2021-2022 Fall semester Information for ENS-315 Energy (Hybrid Course) (tentative)

- Class hours: Tuesday, 13:40-14:30 Thursday, 10:40-12:30 Zoom link: https://sabanciuniv.zoom.us/j/98600264393
- Instructor: İsmet İ. Kaya, Office: FENS-1024, Phone: 9591 Office hour: Thursday, 13:40-14:30, by appointment in Zoom: Lecture link above
- TA: Ece Kurt Office hour: schedule to be determined later, by appointment in Zoom: will be given here

References:

Sustainable Energy — without the hot air David JC MacKay Free e-book available in the web.

Energy, Physics and the environment

Ernie L. McFarland, James L. Hunt, John L. Campbel; 3rd edition. Cangage Learning, 2007

Quizes:

Unscheduled quizzes during the lectures via Tophat or SuCourse.

HW- Problem Solving

Weekly exercises and problems will be announced and to be submitted at SuCourse.

HW- Writing Assignment

You are expected to write an article within the scope of the course on a topic you will select yourself. The article should be 2,000-3,000 words in length, and include an excellent set of scholar and non-scholar references. Detailed instructions will be given later.

Exams:

There will be 2 Mid-Term exams and a Final Exam. MT exam weeks are displayed in the weekly schedule below.

Grading:

10% Quizzes + 10% HW/PS + 20% HW/WA+ 20% MT1+ 20% MT2 + 20% Final

85-100	А
80-84	A-
75-79	B+
70-74	В
65-69	В-
60-64	C+
55-59	С
50-54	C-
45-49	D+
40-44	D
0-39	F

Academic Week	Торіс	
1	Introduction to the course: Energy fundamentals; definitions.	
	Introduction to Physics of Energy: Energy and Power; forms of energy and conversions; efficiency; units.	
2	Growth and Sustainability:	
2	Growth patterns; critical resources; historical development; future scenarios.	
224	Fossil Fuels:	
2,3,4	Fossil fuel formation theories; exploration and production technologies; reserves and resources; transportation of fossil fuels.	
	Reserve estimation and Hubbert theory; world fossil fuel reserves; future of fossil fuels.	
	Impact of fossil fuels on the environment, air pollution and its control; global warming.	
	First Mid-Term Exam	
	Thermal Energy:	
5,6	Heat transfer; laws of thermodynamics; heat engines and heat pumps.	
	Electricity:	
7	Introduction to electricity Ohm's Law and analysis of simple circuits; batteries; fuel cells, motors; generators; transformers. Transmission and distribution of electricity, energy storage systems.	
8.9	Solar Energy:	
0,0	Solar to Heat conversion; Solar incidence power and spectrum; Passive and active solar systems.	
	Principles of photovoltaics, PV technologies; PV cost vs efficiency; trends; solar thermal electric generation.	
	Second Mid-Term Exam	
	Other Renewables:	
	Impact of use of renewables: prospects on the distribution and storage.	
	Wind energy: Wind power capacity; wind turbines and systems; trends.	
10, 11, 12	Hydropower: Capacity; systems; trends.	
	Geothermal energy: Its origin and capacity analysis; hydrothermal systems; hot dry rock; low-temperature geothermal systems.	
	Biomass energy: Renewability analysis; biomass conversion technologies.	
13. 14	Nuclear energy:	
10, 14	Fundamentals of nuclear physics; binding energy; fission and fusion; radioactivity.	
	Generation of nuclear power: Fission reactors; fuel production; Nuclear waste management; Safety and risk assessment.	
	Future of nuclear energy; New reactor designs; Fusion power project.	