மனோன்மணியம் சுந்தரனார் பல்கலைக்கழகம்

MANONMANIAM SUNDARANAR UNIVERSITY

SYLLABUS FOR 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

Program Code: 5230

DIPLOMA IN HEAVY VEHICLE MECHANISM

கனரக வாகன இயந்திரவியல் பட்டயம்

SCHEME OF EXAMINATION

Subject Code	Title of the Course	Credit	Hours	Passing Minimum
Semester-I				
C19HV11/E19HV01	I.C Engine	6	90	40/100
C19HV12/E19HV02	Vehicle Transmission System	6	90	40/100
C19HV13/E19HV03	Steering And Braking System	6	90	40/100
C19CE10/E19CE10	Communicative English	6	90	40/100
C19HVP1/E19HVP1	Practical I-Heavy Motor Vehicle Repair And Maintenance	4	120	40/100
Semester-II				
C19HV21/E19HV04	Suspension System, Wheels And Tyres	6	90	40/100
C19HV22/E19HV05	Transport Operations And Maintenance Management	6	90	40/100
C19LS23/E19LS05	Life Skill	6	90	40/100
C19HVP2/E19HVP2	Practical II-Vehicle Electrical System	4	120	40/100
C19HVPW/E19HVPW	Project	10	150	40/100

Eligibility for admission: Pass in 10thstd 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 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

SEMESTER I

Course-I : I.C Engine
Course-II : Vehicle Transmission System
Course-III : Steering and Braking System
Course –IV : Communicative English
Course-V : Practical-I Heavy Motor Vehicle Repair And Maintenance

SEMESTER II

Course-VI : Suspension System, Wheels and Tyres
Course- VII : Transport Operations and Maintenance Management
Course-VIII : Life Skill
Course-IX : Practical-II Vehicle Electrical System
Course- X : Project

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

Program Objectives

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

SEMESTER I
Course I
(C19HV11/E19HV01)I.C Engine

Objectives

- To study about basics of automobile Engines
- To set knowledge about fuel supply system, cooling and lubricating system
- To get knowledge about automobile emission and emission control system.

Unit I **18 Hrs**

BASICS OF ENGINE

Engine: Types of IC engines –working principle- Constructional details of Heavy vehicles-Cylinder block, cylinder head, piston, piston rings, connecting rod, crank shaft, main bearing, cam shaft, valves, cylinder liners, gasket, crankcase, Oil pan, Manifold, vibration damper, flywheel.

Unit II **18 Hrs**

COOLING AND LUBRICATION SYSTEM

Heavy vehicle engine cooling system–necessity-Components of cooling system- Water cooling system- types -Antifreeze solutions. Lubrication system–necessity-components of lubrication system-Types of Lubricant-oil filter-oil pump-types-construction and working -Crankcase ventilation-chassis lubrication.

Unit III **18 Hrs**

FUEL SUPPLY SYSTEM

Fuel injection system-components of fuel injection system-Fuel injection pump-types-Jerk, distributor type-construction and working- Fuel injector-types-multi-hole, pintile, pintax- construction and working-Governor-types-Mechanical, Hydraulic and pneumatic-construction and working- Cold starting device-Supercharging and turbo charging of diesel engine.

Unit IV **18 Hrs**

EMISSION AND EMISSION CONTROL

Emission control-effect of emission for atmosphere-Reduction of pollutants formation-Closed crank case ventilation -Changes in fuel supply system-Exhaust gas analysis- catalytic converter-exhaust gas recirculation system-emission standards -BS-I, BS-II, BS-III, BS-IV.

Unit V **18 Hrs**

TROBLE SHOOTING OF IC ENGINES

Troubles in wet liners - Piston failures-Causes of ring failures-Valves troubles-Lubrication system trouble shooting-Fuel supply trouble shooting-Turbocharger and super charger trouble shooting.

REFERENCE BOOKS FOR HEAVY VEHICLE MECHANISM:

- Internal Combustion Engine Fundamentals, "Heywood.J.B", McGraw Hill Book Co., 1995.
- Internal Combustion Engines, "Taylor.C.F", MIT Press, 1972
- Automobiles and Pollution SAE Transaction, 1995
- Automotive electrical equipment, W.H. Crouse, Mc. Graw hill book co. inc. New York
- Automotive Electronics and Electrical equipment by William H. Crouse and DL Anglin, McGraw Hill company.
- Automobile Engineering, KM Gupta, Umesh Publishers
- Automobile Engineering, RB Gupta, Satya Prakashan, New Delh
- Automotive Transmission & Power Train – William H. Grouse.
- Automotive Chassis and Body-William H. Grouse
- Automotive technology- service & maintenance by Don Knowles
- Automotive service by Tim Gills, Delmar Publisher Inc.
- Automotive mechanics by William H Course & Donald L Anglin.
- Service Manuals from Different Vehicle Manufacturers.

