ALTERNATIVE FUEL VEHICLES APPLICATIONS

1	Course Title:	ALTERNATIVE FUEL VEHICLES APPLICATIONS	
2	Course Code:	OTO4126	
3	Type of Course:	Optional	
4	Level of Course:	First Cycle	
5	Year of Study:	4	
6	Semester:	8	
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:		
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. M.İHSAN KARAMANGİL	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	E-posta : ihsan@uludag.edu.tr T: +90 224 294 1978- 294 2602 Uludağ Üniversitesi Mühendislik Fakültesi Otomotiv Mühendisliği Bölümü Görükle Kampusu Bursa 16059	
17	Website:		
18	Objective of the Course:	The purpose of this course is to teach general properties of classic (gasoline and diesel) and alternative fuels (LPG, natural gas, hydrogen, methanol, ethanol and biodiesel) and is to inform about conversion kits used to alternative fuel vehicles. Moreover, comparisons are performed in terms of economic, conversion cost, running for a long time without breakdown, engine performance (power, torque, specific fuel consumption) and pollutant emissions.	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	Skill of comprehending vehicles using alternative fuel
		2	Skill of solving engineering problems related to vehicles using alternative fuel
		3	Skill of using information technologies effectively
		4	Skill of analyzing and commenting vehicles using alternative fuel
		5	Skill of gaining to conduct individual and team work
		6	Skill of gaining awareness of lifelong learning necessity
		7	
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		10	
21	Course Content:		
	Course Content:		
Week	Theoretical		Practice

1	Introduction of energy resources. Information about renewable energy sources which are thought to use in vehicles (solar energy, wind energy)	
2	Classification of the fuels	
3	Obtaining methods of motor fuels (distillation, cracking and synthesis method) Classification of engine fuels	
4	General properties desired from spark ignition engine fuels (volatility, knock resistant…) Gasoline properties	
5	General properties desired from compression ignition engine fuels (cetan number, viscosity…) Diesel properties	
6	Problems occurring in engines because of illegal fuel usage	
7	General properties of other alternative fuel properties used engines (CNG, LPG, H2, methanol, ethanol, biodiesel)	
8	Fuel supply systems used in gasoline and diesel engines	
9	Midterm Exam	
10	LPG conversion kits used diesel and gasoline vehicles Comparison of engine performance and CNG and original fuel Comparison of LPG and natural gas stations	
11	vehicles powered by hydrogen (diesel and gasoline) emission values ??of hydrogen powered vehicles with the values ??in the original	
12	Comparison of performance and pollutant emission values ??of ethanol-powered vehicles with those in the original engine Comparing the performance and pollutant emission values ??of the vehicles working with methanol with the values ??in the original engine	
13	Vehicles powered by sodium boron hydride Fuel cell driven vehicles	
14		

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	2.00	28.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	2	11.00	22.00
Homeworks	1	14.00	14.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	16.00	16.00
Others	0	0.00	0.00
Final Exams	1	10.00	10.00
Total Work Load			106.00
Total work load/ 30 hr			3.00
ECTS Credit of the Course			3.00

22	Textbooks, References and/or Other Materials:	1. Ali Sürmen, İhsan Karamangil, Rıdvan Arslan “Motor Termodinamiği” Alfa Aktüel, 2004. 2. Oğuz Borat, Ali Sürmen, Mustafa Balcı “Motorlar” TEV Yay, 2006. 3. Richard van Basshuysen, Fred Schafer “Internal Combustion Engine Handbook” SAE, 2004. 4. SAE Papers

23	Assesment

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Midterm Exam	1	30.00
Quiz	0	0.00
Home work-project	1	10.00
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		

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	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
ÖK5	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0
ÖK6	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
ÖK7	0	0	0	0	0	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							