DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
MECHANICAL ENGINEERING PROGRAM, BSC.

Course Syllabus

1. **Course number and name**
   ME 323 Thermodynamics Laboratory

2. **Credits and contact hours**
   (0+1) 1 credit hour, 3 contact hours

3. **Course type**
   Face to face Learning Course (3+0)

4. **Instructor's or course coordinator's name**
   Eng. Dia' A. Afaneh

5. **Textbook information**
   Thermodynamics Laboratory Manual.

   a. **Other supplemental materials**
      Yunus A. Cengle and Michael A. Boles. Thermodynamics, An Engineering Approach, Mc Graw Hill, Eighth Edition, 2015.
      Instructor's notes

6. **Specific course information**
   a. **Catalog description**
      Performing laboratory experiments such as Work to heat, specific heat ratio, Gas fuel calorific value, Refrigeration cycle, Flash and fire point of a fuel, Marcet boiler, Viscosity measurement, and instant gas heater..

   b. **Prerequisites or co-requisites**
      Co-requisite: ME 221 Thermodynamics I.

   c. **The course is:**
      Required in Mechanical Engineering Department.

7. **Specific goals for the course**
   a. **Course outcomes:**
   After completion of the course, students are expected to be able to:
      1. Investigate the relationship between heat energy and work energy.
      2. Determine the specific heat ratio for air.

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
MECHANICAL ENGINEERING PROGRAM, BSC.

3. Ability to use the basic theoretical calculations of thermodynamics processes by using the required thermal properties of the experimented fluid.
4. Demonstrate the vapor compression refrigeration cycle and estimate of coefficient of performance.
5. Determine the calorific value of a gaseous fuel.

b. The following student outcomes are addressed by the course:

SO-(b) an ability to design and conduct experiments, as well as to analyze and interpret data.
SO-(K) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
SO-(pc-2) prepare students to work professionally in thermal systems

8. Learning Outcomes and their Alignment with Program Educational Objective (PEO's), Methods of Delivery, and Assessment Methods:

Learning Outcomes	Program PEOs	Method of Delivery	Assessment Method
Course Outcomes			
Investigate the relationship between heat energy and work energy.	-	Experiment	Question in exam
Determine the specific heat ratio for air.	-	Experiment	Question in exam
Ability to use the basic theoretical calculations of thermodynamics processes by using the required thermal properties of the experimented fluid.		Experiment	Question in exam
Demonstrate the vapor compression refrigeration cycle and estimate of coefficient of performance.	-	Experiment	Question in exam
Determine the calorific value of a gaseous fuel.		Experiment	Question in exam
Student Outcomes			
SO-(b) an ability to design and conduct experiments, as well as to analyze and interpret data.			
SO-(K) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice			

SO-(pc-2) prepare students to work professionally in thermal systems			

9. Weekly Teaching Plan

Week No.	Lecture	Topic	Method of Delivery
1	Mon (13:00–16:00)	Introduction	Experiment
2	Mon (13:00–16:00)	Mechanical equivalent of heat.	Experiment
3	Mon (13:00–16:00)	Specific heat ratio.	Experiment
4	Mon (13:00–16:00)	Viscosity.	Experiment
5	Mon (13:00–16:00)	Gas calorific value.	Experiment
6	Mon (13:00–16:00)	Flash and fire point of a fuel.	Experiment
7	Mon (13:00–16:00)	Refrigeration cycle.	Experiment
8	Mon (13:00–16:00)	Midterm Exam	Exam
9	Mon (13:00–16:00)	Marcet boiler.	Experiment
10	Mon (13:00–16:00)	Instant gas heater.	Experiment
11	Mon (13:00–16:00)	Specific heat of water.	Experiment
12	Mon (13:00–16:00)	Bomb calorimeter.	Experiment
13	Mon (13:00–16:00)	Nozzle flow behavior test.	Experiment
14	Mon (13:00–16:00)	Demonstration and performance analysis of refrigeration cycle	Experiment
15	Mon (13:00–16:00)	Final Exam	Exam

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
MECHANICAL ENGINEERING PROGRAM, BSC.

10. Grade Distribution:

Assessment	Grade	Date
- Midterm Exam	30%	8th Week
- Assignments	30%	
- Final Examination	40%	15th Week

* Make-up exams will be offered for valid reasons. It may be different from regular exams