



மனோன்மணியம் சுந்தரனார் பல்கலைக்கழகம்

MANONMANIAM SUNDARANAR UNIVERSITY

**SYLLABUS FOR ADVANCED DIPLOMA IN HEAVY VEHICLE MECHANISM
PROGRAM OFFERED THROUGH DIRECTORATE OF VOCATIONAL
EDUCATION (COMMUNITY COLLEGES AND VOCATIONAL SKILL DEVELOPMENT
CENTRES) FROM 2019 - 2020**



கல்விசார் நிலைக்குழுக் கூட்டம்

**MEETING OF THE STANDING COMMITTEE ON
ACADEMIC AFFAIRS HELD ON WEDNESDAY
THE 22nd JANUARY 2020**

ADVANCED DIPLOMA IN HEAVY VEHICLE MECHANISM

மேம்பட்ட கனரக வாகன இயந்திரவியல் பட்டயம்

SCHEME OF EXAMINATION

Subject code	Title of the Course	Credit	Hours	Passing Minimum
Semester I				
C19HT11/E19HT01	Automobile Engines-I	6	90	40/100
C19HT12/E19HT02	Automobile Engines-II	6	90	40/100
C19HTP1/E19HTP1	Practical I-Automobile Engineering-I	4	120	40/100
C19CE10/E19CE10	Communicative English	6	90	40/100
C19HTP2/E19HTP2	Practical II-Automobile Engineering-II	4	120	40/100
Semester II				
C19HT21/E19HT03	Automobile Chassis and Transmission-I	6	90	40/100
C19HT22/E19HT04	Automobile Chassis and Transmission-II	6	90	40/100
C19LS23/E19LS05	Life Skill	6	90	40/100
C19HTP3/E19HTP3	Practical III-Automobile Transmission-I	4	120	40/100
C19HTP4/E19HTP4	Practical IV-Automobile Transmission-II	4	120	40/100
Semester III				
C19HT31/E19HT05	Automotive Electrical and Equipment-I	6	90	40/100
C19HT32/E19HT06	Automotive Electrical and Equipment-II	6	90	40/100
C19HTP5/E19HTP5	Practical V- Automobile Electrical and Equipment-I	6	120	40/100
C19HTP6/E19HTP6	Practical VI-Automobile Electrical and Equipment-II	4	120	40/100
C19HTIP/E19HTIP	Internship Training	12	150	40/100
Semester IV				
C19HT41/E19HT07	Automobile Maintenance and Emission Control	6	90	40/100
C19HT42/E19HT08	Vehicle Body Engineering	6	90	40/100
C19HT43/E19HT09	Vehicle Transport Management	6	90	40/100
C19HTP7/E19HTP7	Practical VII- Engine Recondition	6	120	40/100
C19HTPW/E19HTPW	Project Work	12	150	40/100

Eligibility for admission: Pass in 10th std examination conducted by the Govt. of Tamil Nadu Board of Secondary Education, Government of Tamil Nadu or any other equivalent examination.

Examination: Passing Minimum for each Course is 40%. Classification will be done on the basis of percentage marks of the total marks obtained in all the Courses and as given below:

40 % but less than 50 % - Third class
50 % but less than 60 % - Second class
60 % and above - First class

Theory Paper

Internal Marks-25

External Marks-75

Syllabus

First Semester:-

Course I - Automobile Engines –I
Course II - Automobile Engines –II
Course III - Practical I-Automobile Engineering-I
Course IV - Communicative English
Course V - Practical II-Automobile Engineering-II

Second Semester:-

Course VI - Automobile Chassis and Transmission - I
Course VII - Automobile Chassis and Transmission -II
Course VIII - Life Skill
Course IX - Practical III-Automobile Transmission-I
Course X - Practical IV-Automobile Transmission-II

Third Semester:-

Course XI - Automotive Electrical and Equipment-I
Course XII - Automotive Electrical and Equipment-II
Course XIII - Practical V-Automobile Electrical and Equipment-I
Course XIV - Practical VI-Automobile Electrical and Equipment-II
Course XV - Internship Training

Fourth Semester:-

Course XVI - Automobile Maintenance and Emission Control
Course XVII- Vehicle Body Engineering
Course XVIII- Vehicle Transport Management
Course XIX - Practical VII-Engine Recondition
Course XX - Project Work

***(Semester Pattern for Community College Only)**

Program Objectives

- To make qualified and skilled worker for the Heavy vehicle service and Maintenance sector.
- To create an opportunity for the students to have technical Education and increase the employability.

SEMESTER I

COURSE -I (C19HT11/E19HT01)AUTOMOBILE ENGINES-I

Objective

- To get knowledge about fundamentals of Engines
- To get knowledge about Construction of various Types of Engines used in Automobiles.

