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

**Course Syllabus**

1. **Course number and name**
   ME 222 Thermodynamics 2

2. **Credits and contact hours**
   (3+0) 3 credit hours, 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**
   Yunus A. Cengle and Michael A. Boles. Thermodynamics, An Engineering Approach, Mc Graw Hill, Eighth Edition, 2015.

   a. **Other supplemental materials**
      - Fundamentals of Classical Thermodynamics, by G. Van Wylen, R. Sonntag and C. Borgnakke.
      - Fundamentals of Engineering Thermodynamics, by M.J. Moran and H. N. Shapiro.
      - Applied Thermodynamics for Engineering Technologists, by Eastop & Mcconkey
      - Instructor's notes

6. **Specific course information**
   a. **Catalog description**
      Power Cycles, Air-Standard cycles, Otto, Diesel and Joule cycles. Vapor power cycles, Carnot cycle, Rankin cycle, The Regenerative cycle and modifications, Refrigeration cycle, Non-reactive gas mixtures, Air-Water vapor (Psychrometrics) mixture, Combustion of H-C fuels.

   b. **Prerequisites or co-requisites**
      Prerequisite: ME 221 Thermodynamics 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 different types of thermal systems, their characteristics and applications.
2. Perform process analysis and cycle calculations in general.
3. Model, analyze and design attempts of thermal systems.

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

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

SO-(e) an ability to identify, formulate and solve engineering problems

**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 different types of thermal systems, their characteristics and applications. | - | Lectures (Example and Problems) | Question in exam |
| Perform process analysis and cycle calculations in general. | - | Lectures (Example and Problems) | Question in exam |
| Model, analyze and design attempts of thermal systems. | | Lectures (Example and Problems) | Question in exam |
| **Student Outcomes** | | | |
| SO-(a) an ability to apply knowledge of mathematics, science, and engineering | | | |
| SO-(e) an ability to identify, formulate and solve engineering problems | | | |

## 9.  Weekly Teaching Plan

| Week No. | Lecture | Topic | Method of Delivery |
|---|---|---|---|
| 1 | Sun (9-10) | Chapter 9: GAS POWER CYCLES | Lecture |
| | Tue (9-10) | Chapter 9: GAS POWER CYCLES | Lecture |
| | Thu (9-10) | Chapter 9: GAS POWER CYCLES | Lecture |
| 2 | Sun (9-10) | Chapter 9: GAS POWER CYCLES | Lecture |
| | Tue (9-10) | Chapter 9: GAS POWER CYCLES | Lecture |
| | Thu (9-10) | Chapter 9: GAS POWER CYCLES | Lecture |
| 3 | Sun (9-10) | Chapter 9: GAS POWER CYCLES | Lecture |
| | Tue (9-10) | Chapter 9: GAS POWER CYCLES | Lecture |
| | Thu (9-10) | Chapter 9: GAS POWER CYCLES | Lecture |
| 4 | Sun (9-10) | Chapter 9: GAS POWER CYCLES | Lecture |
| | Tue (9-10) | Chapter 9: GAS POWER CYCLES | Lecture |
| | Thu (9-10) | Chapter 9: GAS POWER CYCLES | Lecture |
| 5 | Sun (9-10) | Chapter 10: VAPOR AND COMBINED POWER CYCLES | Lecture |
| | Tue (9-10) | Chapter 10: VAPOR AND COMBINED POWER CYCLES | Lecture |
| | Thu (9-10) | First Exam | Exam |
| 6 | Sun (9-10) | Chapter 10: VAPOR AND COMBINED POWER CYCLES | Lecture |
| | Tue (9-10) | Chapter 10: VAPOR AND COMBINED POWER CYCLES | Lecture |
| | Thu (9-10) | Chapter 10: VAPOR AND COMBINED POWER CYCLES | Lecture |
| 7 | Sun (9-10) | Chapter 11: REFRIGERATION CYCLES | Lecture |
| | Tue | Chapter 11: REFRIGERATION CYCLES | Lecture |

| | | | |
|---|---|---|---|
| | (9-10) | | |
| | Thu (9-10) | Chapter 11: REFRIGERATION CYCLES | Lecture |
| 8 | Sun (9-10) | Chapter 11: REFRIGERATION CYCLES | Lecture |
| | Tue (9-10) | Chapter 11: REFRIGERATION CYCLES | Lecture |
| | Thu (9-10) | Chapter 11: REFRIGERATION CYCLES | Lecture |
| 9 | Sun (9-10) | Chapter 13: GAS MIXTURES | Lecture |
| | Tue (9-10) | Chapter 13: GAS MIXTURES | Lecture |
| | Thu (9-10) | Chapter 13: GAS MIXTURES | Lecture |
| 10 | Sun (9-10) | Chapter 13: GAS MIXTURES | Lecture |
| | Tue (9-10) | Chapter 13: GAS MIXTURES | Lecture |
| | Thu (9-10) | Chapter 13: GAS MIXTURES | Lecture |
| 11 | Sun (9-10) | Chapter 14: GAS–VAPOR MIXTURES AND AIR-CONDITIONING | Lecture |
| | Tue (9-10) | Chapter 14: GAS–VAPOR MIXTURES AND AIR-CONDITIONING | Lecture |
| | Thu (9-10) | Second Exam | Exam |
| 12 | Sun (9-10) | Chapter 14: GAS–VAPOR MIXTURES AND AIR-CONDITIONING | Lecture |
| | Tue (9-10) | Chapter 14: GAS–VAPOR MIXTURES AND AIR-CONDITIONING | Lecture |
| | Thu (9-10) | Chapter 14: GAS–VAPOR MIXTURES AND AIR-CONDITIONING | Lecture |
| 13 | Sun (9-10) | Chapter 15: CHEMICAL REACTIONS | Lecture |
| | Tue (9-10) | Chapter 15: CHEMICAL REACTIONS | Lecture |
| | Thu (9-10) | Chapter 15: CHEMICAL REACTIONS | Lecture |
| 14 | Sun (9-10) | Chapter 15: CHEMICAL REACTIONS | Lecture |
| | Tue | Chapter 15: CHEMICAL REACTIONS | Lecture |

| | | | |
|---|---|---|---|
| | (9-10) | | |
| | Thu (9-10) | Chapter 15: CHEMICAL REACTIONS | Lecture |
| 15 | Sun (9-10) | Chapter 15: CHEMICAL REACTIONS | Lecture |
| | Tue (9-10) | Chapter 15: CHEMICAL REACTIONS | Lecture |
| | Thu (9-10) | Chapter 15: CHEMICAL REACTIONS | Lecture |

**10. Grade Distribution:**

| Assessment | Grade | Date |
|---|---|---|
| - First Exam | 20% | Fifth Week |
| - Second Exam | 20% | 10$^{th}$ Week |
| - Assignments | 10% | |
| - Final Examination | 50% | 16$^{th}$ Week |

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