GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN AUTOMOBILE ENGINEERING

TEACHING SCHEME (w.e.f. 18th July '2011)

SEMESTER- V

SR. NO	SUB. CODE	SUBJECT	TEACHING SCHEME (HOURS)			CREDITS
			THEORY	TUTORIAL	PRACTICAL	
1	2350201	Transport Management & Motor Industry	3	0	0	3
2	2350202	Vehicle Dynamics	4	2	0	6
3	2350203	Diagnosis and Testing – I (Auto Engines)	4	0	0	4
4	2350204	Diagnosis and Testing – II (Transmission)	4	0	0	4
5	2350205	Diagnosis and Testing – III (Electrical System)	4	0	0	4
6	2350206	Practice in Diagnosis and Testing – I	0	0	2	2
7	2350207	Practice in Diagnosis and Testing – II	0	0	2	2
8	2350208	Practice in Diagnosis and Testing – III	0	0	2	2
9	2350209	Project-I	0	0	4	4
		Total	**19**	**2**	**10**	**31**

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Subject Code **: 2350201**
Subject Name **: Transport Management & Motor Industry**

Sr. No.	Subject Content	Hrs.
1	**Preliminary About Transport Authorities:** Concept of Transport authorities. The key terms used in the motor vehicle act. The classification of different types of vehicle.	**2**
2	**Licensing:** Necessity and eligibilities for obtaining the driving license, Form contents, validity and currency of driving license, Renewal, revocation, endorsement and power of disqualifying the holder for driving license. Conducts and duties of driver of motor vehicle. Necessities and granting of conductor's license. Duties and conducts of conductor rule.	**4**
3	**Registration of Motor Vehicle:** Registration of Motor Vehicle. The exhibition of registration. Information about the refusal of registration of vehicle. Procedure for registration of vehicles removed to another state. The Provision for transfer of ownership of the vehicle. The Provision for alteration in vehicle. The suspension of registration. The cancellation of registration of vehicle. The necessity of certificate of fitness of transport vehicle.	**5**
4	**Control of Transport Vehicle:** The necessity of permit. The provision regarding the permit and forms used for granting permit. Special provision relating to S. T. Undertaking.	**5**
5	**Construction Equipment and Maintenance of Motor Vehicle:** General provisions regarding construction and maintenance of motor vehicle. Provisions regarding: Lamps, Brakes, Horn, Silencer, Mirror, Safety glass, Wind screen wiper, Tyres, Speedometer, Steering, Springing, Direction indicator and stop light, First Aid Box, Emission of smoke, vapour and grit. For attaching side-car to a motor-cycle.	**7**
6	**Control of Traffic:** Limits of Speed. Limits of weight and limitation on use. The power to have vehicle weighted. The power to erect traffic signs. The driving regulation. Provision regarding vehicle with Left-hand control. The	**5**

	provisions of Section 81,82,83,84 and 85, 82-A,85-A. The duties of driver and owner. The provision regarding inspection of vehicle involves in accident. The provision regarding motor vehicle temporarily leaving or visiting India. The provision regarding payment of compensation on the principle of no fault.	
7	**Insurance of Motor Vehicle against Third Party Risk:** The definitions of Authorized insurer, Certificate of insurance, Liability, Property, Reciprocating Country, Third party, Policy. The necessity for insurance against third party risk. The requirement of policies and limits of Liability. The provisions regarding compensation application fees.	**4**
8	**Offences, Penalty & Procedure:** The general provisions for punishment of offences. The provisions of disobedience, obstruction and refusal of information. The provisions regarding allowing driving of vehicle by unauthorized person. The provisions regarding offences relating to Licenses. The provision regarding using the vehicle without registration of permit. The provision regarding driving the vehicle exceeding permissible weight. The provision regarding driving the uninsured vehicle. The provisions of power to detain the vehicles used without certificate of registration of permit. Guide Line for following offences such as : - Driving recklessly or dangerously , Driving while under the influence of drink or drugs - Abetment of an offence under section 116 or 117, Taking part in unauthorized race or trial of speed - Driving when disqualified,- Obtaining or applying for a license without giving particulars of endorsement,- Failing to stop on the occurrence of accident.	**6**
9	**Vehicle Sales Practice and Sales Promotion:** The salient features of agreement between Manufacturer-Dealer. The various steps involved in vehicle selling technique. Professional approach of selling vehicle.	**4**
	Total	**42**

Note:

The content of this Subject should follow the latest amendments/ clauses of existing M.V Act
and M.V Rules.