UNIT- I: GENERAL STRUCTURE OF AUTOMOBILE

18 Hours

Classification of Automobile, Major systems of an Automobile - their functions, Chassis – definition-chassis layout with major components - their functions , engine mounts –definition of : wheel base - wheel track - overall length - front overhung - rear overhung -height of CG point - ground clearance - gross weight and kerb weight.

UNIT-II: HEAT ENGINES

18 Hours

Heat engines - Definition - types - comparison of IC engines-engine terminology-bore – stroke– TDC – BDC – clearance volume - swept volume - total volume - compression ratio - mean effective pressure – indicated power – brake power - friction power - engine speed engine torque, classification of IC engines with respect to different parameters, Two stroke & four stroke SI engines-construction–working, Two stroke & Four stroke CI engines - construction – working,-comparison of SI and CI engines- comparison of Two stroke and Four stroke engines.

UNIT-III: ENGINE CONSTRUCTION DETAILS - I

18 Hours

Cylinder block –Constructional details - materials used , Cylinder head - constructional details -materials used, crank case, oil pan , cylinder liners – types –,Gasket - purpose- types , Piston - functions - constructional details - materials used , Piston rings – functions - types – constructional details – materials, Piston pin - Connecting rod and crank shaft– functions –types – construction – materials.

UNIT-IV ENGINE CONSTRUCTIONAL DETAILS - II

18 Hours

Single Cylinder engine, Multi-cylinder engine- firing order, firing order -four and six cylinder engines-functions, construction and materials of flywheel-need, types and constructional details of vibration damper-functions, construction and materials of cam shaft, different types of camshaft drives. Inlet and Exhaust valves-valve clearance.

UNIT-V: COOLING SYSTEM

18 Hours

Cooling system-purpose-types, Air cooling system –construction-working-merits and demerits-Pump circulation water cooling system - necessity - construction-working -merits and demerits-Water Pump - construction - working, Radiator-necessity, Radiator pressure cap-need –construction and working , Expansion tank- necessity, Thermostat valve- necessity- types – construction andworking - Anti- freeze solutions-purpose, Anti-rust solutions-purpose.

Reference books:

- Automobile Engineering vol-2 ,Kripal Singh-Standard publications
- Automobile Engineering ,R B Gupta-Satya Prakashan
- Automotive Engines ,S Srinivasan-Tata McGraw-Hill
- Automotive Technology,H M Sethi -Tata McGraw-Hill
- Automotive Mechanics ,Crouse and Anglin -Tata McGraw-Hill
- Automotive Engineering vol-2,Anil Chikara -Satya Prakashan
- Automobile Engineering ,Er S.K.Gupta -S.Chand

COURSE -II

(C19HT12/E19HT02)AUTOMOBILE ENGINES -II

Objective

- To accure knowledge about Construction & working of lubricating system, fuel feed system and fuel injection system.

UNIT-I: LUBRICATION SYSTEM

18 Hours

Lubricants - types - properties - SAE ratings - applications, Lubrication system-purpose-types, Petrol, Splash Lubrication-construction- working, Force feed lubrication system- construction-working, Gear pump - Construction-working, Rotor pump - Construction- working, Vane pump - Construction-working, Full flow filtering system - layout - working, By-pass flow filtering systems - layout- working, Bearings - need - types, Shell bearings - Ball bearings - Thrust bearings - necessity -Construction and working of each type.

UNIT- II: FUEL FEED SYSTEMS IN PETROL ENGINES

18 Hours

Fuel feed systems- function - types, Gravity feed system - layout - construction, Pump feed system - layout - construction, Fuel tank, Fuel filter - need , Air filters - need - types, Wet & Dry type - construction - working , AC mechanical fuel pump - construction - working, SU electrical fuel pump - construction - working.

UNIT-III: CARBURETORS

18 Hours

Carburization, Atomization, Vaporization, Air fuel ratio requirements - Carburetor -requirements, Simple carburetor - Principle - construction - working - limitations, Classifications of carburetors based on various parameters , S U carburetor - construction -working.

UNIT-IV: FUEL FEED SYSTEMS IN CI ENGINES

18 Hours

Fuel injection systems - requirement - function - types, Layouts of - Individual pump injection system - Distributor type injection system - common rail injection - unit injection system, Water separator - Construction - working, Fuel filters - primary filter - secondary filters -purpose - construction - working of each type.

UNIT-V: FUEL INJECTION PUMPS IN CI ENGINES

18 Hours

Plunger type Fuel feed pump - construction - working, Fuel injector - construction - working, Fuel nozzles - types - construction - working, Governors -necessity - classification -mechanical and pneumatic governor - construction - working of each type.

