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

Course Syllabus

1. **Course number and name**
   ME 221 Thermodynamics 1

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

3. **Course type**
   Face to face Learning Course (2+1)

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

5. **Textbook information**
   Yunus A. Cengle and Michael A. Boles. Thermodynamics, An Engineering Approach, Mc Graw Hill, Eighth Edition, 2015.

   a. **Other supplemental materials**
      Instructor's notes

6. **Specific course information**
   a. **Catalog description**
      Thermodynamic and energy (Heat & Work), Energy Transfer, Properties of pure substances, Energy analysis of closed and open systems, Thermodynamic processes and a cycle, Second law of thermodynamics and Entropy. Heat Engine and Heat Pump.

   b. **Prerequisites or co-requisites**
      Prerequisite: 1501120 General Physics (1).

   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. Identify and calculate the energy transfer for a given application.
      2. Provide students with the fundamental principles of energy.
      3. Apply the first law of thermodynamics for closed and steady flow systems and for various processes.

4. Ability to calculate the entropy values of the given working fluid during a given process.

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

SO-(a) an ability to apply knowledge of mathematics, science, and engineering

SO-(pc-1) apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations); to model, analyze, design, and realize physical systems, components or processes

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			
Identify and calculate the energy transfer for a given application.	-	Lectures (Example and Problems)	Question in exam
Provide students with the fundamental principles of energy.	-	Lectures (Example and Problems)	Question in exam
Apply the first law of thermodynamics for closed and steady flow systems and for various processes.		Lectures (Example and Problems)	Question in exam
Ability to calculate the entropy values of the given working fluid during a given process.	-	Lectures (Example and Problems)	Question in exam
Student Outcomes			
SO-(a) an ability to apply knowledge of mathematics, science, and engineering			
SO-(pc-1) apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations); to model, analyze, design, and realize physical systems, components or processes			

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

9. Weekly Teaching Plan

Week No.	Lecture	Topic	Method of Delivery
1	Sun (9-10)	Chapter 1: INTRODUCTION AND BASIC CONCEPTS	Lecture
	Tue (9-10)	Chapter 1: INTRODUCTION AND BASIC CONCEPTS	Lecture
	Thu (9-10)	Chapter 1: INTRODUCTION AND BASIC CONCEPTS	Lecture
2	Sun (9-10)	Chapter 1: INTRODUCTION AND BASIC CONCEPTS	Lecture
	Tue (9-10)	Chapter 1: INTRODUCTION AND BASIC CONCEPTS	Lecture
	Thu (9-10)	Chapter 1: INTRODUCTION AND BASIC CONCEPTS	Lecture
3	Sun (9-10)	Chapter 2: ENERGY, ENERGY TRANSFER, AND GENERAL ENERGY ANALYSIS	Lecture
	Tue (9-10)	Chapter 2: ENERGY, ENERGY TRANSFER, AND GENERAL ENERGY ANALYSIS	Lecture
	Thu (9-10)	Chapter 2: ENERGY, ENERGY TRANSFER, AND GENERAL ENERGY ANALYSIS	Lecture
4	Sun (9-10)	Chapter 2: ENERGY, ENERGY TRANSFER, AND GENERAL ENERGY ANALYSIS	Lecture
	Tue (9-10)	Chapter 2: ENERGY, ENERGY TRANSFER, AND GENERAL ENERGY ANALYSIS	Lecture
	Thu (9-10)	Chapter 2: ENERGY, ENERGY TRANSFER, AND GENERAL ENERGY ANALYSIS	Lecture
5	Sun (9-10)	Chapter 3: PROPERTIES OF PURE SUBSTANCES	Lecture
	Tue (9-10)	Chapter 3: PROPERTIES OF PURE SUBSTANCES	Lecture
	Thu (9-10)	First Exam	Exam
6	Sun (9-10)	Chapter 3: PROPERTIES OF PURE SUBSTANCES	Lecture
	Tue (9-10)	Chapter 3: PROPERTIES OF PURE SUBSTANCES	Lecture
	Thu (9-10)	Chapter 3: PROPERTIES OF PURE SUBSTANCES	Lecture

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

7	Sun (9-10)	Chapter 3: PROPERTIES OF PURE SUBSTANCES	Lecture
	Tue (9-10)	Chapter 3: PROPERTIES OF PURE SUBSTANCES	Lecture
	Thu (9-10)	Chapter 3: PROPERTIES OF PURE SUBSTANCES	Lecture
8	Sun (9-10)	Chapter 4: ENERGY ANALYSIS OF CLOSED SYSTEMS	Lecture
	Tue (9-10)	Chapter 4: ENERGY ANALYSIS OF CLOSED SYSTEMS	Lecture
	Thu (9-10)	Chapter 4: ENERGY ANALYSIS OF CLOSED SYSTEMS	Lecture
9	Sun (9-10)	Chapter 4: ENERGY ANALYSIS OF CLOSED SYSTEMS	Lecture
	Tue (9-10)	Chapter 4: ENERGY ANALYSIS OF CLOSED SYSTEMS	Lecture
	Thu (9-10)	Chapter 4: ENERGY ANALYSIS OF CLOSED SYSTEMS	Lecture
10	Sun (9-10)	Chapter 5: MASS AND ENERGY ANALYSIS OF CONTROL VOLUMES	Lecture
	Tue (9-10)	Chapter 5: MASS AND ENERGY ANALYSIS OF CONTROL VOLUMES	Lecture
	Thu (9-10)	Chapter 5: MASS AND ENERGY ANALYSIS OF CONTROL VOLUMES	Lecture
11	Sun (9-10)	Chapter 5: MASS AND ENERGY ANALYSIS OF CONTROL VOLUMES	Lecture
	Tue (9-10)	Chapter 5: MASS AND ENERGY ANALYSIS OF CONTROL VOLUMES	Lecture
	Thu (9-10)	Second Exam	Exam
12	Sun (9-10)	Chapter 6: THE SECOND LAW OF THERMODYNAMICS	Lecture
	Tue (9-10)	Chapter 6: THE SECOND LAW OF THERMODYNAMICS	Lecture
	Thu (9-10)	Chapter 6: THE SECOND LAW OF THERMODYNAMICS	Lecture
13	Sun (9-10)	Chapter 6: THE SECOND LAW OF THERMODYNAMICS	Lecture
	Tue (9-10)	Chapter 6: THE SECOND LAW OF THERMODYNAMICS	Lecture
	Thu (9-10)	Chapter 6: THE SECOND LAW OF THERMODYNAMICS	Lecture

14	Sun (9-10)	Chapter 7: ENTROPY	Lecture
	Tue (9-10)	Chapter 7: ENTROPY	Lecture
	Thu (9-10)	Chapter 7: ENTROPY	Lecture
15	Sun (9-10)	Chapter 7: ENTROPY	Lecture
	Tue (9-10)	Chapter 7: ENTROPY	Lecture
	Thu (9-10)	Chapter 7: ENTROPY	Lecture

10. Grade Distribution:

Assessment	Grade	Date
- First Exam	20%	Fifth Week
- Second Exam	20%	10th Week
- Assignments	10%	
- Final Examination	50%	16th Week

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