THERMODYNAMICS II

1	Course Title:	THERMODYNAMICS II	
2	Course Code:	MAK2008	
3	Type of Course:	Compulsory	
4	Level of Course:	First Cycle	
5	Year of Study:	2	
6	Semester:	4	
7	ECTS Credits Allocated:	3.00	
8	Theoretical (hour/week):	2.00	
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. ATAKAN AVCI	
15	Course Lecturers:	Prof. Dr. ATAKAN AVCI Doç. Dr. ERHAN PULAT Doç. Dr. NURETTİN YAMANKARADENİZ	
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 fundamental application areas of thermodynamics and to apply the principles of thermodynamics to analysis of related engineering systems.	
19	Contribution of the Course to Professional Development:	Design and analysis of power cycles	
20	Learning Outcomes:		
		1	Comprehension of thermodynamic cycles. Performing quantitative cycle analysis by using basic thermodynamic principles.
		2	Combination of various engineering devices to form a cycle and comprehension of relationships between cycle elements to enhance efficiency.
		3	Application the laws of thermodynamics to ideal gas mixtures.
		4	Analysis of various moist air processes by using fundamental relations and charts.
		5	Comprehension of basic principles of combustion process.
		6	Comprehension of the societal and environmental implications of thermodynamic applications.
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21	Course Content:		

	Course Content:	
Week	Theoretical	Practice
1	Introduction to vapor cycles. Ideal and actual Rankine cycle. Analysis of Rankine cycle and thermal efficiency.	
2	Effects of pressure and temperature on the efficiency of the Rankine cycle. Reheat Rankine cycle Regenerative Rankine cycle.	
3	Open feedwater heaters and closed feedwater heaters. Brief description of supercritic Rankine cycle and cogeneration.	
4	Ideal vapor compression refrigeration cycle. Analysis of vapor compression refrigeration cycle and coefficient of performance. lnP-h diagram.	
5	Ideal vapor compression heat pumps. Analysis of vapor compression heat pump cycle and coefficient of performance.	
6	Actual vapor-compression refrigeration cycles. Cascade refrigeration systems. Liquefaction of gasses. Brief description of absorption refrigeration cycle.	
7	Introduction to gas power cycles and air-standard assumptions. Ideal Otto cycle. Compression ratio and mean effective pressure.	
8	Repeating courses and midterm exam	
9	Brayton cycle (ideal gas turbine cycle). Actual Brayton cycle. Brayton cycle with	
10	description of gas refrigeration cycles.	
11	concepts related to mixtures. Dalton and Amagat models. Properties of ideal gas	
12	Introduction to gas-vapor mixtures. Basic definitions and concepts related to moisture	
13	psychrometric chart.	
14	Air conditioning process for moist air and psychrometric chart.	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	2.00	28.00
Practicals/Labs	0	0.00	0.00
Self study and preparation	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	12.00	12.00
Others	2	4.00	8.00
Final Exams	1	14.00	14.00
Total Work Load			90.00
Total workload/ 30 h			3.00
ECTS Credit of the Course			3.00

22	Textbooks, References and/or Other Materials:	1. Mühendislik Termodinamiğin Temelleri, Cilt 2, Uygulama Esasları, 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 2, Termodinamiğin Temel Yasaları, A.R. Büyüktür, U.Ü. Basımevi, 1982, Bursa. 6. Fundamentals of Classical Thermodynamics, G.J. Won Wylen, R.E. Sonntag, 3thEd. SI Version, John Wiley and Sons, 1985, Singapore. 7. Fundamentals of Engineering Thermodynamics, M.J. Monan, 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		Traditional and complementary measurment and evaluation techniques

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

LO: Learning Objectives PQ: Program Qualifications

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