ADVANCED GAS TURBINE THEORY AND DESIGN FUNDAMENTALS

1	Course Title:	ADVANCED GAS TURBINE THEORY AND DESIGN FUNDAMENTALS
2	Course Code:	OTO6134
3	Type of Course:	Optional
4	Level of Course:	Third Cycle
5	Year of Study:	2
6	Semester:	4
7	ECTS Credits Allocated:	6.00
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:	Dr. Ögr. Üyesi HARUN GÜÇLÜ
15	Course Lecturers:	Yok
16	Contact information of the Course Coordinator:	Dr. Öğr. Üyesi Harun Güçlü harunguclu@uludag.edu.tr +90 (224) 294 20 15 Mühendislik Fakültesi Otomotiv Mühendisliği Bölümü
17	Website:	None
18	Objective of the Course:	For the use of gas turbine engine/power plants in power generation Teaching the analysis, working principles of aircraft/jet engines, and transferring the theory for thermodynamic designs.
19	Contribution of the Course to Professional Development:	Upon completion of this course, students are expected to have the following knowledge and skills: 1. Recognizing the construction and basic structure of gas turbines 2. Recognizing the basic concepts and equipment of gas turbines 3. To learn about energy generation and thermodynamic relations with gas turbines.
20	Learning Outcomes:	
	1	Thermodynamic principles of gas turbines
	2	Ideal gas cycles and the simple Brayton cycle
	3	The use of gas turbines in practical life, understanding of common problems and solutions, developing the working methodology.
	4	Gas turbine cycles for aircraft (jet) engines
	5	Thermodynamics of high speed fluids
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21	Course Content:	

Course Content:

Week	Theoretical	Practice
1	Introduction to gas turbines and gas turbine engines	

2	Introduction to gas turbine thermodynamics	
3	Ideal gas cycles and the simple Brayton cycle	
4	Brayton cycle with regenerator	
5	Brayton cycle with intercooling and intermediate heating	
6	Brayton cycle with intercooling - intermediate heating and regenerator	
7	Gas turbine cycle for aircraft (jet) engines	
8	Analysis of jet / aircraft engines	
9	Thermodynamics of high speed fluids	
10	Ideal turbo jet cycle analysis	
11	Turbo-prop engines (ideal cycle calculation)	
12	Design parameters in turbines	
13	Components of steam and gas turbines (compressors, combustion chambers and boilers)	
14	Production technologies of turbine blades and gas turbines	

22	Textbooks, References and/or Other Materials:	1. Gas Turbine Theory 5th Edition 2. Elements of Gas Turbine Propulsion; Mattingly, McGraw Hill, 1996 3. Gas Türbinleri; Çetinkaya Y. ; Nobel Yayın Dağıtım, 1997

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	10	6.00	60.00
Homeworks	2	30.00	60.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	0	0.00	0.00
Others	0	0.00	0.00
Final Exams	1	18.00	18.00
Total Work Load			180.00
Total work load/ 30 hr			6.00
ECTS Credit of the Course			6.00

23	Assessment	
TERM LEARNING ACTIVITIES	**NUMBE**	**WEIGHT**
Midterm Exam	2	40.00
Home work-project	3	60.00
Total		100.00
Success Grade		
Contribution of Final Exam to Course Grade		
Total		100.00
Course	grades, including at least one of two questions that require in-depth analysis on each topic. The final exam is given in the form of "homework" similar to the yearly assignments but more comprehensive. Course evaluation is done over a midterm and a final exam.	

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	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	5	0	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	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK5	0	0	0	0	5	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**