Reference Books:

Sr. No.	Name of Books	Author
1.	Industrial Engineering & Management	O.P. Khanna
2.	Motor vehicles Act, 1989	
3.	The Gujarat Motor vehicles Rules, 1989	
4.	The Central Motor vehicle Rules,1989	

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Subject Code **: 2350202**
Subject Name **: Vehicle Dynamics**

Sr. No.	Subject Content	Hrs.
1	**Balancing:** Balancing of rotating mass. Balancing of single rotating mass Balancing of several rotating masses. Primary and secondary unbalanced forces of reciprocating masses. Partial balancing of unbalance primary force in reciprocating engines. Variation of tractive force. Swaying couple. Hammer blow. Balancing of primary forces of multicylinder in-line engine. Balancing of secondary forces of multicylinder in-line engine	12
2	**Vehicle Vibration:** Definition. Vehicle vibration with single degree of freedom. Free Vibration. Forced Vibration	6
3	**Steering Mechanism:** Condition for true rolling. Ackerman steering gear. Turning circle radius.	6
4	**Suspension System:** Vehicle suspension. Theory of chassis spring. Mechanism of independent. Suspension system.Roll axis and effect of side forces	6
5	**Propeller Shafts and Axles:** Propeller shaft. Universal joint and Hook's joint. Front axle. Bearing load on front axle. Bearing load on rear axle. Axle shafts. Axle mechanism	8
6	**Vechicle Performance:** Various resistances to vehicle. Power for propulsion. Traction and tractive effort. Relation between engine speed and vehicle speed. Acceleration, drawbar pull and gradeability. Distribution of weight. Calculation of Equivalent weight. Stability of vehicle on slope and while taking turn. Calculation of maximum acceleration, maximum tractive effort and relation for different drive. Factors affecting braking efficiency. Calculation of stopping distance. Braking of vehicle on curved path.	16

7	**Ergonomics:** Vehicle Vibration and human comfort. Factors affecting human comfort	**2**
	Total	**56**

Note: Every formulas/ equations, numerical problems must be in S.I Units only.

List of Tutorials:

Hrs.

1. Exercise on balancing
2. Report writing on Vibration
3. Exercise on steering mechanism
4. Exercise on suspension system
5. Exercise on propeller shaft and axles
6. Exercise on vehicle performance
7. Report writing on ergonomics

Total

Reference Books:

1. Problems in Automobile Engg, K.M.Agrawal.
2. Theory of machine, by R. S. Khurmi, W. steeds.
3. The motor vehicle, I C Newton.
4. Mechanics of road vehicle, W. steeds.
5. Automobile Technology, Dr.N.K.Giri.
6. Auto Design, R.B.Gupta.

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Subject Code **: 2350203**
Subject Name **: Diagnosis and Testing - I (Auto Engines)**

Sr. No.	Subject Content	Hrs.
1	**Measurement and Inspection:** S.I. system of measurement, Measuring tools, List of engine parts.	2
2	**Engine Disassembly and Cleaning:** Upper engine Disassembly and cleaning, Lower engine Disassembly and cleaning.	4
3	**Engine Removal:** Engine removal preparation, Engine removal procedure.	2
4	**Engine Components:** Different Engine tests like, compression test, vacuum test, cylinder leakage test etc., Inspection of different engine components, Types of defects (troubles), likely to occur in different engine components and their analysis, Causes and remedies for different troubles in engine components, Procedure of reconditioning of different engine components, Procedure of replacement of different engine components.	10
5	**Fuel System for Petrol Engines:** Inspection, repair and service of fuel tank, fuel lines and fuel filters, Inspection, repair, testing and service of fuel pump, Carburetor, cleaning, servicing and adjustment, Servicing of Air cleaners, Inspection, repair and service of petrol injection system.	6
6	**Fuel System for Diesel Engines:** Testing and adjustment of fuel injectors and nozzles, Calibration and phasing of fuel injection pump, Servicing of the fuel feed pump, Procedure of checking and setting of governors, Checking and setting of injection timing, Procedure of replacement of the fuel filters, Bleeding of the diesel fuel feed system.	6
7	**Cooling System:** Causes of engine overheating, Servicing of the radiator and water jacket, Detection and repairs of leakage in the radiator and cooling	5