Reference books:

- Automobile Engineering vol-2, Kirpal Singh-Standard publications
- Automobile Engineering ,R B Gupta-Satya Prakashan
- Automotive Engines ,S Srinivasan -Tata McGraw-Hill
- Automotive Technology,H M Sethi-Tata McGraw-Hill
- Automotive Engineering vol-2, Anil Chikar-Satya Prakashan
- The Automobile, Harbans Singh rayat S Chand

COURSE -III**(C19HTP1/E19HTP1)AUTOMOBILE ENGINEERING-I****LIST OF EXERCISES:**

- Safety precautions in automobile workshop.
- Identification of tools, special tools, gauges and equipments used in Automobile workshop.
- Identification of major components in Four-wheeler
- Practice on dismantling and assembling of Four-stroke single cylinder petrol engine.
- Practice on adjusting belt tension of cooling / charging system.
- Identification of components of valve operating mechanism and adjust the tappet clearance.
- Practice on using different jacks to remove wheels from vehicle and.
- Practice on removal of tyre from disc and mending the punctured tubes using hot patch and cold patch.
- Practice on High pressure washing of different vehicles.

Course IV
(C19CE10/E19CE10) Communicative English

1. Basic Grammar:

- a. Review of grammar
- b. Remedial study of grammar
- c. Simple sentence
- d. Word passive voice etc.

2. Buibling Vocabulary:

- a. Synonyms
- b. Antonyms
- c. One – work Institution

3. Reading and Understanding English

- a. Comprehension passage
- b. Précis – writing
- c. Developing a story from hints.

4. Writing English

- a. Writing Business letters.
- b. Paragraph writing
- c. Essay writing
- d. Dialogue writing

5. Speaking English

- a. Expressions used under different circumstances
- b. Phonetics

Reference :

1. V.H.Baskaran – “English Made Easy”
2. V.H.Baskaran – “English Composition Made Easy”
(Shakespeare Institute of English Studies, Chennai)
3. N.Krishnaswamy – “Teaching English Grammar”
(T.R.Publication, Chennai)
4. “Life Skill” – P.Ravi, S.Prabakar and T.Tamzil Chelvam,
M.S.University, Tirunelveli.

**COURSE- V
PRACTICAL II**

(C19HTP2/E19HTP2)AUTOMOBILE ENGINEERING-II

LIST OF EXERCISES:

- Inspection and cleaning of fuel tank & fuel lines.
- Identification of different components in Fuel supply system of Diesel engines
- Servicing of Air cleaners.
- Replacing of petrol and diesel Fuel filters
- Servicing of Plunger type Fuel feed pump.
- Servicing of diesel Fuel injection pump.
- Servicing and testing of diesel Fuel injectors.
- Servicing of Radiator.
- Servicing of water pump.
- Replacing of engine oil and oil filters

SEMESTER II

COURSE –VI

(C19HT21/E19HT03)AUTOMOBILE CHASSIS AND TRANSMISSION -I

Objective

- To accure knowledge about the Construction and working of various Transmission system components.

UNIT-I: CHASSIS FRAMES

18 Hours

Frames- purpose- loads acting - types –construction-ladder type-x type-integral, sections used in frames- Channel-Box-Tubular, materials used for frames, sub frames-need.

UNIT-II: CLUTCH

18 Hours

Purpose-requirements-classifications- principle of friction clutch, construction and working -single plate- multi plate- centrifugal, advantages and disadvantages-single plate, multi plate-centrifugal clutch, Clutch Lining materials, Clutch operating mechanisms mechanical-hydraulic

UNIT-III: GEAR BOX

18 Hours

Necessity- Classification-construction and working - constant mesh-synchromesh gear box, synchronizer-need-construction and working, gear selector mechanisms-types-construction and working –floor mounted mechanism.

UNIT-IV: PROPELLER SHAFT, FINAL DRIVE, DIFFERENTIAL 18 Hours

Propeller shaft-function-construction, universal joints & slip joints- function-types-construction and working- cross or spider type-flexible ring type-Rzeppa joint-Tripod joint.

Final drive- Purpose- types- construction & working.

Differential- necessity- principle- construction & working.

UNIT-V: FRONT AXLE AND REAR AXLE

18 Hours

Front axle -types-construction-live (drive shaft)-dead axle (conventional), stub axles-types-construction - Elliot, reverse-Elliot, lemoine and reverse - lemoine.

Rear axle- loads acting- types - construction and operation - hotch kiss - torque tube drive, rear axle drive-construction-semi-floating -3/4 floating -fully floating rear axle drives, double reduction axle-necessity-types.

Reference books:

- Automotive Mechanics, W. H. Crouse & Anglin-Tata MC Graw-Hill
- Diesel Engineering, Sean Bennett-CENGAGE Learning
- The Automobile Engineering, Vol-2, K.M Guptha-Umesh publications
- Automobile Engineering, K.M Gupta-Umesh publications
- Automobile Engineering, Vol I, Kirpal Singh-Standard publication
- Automobile Engineering, Er S K Gupta-S Chand
- Automobile engineering, R B Gupta -Kanna Publications

COURSE –VII

(C19HT22/E19HT04)AUTOMOBILE CHASSIS AND TRANSMISSION –II

Objective

- To accure knowledge about steering, braking and suspension system
- To study about Wheels, Tyres and advancements in final drives.

