HYDROGEN ENERGY AND TECNOLOGIES

1	Course Title:	HYDROGEN ENERGY AND TECNOLOGIES	
2	Course Code:	MAK4434	
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. Akın Burak Etemoğlu	
15	Course Lecturers:	Dr.Öğr.Üyesi Burak Türkan	
16	Contact information of the Course Coordinator:	Prof.Dr. Akın B. Etemoğlu e-posta: aetem@uludag.edu.tr telefon: 224 2941976 adres: BUÜMF, Makine Müh. Blm.	
17	Website:		
18	Objective of the Course:	Explaining energy sources and their importance. Hydrogen energy and technologies, applications of fuel cells and examination of the process from obtaining hydrogen as a fuel to its usability.	
19	Contribution of the Course to Professional Development:	Acquiring practical knowledge and skills on the use and projecting of alternative fuel source hydrogen energy (fuel cell, storage, etc.) that will be used today and in the future, together with the learning of renewable energy sources.	
20	Learning Outcomes:		
		1	To provide basic knowledge about classical and renewable energy sources.
		2	To provide information about the advantages, usage areas and current hydrogen technologies of hydrogen energy.
		3	To have the ability to design by considering the properties of hydrogen, the storage and transportation of hydrogen energy, obtaining hydrogen as a fuel and its conversion to energy.
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21	Course Content:		

Course Content:

Week	Theoretical	Practice
1	Basic concepts	

2	Renewable energy sources	
3	Information on the use of renewable energy sources	
4	What is hydrogen energy? Examination of existing studies	
5	Properties of hydrogen	
6	Production methods of hydrogen	
7	Storage and transportation of hydrogen	
8	Hydrogen technologies	
9	Different uses of hydrogen and introduction to fuel cells	
10	Efficiency and thermodynamic analysis in hydrogen and fuel cell systems	
11	Advantages and disadvantages of hydrogen energy	
12	The future of hydrogen energy	
13	Presentations	
14	Presentations	

22	Textbooks, References and/or Other Materials:	1.Hidrojen ve Yakıt Pili Teknolojisi Prof. Dr. Durmuş Kaya, Prof. Dr. H. Hüseyin Öztürk, Doç. Dr. Muhammet Kayfeci Umuttepe Yayınları 2.Fuel Cell Fundamentals, Ryan O'Hayre, Suk-Won Cha, Whitney Colella, Fritz B. Prinz

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			10	2.00	20.00
Homeworks			0	0.00	0.00
Projects	0	0.00	0	0.00	0.00
Field Studies			0	0.00	0.00
Midterm Exams	1	60.00	1	18.00	18.00
Others			0	0.00	0.00
Final Exams	1	40.00	1	24.00	24.00
Total Work Load					90.00
Total work load/ 30 hr					3.00
ECTS Credit of the Course					3.00

Measurement and Evaluation Techniques Used in the Course	Exam, homework, working in a group

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	0	0	0	0	4	0	0	0	0	0	0	0	0	0
ÖK2	4	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0
ÖK3	4	4	0	0	0	0	4	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**