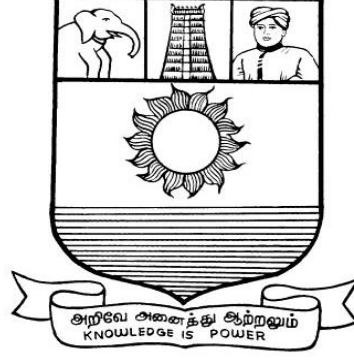


மனோன்மணியம் சுந்தரனார் பல்கலைக்கழகம்
திருநெல்வேலி - 627 012

Manonmaniam Sundaranar University
Thirunelveli - 627 012.



கல்விசார் நிலைக்குழுக் கூட்டம்

**MEETING OF THE STANDING COMMITTEE ON
ACADEMIC AFFAIRS HELD ON FRIDAY
THE 27th OCTOBER 2017.**

**Syllabus for Diploma in Four Wheeler Mechanism Course offered
through Directorate of Vocational Education
(Community Colleges and Extension Learning Programme)
from 2017 - 2018**

DIPLOMA IN FOUR WHEELER MECHANISM
SCHEME OF EXAMINATION

SUBJECT CODE	TITLE OF THE PAPER	CREDIT	HOURS	PASSING MINIMUM
Semester-I				
C17FM11/C17FM01	Automotive Engines-I	6	90	40/100
C17FM12/C17FM02	Automotive Engines-II	6	90	40/100
C17FM13/C17FM03	Transmission system-I	6	90	40/100
C17CE10/C17CE10	Communicative English	6	90	40/100
C17FMP1/C17FMP1	Practical paper-I Automobile Engines Practical	6	90	40/100
Semester-II				
C17FM21/C17FM03	Controls and Suspension system	6	90	40/100
C17FM22/C17FM04	Transport Operations And Maintenance Management	6	90	40/100
C17LS23/C17LS05	Life Skill	6	90	40/100
C17FMP2/C17FMP2	Practical Paper-II Automobile Electrical Equipments	6	90	40/100
C17FMPW/C17FMPW	Project	6	90	40/100

Eligibility for admission: Pass in 12th 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 paper is 40%. Classification will be done on the basis percentage marks of the total marks obtained in all the papers and as given below:

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

Syllabus

FIRST SEMESTER

- | | |
|-----------|--|
| Paper-I | :Automotive Engines-I |
| Paper-II | : Automotive Engines-II |
| Paper-III | : Transmission system-I |
| Paper -IV | : Communicative English |
| Paper-V | : Practical paper-I Automobile Engines Practical |

SECOND SEMESTER

- | | |
|------------|---|
| Paper-VI | : Controls and Suspension System |
| Paper- VII | : Transport Operations And Maintenance Management |
| Paper-VIII | : Life Skill |
| Paper-IX | : Practical Paper-II Automobile Electrical Equipments Practical |
| Paper- X | : Project |

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

FIRST SEMESTER
(C17FM11/C17FM01)DIPLOMA IN FOUR WHEELER MECHANISM

PAPER-I AUTOMOTIVE ENGINES-I

UNIT –I FUNDAMENTALS OF ENGINES

Engine components- functions, types, materials and construction of – cylinder block- crankcase –oil pan- cylinder head- Gaskets- cylinder liners- piston- piston rings- types of compression rings and oil control rings- connecting rod- methods of connecting piston and connecting rod- crankshaft- flywheel- cam shaft- methods of cam shaft drive arrangements- valve and valve mechanism.

UNIT-II PETROL AND DIESEL ENGINE

Petrol Engines- single and multi cylinder engines- firing order - Detonation- Petrol Knock- Octane number- Anti Knock Fuel. Diesel engine – combustion of diesel fuel- phases of combustion in four stroke engines- diesels knock- cetane number- fuel dopes- Types of diesel engine combustion chamber- engine tune up- High speed Diesel Engines.

