Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
Advanced Energy Technologies	FZ 6037		3 + 0	3.0	7.5

Prerequisites	None
Language of Instruction	Turkish
Course Level	Third Cycle
Course Type	Elective
Mode of delivery	Face to face
Course Coordinator	Prof. Dr. İsmail TARHAN
Instructors	Prof. Dr. İsmail TARHAN
Assistants	
Course Objectives	The main objective of this course is to provide informations on energy reserves, energy generation technologies, energy storage systems and technologies, relation of advanced energy technologies and environment.
Course Content	The main topics of the course intent are fundamentals of energy, energy conservation, energy reserves and resources, composition and gasification, environmental impacts of energy systems, stream power plant technology, gas turbine power generation technology, gas turbine based combined-cycle power plants, cogeneration and trigeneration, fuel cell and MHD-based power plants, clean coal power generation technology, advanced energy storage systems, energy storage productivity features, electrochemical and electromagnetic energy storage, energy storage technologies for solar power plants.
Course Learning Outcomes	1) Explain fundamentals of energy 2) Interpret about energy reserves and their utilities. 3) Analayze mechanisms of energy generation systems. 4) Describe the efficiency of energy generation systems. 5) Describe the impacts of energy generation systems to environment.

WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	Fundamentals of Energy, Energy Conservation	Oral lectures with interactive discussions, research, homework	
2. Week	Energy Reserves and Resources	Oral lectures with	

Quick Access

Physics (PhD)
- Qualification Awarded
- Level of Qualification
- Qualification Requirements and Regulations
- Specific Admission Requirements
- Recognition of Prior Learning
- Profile of the Program
- Program Key Learning Outcomes
- Occupational Profile of Graduates
- Access to Further Studies
- Course Structure & Credits
- Exam Regulations & Assessment & Grading
- Graduation Requirements
- Mode of Study
- Programme Director(or Equivalent)
- Evaluation Questionnaire
- TYYÇ

Course Information
- Course Information
- Weekly Course Content
- Resources
- Assessment
- Course Category
- CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES
- ECTS credits and course workload

		interactive discussions, research, homework	
3. Week	Composition and Gasification	Oral lectures with interactive discussions, research, homework	
4. Week	Environmental Impacts of Energy Systems	Oral lectures with interactive discussions, research, homework	
5. Week	Stream Power Plant Technology	Oral lectures with interactive discussions, research, homework	
6. Week	Gas Turbine Power Generation Technology	Oral lectures with interactive discussions, research, homework	
7. Week	Gas Turbine Based Combined-Cycle Power Plants	Oral lectures with interactive discussions, research, homework	
8. Week	Midterm exam	Oral lectures with interactive discussions, research, homework	
9. Week	Cogeneration	Oral lectures with interactive discussions, research, homework	
10. Week	Fuel Cell and MHD-Based Power Plants	Oral lectures with interactive discussions, research, homework	
11. Week	Clean Coal Power Generation Technology	Oral lectures with interactive discussions, research, homework	
12. Week	Advanced Energy Storage Systems	Oral lectures with interactive discussions, research, homework	
13. Week	Energy Storage Performance Characteristics	Oral lectures with interactive discussions, research, homework	
14. Week	Electrochemical and Electromagnetic Energy Storage	Oral lectures with interactive discussions, research, homework	
15. Week	Energy Storage Technologies for Solar Power Plants	Oral lectures with interactive discussions, research, homework	

16. Week	Final Exam	Oral lectures with interactive discussions, research, homework	

RESOURCES

Recommended Sources
1) N.V. Khartchenko (1998), Advanced Energy Systems, Taylor&Francis
1) D.P. Kothari, K.C. Singal, R. Ranjan (2008), Renewable Energy Sources and Emerging Technologies, PHI Learning Private.

ASSESSMENT

Measurement and Evaluation Methods and Techniques		
Mid-term exam + Assignment + Research & Project and Presentation 40%, Final Exam 60%		
In-Term Studies	**Quantity**	**Percentage**
Mid Term Exam 1	1	40
Total	1	40
End-Term Studies	**Quantity**	**Percentage**
Final Exam	1	60
Total	1	60
Contribution Of In-Term Studies To Overall Grade		40
End-Term Studies		60
Total		100

COURSE CATEGORY

Course Category	Percentage
Support Courses	% 50
Transferable Skills Courses	% 50

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES

Programme Outcomes	Contribution Level	DK1	DK2	DK3	DK4	DK5
PY1	5	4	4	4	4	4
PY2	4	5	4	4	4	2
PY3	5	5	4	5	4	5
PY4	4	4	4	4	4	4
PY5	5	5	5	4	4	4
PY6	5	5	5	5	4	4
PY7	5	4	4	4	5	5
PY8	5	4	4	4	4	4
PY9	5	5	5	4	4	4
PY10	4	4	4	4	4	4
PY11	4	4	4	5	4	4

PY12	4	4	4	5	4	4
PY13	4	5	4	4	4	5
PY14	4	4	4	4	4	4
PY15	4	4	5	4	4	4

*DK = Course's Contrubution.

	0	1	2	3	4	5
Level of contribution	None	Very Low	Low	Fair	High	Very High

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ECTS CREDITS AND COURSE WORKLOAD

Event	Quantity	Duration (Hour)	Total Workload (Hour)
Final Exam	1	3	3
Presentation/Seminar	1	12	12
Class Hours (14 weeks)	14	3	42
Mid Term Exam Preparation	1	9	9
Final Exam Preparation	1	15	15
Further Study	14	3	42
Research&Project	3	8	24
Assignment 1	3	4	12
Mid Term Exam 1	1	3	3
Preliminary Study	10	3	30
		Total Workload	192
		Total Workload / 25.5 (s)	7.53
		ECTS Credit of the Course	8