UNIT-I: STEERING SYSTEM

18 Hours

Purpose- requirements-mechanisms-types-details –Ackerman mechanism, layouts-rigid axle-independent suspension system, steering gear box-need-types-construction and working- Rack & Pinion-worm and wheel re-circulating ball and nut type, steering geometry-definition, define and explain-camber-caster-king pin inclination-combined angle-toe in and toe out, wheel alignment and wheel balancing-need.

UNIT-II: BRAKING SYSTEM

18 Hours

Purpose- requirements- types, construction and working-internal expanding drum brake, mechanical brakes-layout, hydraulic brake-principle-layout-advantages and disadvantages, master cylinder-types-construction and working –conventional –tandem, wheel cylinder-types-construction and working –single and double piston type, parking brake-purpose, brake lining materials, disc brakes-types-merits and demerits-construction and working – fixed-sliding-swinging type.

UNIT-III: SUSPENSION SYSTEM

18 Hours

Necessity-types, springs-types, construction and working-rigid axle suspension with leaf spring-McPherson strut-double wishbone-trailing link, sprung and un sprung weight-definition, shock absorber-need-construction and working of double acting shock absorber.

UNIT-IV: WHEELS AND TYRES

18 Hours

Wheels- requirements-types, Constructional details-wire-disc-alloy wheel.

Tyres-function-types-construction-tube-tubeless, carcass-types-construction-cross ply –radial - bias type, treads pattern – need - types, aspect ratio, and specification.

UNIT-V: ADVANCEMENTS IN FINAL DRIVES AND BRAKES**18 Hours**

Limited slip differential-need-types-construction and working of clutch type LSD, Differential lock-need-construction and working of dog clutch type differential lock -Servo brakes-need-types, vacuum servo brakes-layout-working, vacuum servo booster construction and working, power brakes-need -types, air brake system-layout and working, air brake valve-brake chamber-unloader valve- construction and working, air assisted hydraulic system-layout-working, exhaust brakes-need-layout and working.

Reference books:

- Automotive Mechanics, W. H. Crouse & Anglin-Tata MC Graw-Hill
- Diesel Engineering, Sean Bennett-CENGAGE Learning
- The Automobile Engineering, Vol-2, K.M Gupta-Umesh publications
- Automobile Engineering, K.M Gupta-Umesh publications
- Automobile Engineering, Vol I, Kirpal Singh-Standard publication
- Automobile Engineering, Er S K Gupta S Chand
- Automobile engineering ,R B Gupta -Kanna Publications

Course VIII

(C19LS23/E19LS05) Life Skill

I Life Coping or adjustment

- (a) External and internal influence in one's life
- (b) Process of coping or adjustment
- (c) Coping with physical change and sexuality
- (d) Coping with stress, shyness, fear, anger far live and criticism.

II Attitude

- (a) Attitude
- (b) Self acceptance, self – esteem and self actualization
- (c) Positive thinking

III Problem Solving

- (a) Goal Setting
- (b) Decision Making
- (c) Time Management and stress Management.

IV Computers

- (a) Introduction to Computers
- (b) M.S.Office
- (c) Power Point

V Internet

- (a) Introduction to internet
- (b) E – mail
- (c) Browsing

References:

- 1) Life Skill Programme course I & II by Dr. Xavier Alphona MCRDCE Publications. R.K.Mutt Road, Chennai – 28
- 2) ஆளுமை பண்பு வளர்த்தல் மற்றும் தகவல் தொடர்பு by M.Selvaraj Community College,Palayamkottai
- 3) “Life Skill” –P.Ravi, S.Prabahar & T.Tamil Chelvam, M.S. University, Tirunelveli

COURSE- IX

PRACTICAL III

(C19HTP3/E19HTP3)AUTOMOBILE TRANSMISSION-I

LIST OF EXERCISES:

- Overhauling of a Single plate clutch. (coil spring type)
- Overhauling of a Single plate clutch. (Diaphragm spring type)
- Overhauling of a multi-plate clutch.
- Overhauling of a synchro-mesh Gear-box & calculation of gearratio's w.r.t number of teeth.
- Overhauling of a Transfer case.
- Overhauling of a Propeller shaft & universal joint
- Overhauling of a Final drive & Differential with backlash adjustment, & calculation of Final drive gear ratio
- Overhauling of a front axle & hub greasing

COURSE- X

PRACTICAL IV

(C19HTP4/E19HTP4)AUTOMOBILE TRANSMISSION-II

LIST OF EXERCISES:

- Overhauling of a Steering gear box with Backlash, End-play adjustment & calculation of steering gear ratio. (minimum any three different types of steering gear box)
- Overhauling of an Independent suspension system
- Overhauling of a Leaf spring & re-chambering.
- Overhauling of a mechanical brake with free-play & brake shoe adjustments.
- Overhauling of a drum brake
- Overhauling of a disc brake
- Overhauling of a Master cylinder & wheel cylinder.
- Bleeding of hydraulic brake system, free-play & brake shoe adjustments.
- Measurement of Wheel base, wheel track, Toe-in, Toe-out, over length, over all height, front over-hang, rear over-hang, ground clearance.