Course II

(C19HV12/E19HV02)Vehicle Transmission System

Objectives:

- To accure knowledge about various Transmission system components.
- To get the Trouble shooting ability about the Transmission system components

Unit I **18 Hrs**

CLUTCH

Clutch-principle of friction clutches- Clutch types - Clutch Operation-Mechanical-Hydraulic operation-Clutch components-Clutch adjustment.

Unit II **18 Hrs**

GEAR BOX

Necessity of gear box-Types of Gear boxes- Sliding Mesh Gear box-Constant mesh gear box-Double declutching-Synchromesh Gear box-construction and working-Lubrication of Gears- Selector mechanism-Transfer box.

Unit III **18 Hrs**

AUTOMATIC GEAR BOX

Automatic transmission- Principle of Automatic transmission- Epicyclical Gear box-Free wheel unit-Torque converter -Over drive.

Unit IV **18 Hrs**

PROPELLER SHAFT AND DIFFERENTIAL

Propeller shaft-Universal joint-Final drive –Differential-Rear axle types-semi floating, three quarter floating, full floating-Rear axle drive types- Hotchkiss drive, Torque tube Drive.

Unit V **18 Hrs**

TROUBLE SHOOTING OF TRANSMISSION SYSTEM

Clutch trouble shooting-Fluid flywheel trouble shooting-Gear box trouble shooting-Propeller shaft trouble shooting-Rear axle trouble shooting-Differential trouble shooting.

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- Internal Combustion Engine Fundamentals, “Heywood.J.B”, McGraw Hill Book Co., 1995.
- Internal Combustion Engines, “Taylor.C.F”, MIT Press, 1972
- Automobiles and Pollution SAE Transaction, 1995
- Automotive electrical equipment, W.H. Crouse, Mc. Graw hill book co. inc. New York
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- Automotive Transmission & Power Train – William H. Grouse.
- Automotive Chassis and Body-William H. Grouse
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COURSE III

(C19HV13/E19HV03)Steering and Braking System

Objectives

- To accure knowledge about Construction ^ working of steering and braking system.
- Ability to Trouble shoot the steering & braking system of Heavy vehicles

Unit I **18 Hrs**

FRONT AXLE AND STEERING SYSTEM

Front axle types-Components of front axle-stub axle and its types- layout of Steering system -components of steering system-Types of steering Gears-Steering linkage-Steering Ratio-Steering geometry- Ackermann steering mechanism.

Unit II **18 Hrs**

POWER STEERING AND WHEEL BALANCING

Power steering-components of power steering- types of power Steering: integral type, linkage booster type-Wheel balancing-static and dynamic balancing -Backlash in steering Gear and its Adjustment-Steering adjustments.

Unit III **18 Hrs**

BRAKING SYSTEM

Necessity of brakes-Principle of braking system-Brake system components and layout-Classification of Brakes-Drum brake, air brake- components and working -Engine exhaust brake- Hand brake-Anti lock brake system.

Unit IV **18 Hrs**

HYDRAULIC BRAKING SYSTEM

Hydraulic brake System: layout and its Components-master cylinder: tandem master cylinder-wheel cylinder-types of wheel cylinder-brake booster-bleeding of hydraulic braking system.

Unit V **18 Hours**

TROUBLE SHOOTING OF STEERING AND BRAKING SYSTEM

Brake system trouble shooting-Steering trouble shooting- Inspection of brake system-Adjustment of Brakes-Replacing Brake lining-Brake maintenance.

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- Internal Combustion Engine Fundamentals, “Heywood.J.B”, McGraw Hill Book Co., 1995.
- Internal Combustion Engines, “Taylor.C.F”, MIT Press, 1972
- Automobiles and Pollution SAE Transaction, 1995
- Automotive electrical equipment, W.H. Crouse, Mc. Graw hill book co. inc. New York
- Automotive Electronics and Electrical equipment by William H. Crouse and DL Anglin, McGraw Hill company.
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- Automobile Engineering, RB Gupta, Satya Prakashan, New Delh
- Automotive Transmission & Power Train – William H. Grouse.
- Automotive Chassis and Body-William H. Grouse
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- Automotive service by Tim Gills, Delmar Publisher Inc.
- Automotive mechanics by William H Course & Donald L Anglin.
- Service Manuals from Different Vehicle Manufacturers.

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. **Bubbling 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 I

(C19HVP1/E19HVP1)Heavy motor vehicle repair and maintenance

Objectives

- To get knowledge about various automobile Tools and Their applications.
- Ability to dismantling servicing and Maintenance of Cylinder head, piston & various parts of the Vehicle.
- To Study about safety measuring Tools and Equipments.

List of Exercises

- Identification & Application of Mechanic Tools
- Water servicing of Heavy Vehicles
- Dismantling ,servicing and assembling of Engine cylinder head assembly.
- Dismantling ,servicing and assembling of piston & connecting rod assembly.
- Dismantling ,servicing and assembling of water pump.
- Dismantling ,servicing and assembling of clutch.
- Dismantling, servicing and Assembling of Radiator.
- Dismantling,servicing and Assembling of fuel feed pump.
- Dismantling,servicing and Assembling of Gearbox.
- Dismantling servicing and Assembling of Final drive.
- Adjustment of brake and clutch.
- Dismantling servicing and Assembling of Turbo charger.
- Replacement of oil for Engine and gear box.
- Study about Measuring Tools and equipments.