	system, Repairs, maintenance and over hauling of water pump, Testing of thermostat valve, Defects in the cooling system components, their causes and remedies, Inspection and adjustment of the fan belt.	
8	**Lubricating System:** Checking and testing of the lubricating system, Servicing of oil pump and relief valve. Deterioration of Engine oil, Excessive oil consumption, Low and high oil pressure, Necessity of oil change and its interval, Servicing and replacement of the oil.	**5**
9	**Engine Trouble Shooting:** Causes for the different troubles and their remedial measures. Procedure of decarbonising of the engine, Procedure of major and miner Tune-Up, Difference between major and minor overhaul of the engine.	**8**
10	**Engine Performance Testing:** Types of dynamometer, working principle, merits and limitations. Engine power measurements and related terms, Determination of I.H.P., B.H.P., F.H.P. and torque. Computation of various efficiencies, mean effective pressure, specific fuel consumption, Plotting of the graphs and inter-petition of the data from the graph. Morse Test on I.C. Engine, Heat Balance Sheet.	**8**
	Total	**56**

Reference Books:

Sr. No.	Name of Books	Author
1.	Automobile Mechanics	W. H. Crouse
2.	Automotive Engines Theory & Servicing	James D. Halderman
3.	Auto Engines	Venk & Spicer
4.	Audels auto guide	Audels
5.	Automobile Engineering	R. B. Gupta
6.	Automobile Technology	N.K Giri
7.	Auto Diagnosis and tune-up	J. A. Johnsen
8.	Diesel equipment – I	Erich J. Schulz
9.	Diesel equipment – II	Erich J. Schulz

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Subject Code **: 2350204**
Subject Name **: Diagnosis and Testing - II (Transmission)**

Sr. No.	Subject Content	Hrs.
1	**Clutch:** Troubles in clutch units, its causes and rectification, Inspection, procedure and rectification, Reconditioning of clutch components, Clutch adjustment, Lubrication of clutch units and linkages, Troubles in fluid coupling, its causes and remedies	**8**
2	**GEAR BOX (Conventional and Automatic):** Troubles in gear box unit, their causes and remedies, Inspection of components of gear box, Rectification of various troubles in components.	**10**
3	**Propeller Shaft and Universal Joint:** Troubles in propeller shaft assembly, Inspection procedure, Rectification of various troubles.	**4**
4	**Rear Axle Assembly:** Troubles in rear axle assembly and their probable causes, Inspection procedure, Rectification of rear axle assembly, Procedure for road testing for proper performance of rear axle assembly.	**6**
5	**Front Axle and Steering:** Troubles in front axle and steering system, and their probable causes, Inspection procedure, Rectification of various troubles, Procedure of testing for proper performance, Troubles, its causes and remedies in power steering system.	**8**
6	**Brakes:** Troubles in Mechanical, hydraulic and Air braking system and their causes, External checks of braking system, Internal checks of system, Rectification of various troubles, Brake performance test.	**8**
7	**Suspension System:** Various troubles and their probable causes in suspension system, Inspection procedure, Remedial operation.	**4**
8	**Wheels and Tyres:** Different troubles and probable causes, Inspection procedure, Remedial	**4**

	Operation, Rotation of tyre, Tyre Retarding procedure, Various troubles, causes and remedies in alloy wheels.	
9	**Chasis Frame:** Various troubles and causes in chassis frame, Inspection procedure, Remedial operation, Repairs and alignment of frame, Schedule for chassis lubrication, Types of instrument used.	**4**
	Total	**56**

References Books:

1. Automotive Mechanics, W. H. Crouse.
2. Auto diagnosis and tune up, J. A. Johnson.
3. Automotive Mechanics, J. Heitner.
4. Motor vehicle calculation and science I & II, Champion and Arnold.
5. Transmission and power train, W. H. Crouse.
6. Motor vehicle technology I, II, III, IV, S. C. Mud.
7. Motor vehicle technology, K. Newton, W Steed.
8. Automobile Technology, N.K Giri.