SEMESTER III
COURSE -XI
(C19HT31/E19HT05)AUTOMOTIVE ELECTRICAL AND EQUIPMENT-I

Objective

- To get knowledge about fundamentals of Electrical and Electronics system.
- To get knowledge about Electrical safety
- To study about Automotive Electrical system and its Components.

UNIT-I: BASIC ELECTRICITY

18 Hours

Electrical energy-definition-Benefits-sources-effects of electrical current with applications, electrical current-definition-units-DC current-definition-applications-AC current-applications, voltage-definition-units, resistance-definition-unit, conductors, insulator, semiconductors, capacitors-working principle-capacitance unit-types applications, Ohms law-series and parallel circuits, magnetism-magnetic lines of force -magnetic field-reluctance-flux density, electromagnetism-faraday's law of electromagnetic induction-self induction-mutual induction-units of inductance, Switches-function-types.

UNIT-II: BASIC ELECTRONICS

18 Hours

Semiconductors- P type- N type, Diode-introduction-half wave rectification-full wave bridge rectifier-full wave bridge rectifier with capacitor filter, zener diode-introduction, zener diode as voltage regulator, LED and photo diode-introduction-applications, transistor-introduction-NPN and PNP transistor-applications-transistor as switch.

UNIT-III: INTRODUCTION TO AUTOMOTIVE ELECTRICAL SYSTEM

18 Hours

Automotive Electrical Systems-function of each system, Earth and Insulated return system circuit diagram-merits and demerits, Positive and negative earth return system-merits and demerits, Electrical and electronics symbols used in Auto electrical system.

UNIT-IV: BATTERY

18 Hours

Battery -purpose-types, construction and working-Lead acid and alkaline battery-differences between lead acid and alkaline battery, Explain-Cell voltage -Battery capacity-Battery efficiency, Battery ratings- types.

UNIT-V: AUTOMOTIVE ELECTRONICS AND ELECTRICAL SAFETY

18 Hours

Automotive electronics-Engine electronics- Transmission electronics-Chassis electronics- Passive safety-Driver assistance-Passenger comfort-Entertainment systems-Electronic integrated cockpit systems.

Electrical safety- importance of earthing - electric shock: first aid, precautions - causes of accident and their preventive measures. Energy conservation

Reference books:

- Automobile Electrical Equipment-Kohli-Tata McGraw-Hill
- Automobile Engineering,Vol-2 Kirpal Singh-Standard Publications
- The Automobile Engineering,Vol-2 K.M Guptha-Umesh publications
- Principals of Electrical Engineering &V. K Mehta & Electronics ,Rohit Mehta -S Chand & Co
- The Automobile Engineering,Harban Singh Reyath-S Chand & Co
- The Automobile Engineering,Er S K Gupta-S Chand & Co
- Automobile Electrical Equipment,W. H. Crouse-Tata McGraw-Hill
Website: <https://en.m.wikipedia.org>

COURSE -XII

(C19HT32/E19HT06)AUTOMOTIVE ELECTRICAL AND EQUIPMENT-II

Objective

- To get knowledge about various Automotive electrical system and its components.
- To get knowledge about electrical accessories used in Automobiles.

UNIT-I: CHARGING SYSTEM

18 Hours

Charging system-purpose-circuit diagram with D C generator, D C generator-principle-construction and working, need of cut-out relay, current and voltage regulator, Alternator charging circuit with alternator-working principle-construction and working-regulation, Electronic voltage regulators-construction and working, comparison between generator and alternator.

UNIT-II: STARTING SYSTEM

18 Hours

Starting system-requirements-circuit diagram-working principle, construction and working-series shunt wound motor Drive mechanism-need-types, construction and working-Standard Bendix drive- positive engaging drive with shift lever and over running clutch drive-axial sliding armature drive, Solenoid switch with two winding-construction and working.

UNIT-III: IGNITION SYSTEM

18 Hours

Ignition system-requirements-types, battery coil ignition system-circuit diagram-function of each component, Ignition coil-function-construction and working ,Ignition timing-definition-need of ignition timing advance based on speed and load, Firing order-definition-need, Magneto ignition system-circuit diagram of High tension rotating magnet type ignition system-function of each component, spark plug-classification-construction-specification, spark plug gap, heat range and reach- definition and importance.

