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

Course Syllabus

1. **Course number and name**
   ME 507 Thermal systems design

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**
   Design of Fluid Thermal Systems 4th Edition by Janna.
   ISBN-10 : 1285859650

   a. **Other supplemental materials**
   - Design of Thermal Systems by Stoecker,
   - Thermal Design and Optimization by Bejan, Tsatsaronis & Moran
   - Fundamentals of Heat and Mass Transfer-7th edition-(Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, and David P. Dewitt.
   - 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**
   Device design and system design. Quantitative data for system design including operating characteristics of compressors, turbines, heat exchangers, piping systems, internal combustion engines, and other component equipment. Component matching and system simulation. Optimization including thermo-economic evaluation and energy analysis.

   b. **Prerequisites or co-requisites**
   Prerequisite: ME 455 Heat transfer.

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

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7. Specific goals for the course

a. Course outcomes:

After completion of the course, students are expected to be able to:

1. Students should be able to integrate material from the basic courses in thermodynamics, fluid mechanics, and heat transfer into the design of various thermal systems.
2. To develop computational skills to analyze and design of components.
3. To gain experience in using computer techniques in modeling and simulating typical thermal systems.
4. To perform economic calculations involving time and interest.
5. be familiar with the environmental impact of energy systems.

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

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			
Students should be able to integrate material from the basic courses in thermodynamics, fluid mechanics, and heat transfer into the design of various thermal systems.	-	Lectures (Example and Problems)	Question in exam
To develop computational skills to analyze and design of components.	-	Lectures (Example and Problems)	Question in exam
To gain experience in using computer techniques in modeling and simulating typical thermal systems.		Lectures (Example and Problems)	Question in exam

To perform economic calculations involving time and interest.	-	Lectures (Example and Problems)	Question in exam
be familiar with the environmental impact of energy systems.	-	Lectures (Example and Problems)	Question in exam
Student Outcomes			

9. Weekly Teaching Plan

Week No.	Lecture	Topic	Method of Delivery
1	Sun (9-10)	Introduction	Lecture
	Tue (9-10)	Introduction	Lecture
	Thu (9-10)	Introduction	Lecture
2	Sun (9-10)	Review of the Basic Equations	Lecture
	Tue (9-10)	Review of the Basic Equations	Lecture
	Thu (9-10)	Review of the Basic Equations	Lecture
3	Sun (9-10)	Piping Systems	Lecture
	Tue (9-10)	Piping Systems	Lecture
	Thu (9-10)	Piping Systems	Lecture
4	Sun (9-10)	Piping Systems	Lecture
	Tue (9-10)	Piping Systems	Lecture
	Thu (9-10)	Piping Systems	Lecture

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5	Sun (9-10)	Pumps Types	Lecture
	Tue (9-10)	Pumps Types	Lecture
	Thu (9-10)	First Exam	Exam
6	Sun (9-10)	Pumps Performance Evaluation	Lecture
	Tue (9-10)	Pumps Performance Evaluation	Lecture
	Thu (9-10)	Pumps Performance Evaluation	Lecture
7	Sun (9-10)	Heat Exchangers Types and Evaluation	Lecture
	Tue (9-10)	Heat Exchangers Types and Evaluation	Lecture
	Thu (9-10)	Heat Exchangers Types and Evaluation	Lecture
8	Sun (9-10)	Heat Exchangers Physical Design Specifications	Lecture
	Tue (9-10)	Heat Exchangers Physical Design Specifications	Lecture
	Thu (9-10)	Heat Exchangers Physical Design Specifications	Lecture
9	Sun (9-10)	Heat Exchangers selection	Lecture
	Tue (9-10)	Heat Exchangers selection	Lecture
	Thu (9-10)	Heat Exchangers selection	Lecture
10	Sun (9-10)	Fuel Cells	Lecture
	Tue (9-10)	Fuel Cells	Lecture
	Thu (9-10)	Fuel Cells	Lecture
11	Sun (9-10)	Advanced cycles	Lecture
	Tue (9-10)	Advanced cycles	Lecture
	Thu (9-10)	Second Exam	Exam
12	Sun	Thermal System Simulation	Lecture

	(9-10)		
	Tue (9-10)	Thermal System Simulation	Lecture
	Thu (9-10)	Thermal System Simulation	Lecture
13	Sun (9-10)	Thermal System Simulation	Lecture
	Tue (9-10)	Thermal System Simulation	Lecture
	Thu (9-10)	Thermal System Simulation	Lecture
14	Sun (9-10)	Optimization and Thermoeconomics	Lecture
	Tue (9-10)	Optimization and Thermoeconomics	Lecture
	Thu (9-10)	Optimization and Thermoeconomics	Lecture
15	Sun (9-10)	Optimization and Thermoeconomics	Lecture
	Tue (9-10)	Optimization and Thermoeconomics	Lecture
	Thu (9-10)	Optimization and Thermoeconomics	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.