

## Fluids Mechanics Laboratory

### Purpose:

In this laboratory many concepts related to fluid properties, fluid static and fluid dynamics will be studied experimentally. Also energy principle, momentum principle, hydraulics and aerodynamics will be investigated.

The objective of this laboratory is to enhance the student knowledge in the area fluid mechanics, and to support the student information of fluid mechanics principles and concepts. Also to link the practical side with the theoretical one.

### Equipment:

- |  |                                       |
|--|---------------------------------------|
| 1- Hydrostatics and Properties of Fluids | 7- Series and Parallel Pump Test Set  |
| 2- Flow Measurement                      | 8- Positive Displacement Pump Support |
| 3- Reynolds Number and Transitional      | Module                                |
| Flow                                     | 9- Open Flow Channel                  |
| 4- Orifice and free jet flow             | 10- Pelton Turbine                    |
| 5- Impact of a Jet                       | 11- Francis Turbine                   |
| 6- Losses in Piping Systems              | 12- Subsonic Wind Tunnel              |



## Thermodynamics Laboratory

### Purpose:

This laboratory covers a wide range of thermodynamics concepts and basics, like, Temperature measurements, Pressure measurements, and first law of thermodynamics. Also some basic thermodynamic cycles like refrigeration cycle, Stirling cycle and Rankin cycle are covered. On the other hand internal combustion engines and gas turbine will be investigated.

The overall aim of the Laboratory is to strengthen and support the student information and knowledge in the area of thermodynamics principles and concepts which include energy conversion, cycles, and thermal engineering applications.

### Equipments

- |                                  |                                  |
|----------------------------------|----------------------------------|
| 1- Mechanical Equivalent of heat | 6- 4 stroke Petrol (S.I.) Engine |
| 2- Bomb Calorimeter              | 7- 4 stroke Diesel (C.I.) Engine |
| 3- Nozzle Apparatus              | 8- Gas Turbine                   |
| 4- Two-stage Air Compressor      | 9- Steam Power Plant             |
| 5- Sterling Engine               |                                  |



## **Strength of Materials Laboratory**

### **Purpose:**

The purpose of the Strength of Materials (SoM) Lab. is the education of the undergraduate students by demonstrating the fundamental principles in the fields of mechanics of materials and strength of structural components throughout conducting fundamental and technological state-of-the-art series of experiments. Students are also introduced to the data acquisition systems used in experimental study. Moreover, this Lab. provides students with the conceptual ethics of strength evaluation and design of structural components and structures, as well as the analysis of structural failures.

### **Equipment:**

- |                              |   |
|------------------------------|---|
| 1- Universal Testing Machine | 6- Deflection of Beams                            |
| 2- Torsion Testing Machine   | 7- Buckling Tester                                |
| 3- Hardness Testing Machine  | 8- Thin Wall Pressure Vessel Apparatus            |
| 4- Fatigue Testing Machine   | 9- Creep Measurement Apparatus                    |
| 5- Impact Testing Machine    | 10- Unsymmetrical Bending /Shear Center Apparatus |



## Mechanical Systems Laboratory

### Purpose:

This laboratory covers experiments to understand some basic concepts of heat transfer, refrigeration systems, special humidity sensor and vibration systems. Also internal Combustion Engines, Solar Energy principle, can be investigated. The lab make students familiar as much as possible with the devices by getting readings, analyzing the results then comparing with the theoretical calculations for each experiment, and then trying to find the basic technical reasons of these differences.

### Equipments:

- |                                      |  |
|--------------------------------------|--|
| 1- Linear Heat Conduction            | 7- Diesel Engine Auto Trainer              |
| 2- Combined Convection And Radiation | 8- Petrol Engine Auto Trainer              |
| 3- Boiling Heat Transfer Module      | 9- Heat Pump Trainer                       |
| 4- Heat Exchanger Service Unit       | 10- Air Conditioning Unit                  |
| 5- Cross Flow Heat Exchanger         | 11- Hot Water Instrument And Control Panel |
| 6- Compressible Flow Range           | 12- Solar Energy Demonstrator              |
|                                      | 13- Vibration Modules                      |



## Measurement and Instrumentations Laboratory

### Purpose:

The primary purpose of this lab is to provide fundamental knowledge in the theory and practical experience in the application of mechanical engineering measurements.

Experiments in related to pressure measurement, temperature measurement, calibration, strain gauges, and different sensors can be conducted in the lab.

### Equipment:

- 1- Pressure Measurement and calibration
- 2- Temperature Measurement and Calibration
- 3- Strain Gauge Trainer
- 4- Strain Gauge Kit
- 5- Sensors and Instrumentations system



## **Control and Vibration Laboratory**

### **Purpose:**

This lab contains many equipment related to Process control like level control, pressure control, and temperature control. In addition, Two setups related to Servo and Stepper motor control. Fully basic and advanced hydraulic rigs are also available. On the other hand complete setup vibration equipment that capable to perform many of basic vibration experiments.

### **Equipment:**

- 1- Level Workstation
- 2- Flow temperature workstation
- 3- Pressure Workstation
- 4- Proportional hydraulics basic level
- 5- Hydraulics and electro-hydraulics basic and advanced level
- 6- Servo-control system and stepper-control system
- 7- Universal vibrations apparatus