UNIT-IV: LIGHTING SYSTEM**18 Hours**

Circuit diagram-head light-parking light, side indicator, brake light, reverse gear light, Head light-construction, bulbs, Dipper switch, Fuses, cable colour codes, cable connectors, Wiring harness.

UNIT-V: Electrical Accessories**18 Hours**

Circuit diagram and explain- fuel level gauge-coolant temperature gauge, oil pressure gauge, horn, wind screen wiper, construction and working- Speedo meter, odometer, wind screen wiper, electric horn, purpose, types, construction-relays.

Reference books:

- Automobile Electrical Equipment, Kohli-Tata McGraw-Hill
- Automobile Engineering, Vol-2, Kirpal Singh-Standard Publications
- The Automobile Engineering, Vol-2, K.M Gupta- Umesh publications
- Principles of Electrical Engineering & V. K Mehta & Electronics Rohit Mehta-S Chand & Co
- The Automobile Engineering, Harban Singh Reyath-S Chand & Co
- The Automobile Engineering, Er S K Gupta-S Chand & Co
- Automobile Electrical Equipment, W. H. Crouse-Tata McGraw-Hill

**COURSE-XIII
PRACTICAL V****(C19HTP5/E19HTP5)AUTOMOBILE ELECTRICAL AND EQUIPMENT-I****LIST OF EXERCISES:**

- Test the battery charge condition using hydrometer, Voltmeter.
a) Practice on preparation of electrolyte.
b) Charging of Lead acid battery by constant voltage method,
- Charging multiple batteries and trickle charging.
- Practice on creating circuits of half wave rectifier, Full wave bridge rectifier
- Practice on creating circuit to demonstrate Transistor as a switch function.
- Find the resistance of given resistor using colour code and multi meter.
- Find the equivalent resistance in series and parallel circuits.
- Practice on checking the condition of Capacitor.
- Practice on checking the condition of diode.

COURSE- XIV
PRACTICAL VI
(C19HTP6/E19HTP6) AUTOMOBILE ELECTRICAL AND EQUIPMENT-II

Objective

- To Identify Various electrical Servicing Tools used in Automobile workshop.
- To get the ability to servicing and replacement of various Automobile Electrical components.

LIST OF EXERCISES:

- Practice on Servicing of the D C generator.
- Test field windings, brush holders armature for continuity, short and open circuit using growler/ Multifunction Tester.
- Practice on servicing of the Alternator.
- Test stator, rotor and rectifier for continuity, short and open circuit using Multifunction Tester / Test lamp
- Practice on servicing of the Starter motor.
- Test field windings, brush holders armature and solenoid switch for continuity, short and open circuit using growler/ Multifunction Tester
- Practice on servicing of the distributor, setting CB point's gap and checking dwell angle.
- Checking and setting ignition timing and starting the engine.
- Practice on servicing and tuning of horns.
- Practice on servicing of the Wiper motor.
- Practice on aiming of head lights.
- Practice on replacement of bulbs, fuses and relays.

COURSE- XV
(C19HTIP/E19HTIP)INTENSHIP TRAINING

The Candidate has expected to undergo 30 days intensive training in a core Company (Heavy Vehicle Automobile Engineering Company) for which he has to get a certificate of attendance and submit a report of the Training undergone for the above said period and the same should be submitted to the University through the Co-ordinator of the Community college.

INDUSTRIAL TRAINING DIARY

Students are required to maintain the record of day-to-day work done. Such record is called Industrial training Diary. Students have to write this report regularly. All days for the week should be accounted for clearly giving attendance particulars (Presence, absence, Leave, Holidays etc). The concern Industrial supervisor is to check periodically these progress reports.

SEMESTER IV
COURSE -XVI
(C19HT41/E19HT07)AUTOMOBILE MAINTENANCE AND EMISSION
CONTROL

Objective

- To study about the various Records used in Automobile workshop.
- To get ability to repair and overhauling of various automobile Electrical components.
- To get knowledge about Maintenance of fuel system, cooling system & lubricating system.

UNIT-I: MAINTENANCE OF RECORDS AND SCHEDULES 18 Hours

Importance of maintenance - preventive (scheduled) and breakdown (unscheduled) maintenance - requirements of maintenance - preparation of check lists - Inspection schedule - maintenance of records, log sheets and other forms – safety precautions in maintenance.

UNIT-II: ENGINE MAINTENANCE – REPAIR AND OVERHAULING 18 Hours

Dismantling of engine components and cleaning - cleaning methods - visual and dimensional inspections - minor and major reconditioning of various components- reconditioning methods - engine assembly - engine tune up.- special tools used for maintenance and overhauling.