UNIT-III FUEL FEED SYSTEM (PETROL ENGINE)

Petrol fuel feed systems- construction and working of mechanical and electrical fuel feed pumps- fuel filters- Air filters: types- dry type, wet type and oil bath type. Carburetion - principles- simple carburetors- solex carburetor- S.U. carburetor. Inlet and exhaust manifolds - mufflers and silencers- petrol injection - MPFI system - construction and working-merits and demerits.

UNIT-IV FUEL FEED SYSTEM (DIESEL ENGINE)

Diesel fuel feed system- layout- feed pump.- types-FIP- types- construction and operation – diesels filter- pre-filter and micro filter- water separator- injectors and Nozzles –types , single , multi hole, pintle and pintex type nozzles. Common Rail direct injection (CRDI)- Governors- Mechanical ad pneumatic type – super charging- Turbo chargers.

UNIT V COOLING AND LUBRICATION SYSTEM:

Cooling system: types: Air cooling system- water cooling system- comparison- thermo siphon and pump circulation in water cooling system- Pressure sealed cooling system – thermostat- wax pellet and bellow type – water pump- Radiators- cellular and tubular- coolant types- Anti Freeze solution.

LUBRICATION SYSTEM:

Splash – Partial pressure system- full flow and by pass systems- characteristics of lubricating oils- classification and identification of SAE oils- filtering systems- oil strainer- oil pumps- Gear and Rotor type-Construction and operation- pressure relief valve- construction.

(C17FM12/C17FM02) PAPER –II AUTOMOTIVE ENGINES-II

UNIT-I EMISSION FROM AUTOMOBILES

Various emission from Automobiles- Formation –effects of pollutants on environment and human beings – emission formation in SI engines- carbon monoxide- hydrocarbon- Nitric oxide- Lead particulate- Emission from C.I Engine- Emission formation due to incomplete combustion- white, blue and black smokes- particulates- Noise pollution.

UNIT-II EMISSION CONTROL METHODS

Emission norms- EURO, and India. Controlling of pollutants from engine- catalytic converters- charcoal canister- control for evaporative emission- positive crank case ventilation system for unburnt hydro carbon -emission reduction- EGR (Exhaust gas recirculation)-Air injection – Silencer design on sound reduction in automobiles- Exhaust gas analyzer- smoke meter.

UNIT-III AUTOMOBILE ELECTRICAL SYSTEM

Definitions- Electric Current, voltage and resistance-Ohm's law and Kirchhoff's law- electromagnetism. Generator, alternator, Regulator and starting motor- purpose, construction and working – ignition system- charging system- lighting system and Auxiliary system- lead acid battery- purpose- construction and working- capacity rating- testing- hydrometer test- open voltmeter test- High rate discharge test- charging methods- trouble shooting in batteries- run down- over charging- sulphation- bulging. Battery coil ignition system- purpose- components and its functions- Distributor, spark plug- types- condenser- breaker point mechanism – Magneto ignition system.

UNIT-IV AUTOMOBILE TOOLS AND EQUIPMENTS

HAND TOOLS: Screw drivers- spanners- wrenches – cutting pliers.

Measuring Tools: Steel rule- vernier calipers- micrometers- thickness gauge

Servicing Tools: Piston ring expander and compressor- valve spring compressor- valve seat grinder- Air compressor- wheel balancer- torque wrench- jack – tyre changer.

Arc welding- gas welding – equipments- working – advantages and disadvantages.

UNIT-V SAFETY PRECAUTIONS

Safety in arrangement of tools and equipments- safety precautions to be followed while handling of tools- fire- classifications- fire extinguisher- types: foam type, carbon-di-oxide, dry chemicals type. Soda- acid type- applications- safety devices- importance of earthing – electric shock- precautions against shock- first aid: definition- procedures.

(C17FM13/C17FM03)PAPER-III TRANSMISSION SYSTEM-I

UNIT-I CHASSIS, FRAME AND BODY

Introduction - chassis frame- layout of the chassis and its main components- functions of the chassis frame- types of chassis frames- various loads acting on the frame- different bodies used in automobiles- requirements of bodies for various types of vehicles viz. private, commercial etc.