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Subject Code **: 2350205**

Subject Name **: Diagnosis and Testing - III (Electrical System)**

Sr. No.	Subject Content	Hrs.
1	**Automobile Battery:** Different troubles of the battery, Causes and remedies for various troubles, Symptoms and effects of various battery failures, Different battery tests, Determination of battery condition, Determination of serviceability of the battery, Reconditioning of the battery, Battery charging.	**4**
2	**Ignition System:** Different ignition failures, their causes and remedies, Quick checking of ignition system, Ignition service, Testing of different ignition system components, Procedure of checking and setting of ignition timing, Use of oscilloscope ignition tester for diagnosis of ignition trouble, Testing of the transistorized ignition system and their components, Servicing testing and adjustment of the fly wheel magneto ignition system.	**8**
3	**Starting System:** Common troubles in starting motor and its drive mechanism, Causes and remedies for the various troubles, Maintenance of the starter motor and its circuits, Reconditioning of the starter motor, Different starter tests and interpretation of the results, Testing of the starter switches.	**6**
4	**Charging System:** Different troubles in alternator, their causes and remedies, Testing procedure of alternator components, Testing procedure of regulator, Precautions to be observed in the use of alternator and regulator, Maintenance of alternator and regulator.	**10**
5	**Lighting System:** Faults in the Automobile lighting circuits, Causes and remedies for various troubles, Method of focusing the head light.	**4**

6	**Indicating and Warning Devices:** Troubles in fuel level gauge and its circuits, Causes and remedies for the various troubles, Procedure of testing gauge and tank units, Troubles in the water temperature gauge, Causes and remedies for the troubles in temperature gauge, Procedure for testing of temperature gauge unit, Troubles in the oil pressure gauge, Causes and remedies for the troubles, Testing procedure of oil pressure gauge, Common troubles in speedometer and odometer, Causes and remedies for the troubles in speedometer and odometer, Troubles, causes and remedies in indicator devices and flasher unit.	**4**
7	**Miscellaneous Electrical Equipments and Accessories:** Troubles in wind shield wiper and its circuit, Possible causes and remedies for the trouble, Troubles in electric horn (high frequency) relay and its circuit, Probable causes and remedies for the troubles, Method of replacement of the horn components, Troubles in electric fuel pumps, Causes and remedies for the troubles, Testing procedure of electric fuel pump, Troubles in vehicle air-conditioning, Causes and remedies for troubles in Air-Conditioning, Troubles, causes and remedies in power window operating system.	**10**
8	**Wiring and Installation:** Troubles in auto vehicle wiring, Causes and remedies of the troubles, Testing of broken cable, Causes of deterioration of cable after long service and their remedies, Types of deterioration of cables.	**4**
9	**Testing Instruments:** Method of using battery tester, Method of using ignition coil tester, Method of using the condenser tester, Method of using the distributor tester, Method of using cam angle and RPM tester, Method of using ignition scope and interpreting the results obtained, Method of using ignition timing device, Method of using growler for generators and starters.	**4**
10	**Electrical System Inspection:** Periodical checking of the automobile electrical equipment e.g. battery, cables, Regulator, Generator, Charging, Circuit cranking motor ignition system and electrical accessories.	**2**
	Total	**56**

Reference Books:

1. Automotive Electrical equipment, W. H. Crouse.
2. Automotive Electrical maintenance, A. W. Judge.
3. Automotive diagnosis & tune-up, J. A. Johnson.
4. Automobile fault tracing, Station Abbey.
5. Automotive Electrical equipment, P. L. Kohli.
6. Auto Electrical Systems, C. P. Nakra.
7. Automobile Technology, N. K. Giri.

