G. S. Mandal's

MARATHWADA INSTITUTE OF TECHNOLOGY, AURANGABAD

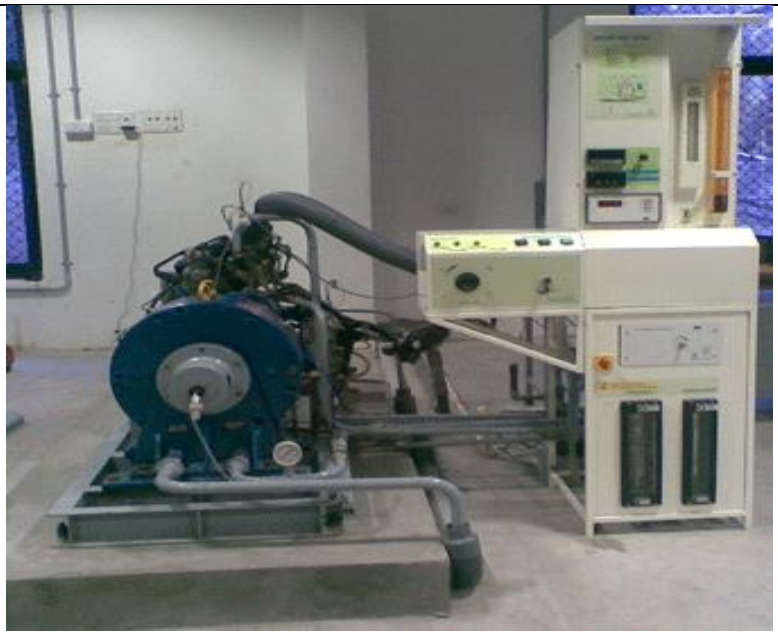
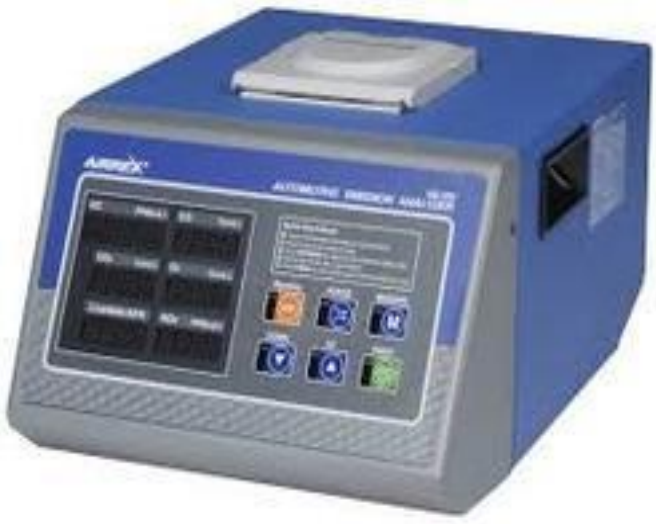
DEPARTMENT OF MECHANICAL ENGINEERING

