

**DEPARTMENT of INDUSTRIAL ENGINEERING
COURSE CATALOGUE FORM**



Course Code: INDE4486				Course Title: Energy Policy, Planning and Markets			
Semester	L + R + L	Credits	AKTS	Language	Category	Instructional Methods	Prerequisites
8	3+0+0	3	6	English	Elective	Lecture	INDE2001
Course Objectives			Ability to understand mathematical modeling, coding and analysis on understanding and modeling of the interactions and operations of Energy / Electricity markets and systems, Ability to understand energy economy-environment models				
Course Content			Market structure and design; supply demand characteristics, competitive electricity market, market power and measures, transmission lines- congestion, alternative current power flow optimization, direct current power flow optimization, climate change and legal infrastructure, energy-economy-environment models				
Course Learning Outcomes			<p>Students, who pass the course satisfactorily:</p> <ol style="list-style-type: none"> 1. Recognize the electricity market. [2] 2. Basic information about market analysis and design. [2] 3. To be able to comprehend and model supply-demand dynamics. [2] 4. Knowledge of market impacts and market design. [2] 5. Basic information about transmission lines and dynamics in the formation of electricity market. [2] 6. Basic information about power flow optimization methods and ability to model. [2] 7. Ability to understand climate change and energy-economy-environment modeling. [2] <p><i>[Note: Numbers in brackets are indicating the related program outcomes]</i></p>				
ISCED Category of the course			52 Engineering				
Textbook			Fundamentals of Power System Economics Daniel Kirschen and Goran Strbac, ISBN: 0-470-84572-4, 2004 John Wiley & Sons, Ltd.				
Supplementary Material			Power System Economics: Designing Markets for Electricity, Steven Stoft, ISBN: 978-0-471-15040-4 June 2002, Wiley-IEEE Press				

COURSE PLAN

Week	Topics	Laboratory / Tutorial Work
1	Power Markets Basics	
2	Competitive electricity market price determination	
3	Market imbalances and difficulties in restructuring the power markets	
4	Market structure and design	
5	Power supply and reliability	
6	Transmission Network basics and their impact on the market -	
7	Unit production commitment problem	
8	AC Power flow basics and optimization problem	
9	DC Power flow basics and optimization problem	
10	Capacity Planning	
11	Energy Use and Climate Change	
12	Energy policy modeling approaches	
13	Modeling of energy economic interactions	
14	Modeling of energy economic interactions	

COURSE ASSESSMENT SYSTEM

	Activities	Contribution (%)
Semester Activities	Semester Written Exams	40
	Homework	
	Reports	40
FINAL EXAM		20
Total		100

CONTRIBUTION of the COURSE on INDUSTRIAL ENGINEERING PROGRAM OUTCOMES

	Program Outcomes	Low	High
1	Adequate knowledge in mathematics, science and subjects pertaining to Industrial Engineering; ability to use theoretical and applied knowledge in these areas in complex engineering problems.		
2	Ability to identify, formulate, and solve complex Industrial Engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.		X
3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.		
4	Ability to devise, select, and use modern techniques and tools needed for analyzing and solving problems encountered in engineering practice; ability to employ information technologies effectively.		
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.		
6	Ability to work efficiently individually and in intra-disciplinary / multi-disciplinary teams.		
7	Knowledge of Turkish and English languages; ability to communicate effectively orally, inscriptive and visually by using these languages (via business methods such as reports, presentations and instructions).		
8	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.		
9	Consciousness to behave according to ethical principles and professional and ethical responsibility; knowledge on standards used in engineering practice.		
10	Knowledge about business life practices (management activities such as project, risk, change and quality etc.); awareness in entrepreneurship, innovation; knowledge about sustainable development.		
11	Knowledge about the global and social effects of engineering practices on health, environment, economics and safety, and contemporary issues of the century reflected into the field of engineering; awareness of the legal consequences of engineering solutions.		

ECTS - WORK LOAD TABLE

COURSE ACTIVITIES	Quantity	Time (hr)	Work Load (hr)
Lectures	14	3	42
Final Exam (Preparation included)	1	20	20
Semester Written Exams (Preparation included)	2	15	30
Out of class study time	14	2	28
Homework			
Reports	3	10	30
Labs			
Seminar			
Presentations			
Term Project			
Total Load (hr)			150
ECTS Credits of the course (Total Work Load / 25)			6

Revision / Date 5/02/2020	Coordinator / Prepared By Kemal Sarıca	Approved By Çağlar Aksezer
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