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Subject Code **: 2350206**
Subject Name **: Practice in Diagnosis and Testing - I**

Sr. No.	Subject Content	Hrs.
1	Cylinder boring and honing	4
2	Connecting rod alignment	4
3	Inspection and reconditioning of crankshaft	4
4	Re-conditioning of valves and valve seat	4
5	Calibration and phasing of fuel injection pump	4
6	Servicing and testing of injectors	4
7	Setting of fuel injection timing on a diesel engine	4
8	Fuel consumption test on automobiles	4
9	Testing of I.C. engine	4
10	Engine tune up and exhaust gas analysis	4
11	Servicing of cooling system	4
12	Servicing of lubrication system	4
13	Testing and setting of petrol injection system	4
	Total	28

Note : Perform **ANY SEVEN** experiences from the above list

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Subject Code **: 2350207**

Subject Name **: Practice in Diagnosis and Testing – II**

Sr. No.	List of Practicals	Hrs.
1	Servicing of clutch	4
2	Servicing of gear box	4
3	Servicing of automatic transmission	4
4	Servicing of fluid coupling	4
5	Servicing of final drive	4
6	Servicing of steering system	4
7	Servicing of gear shifting mechanism	4
8	Servicing of braking system	4
9	Bleeding of hydraulic braking system and pedal adjustment	4
10	Servicing of air brake system	4
11	Wheel alignment and balancing	4
12	Car washing and servicing	4
13	Vehicle performance test and driving practice	4
	Total	28

Note : Perform **ANY SEVEN** experiences from the above list

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Subject Code **: 2350208**

Subject Name **: Practice in Diagnosis and Testing – III**

Sr. No.	List of Practical	Hrs.
1	Testing of an automobile battery for its serviceability.	4
2	Testing of ignition coil, condenser, dwell angle, etc.	4
3	Setting and checking of ignition timing of S.I. engine.	4
4	Testing of starter motor and its circuit for voltage drop, no-load and torque.	4
5	Testing of starter motor component.	4
6	Testing of alternator and its components.	4
7	Testing of output of alternator.	4
8	Setting and adjustment of head light of the automotive vehicle.	4
9	Setting and adjustment of high frequency electric horn with its relay.	4
	Total	28

Note : Perform **ANY SEVEN** experiences from the above list .

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Subject Code **:** **2350209**
Subject Name **:** **PROJECT – I** (4 Hours Per Week)

An Automobile is service oriented business. There are few Automobile manufacturing industries in the Gujarat. Generally Automobile dealers are spread over entire Gujarat, so the Institute level project work/ Automobile manufacturing industries/Automobile dealer base project work, ST Workshops / RTO etc may be allocate to the students. Faculties & students are advised to study web content of GTU-Innovative Council on official web site of GTU. The basic concept is to bridge the industries & institute & create innovation by means of this subject.

(1)Students shall pursue their project work on their own risk. they need to observe all safety rules and precautions. In the case of accidents Institute shall not be responsible.

(2)Students are required to submit problem definition along with possible remedial measures within the define time period which is decided by Institute.

(3)Department / Institute / university shall help in allocating students amongst various Automobile manufacturing industries/Automobile dealers/ ST Workshops / RTO etc , student shall be free to select the Automobile industries/Automobile dealers ST Workshops / RTO etc in consultation with the Institute faculties.

(4)Due to lesser Automobile industries students may be allowed to take up project in the institute itself, but the faculties / Guide should ensure the scope of the work with respect to course content & syllabus.

(5)Institute can also define and assign project pertaining to Lab. Development and facilities development of the department.

(6) Institute can also define and assign, Survey type, Mathematical Simulation Type, Computerised Programming Type Project, within the scope of Automobile Engineering.

(7)Report writing and continuous evaluation is to be carried out during the term.

References:

(1) Web Content of GTU Innovative Council (www.gtu.ac.in)

(2) Internet
(3) College Library
(4) Directory / Database Of Automobile Industries in Gujarat & India