Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
Solar Cells And Their Applications	FZ 6040		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	Assoc. Prof. Dr. Vildan BİLGİN
Instructors	Assoc. Prof. Dr. Vildan BİLGİN
Assistants	
Course Objectives	Solar cells and sunlight, review of semiconductor properties, p-n junction diodes, efficiency limits, losses and measurement, standard silicon solar cell technology, design of silicon solar cells
Course Content	The nature of Solar Energy,Conversion of Solar energy to heat ,Solar radiation calculations,Solar collectors,Solar energy storage ,Solar Energy economics,Solar cells and sunlight,Semiconductor materials,p-n junction diodes ,Photovoltaic effect,Efficiency limits, losses and measurement ,Silicon solar cell technology ,Design of silicon solar cells,Thin Film Solar cells.
Course Learning Outcomes	1) Solve the basic equations of device physics 2) Analyze how p-n junction diodes work 3) Describe efficiency of solar cells 4) Explain the physical operating principles of solar cells 5) Apply of gained knowledge to technology and industry

WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	The nature of Solar Energy	Lecture, Problem solving, Homework	
2. Week	Conversion of Solar energy to heat	Lecture, Problem solving, Homework	
3. Week	Solar radiation calculations	Lecture, Problem solving, Homework	
4. Week	Solar collectors	Lecture, Problem	

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

		solving, Homework	
5. Week	Solar energy storage	Lecture, Problem solving, Homework	
6. Week	Solar Energy economics	Lecture, Problem solving, Homework	
7. Week	Solar cells and sunlight	Lecture, Problem solving, Homework	
8. Week	Midterm exam	Exam	
9. Week	Semiconductor materials	Lecture, Problem solving, Homework	
10. Week	p-n junction diodes	Lecture, Problem solving, Homework	
11. Week	Photovoltaic effect	Lecture, Problem solving, Homework	
12. Week	Efficiency limits, losses and measurement	Lecture, Problem solving, Homework	
13. Week	Silicon solar cell technology	Lecture, Problem solving, Homework	
14. Week	Design of silicon solar cells	Lecture, Problem solving, Homework	
15. Week	Thin Film Solar cells	Lecture, Problem solving, Homework	
16. Week	Final Exam	Exam	

RESOURCES

Recommended Sources
Kasturi Lal Chopra and, Suhit Ranjan das,Thin Films Solar Cells, 1983.
Concentrator Photovoltaics, Antonio L. Luque and Viacheslav. Andreev, 2007, Springer.
Solar Cells,Tom Markvart and Luis Castaner, 2005, Elsevier.

ASSESSMENT

Measurement and Evaluation Methods and Techniques		
Midterm exam, Homework, Final exam		
In-Term Studies	**Quantity**	**Percentage**
Mid Term Exam 1	1	30
Assignment 1	1	20
Total	2	50
End-Term Studies	**Quantity**	**Percentage**
Final Exam	1	50
Total	1	50
Contribution Of In-Term Studies To Overall Grade		50
End-Term Studies		50
Total		100

COURSE CATEGORY

Course Category	Percentage

Core Courses	% 30
Area of?Specialization Courses	% 70

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES

Programme Outcomes	Contribution Level	DK1	DK2	DK3	DK4	DK5
PY1	4	4	4	4	4	4
PY2	3	3	3	3	3	3
PY3	3	5	3	4	3	3
PY4	3	3	3	3	3	3
PY5	3	3	3	3	3	3
PY6	4	4	4	4	4	4
PY7	0	0	0	0	0	0
PY8	3	3	3	3	3	3
PY9	4	4	4	4	4	4
PY10	0	0	0	0	0	0
PY11	3	4	3	3	2	3
PY12	3	3	3	3	3	3
PY13	0	0	0	0	0	0
PY14	2	2	2	2	2	2
PY15	0	0	0	0	0	0

*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)
Class Hours (14 weeks)	14	3	42
Final Exam Preparation	1	22	22
Mid Term Exam Preparation	1	15	15
Further Study	14	4	56
Assignment 1	2	25	50
Final Exam	1	3	3
Mid Term Exam 1	1	3	3
		Total Workload	191
		Total Workload / 25.5 (s)	7.49
		ECTS Credit of the Course	7