SEMESTER II
COURSE VI

(C19HV21/E19HV04)SUSPENSION SYSTEM, WHEELS AND TYRES

Objectives

- To accure knowledge about various suspension system & its components
- To get knowledge about Wheels & Tyres.
- To get knowledge of Trouble shooting of suspension system & Tyres.

Unit I **18 Hrs**

FRONT SUSPENSION

Suspension system – components of suspension system-leaf spring suspensions - spring pack principle – spring pack self damping – types of leaf spring assemblies-front suspension.

Unit II **18 Hrs**

REAR SUSPENSION

Rear suspension-single axle – Rear suspension Tandem axle –Bogie suspension –spring suspension with shock absorbers – spring suspension with torque rod –Equalizing beam suspensions – leaf spring equalizing beam – fibre composite leaf springs – solid rubber spring equalizing beam –Torsion bar suspensions.

Unit III **18 Hrs**

AIR SUSPENSION AND SHOCK ABSORBER

Air suspension features- Air suspension components- height control valve- regulator- air springs- shock absorbers- purpose- operations-types of shock absorbers- fifth wheel and coupling system – type of fifth wheels.

Unit IV **18 Hrs**

WHEELS AND TYRES

Tyre types-Tyre construction-Bias and Radial Plies-Tyre pressure monitoring-Tyre size- sidewall markings-Speed rated tyres-Tyre grading-Tubes. Wheels-Cast- spoke wheels-Disc wheels–Piloted wheel-Hub-Piloted Wheel-Wide -Base Wheels.

Unit V **18 Hours**

TROUBLE SHOOTING OF SUSPENSION AND TYRES

Leaf spring suspension Trouble shooting- rough ride diagnosis - air suspension inspection- rough ride check list- tyre inspection- mechanical irregularities – causes of tyre wear – tyre rotation and replacement – tyre and rim safety –rim inspection – Inflation –wheel and tyre trouble shooting .

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- Internal Combustion Engine Fundamentals, “Heywood.J.B”, McGraw Hill Book Co., 1995.
- Internal Combustion Engines, “Taylor.C.F”, MIT Press, 1972
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- Automotive Chassis and Body-William H. Grouse
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- Automotive mechanics by William H Course & Donald L Anglin.
- Service Manuals from Different Vehicle Manufacturers.

COURSE VII

(C19HV22/E19HV05) TRANSPORT OPERATIONS AND MAINTENANCE MANAGEMET

Objectives

- To study about goods & passenger Transport operation
- To get knowledge about motor vehicle ACT, Road signals & vehicle maintenance.

Unit I **18 Hrs**

Transportation-Meaning-Importance and functions-Developments of Transport in India- Challenges faced by Indian Transport system-modes of Transport-Air –land –water-Element and Components of Transport – Transport fore casting.

Unit II **18 Hrs**

Goods Transport Operation: Layout of garages and depots - 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.

Unit III **18 Hrs**

Passenger Transport Operation: 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.

Unit IV **18 Hrs**

Motor Vehicles Act, Road Signals: Definition of vehicles permit – insurance, road tax, etc. – procedure for registering a vehicle – fitness certificate– inspection of accidents and recording – issue of driving license and conductor license – enforcement of emission norms –Road signals and their meanings.

Unit V **18 Hrs**

Vehicle Maintenance: Necessity of maintenance, types of maintenance-preventive maintenance system, scheduled maintenance system and breakdown maintenance system- General maintenance schedule- daily, weekly, monthly and periodic maintenance of various vehicles -General automotive service procedure-maintenance of records used in automobile workshops.

REFERENCE BOOKS FOR HEAVY VEHICLE MECHANISM:

- Internal Combustion Engine Fundamentals, “Heywood.J.B”, McGraw Hill Book Co., 1995.
- Internal Combustion Engines, “Taylor.C.F”, MIT Press, 1972
- Automobiles and Pollution SAE Transaction, 1995
- Automotive electrical equipment, W.H. Crouse, Mc. Graw hill book co. inc. New York
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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 II

(C19HVP2/E19HVP2)VEHICLE ELECTRICAL SYSTEM

Objectives

- To Identify the various electrical servicing Tools and Equipments.
- Ability to Measure current Voltage and résistance in Electrical circuit.

List of Exercises

1. Identification & Applications of Electrical Tools & Equipments.
2. Study of Electrical, conductors sensors and various Electrical circuits.
3. Measuring voltage, current and Résistance of a Auto Electrical Circuit.
4. Testing and charging of battery.
5. Servicing of ignition system.
6. Dismantling, servicing and Assembling of Alternator.
7. Dismantling, servicing and Assembling of Starting Motor
8. Trouble shooting of various electrical circuits of Automobile Vehicles.

Course X

(C19HVPW/E19HVPW) Project