UNIT-III: CHASSIS MAINTENANCE - REPAIR AND OVERHAULING 18 Hours

Mechanical and automotive clutch and gear box servicing and maintenance - maintenance and servicing of propeller shaft and differential system – Maintenance and servicing of suspension systems - Brake systems, types and servicing techniques. Steering systems- overhauling and maintenance. - Wheel alignment - computerized alignment and wheel balancing.

UNIT-IV: 18 Hours
ELECTRICAL SYSTEM MAINTENANCE - SERVICING AND REPAIRS

Testing methods for checking electrical components - checking batter - starter motor - charging systems - DC generator and alternator - ignitions system – lighting systems. Fault diagnosis and maintenance of modern electronic controls – checking and servicing of dash board instruments.

UNIT-V: 18 Hours
MAINTENANCE OF FUEL SYSTEM, COOLING SYSTEMS, LUBRICATION
SYSTEM AND VECHICLE BODY

Servicing and maintenance of fuel system of different types of vehicles – calibration and tuning of engine for optimum fuel supply – Maintenance of cooling systems and its components - water pump, radiator, thermostat - anticorrosion and antifreeze additives. Lubrication maintenance - lubricating oil changing - greasing of parts. Vehicle body maintenance - minor and major repairs. Door locks and window glass actuating system maintenance.

Reference Book

- Fleet Management, John Doke, McGraw-Hill Co. 1984.
- Advanced Engine Performance Diagnosis, James D Halderman, PHI - 1998.
- Service Manuals from Different Vehicle Manufacturers.

COURSE -XVII

(C19HT42/E19HT08)VEHICLE BODY ENGINEERING

Objective

- To study about Bus & commercial vehicle bodies
- To get knowledge about vehicle body materials and body painting.
- To get knowledge about vehicle body repair & Maintenance.

UNIT-I: BUS AND COMMERCIAL VEHICLE BODIES

18 Hours

Types, Bus body layouts of each type, Bus Body Lay Out-Floor height-engine location-entrance and exit location-seating dimensions, Constructional details-Frame construction-types-Types of metal section used-Regulations, Double skin construction-concept, Conventional and Integral type construction-concept-merits-demerits, Commercial Vehicle body- Types- illustration of each type, Dimensions of driver's seat in relation to controls, driver's cabin design.

UNIT- II: BODY MATERIALS

18 Hours

Body material -Requirements-Steel sheet, timber, plastics, GRP, CRP-properties of materials applications in vehicle body, Interior materials-requirements-types-applications, Glasses-types, laminated glass-concept-purpose, defrosting in glasses-concept-purpose.

UNIT III: VEHICLE AERODYNAMICS

18 Hours

Vehicle aerodynamics- Objectives – vehicle drag and types, various types of forces and moments – effects of forces and moments – various body optimization techniques for minimum drag – Wind tunnel testing – Flow visualization techniques- scale model testing.

UNIT IV: BODY PAINTING

18 Hours

Painting-concept-objectives, elements of paint-resins-concept-function, pigment- concept-function, solvent- concept-function -Types, paint drying process-Types-drying principle of each type-merits-demerits, composition & functions- primer paint- putty paint- surface-sealer - top coat, spray painting-Types, air spray painting-procedure, air less spray painting-procedure, electrostatic painting-procedure, New vehicle painting with a block diagram.

UNIT V: BODY REPAIR

18 Hours

Body repair : Integral body - frame – design features of an integral body frame – safety body cell – off road vehicles – accident damage and diagnosis – body repair spares. Repair procedures – minor damage vehicle repairs – repairs with washer welder –panel filling with plastic body fillers and putties – body aligning – panel replacement – outer door panel replacement – repair of plastic parts – rust repairs – surface rust repairs – repair of severely rusted panels-Corrosion protection.

Reference Book:

- Vehicle Body Engg, Powloski J, Business Books Ltd, 1989
- Body repair Techniques, Anil Chhikara, Satya Prakashan , New Delhi – Voli V
- Body Construction & design, Giles G.J. Illiffe-Books Butter worth & co
- Vehicle Body Layout and analysis, John Fenton - Mechanical Engg Publication Ltd , London.
- Paint techniques, Anil Chhikara, Satya Prakashan ,New Delhi – Vol IV
- Auto body repairing and repainting, Bill Toboldt, The Goodheart – Willcox Company, Inc.
- Vehicle Body Repair, James Duffy-Cengage Learning
- Automobile Engineering (Paint Technology)-vol V, Anil Chhikara Satya Prakashana, New Delhi
- Automotive Mechanics, Grouse W and Anglin D Tata Mcgraw Hill Publication 10th edition, 2004

COURSE -XVIII
(C19HT43/E19HT09)VEHICLE TRANSPORT MANAGEMENT

Objective

- To study about vehicle service stations.
- To get knowledge about goods and passenger Transport operations.
- To get knowledge about Motor vehicle act, Road signals and pollution control.