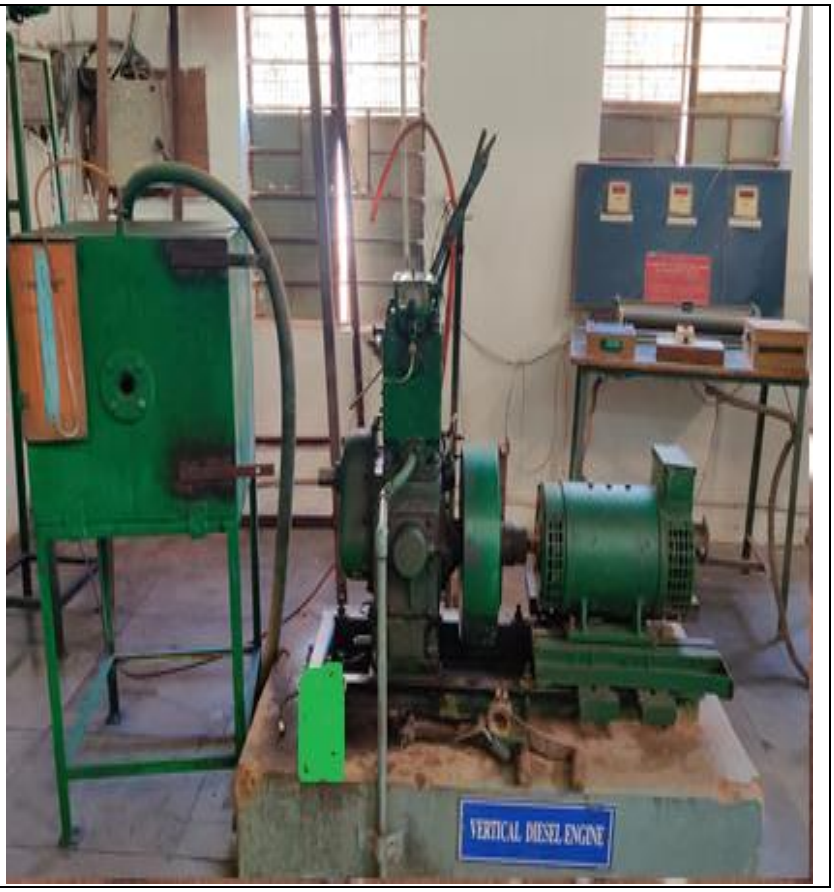
Laboratory Name and Location: I. C. Engines (Central Workshop)

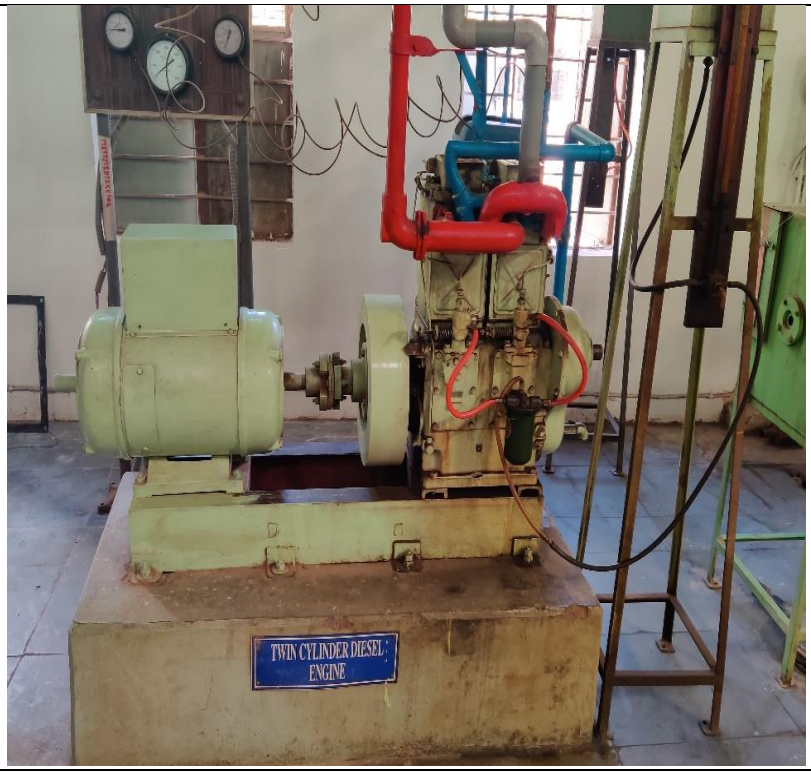
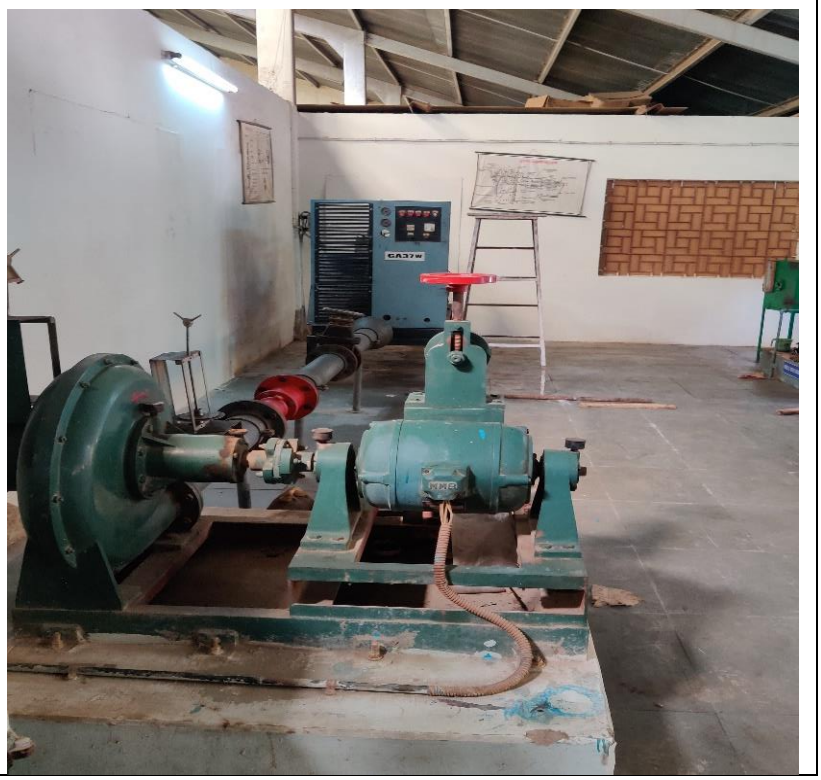
Lab In-charge: Mr. K. A. Antarkar (Assistant Professor)

