

THERMODYNAMICS I

1	Course Title:	THERMODYNAMICS I
2	Course Code:	OTO2007
3	Type of Course:	Compulsory
4	Level of Course:	First Cycle
5	Year of Study:	2
6	Semester:	3
7	ECTS Credits Allocated:	5.00
8	Theoretical (hour/week):	3.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	None
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Prof. Dr. ERHAN PULAT
15	Course Lecturers:	Doç. Dr. NURETTİN YAMANKARADENİZ
16	Contact information of the Course Coordinator:	pulat@uludag.edu.tr 0 224 2941982 Bursa Uludağ Üniversitesi, Mühendislik Fakültesi, Makina Müh. Bölümü, Oda No:217, Görükle, 16059, Bursa
17	Website:	
18	Objective of the Course:	Teaching of fundamental concepts and laws of thermodynamics by engineering approach.
19	Contribution of the Course to Professional Development:	Knowing performance limits of heat engines and having possible environmental effects of heat engines, refrigerators, and heat pumps. Constructing relations of thermodynamics with other engineering branches, social disciplines, and ecosystems.
20	Learning Outcomes:	
	1	Explaining of thermodynamic concepts and laws by proper using of thermodynamic terminology.
	2	Doing distinction between pure substance and ideal gas, finding or determination of properties of substances.
	3	Using of first and second law of thermodynamics in problem solving.
	4	Doing proper assumptions to solve thermodynamic problems and obtaining thermodynamic data.
	5	Knowing performance limits of heat engines. Having possible environmental effects of heat engines, refrigerators, and heat pumps.
	6	Doing distinction between closed and open systems.
	7	Constructing relations of thermodynamics with other engineering branches, social disciplines, and ecosystems.
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21	Course Content:	
	Course Content:	
Week	Theoretical	Practice

1	Introduction to thermodynamics, definitions, closed and open systems, properties, processes and cycle.			
2	Pure substances, equilibrium diagrams, thermodynamic tables, equations of state, ideal gas equation of state.			
3	Work and Heat. Moving boundary work.			
4	Nature of work and heat, heat transfer rate and power.			
5	First law of thermodynamics, internal energy, enthalpy, and specific heats.			
6	First law analysis, internal energy, enthalpy and specific heats of ideal gases.			
7	Second law of thermodynamics. Heat sources. Carnot's principle. Heat engines. Thermal efficiency. Heat pumps and refrigerators. Coefficient of performance, Clausius's and Kelvinb Planck's statements.			
8	Mid-term exam.			
9	Reversible and irreversible processes. Carnot cycle. Thermodynamic temperature scale.			
10	Entropy. Clausius's inequalty. Property diagrams related to entropi. Increase of entropi principle.			
11	Entropy change of pure substance. Entropi change of ideal gases. Reversible and			
Activites		Number	Duration (hour)	Total Work Load (hour)
Theoretical volumes. Flow work. Second law of thermodynamics for control volumes.		14	3.00	42.00
Practicals/Labs		0	0.00	0.00
Self study. Control volume work for SSSF processes.		14	2.00	28.00
Homeworks		0	0.00	0.00
Projects		0	0.00	0.00
Field Studies		0	0.00	0.00
Midterm Exams		1	40.00	40.00
Others		0	0.00	0.00
Final Exams		2	40.00	40.00
Total Work Load				150.00
Total work load/ 30 hr				5.00
ECTS Credit of the Course				5.00
		4. Çözümü Termodinamik Problemleri, A.N. Eğriçan, H. Atılğan, Pamuk Ofset, 1985, İstanbul. 5. Elements of Environmental Engineering: Thermodynamics and Kinetics, 2nd Ed., K. Valsaraj, Lewis Publishers, Inc., 2000. 6. Thermodynamics of Atmospheres and Oceans, J. A. Curry and P. J. Webster, Academic Press, 1999.		
23	Assesment			
TERM LEARNING ACTIVITIES		NUMBE R	WEIGHT	
Midterm Exam		1	40.00	
Quiz		0	0.00	
Home work-project		0	0.00	
Final Exam		1	60.00	

Total	2	100.00
Contribution of Term (Year) Learning Activities to Success Grade	40.00	
Contribution of Final Exam to Success Grade	60.00	
Total	100.00	
Measurement and Evaluation Techniques Used in the Course	Classical Written Midterm and Final Exam	

24	ECTS / WORK LOAD TABLE
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25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK6	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK7	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low		2 low		3 Medium		4 High		5 Very High							