydraulic system, pump control valve and remote cylinder.	3
3	Overhauling of power filler transmission system including main clutch, steering clutch and brake mechanism.	3
4	Testing of wheel and hub for field operation with and without implements.	2
5	Demonstration of implements like disc harrow grass cutter and lawn mover.	2
6	Fitting and adjustment of implements like disc harrow grass cutter and loan mover.	2
7	Demonstration of implements like plough cultivator and power take off unit.	2
8	Fitting and adjustment of implements like plough, cultivator and p.t.u. unit for its serviceability before use.	3
9	Observation of service equipment study of job cards, process sheets, workshop system layout and log book.	4
10	Preparation of trouble shooting chart in tractor driving and testing of the performance of tractor with and without implements.	5
	TOTAL	**28**

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER- VI

Subject Name: Automotive Pollution Control Engineering
Subject Code: 2360206

Sr. No.	Subject Content	Total Hrs.
1	**EXHAUST GASES.** 1.1 The atmosphere 1.2 Air pollutants. 1.3 Pollutants produced by automobiles.	2
2	**PRINCIPLE OF PRODUCTON OF EXHAUST GASES.** 2.1 Theoretical air-fuel ratio. 2.2 Carbon monoxide (CO) gas. 2.3 Hydro Carbon (HC) gas. 2.4 Oxides of Nitrogen (NO2). 2.5 Driving conditions and exhaust gases.	5
3	**EMISSION CONTROL SYSTEMS.** 3.1 Emission control components layout and drawing. 3.2 Necessity and operation of Positive Crankcase Ventilation (PVC) system. 3.3 Necessity and operation of fuel evaporative emission control (EVAP) system. 3.4 Necessity and operation of Throttle Positioner (TP) system. 3.5 Catalytic converters. 3.6 Necessity and operation of High Altitude Compensation (HAC) system. 3.7 Necessity and operation of Hot Idea Compensation (HIC) system. 3.8 Spark timing emission control systems. 3.9 Exhaust gas re-circulation (EGR) system. 3.10 Air Suction (AS) systems and Air Injection (AI) system. 3.11 Necessity and operation of choke opener system. 3.12 Necessity and operation of Choke Breaker (CB) system.	24

	3.13 Necessity and operation of decelerations fuel cut off system. 3.14 Necessity and operation of Mixture Control (MC) system. 3.15 Necessity and operation of Cold Mixture Heater (MH) system. 3.16 Necessity and operation of Dash Pot (DP) system.	
4	**PRINCIPLE METHODS OF EXHAUST GAS ANALYSIS.** 4.1 Measuring CO and CO_2 concentrations. 4.2 Measuring HC concentrations. 4.3 Measuring NOx concentrations. 4.4 Automotive emission control in India.	**4**
5	**COMPRESSED NATURAL GAS (CNG) CONVERSION.** 5.1 Merits of CNG's. 5.2 CNG conversion kit. 5.3 CNG kit installation. 5.4 Maintenance of CNG kit components. 5.5 Characteristics of CNG vis-à-vis petrol.	**4**
6	**AUTOMOBILE NOISE AND ITS CONTROL.** 6.1 Noise and sound pressure. 6.2 Measurement of noise. 6.3 Causes of automobile noise and its reduction.	**3**
	TOTAL	**42**

Reference Books:

1. Automobile Engineering (Volume – I) -: - Anil Chhikara
2. Automotive Emission Control -: - William H. Carouse &Donald L. Anglin
3. Automotive Tune up -: - William H. Carouse &Donald L. Anglin
4. Automotive Fuel, Ignition and Emission Control Systems-: - Glen E. Ireland
5. Air Pollution Control Technology -: - Robert M. Bethea
6. A Seminar on Environmental Pollution -: - By Automobiles M.T.I.Madras
7. A Seminar on Environmental Pollution -: - Pollution Control Board, Gandhinagar.

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER- VI

Subject Name: Practice in Automotive Pollution Control Engineering
Subject Code: 2360207

NOTE:-
Following are the minimum experiences required, but the college can do more experiences if possible.

Sr. No.	Subject Content	Total Hrs.
1	Vacuum Control Diagnosis	2
2	Measure CO, HC emission from petrol engines on exhaust gas analysis	3
3	Measure diesel exhaust smoke of diesel engine on diesel smoke meter	3
4	Positive Crankcase ventilation system service.	2
5	Air Injection system service.	3
6	Spark timing control system tests.	3
7	General converter service	4
8	Catalytic converter service	4
9	CNG kit inspection, testing and setting.	4
	TOTAL	28

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN AUTOMOBILE ENGINEERING
SEMESTER- VI

Subject Name: Project - II **84 Hrs**
Subject Code: 2360209

1. RATIONALE:

This course enable the students to exercise some of the knowledge and/or skills developed during the programme to new situation or problem for which there are number of Engineering solutions. This course includes a planning of the programme which is to be completed within the time allocated, the maintenance of a log book and the preparation of a report. The report contains the description of literature review, activities carried out,,results, graphs conclusion & future work.
Thus by studying this course abilities like creativity, initiative, performance qualities are developed in students.

Faculty members are instructed to guide the students in selection of projects such as: Fabrication Type, Study & analysis type, Analytical, Survey, Research & development, Simulation & computer programming type, etc.

2. Suggested stages of Project:

1) Literature/Market survey
(2) Selection of project
(3) Justification of selection
(4) Selection of materials
(5) Selection of Manufacturing processes, machine tools, Cutting tools, forming tools, Inspection tools, holding tools, cutting parameters and its applications.
(6) Process planning for all the components.
(7) Design and /or production drawing preparation.(computer may be used here)
(8) Activity planning and work distribution with Time Schedule using Gantt chart and CPM.
(9) Execution of the Project.
(10) Problem encountering in Materials and processes.
(11) Strategies used for finding solution of problem.
(12) Manufacture components parts etc.
(13) Assembly .
(14) Try-out.
(15) Modification if necessary.
(16) Costing.

Reference Books:

(1) Use of Library & Internet
(2) Reference books
(3) Hand books
(4) Encyclopedia
(5) Magazines
(6) Periodicals
(7) Journals
(8) Visits of
    (i) Industry
    (ii) Organizations Related
    (iii) Institutions etc. as per the requirement.