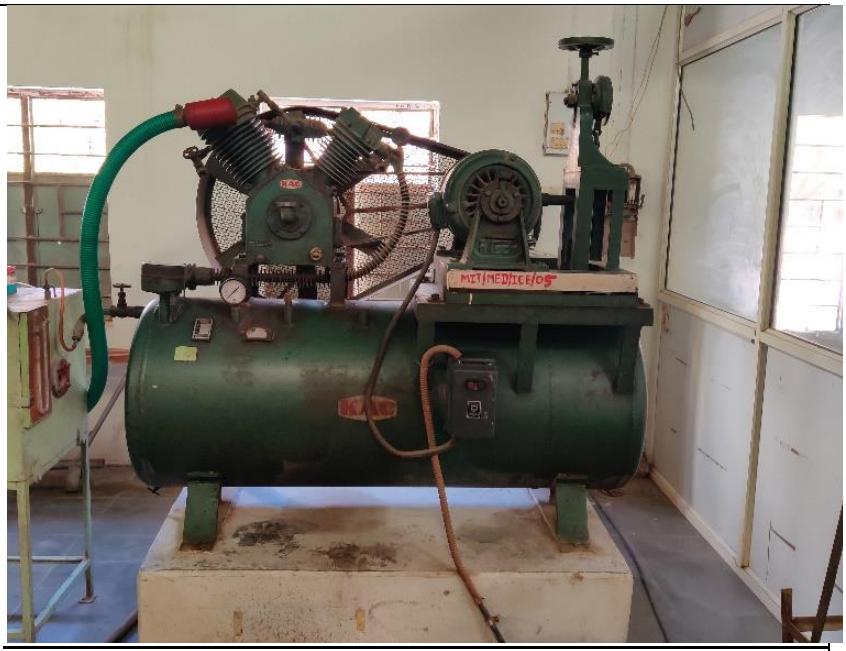
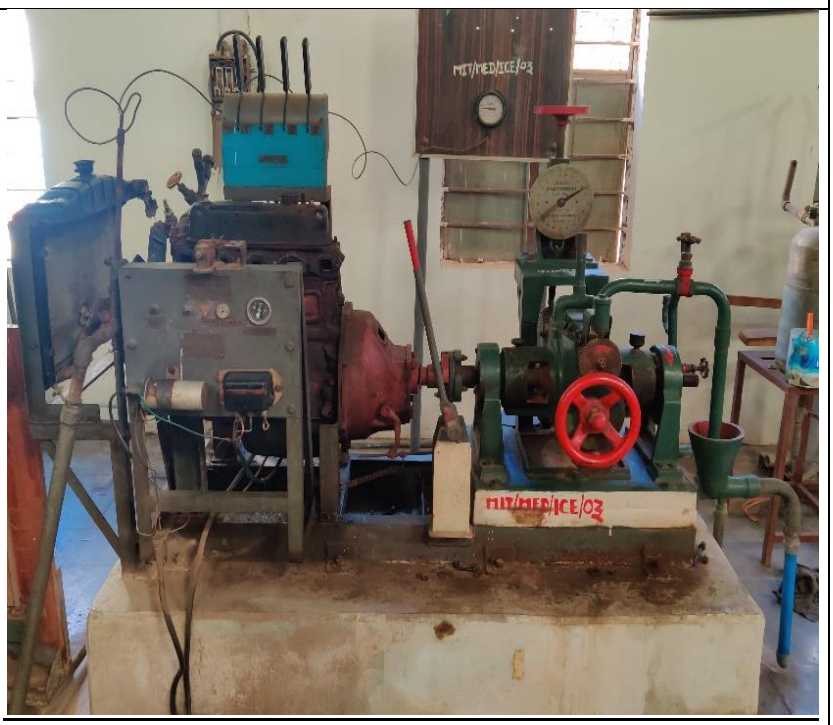
Lab Area: 113 Sq. m. **Total Investment (INR): 24,72,630/-**

