

DETAILED SYLLABUS
FOR
DISTANCE EDUCATION

**Certificate in Diesel Mechanic
(CDM)**

(Yearly Scheme)

COURSE TITLE : CERTIFICATE IN DIESEL MECHANIC
DURATION : ONE YEAR
MODE : YEARLY
MARKS : 400

FIRST YEAR

COURSE TITLE	PAPER CODE	MARKS				TOTAL
		THEORY		PRACTICAL		
		EXT.	INTR.	EXT.	INTR.	
INTRODUCTION TO TRADE THEORY	CDM/Y-110	60	40	00	00	100
WORKSHOP CALCULATION & SECINCE	CDM/Y-120	60	40	00	00	100
BASICS OF ENGINEERING DRAWING	CDM/Y-130	60	40	00	00	100
PRACTICAL	CDM/Y-140	00	00	60	40	100

1 TRADE INTRODUCTION SAFETY PRECAUTIONS AND FIRST AID:-

General

Introduction to the course- Duration of the course content. Study of the Syllabus-General Rules pertaining to the Institute-Facilities Available-Hostel-Recreation and Medical facility-Library-Working hours-Time Table. Importance of Safety and General Precautions to be observed in the shop-fire extinguishers used for different types of fire Storing and Handling of Inflammable Materials-Elementary-FIRSY AID.

2 MEASURING AND LAYOUT TOOLS:-

System of Measurement Conversion of English into Metric Measurements and vice-versa-Marking Media-Chalk-Mechanics Blue Red Lead-and Tool used for Marking-Steel Rule, Try Square, Calipers and Dividers, Scribes-Prick and Center Punch-Hammer and Chisel-Uses and Maintenance-Safety Precautions in Handling-Grinding Machines.

3 CUTTING TOOLS:-

Types of Hacksaw Frames and Blades Their selection and uses types of files and their uses-Care and maintenance of Files-Types and sizes of drills-Cutting angles and speed of drills-Calculation of tab drill sizes.

Tape and dies-description use of different Types, Taps and Dies-Use of 'V' Threads-Precautions while using Taps and Dies-Description and use of Different Types of Scrapers, Reamers and Emery Papers.

4 PRECISION MEASURING INSTRUMENTS:-

Construction and method of reading Micrometers (internal and external) and Vernier Calipers-Correct handling of Micrometers and Vernier Calipers-Reading of Scale-Description and use of combinations sets-Care and maintenance of Micrometers, Vernier Calipers, Combination Set.

5 SHEET METAL WORK, TOOLS AND PIPE FITTING:-

Sheet Metal Worker's Hand Tools Their Descriptions and Uses Descriptions of Simple Soldering and Brazing Fluxes uses for common Joints Types of Sheet Metal Joints Their uses. Sheet and wire Gauges The blow lamp and its uses Pipe fitting Explanation of various common Metal Sheets used in Sheet Metal Shop.

6 FOUR STROKE DIESEL ENGINE:-

General Description and Construction of Diesel Engine-Diesel Engine Characteristics and classifications-working principles of 4 stroke cycle Diesel Engine-Comparison between petrol and Diesel Engine

7 TWO STROKE DIESEL ENGINE:-

Two Stroke Cycle Diesel Engine- Types of Scavenging uniflow and loop flow- Scavange opposed piston engine- Difference between two stroke and four stroke Cycle Diesel Engines.

8 ENGINE PARTS AND CYLINDER HEAD ASSEMBLY:-

Engine details: Cylinder materials- Cycling arrangement- Cylinder liners and their advantages-Cylinder heads- Description, Function, Care and Maintenance- Location combustion chamber in cylinder heads and also heater plugs and port and valve arrangement. Combustion Chambers-pumps- open and closed type- advantages and disadvantages, compression ratios and compression testing of cylinders and analysis of results and its importance.

9 DIESEL ENGINE MAINTENANCE:-

Need for maintenance check up in Diesel Engine. Preparation of Maintenance Schedule from charts of popular makes of Engines.

10 CAMSHAFT ASSEMBLY, VALVES, VALVE OPERATING, AIR INTAKE & EXHAUST SYSTEM MECHANISM:-

Valve and valve operations- Mechanism parts and function of each- valve timing diagram- Camshaft and timing gears- Types of drives used in engines- Chain tension and its importance- cylinder head and manifold construction and function- Water jacket passage. Description and function of valve parts- Maintenance materials used-Necessity of valve clearances- prescribed by makers of engines- Effects of incorrect clearances- Common troubles and Remedy- Reasons of Warping of cylinder head.