UNIT-II CLUTCH

Clutch- function- clutch actuating mechanism- Mechanical and hydraulic types- clutch material- single plate dry clutch- dual plate dry clutch – multi-plate wet clutch- semi centrifugal and centrifugal clutch- fluid coupling – trouble shooting of clutch.

UNIT-III GEAR BOX

Gear box- purpose- resistance offered to the motion of the vehicle – air resistance—rolling resistance- offered to the motion of the vehicle- gradient resistance- types of gear boxes.- sliding mesh- constant mesh- synchromesh device- epicyclic – over drive- under drive and transfer cases- four wheel drive- gear shifting mechanism- floor shifting and steering column shifting- trouble shooting of gear box.

UNIT- IV UNIVERSAL JOINT AND PROPELLER SHAFT

Universal joints- variable velocity joint- constant velocity joints- cross or spider type- Rzeppa joints- bendix weiss type- tracta- centre joint- construction for heavy vehicles- propeller shaft –construction – types- Hotchkiss, torque tube, torque arms- shackles- types. Maintenance and overhauling of universal joint and propeller shaft.

UNIT-V FINAL DRIVE AND DIFFERENTIAL

Final drive -function- types – spiral, bevel, hypoid- worm and worm wheel- differential function- differential action- non-slip differential- differential lock- trouble shooting of final drive and differential. Maintenance and overhauling of final drive and differential.

(C17CE10/C17CE10) Paper IV Communicative English

Unit I: Learning context

Concept of learning – Learning style –Grammatical framework – sentence framing – paragraph and texts

Unit II: Reading

Basic concept – Purposes of reading-Decoding-Reading materials – Barriers of reading

Unit III: Writing

Basic concept-Writing style-Terminology-stages-English spelling and punctuation – Written texts

Unit IV: Speaking

Language functions-Conversation- Features of spoken English – Types of English course: functional English, English literature, advance English – Phonetic

Unit V: Developing Communication Skills

Meaning –Classroom presence- Features of developing learning process- Practical skills and Listening-uses of communicative English

References Books:

1. Raman, m.&S. Sharma (2011) communication skills, OUP,New Delhi: India
2. Lata, P.&S. Kumar(2011) communication skills, OUP,New Delhi: India,
- 3.Leech,G&J.Svartvik(2002) A communicative grammar of English, Pearson,India,
4. Sethi, J. and P.V. Dharmija (2007) A course in Phonetics and spoken English. Second edition, Prentice hall: New Delhi

(C17FMP1/C17FMP1) PAPER-V PRACTICAL

AUTOMOBILE ENGINES

LIST OF EXERCISES:

1. Identification and application of Mechanic's Tools.
2. Dismantling, Identification of parts and assembling of Four Stroke Petrol engine.
3. Dismantling, Identification of parts and assembling of Four Stroke Diesel engine.
4. Dismantling, Servicing and assembling of Fuel Feed pump in Petrol Engine.
5. Dismantling, Servicing and assembling of Fuel Feed pump in Diesel Engine.

6. Engine Oil Changing and Replacement of Oil Filters.

7. Dismantling, Servicing and Tuning of Solex Carburetor.

8. Dismantling, Servicing and assembling of Fuel Injection Pump.

9. Dismantling, Servicing and assembling of Fuel Injector.

10. Study of Multi Point Fuel Injection(MPFI) and Common Rail Direct Injection (CRDI) System.

SEMESTER-II

(C17FM21/C17FM03)PAPER- VI CONTROLS AND SUSPENSION SYSTEM

UNIT-I FRONT AND REAR AXLE

Front axle construction- live and dead axle- beam and tubular construction- stub axle types- Elliot and reverse Elliot- Lemoine and Lemoine inverted- rear axle construction- floating axles- semi- floating- three quarter floating and full floating. Wheel alignment-and wheel balancing. Maintenance and overhauling of front and rear axle.

UNIT-II STEERING SYSTEM

Steering system- Ackerman principle of steering- front end geometry- castor, camber, kingpin inclination. Toe-in, toe-out - steering gear box- types- - power steering-construction and working linkage\)-types- power steering pumps-Overhauling and maintenance.