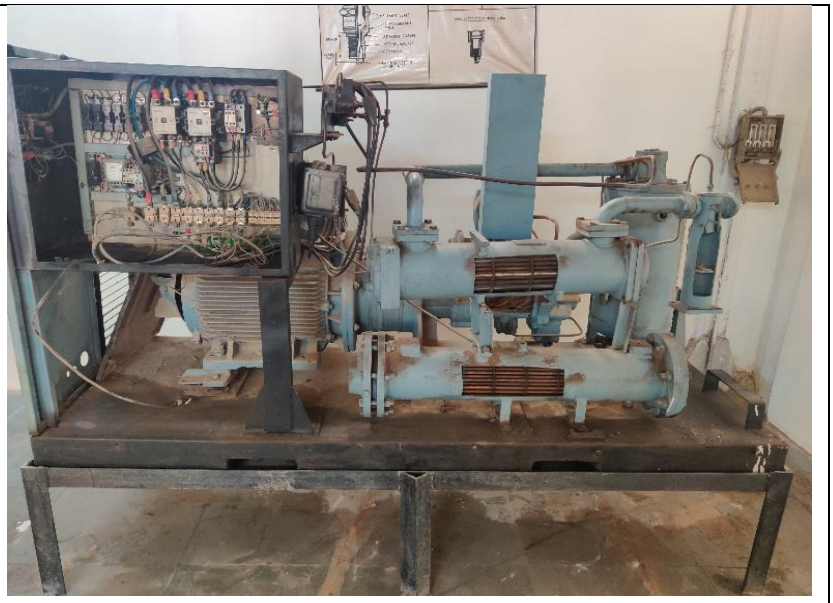
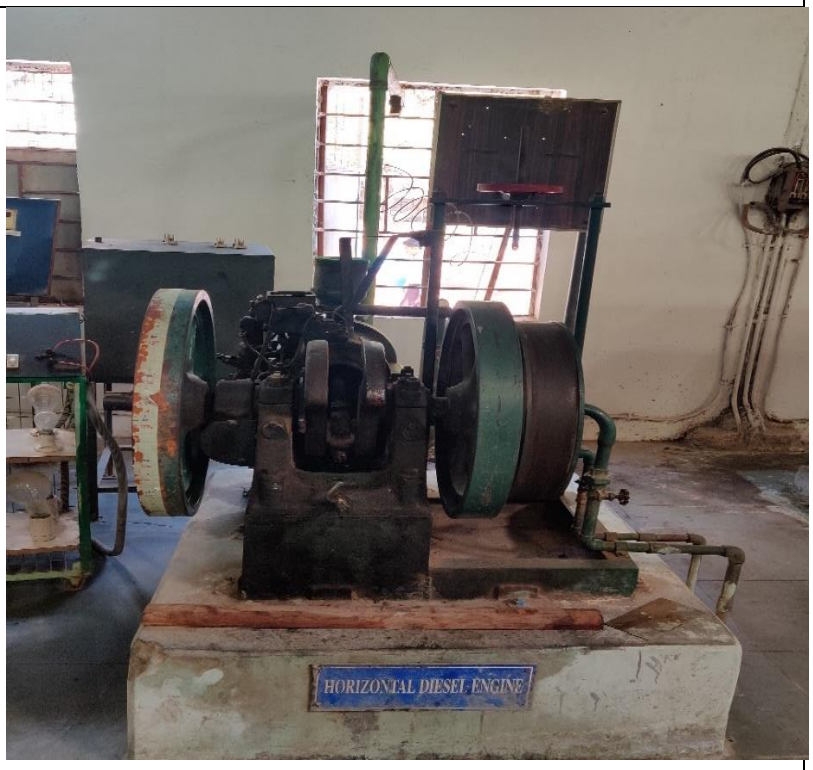
List of Major Equipments:

