

MM 538 Advanced Thermodynamics				MECHANICAL ENGINEERING DEPARTMENT					
Semester	Methods of Education							Credits	
	Lecture	Recit.	Lab.	Project/Field Study	Homework	Other	Total	Credit	ECTS credit
1,2	30	12				146	188	3	7.5
Language	Turkish								
Compulsory / Elective	Optional								
Prerequisites	-								
Course Contents	State equation, property and property relations, incompressible systems, system that they don't react, air-steam mixtures, phase change and chemical equilibrium, reaction, reaction rate and combustion process, minimization and equilibrium of irreversibilities, calculation of exergy, application of air-water vapor mixtures, equilibrium compositions, modern power and refrigeration systems, computer programs for modelling and optimization.								
Course Objectives	To teach basic principles of advanced thermodynamics. To train students to identify, formulate and solve engineering problems in advanced thermodynamics. To teach application of second law analysis for advanced thermodynamic systems.								
Learning Outcomes and Competences	Gaining the ability to use thermodynamic terminology and advanced concepts. Learning the methods to determine and calculate the appropriate energy, mass transfer and entropy generation to solve steady and transient system applications. Learning the advanced methods to apply the concepts of irreversibility, availability and efficiency to various systems.								
Textbook and /or Reference	Bejan, J. (1997). Advanced Engineering Thermodynamics. John Wiley Press. Öztürk A. (1998). Çözümlü Problemlerle Termodinamik. İstanbul. Büyüktürk, A. R., (1995). Termodinamik. Birsan Yayınevi. Cilt 1 ve Cilt 2.								
Assessment Criteria					If any, mark as (X)		Percentage (%)		
	Midterm Exams				X		40		
	Quizzes								
	Homeworks								
	Projects								
	Term Paper								
	Laboratory Work								
	Other								
	Final Exam				X		60		
Instructors									
Week	Subject								
1	Property Relations (Transformations, Jacobians, Stability Criteria)								
2	Principles and Examples								
3	Equation of State for Simple Substances.								
4	Applied Statistical Thermodynamics for Property Estimation.								
5	Midterm Examination I								
6	Non-reacting Mixtures and Applications.								
7	Chemical Equilibrium, Reaction Rate.								
8	Entropy Generation Minimization.								
9	Exergy Analysis								
10	General I-D Compressible Flow in Ducts, Applications.								
11	Midterm Examination II.								
12	Conservation Equations with Reaction, Homogeneous Combustion.								
13	Premixed and Diffusion Flame.								
14	Combustion of Rocket Fuels.								