UNIT I: SERVICE STATIONS AND STORES

18 Hours

Service station-Types – factors to start new service station – service station layout – Tool and equipments required -service station records-job card, Material Requirement Planning (MRP)- concept- applications, Just in Time (JIT)-concept and benefits, Supply chain management concept and benefits.

Stores -classification - Functions of store keeper- Store management- Bin Card – Material Issue Requisition- Material Returned Note- Store ledgers - Codification of stores-Inventory Management- Definition - functions of Inventory Control- Advantages of Inventory Control.

UNIT II: GOODS TRANSPORT OPERATION

18 Hours

Simple layout of garages and depot for goods transport vehicle-materials Handling equipments in the goods vehicle depot-Receipt of goods, delivery of goods, insurance of goods and vehicles-settlement of claims-drivers duty schedules-vehicles schedule, log sheet-way bills and other documents – connected with goods vehicle operation-transshipments and sub contracting.

UNIT III: PASSENGER TRANSPORT

18 Hours

Administrative set up of a passenger transport organization, traffic investigation to improve services – peak hour demands — classification of vehicles – express, limited stop, relief services, etc. – Fare table calculation – vehicle schedule in city service – drivers and conductors duty schedules – ticket system, trip sheet – incentive schemes for improving the service – operating cost.

UNIT IV: MOTOR VEHICLES ACT, ROAD SIGNALS

18 Hours

Motor vehicles Act and road signals – Definition of various vehicles – permit – insurance, road tax, etc. – procedure for registering a vehicle – fitness certificate – issue of non – road worthy certificate – inspection of accidents and recording – issue of driving license and conductor license – enforcement of emission norms – stage carriage – contact carriage.

UNIT-V POLLUTION CONTROL

18 Hours

Pollution – Pollutants – source of pollutants – pollution control techniques for petrol and diesel engines emissions – controlling crank case emission (PCV) – controlling evaporative emission (VRS , VSS , VVR , ECS and EEC) – Treatment of exhaust gas (Catalytic converter , EGR)

Reference Book:

- Industrial Management and Engineering Economics-O.P.Khanna Khanna publishers
- Vehicle Transport Management, S.L. Bhandarkar-Dhanapath Rai & Co
- Goods vehicle Operation – Dunbar.
- Bus Operation – Dunbar.
- Tamilnadu Motor Vehicle Act 1989.

COURSE- XIX

Practical VII

(C19HTP7/E19HTP7) ENGINE RECONDITION

Objective

- To identify the various automobile tools and their uses.
- Ability to reconditioning the various engine.
- Ability to adjust valve Timing & clearance parts.

LIST OF EXERCISES:

- Inspect and Analyze the cylinder head condition after Dismantle, Cleaning and decarburizing.
- Practice on Re-conditioning of valve mechanism –(Removing valve, valve seats and valve guides Check for stem bend, Check the condition of valve spring , Measure the valve face angle) ,
- Recondition of valve using valve refacing machine
- Reconditioning of valve seat by using valve seat cutter kit/ vibro-centre kit & Valve lapping.
- Check crack, warp-age in the cylinder head and practice surface grinding.
- Measure the ovality and taperness of cylinder bore.
- Practice on cylinder ridge reaming and cylinder reboring process.
- Practice on Cylinder Honing using honing machine.
- Inspect and Service the Crank shaft, connecting rod and piston.
- Assemble the engine by using specified torques.
- Adjust valve timing and valve tappet clearance.
- Setting of ignition timing or injection timing and start the engine.

COURSE- XX
(C19HTPW/E19HTPW)PROJECT WORK

Objective

- To implement the theoretical and practical knowledge gained through the curriculum into real practical Applications.
- To get Exposure on industrial environment and its work ethics.

INTRODUCTION

The objective of the project work is to enable the students in convenient groups of minimum of 5 & maximum of 8 members on a project involving theoretical and experimental studies related to the branch of study. Every project work shall have a guide who is the member of the faculty of the institution. Six periods per week shall be allotted in the time table and this time shall be utilized by the students to receive the directions from the guide, on library reading, laboratory work, computer analysis or field work as assigned by the guide and also to present in periodical seminars on the progress made in the project.

ROAD MAP FOR THE PROJECT

1. Carry out a session or a seminar for directing the students to identify project areas in the field of their interested including interdisciplinary areas.
2. Power point presentation in seminar should include detail description of project areas related to program,, Project report formats, developing personnel writing skills.
3. The Students/Departments may at liberty to form the batch not less than 5 and maximum 8 and get registered with project coordinator/HOD.
4. The types of project may include:
 - Industrial case study
 - Preparation of a feasibility report
 - Design and development of equipment.
 - The overhauling of existing equipment
 - Creation of New facilities
5. The project should be challenging but manageable within the resources and time available.
6. Students should undergo reviews for three times; in 4th semester. The guide should monitor the progress of Project work periodically.
7. Students are required to submit a comprehensive report on project with required details .
