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 AVCI Doç. Dr. ERHAN PULAT Doç. Dr. NURETTİN YAMANKARADENİZ
16	Contact information of the Course Coordinator:	E-Posta: recep@uludag.edu.tr, Tel: 224 2941969 Bursa Uludağ Üniversitesi Mühendislik Fakültesi Ali Durmaz 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:	Gaining the ability to make appropriate assumptions in thermal analysis and designs and to apply the laws of thermodynamics.
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.
		8	
		9	
		10	

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	General review and applications.	
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 change of pure substances. The entropy change of ideal gasses. Reversible and _____	
12	Open system analysis. Continuity equation. Flow work. Second law of thermodynamics for open systems.	
13	Calculation of work for SSSF processes. Some steady-state steady flow engineering _____	
14	Uniform state uniform flow processes.	

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	28.00	28.00
Others	0	0.00	0.00
Final Exams	1	38.00	38.00
Total Work Load			150.00
Total work load/30 hr			5.00
ECTS Credit of the Course			5.00

Textbooks, References and/or Other Materials:

1- Mühendisler İçin Termodinamiğin Esasları, Cilt 1, R. Yamankaradeniz, N. Yamankaradeniz, S. Coşkun, Ö. _____ Kasım 2014, Bursa.

2- Mühendislik Yaklaşımıyla Termodinamik, Y.A. Çengel, M.A. Boles, Çeviri Editörü: A. Pınarbaşı, Güven-Bilimsel Kitabevi 5. Basım, 2008, İzmir.

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 Thermodynamics, C. Borgnakke, R.E. Sonntag, 7th ed. Int. Student Version, John Wiley and Sons, 2009, U.S.A.

7- Mühendislik Termodinamiğinin İlkeleri, M.J. Moran, H.N. Shapiro, D.D. Boetner, M.B. Bailey, Çeviri Editörü: A. Akçayoğlu, 7. Baskı SI Version, Palme Yayıncılık, 2015, Ankara.

23	Assesment		
TERM LEARNING ACTIVITIES		**NUMBER**	**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 exam (Open books and notebooks)	

24	ECTS / WORK LOAD TABLE

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**