11 CONNECTING ROD, PISTON, RING AND PISTON PIN:-

Piston and Piston Rings, Function- Types and material used- Recommended clearances for the Rings and its necessity- Precautions while fitting rings- Connecting Rods- Types, function and material used-methods of fixing gudgeon pin on small end, method Lubrication provided for small end bushes.

12 (CRANKSHAFT ASSEMBLY, FLY WHEEL, VIBRATION DAMPER AND COUPLING):-

Crankshaft-Construction and Functions-Materials used Arrangement of Crankpins and Main Journals-Balancing methods-Flywheel Construction and its function and material used-Rim marks and balancing. Elementary Knowledge of function of clutch and coupling units attached to flywheel.

13 ENGINE BLOCK, CRANK CASE AND SUMP:-

Description and Function of Cylinder Block-Materials used-Cylinder Liners and Details-Crank Case and oil Pan and their construction- Water jacket passage and Wall thickness-bolt hole Dimensions for Cylinder Head Fixing Provision for Mounting Accessories like oil pump, Water pump-Filters-oil Flow passages and Cleaning plug.

14 ENGINE BEARINGS:-

Engine bearings-Classification and Location-Material used composition of bearing material-Shell bearing and their advantages-Special bearing material for Diesel engine Application-Bearing failure and its causes-Care and Maintenance.

15 FRICTION, LUBRICANT AND LUBRICATION SYSTEMS

Friction-its meaning and importance, Methods to reduce friction in Engines-Use of Lubricants-oil, grease, high detergent oil for diesel engine lubrication-properties of lubricants. Need for Lubrication system for Diesel Engines-Types used and layout of the system by pass and full flow arrangement-Types of oil pumps, oil filters, oil coolers, common troubles-Care and Maintenance.

16 DECARBONISING, CLEANING AND ASSEMBLING:-

Engine Assembly Procedure, need for cleanliness and special tools and gauges used Engine Assembling, Practice-Periods of decarbonising and overhauling Engine in terms of hours of run or Mileage-Running in procedure of overhauled Engines.

17 LINER:-

Cylinder Liners-Construction and Purpose-Material used and finish provided-Types of liners in use-Methods used to fit the same in Cylinder Bore, Advantages of Wet and Dry Liners-Wear Pattern and Allowable Wear-Cylinder Wear and its cause.

18 COOLING SYSTEM:-

Need for Cooling an Engine-General description and types of air and liquids-Cooling used in Engine lay out of Cooling System and parts in the layout-Function of parts like Radiator-Thermostat and water pump-purpose of thermostat and need to maintain Engine Working Temperature.

19 EXHAUSTER, SUPER CHARGER AND AIR COMPRESSOR:-

Description and Operation of Air Compressor and Exhauster Attached to Transport Vehicle Engine Common Troubles and Maintenance of Both-Their Specific Application for the Brakes of the Vehicle.

20 FOUR AND TWO STROKE PETROL ENGINE:-

Description of Internal and External Engines-Different types of I.C. Engine-Parts of I.C.Engine 4 Stroke Otto Cycle Engine-Two Stroke petrol Engine Differences between the two Importance of Valve Timing and Parts of Valve Operating System Description and Operation.

21 PETROL ENGINE PARTS AND DIFFERENT SYSTEMS:-

Brief description of engine components-Their Location and Function-Cooling and Lubrication System Parts and Layout of the System-Fuel Supply System Layout of parts in the System and Function of each part Ignition System in a petrol engine system layout and parts of ignition system and functions.

22 LUBRICATION & COOLING SYSTEM:-

Step by step method of diagnosis of troubles in the Lubrication and Cooling System Reasons for Engine Over heating and Remedies for the same. Crank case Dilution and Crankcase Ventilation Flow Test Rate Recommended for Radiator.

23 ENGINE NOISES, VIBRATIONS AND EXCESSIVE SMOKE:-

Reasons for Development of Noises in the Engine Components-Rectification, Methods of Assembling-Practice to be followed During Engine Overhauling as per makers shop manual.

24 DIESEL ENGINE STARTING SYSTEMS:-

Starting methods used for starting Diesel Engines used for Transport, Agricultural Marine,Industrial,Purpose-Brief Description of Each method-Methods to Eliminate starting difficulty in a Diesel Eng

ii) WORKSHOP CALCULATION & SCIENCE**Paper Code: CDM/Y-120****(MACHINAL TRADE ONLY)****1 UNIT:-**

Introduction--Definition--classification of units—interrelationship between Metric and British System of units

2 SIMPLIFICATIONS:-

Introduction--fractions--decimal fractions--lowest common multiple, LCM.

3 SQUARE ROOTS:-

Square and square root--symbol of root--method of finding out the square root of a number--factorization method--division method.