UNIT-III BRAKING SYSTEM

Brakes- function- stopping distance- braking system- mechanical, hydraulic and air brake systems- brake shoes, primary and secondary shoes-drum and disc brakes- construction and operation- master cylinder- single and Tandem master cylinder – wheel cylinders- bleeding of brakes- brake shoe adjustment mechanism-ABS- Maintenance and overhauling of braking systems.

UNIT IV SUSPENSION SYUSTEM

suspension system- rigid axle and independent suspension- function of spring and shock absorber-independent suspension- coil, leaf spring, torsion bar and air suspension system- rear independent suspension- antiroll bar- shock absorber types – trouble shooting in suspension systems.

UNIT-V WHEEL, TYRES AND TUBES

Tyres and tubes- cross ply and radial ply- tubeless tyres- wheels- types- disc, split type, spoked and magna- maintenance and servicing of wheel, tyres and tubes.

**PAPER-VII TRANSPORT OPERATIONS AND MAINTENANCE MANAGEMET
(C17FM22/C17FM04)**

Unit I: 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 II: 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 III: 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 IV: 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.

(C17LS23/C17LS05) PAPER VIII (LIFE SKILL)

(Common to All Courses)

UNIT-I ATTITUDE : Positive thinking – Goal setting – Problem Solving and Decision making – Leadership and Team Work.

UNIT-II COMMUNICATION SKILLS: Oral communication: Concept of English language – Fluency – Verbal communication in official and public situations.

UNIT-III COMMUNICATION SKILLS: Written Communication: Comprehension – Writing a formal letter like application for Job, enquiry, reply, complaint and such others – preparation of Resume, Curriculum Vitae.

UNIT-IV COMPUTING SKILLS – 1: Introduction to Computers, its various components and their respective functions – Memory storage devices – Microsoft (MS) Office – MS Word.

UNIT-V COMPUTING SKILLS – 2 Internet Basics – Origin of Internet – MODEM – ISP – Upload – Download – e-mail – Origin of worldwide web (www) Browsers – Search engines.

Reference books:

Life skill, Manonmaniam Sundaranar University Publications Division (2011)

PAPER- IX PRACTICAL

(C17FMP2/C17FMP2)AUTOMOBILE ELECTRICAL EQUIPMENTS

LIST OF EXERCISES:

1. Battery Removing, Testing and Charging.
 2. Dismantling, Overhauling and assembling of Alternator.
 3. Dismantling, Overhauling and assembling of Starter Motor.
 4. Dismantling, Servicing and assembling of Distributor.
 5. Spark Plug Cleaning and adjusting the Spark gap.
 6. Setting of Ignition Timing.
 7. Servicing of Electrical Horn.
 8. Adjusting and Aiming the head lamp
 9. Servicing of wiper motor.
 10. Trouble shooting of Dashboard electrical system.
 11. Tracing and fault finding of electrical wiring for lighting system.
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(C17FMPW/C17FMPW) PAPER X – PROJEC

REFERENCE BOOKS FOR FOUR WHEELER MECHANISM:

- 1 Internal Combustion Engine Fundamentals, “Heywood.J.B”, McGraw Hill Book Co., 1995.
- 2 Internal Combustion Engines, “Taylor.C.F”, MIT Press, 1972
- 3 Automobiles and Pollution SAE Transaction, 1995
- 4 Automotive electrical equipment, W.H. Crouse, Mc. Graw hill book co. inc. New York 6
Automotive Electronics and Electrical equipment by William H. Crouse and DL. Anglin,
McGraw Hill company.
- 8 Automobile Engineering, KM Gupta, Umesh Publishers
- 9 Automobile Engineering, RB Gupta, Satya Prakashan, New Delh
- 10 Automotive Transmission & Power Train – William H. Grouse.
- 11 Automotive Chassis and Body-William H. Grouse
- 12 Automotive technology- service & maintenance by Don Knowles
- 13 Automotive service by Tim Gills, Delmar Publisher Inc.
- 14 Automotive mechanics by William H Course & Donald L Anglin.
- 15 Service Manuals from Different Vehicle Manufacturers.

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