Sr. No.	Name & Specifications of the Equipment	Photograph of the Equipment
1.	**Computerized VCR Diesel Engine Set up.** ➢ Single Cylinder, 4-Stroke, Water Cooled, VCR Diesel Engine. ➢ Power: 3.5 KW ➢ Capacity: 661 CC ➢ Speed: 1500 RPM ➢ Bore: 87.5 mm ➢ Stroke: 110 mm ➢ CR: 12 to 18	
2.	**Gas Emission Analyzer (AVL444N ARAI Approved)** **Exhaust Analysis of 5 Gases** ➢ Hydrocarbons (HC) ➢ Carbon Monoxide (CO) ➢ Carbon Dioxide (CO_2) ➢ Oxygen (O_2) ➢ Nitrogen Oxide (NO_X)	

3.	**Single Cylinder Diesel Engine Test rig with D.C. Shunt generator.** ➢ Single Cylinder, 4 Stroke, Water Cooled, Diesel Engine ➢ BHP: 5 HP ➢ Speed: 1500 RPM ➢ Bore: 80 mm ➢ Stroke: 110 mm ➢ Coupled with DC Shunt Generator of 2.5 KW 220 V ➢ Voltmeter, Ammeter Rheostat & Electrolysis tank	

4.	**Twin Cylinder Diesel Engine with Electrical Load Dynamometer** ➢ Twin Cylinder, 4 Stroke, Water Cooled Engine ➢ Capacity: 550 CC ➢ BHP: 10 HP ➢ Speed: 1500 RPM ➢ Stroke: 110 mm ➢ Bore: 80 mm	
5.	**Blower Test rig** ➢ Test rig with Induction Motor ➢ Power: 7.5 HP ➢ Speed: 2880 RPM	

6.	**Compressor Test rig** ➢ Two Stage Air Compressor ➢ Displacement: 240 CFM ➢ BHP: 7 HP ➢ Speed: 850 RPM ➢ Work Pressure: 200 psi	
7.	**Petrol Engine with Hydraulic Dynamometer with Dog Clutch Assembly** ➢ 4 Cylinder, 4 Stroke, Water Cooled, Petrol Engine ➢ Capacity: 1500 CC ➢ BHP: 10 HP ➢ Speed: 1500 RPM ➢ Stroke: 90 mm ➢ Bore: 73 mm	

