

ADVANCED TOPICS IN INTERNAL COMBUSTION ENGINES

1	Course Title:	ADVANCED TOPICS IN INTERNAL COMBUSTION ENGINES	
2	Course Code:	OTO5136	
3	Type of Course:	Optional	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	2	
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:	Prof. Dr. RUKİYE ERTAN	
15	Course Lecturers:	Yok	
16	Contact information of the Course Coordinator:	surmen@uludag.edu.tr +90 (224) 294 1965 Mühendislik Fakültesi Otomotiv Mühendisliği Bölümü	
17	Website:		
18	Objective of the Course:	Enhancement of engineer's basic internal combustion engine informations; broaden contributions to researches in areas like performance analysis of engines and usage of alternative fuels.	
19	Contribution of the Course to Professional Development:	<p>Students know the difference between engines in terms of different engineering principles.</p> <p>Students know the working principles of different engines.</p> <p>Students comprehend the kinematics and motion principles of internal combustion piston engines.</p> <p>Students can make a full thermodynamic analysis of an internal combustion engine.</p> <p>Students can analyze the effects of engine design on engine performance. Students can model and calculate the effects of different fuels on engine performance.</p> <p>Students can establish a healthy relationship between the theory of motor performance and motor technologies.</p>	
20	Learning Outcomes:		
		1	Students learn volumetric efficiency concept.
		2	They learn the types of supercharging and the effect of supercharging on engines.
		3	They learn the principles of alternative engine tips.
		4	They examine the combustion and they learn the model of combustion.
		5	They can make performance calculations.
		6	They learn the relationship between performance and emission.
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21	Course Content:		
	Course Content:		
Week	Theoretical	Practice	
1	Analysis of Charge Induction Process in ICEs and Volumetric Efficiency,		
2	Analysis of Charge Induction Process in ICEs and Volumetric Efficiency,		
3	Supercharging,		
4	Supercharging,		
5	Alternative Piston Engines		
6	Alternative Piston Engines		
7	Combustion Modelling in ICEs		
8	Combustion Modelling in ICEs		
9	Cycle Simulation and Performance Analysis		
10	Cycle Simulation and Performance Analysis		
11	Cycle Simulation and Performance Analysis		
12	Emission-Performance Relations on Engines		
13	Emission-Performance Relations on Engines		
14	Emission-Performance Relations on Engines		
22	Textbooks, References and/or Other Materials:	1. O. Borat, M. Balcı, A. Sürmen; "İçten Yanmalı Motorlar (Internal Combustion Engines) Gazi Üniversitesi Teknik	
Activites		Number	Duration (hour) Total Work Load (hour)
Theoretical	Engines , ALFA Basım Yayın Dağıtım Ltd. Sti. İstanbul, 2003. ISBN 975877009-8.	14	3.00 42.00
Practicals/Labs		0	0.00 0.00
Self study and preperation	4. B. Heywood; "Internal Combustion Engine	4	6.00 60.00
Homeworks		2	30.00 60.00
Projects	5. E. F. Obert; "Internal Combustion Engines and Air	5	0.00 0.00
Field Studies		0	0.00 0.00
Midterm exams	6. W. W. Pulkrabek; "Engineering Fundamentals of the	6	0.00 0.00
Others		0	0.00 0.00
Final Exams		1	18.00 18.00
Total Work Load			180.00
TERM LEARNING ACTIVITIES		NUMBER	WEIGHT
Total work load/30 hr			6.00
ECTS Credit of the Course			6.00
Quiz	0	0.00	
Home work-project	2	40.00	
Final Exam	1	60.00	
Total	3	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	Midterm exam is given as the average of 4 or 5 homework grades, including at least one or 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.
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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	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
ÖK2	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
ÖK3	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
ÖK4	2	4	0	2	1	0	0	0	0	0	0	0	0	0	0	0
ÖK5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK6	1	0	0	0	2	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							