THERMODYNAMICS I

1	Course Title:	THERMODYNAMICS I	
2	Course Code:	MAK2007	
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. RECEP YAMANKARADENİZ	
15	Course Lecturers:	Prof. Dr. Atakan Avcı Yrd. Doç. Dr. Erhan Pulat	
16	Contact information of the Course Coordinator:	recep@uludag.edu.tr, 0224 2941969 Uludağ Üniversitesi Mühendislik – Mimarlık Fakültesi Makine Mühendisliği Bölümü 16059 Görükle/BURSA	
17	Website:		
18	Objective of the Course:	This course is aimed to teach the basic laws of thermodynamics and to apply these laws to thermodynamics systems.	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	Comprehension of the thermodynamic concepts and laws by using the thermodynamic terminology properly.
		2	Distinction between pure substance and ideal gas, and evaluation of the properties of the substances.
		3	Using the first and second law of thermodynamics to solve problems.
		4	Constitution of appropriate assumptions and obtaining thermodynamic data necessary to solve thermodynamic problems.
		5	Determination of the limits of the performance of the thermal engines.
		6	Distinction between closed-systems and steady-flow processes.
		7	Comprehension of the relationship of thermodynamics to other engineering and non-engineering disciplines.
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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 substance, equilibrium diagrams, thermodynamic tables, equations of state, ideal gas equation of state.	
3	Work and heat. Moving boundary work.	
4	Constitution of work and heat. Heat transfer rate and power.	
5	First law of thermodynamics, internal energy, enthalpy and specific heats.	
6	Analysis of first law of thermodynamics, internal energy, enthalpy and specific heats of ideal gas.	
7	The second law of thermodynamics. Thermal energy reservoirs. Heat engines. Thermal efficiency. Kelvin-Planck Statement.	
8	Repeating courses and midterm exam	
9	Continuation of second law of thermodynamics. Refrigerators and heat pumps. Coefficient of performance. Clausius Statement. Reversible and irreversible processes. The Carnot cycle. Thermodynamic temperature scale.	
10	Entropy. The Clausius inequality. Property diagrams involving entropy. Its relations. Principle of the increase of entropy.	
11	Continuation of the entropy. The entropy change of pure subtances. The entropy change of ideal gasses. Reversible and irreversible processes of pure substances and ideal gasses.	
12	Open system analysis. Continuity equation first law of thermodynamics for open systems. Flow work. Second law of thermodynamics for open systems.	
13	Steady-state and steady flow processes. Calculation of work for SSSF processes. Some steady-state steady flow engineering devices.	
14	Uniform state uniform flow processes.	

22	Textbooks, References and/or Other Materials:	1- Mühendislik Termodinamiğin Temelleri, Cilt 1, R. Yamankaradeniz, Nobel Yayın Dağıtım, Ekim 2004, Ankara. 2- Mühendislik Yaklaşımıyla Termodinamik, Y.A. Çengel, M.A. Boles, Türkçesi: T. Derbentli, McGraw-Hill Literatür Yayıncılık 3. Basım, Ekim 2000, İstanbul. 3- Çözümlü Problemlerle Termodinamik, A. Öztürk, A. Kılıç, 3. Basım, Çağlayan Kitapevi, 1993, İstanbul. 4- Çözümlü Termodinamik Problemleri, A.N. Eğrican, H. Atılgan, Pamuk Ofset, 1985, İstanbul. 5- Termodinamik Cilt 1, Termodinamiğin Temel Yasaları, A.R. Büyüktür, U.Ü. Basımevi, 1982, Bursa. 6- Fundamentals of Classical Thermodynamics, G.J. Won Wylen, R.E. Sonntag, 3rd ed. SI Version, John Wiley and Sons, 1985, Singapore. 7- Fundamentals of Engineering Thermodynamics, M.J. Moran, H.N. Shapiro, 3th Ed. SI Version, John Wiley and Sons, 2000, Singapore.
23	Assesment	

TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**

Midterm Exam	1	30.00
Quiz	2	20.00
Home work-project	0	0.00
Final Exam	1	50.00
Total	4	100.00
Contribution of Term (Year) Learning Activities to Success Grade		50.00
Contribution of Final Exam to Success Grade		50.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		

24 ECTS / WORK LOAD TABLE

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	3.00	42.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	22.00	22.00
Others	2	8.00	16.00
Final Exams	1	28.00	28.00
Total Work Load			150.00
Total work load/ 30 hr			5.00
ECTS Credit of the Course			5.00

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	0	4	0	0	0	0	0	3	0	0	0	0	0	0	0	0
ÖK2	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	4	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	4	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK5	2	4	4	0	0	0	0	0	0	0	0	0	0	2	0	0
ÖK6	2	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK7	3	2	3	0	0	0	0	0	0	0	0	0	0	5	0	0

LO: Learning Objectives PQ: Program Qualifications

Contribution Level:	1 very low	2 low	3 Medium	4 High	5 Very High