8.	**ESB R-50 Genset With Gasifier with 50 KVA** ➢ 3-Phase Self start natural aspiration engine, ➢ coupled with Inductive Alternator	
9.	**Diesel Engine with Mechanical Brake Dynamometer** Single Cylinder, 4 Stroke, Water Cooled, Horizontal Diesel Engine Capacity: 2000 CC, BHP: 5 BHP, Speed: 550 RPM, Stroke: 210 mm, Bore: 112 mm.	

LIST OF EXPERIMENTS

Significance of the Course: The course is intended to build up the understanding of concepts and principles related to I. C. Engines and to get acquainted with the analysis of I. C. Engines through various Performances and Exhaust emission tests.

Particulars of the Experiment	Course Outcomes
Experiment No. 1:- Study of carburetor and Fuel Injector. Aim & Objectives: - To study the construction and working of the different types of carburetor and Fuel Injector. Outcomes: - Able to explain construction and working of different types of carburetor and Fuel Injector.	CO-I CO-II
Experiment No. 2:- Study of Ignition System. Aim & Objectives: - To study Ignition systems. Outcomes: - Able to differentiate between types of Ignition Systems.	CO-I CO-II
Experiment No. 3:- Trial on diesel engine-Variable load test and energy balance. Aim & Objectives: - To carry out variable load test on Diesel engine and prepare Heat balance sheet to interpret its energy balance. Outcomes: - Able to perform trial on Diesel engine to analyse its performance.	CO-III CO-VI
Experiment No. 4:- Trial on Petrol engine-Variable load test and energy balance. Aim & Objectives:- To carry out variable load test on Petrol Engine and prepare Heat balance sheet to interpret its Energy balance. Outcomes:- Able to perform trial on Petrol engine to analyse its performance.	CO-III CO-VI
Experiment No. 5:- Trial on Petrol engine-Morse Test. Aim & Objectives: - To find the Indicated Power (IP) of Multi-Cylinder Petrol Engine by Morse test. Outcomes: - Able to perform trial on Petrol engine to analyse its performance.	CO-III CO-VI

Experiment No. 6:- Measurement of exhaust gas emissions of Petrol and Diesel Engines. Aim & Objectives: - To carry out measurement and analysis of Exhaust gas Emissions from Petrol and Diesel Engines. Outcomes: - Able to measure and analyse the Exhaust gas Emissions from Petrol and Diesel Engines.	CO-IV CO-V
Experiment No. 7:- Measurement of smoke density using Smoke meter. Aim & Objectives: - To detect and measure the amount of smoke emitted by Diesel engines. Outcomes: - Able to measure the amount of smoke emitted by Diesel engines.	CO-IV CO-V
Experiment No. 8:- Measurement of flash point of fuel sample. Aim & Objectives: - To measure the flash point of given fuel sample. Outcomes: - able to measure the flash point of given fuel sample.	CO-V
Experiment No. 9:- Oil Extraction by using Soxhelet apparatus. Aim & Objectives:- 1. To study Solid-Liquid extraction process using Soxhelet extractor. 2. To investigate the effect of residence time and solvent type on the extraction of oil from olive cake. 3. To calculate the Soxhelet extraction efficiency. Outcomes: - Able to study the solid-liquid extraction process using Soxhelet extractor and investigate the effect of residence time and solvent type on the extraction of oil from olive cake.	CO-I CO-II CO-III
Experiment No. 10:- Production of Biodiesel using catalyst Aim & Objectives: - To study Biodiesel preparation by using Homogeneous / Heterogeneous catalyst. Outcomes:- Able to get to know the preparation of Biodiesel by using Homogeneous / Heterogeneous catalyst.	CO-I CO-II