

MENG 446 – Thermal Power Engines

Department:

Mechanical Engineering

Program Name:

Mechanical Engineering

Program Code: 23**Course Code:**

MENG446

Credits:

4 Cr

Year/Semester:

2018-2019/Spring

 Required Course Service Course Elective Course**Prerequisite(s):**

-

Catalog Description:

Application of basic principles of thermodynamics, fluid mechanics and heat transfer; steam generating units; Fuels and combustion; steam and gas turbines, nuclear reactors, pumps, Blowers and compressors; Design of power cycles and associated components.

Course Web Page:staff.emu.edu.tr/devrimaydin/en/meng446**Textbook(s):**

Dipak K. Sarkar, Thermal Power Plant Design and Operation, Elsevier 2015.
M.M. El Wakil, Power Plant Technology, McGraw Hill
Cengel, Boles, Thermodynamics, 5th Edition, McGraw Hill.

Lab Manual:

Lab manuals will be posted to the web.

Indicative Basic Reading List :

There are many books in the library

Topics Covered and Class Schedule:**(3 hours of lectures + 1 hour of lab or tutorial per week)**

Week 1-2:	Fundamentals of power plant engineering
Week 3-4:	Steam generators
Weeks 5-6:	Fuels and combustion
Weeks 7-8:	Midterm examination
Week 9-10:	Gas Power Cycles: Bryton Cycle, Bryton Cycle with Regeneration,
Week 11:	Cogeneration, Combined Heat & Power Technologies
Week 12:	Introduction to Economic Analysis of Power Systems
Week 13:	Power from Renewables
Week 14:	Nuclear Power Plants
Week 15:	Final Examination

Laboratory Schedule:**(2 hours of laboratory per week)**

Week 6	The Heat Engine
Week 10	PV/T panel

Course Learning Outcomes:

At the end of the course, student must be able to

- 1- Understand basic concepts of thermodynamics and terms of thermodynamics.

2- Understand the concept of “System”. 3- Understand energy and energy transfer. 4- Comprehend energy analysis of a system. 5- Understand how to find the properties of pure substances. 6- Comprehend the energy analysis of a closed system. 7- Comprehend mass and energy analysis of open system. 8- Understand in the 2nd Law of Thermodynamics. 9- Understand heat engine, refrigerator, and heat pump. 10- Understand the cycle for Gas-Turbine and Vapor Cycle			
Assessment	Method	No	Percentage
	Midterm Exam	1	30 %
	Quizzes	2	15 %
	Lab Report (s)	2	15 %
	Final Examination	1	40 %
Contribution of Course to Criterion 5 Credit Hours for: Mathematics & Basic Science : 0 Engineering Sciences and Design : 3 General Education : 0			
Relationship of Course to Program Outcomes The course has been designed to contribute to the following program outcomes: (a) apply knowledge of mathematics, science, and engineering (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context (e) identify, formulate, and solve engineering problems			
Prepared by: Asst. Prof. Dr. Devrim Aydin		Date Prepared: 15th Feb 2019	

NG Policy:

Students who do not attend both mid-term and final exams will be given NG.

Students who do not submit both Lab I and Lab II reports will be given NG.

Resit exam policy:

Students who do not have attendance >60% and got D- or F cannot attend Resit exam