4 RATIO AND PROPORTION:-

Introduction--ratio--proportion-

5 PERCENTAGE:-

Introduction--percentage method

6 ALGEBRA:-

Introduction-careful consideration of subject items--addition and subtraction--multiplication and division--algebraic formula-factorization—equations

7 MENSURATION:-

Introduction-rectangle--square--parallelogram—rhombus--trapezium--triangles—circle

8 TRIGONOMETRY:-

Definition--formula--measurement of angles--

Introduction--properties of metal--types of metals--ferrous metals—cast iron-steel- ferrous metals

10 HEAT TREATMENT:-

Introduction--purposes of heat treatment--processes of heat treatment

11 FORCE:-

Newton's law of motion--space diagram--vector diagram

12 MOMENTS AND LEVER:-

Moment--unit--lever
13 SIMPLE MACHINES:-efficiency of machine--effort and load--mechanical advantage--velocity ratio--out and in put

14 WORKS, POWER AND ENERGY:-

Work--unit of work--power--unit of power-energy--uses of energy—

15 FRICTIONS:-

Introduction--advantage and disadvantage of friction--normal reaction--limiting friction

16 VELOCITY AND SPEED:-

Rest and motion--speed--velocity--acceleration--motion under gravity

iii) BASIC OF ENGINEERING DRAWING

Paper Code: CDM/Y-130

(MACHINAL TRADE ONLY)

1 INTRODUCTION, DRAWING INSTRUMENTS AND MATERIALS:-Introduction—Drawing—drawing board—set-square—instrument box—pencil—rubber—drawing sheet—

2 CONVENTIONS FOR LINES, MATERIALS AND BREAKS:-

Introduction—convention for lines—grouping of lines—conventional breaks

3 FREE HAND LETTERING AND SKETCHING:-

Introduction—lettering—type of lettering—free hand sketching—

4 GEOMETRICAL DRAWING:-

Introduction—points—line—curved line—angle—circle—square—rectangle--5 SCALE:-Introduction—plain scale—diagonal scales—comparative scales—vernier scales—

6 ISOMETRIC PROJECTION:-

Introduction—**isometric projection—axis—lines--7 ORTHOGRAPHIC PROJECTION AND IDENTIFICATION OF SURFACES :-**Introduction—projection—pictorial projection—orthographic projection—first angle projection—third angle projection—

8 BLUE PRINT READING:-

Introduction—blue print—some important conventions—diameter—radius—

9 WELD AND WELDED JOINTS:-I

Introduction—lap joint—butt joint—edge joint—corner joint—tee joint—

10 HAND TOOLS:-

Hammers—files—pipe wrench—plier—spanner—hackaws—drilling machines—screw driver—tester—chisel—try-square—vice—etc.

IV) PRACTICAL

Paper Code: CDM/Y-140

- 1 TRADE INTRODUCTION SAFETY PRECAUTIONS AND FIRST AID:-
- 2 MEASURING AND LAYOUT TOOLS:-
- 3 CUTTING TOOLS:-
- 4 PRECISION MEASURING INSTRUMENTS:-
- 5 SHEET METAL WORK, TOOLS AND PIPE FITTING:-
- 6 FOUR STROKE DIESELENGINE:-
- 7 TWO STROKE DIESEL ENGINE:-
- 8 ENGINE PARTS AND CYLINDER HEAD ASSEMBLY:-
- 9 DIESEL ENGINE MAINTENANCE:-
- 10 CAMSHAFT ASSEMBLY, VALVES, VALVE OPERARING, AIR INTAKE& EXHAUST SYSTEM MECHANISM:-
- 11 CONNECTING ROD, PISTON, RING AND PISTON PIN:-
- 12 (CRANKSHAFT ASSEMBLY, FLY WHEEL, VIBRATION DAMPER AND COUPLING):-
- 13 ENGINE BLOCK, CRANK CASE AND SUMP:-
- 14 ENGINE BEARINGS:-
- 15 FRICTION, LUBRICANT AND LUBRICATION SYSTEMS
- 16 DECARBONISING, CLEANING AND ASSEMBLING:-
- 17 LINER:-
- 18 COOLING SYSTEM:-
- 19 EXHAUSTER, SUPER CHARGER AND AIR COMPRESSOR:-
- 20 FOUR AND TWO STORKE PETROL ENGINE:-
- 21 PERTOL ENGINE PARYS AND DIFFERENT SYSTEMS:-
- 22 LUBRICATION & COOLING SYSTEM:-
- 23 ENGINE NOISES, VIBRATIONS AND EXCESSIVE SMOKE:-
- 24 DIESEL ENGINE STARTING SYSTEMS:-
- 25 ENGINE FOUNDATION:-