Course title:				
Solar energy in power engineering				
Energia słoneczna w energetyce				
Field of study:				
Type of study:	The level of education:	Education profile:		
full-time studies	first-cycle studies	general academic		
Type of subject:	Semester:	Course language:		
Wybierz element.	Wybierz element.	English		
Course type:	Number of hours:	ECTS Credit points:		
lecture, tutorials, laboratory	15L, 15T, 30Lab	7		

# **SYLLABUS**

## **COURSE CONTENT**

Form of classes - lectures	
The Solar Radiation	
Photovoltaic Generator	
Properties of PV Generators in Operation Conditions	
Shading effects on PV cells	
Inverters	
Storage	
Test	
Form of classes - tutorials	
Calculation of the work of the PV installation – off grid installation	5
Calculation of the work of the PV installation – on grid installation	
Calculating the distance between rows	
PV installation with self-consumption of energy	
Test	1
Form of classes - laboratories	
Introduction to laboratory exercises, safety rules etc.	
Physical behaviour of solar cells under varying illuminance and temperature	
Solar module measurements	
Application aspects of electrical components for photovoltaic systems	
Results and processing of the obtained results	
Defense of studies	

## **COURSE STUDY METHODS**

1. blackboard
2. multimedia presentation
<b>3.</b> laboratory setup
4. the literature and instructions for laboratory classes

### METHODS OF ASSESMENT (F - formative; S - summative)

F1 activity in classes
<b>F2.</b> - evaluation of work during laboratory exercises
S1. – test
<b>S2.</b> - evaluation of the laboratory reports

### STUDENT WORKLOAD

Form of activity	Workload (hours)
Participation in lectures	14 h
Participation in classes	14 h
Laboratory	30 h
Participation in project classes	5 h
Participation in seminar	-
Preparation course on e-learning	-
Test	2 h
Entrance test for laboratory classes	15 h
Project's defence	-
Exam	-
Consultation hours	15 h
<b>DIRECT TEACHING, hours/ ECTS</b>	95 h / 3,8 ECTS
Preparation for tutorials	25 h
Preparation for laboratories	25 h
Preparation for projects	-
Preparation for seminars	-
Preparation for e-learning classes	-
Participation in e-learning classes	-
Working on project	-
Preparation for tests	30 h
Preparation for exam	-
SELF-STUDY, hours/ ECTS	80 h / 3,2 ECTS
TOTAL (hours)	175 Σ
TOTAL ECTS	7 ECTS

#### PRIMARY AND SUPPLEMENTARY TEXTBOOKS

Advances in Renewable Energies and Power Technologies Volume 1: Solar and Wind Energies Edited by Imene Yahyaoui University Carlos III of Madrid, Spain, 2018 Energy harvesting; Solar, Wind, and Ocean Energy Conversion Systems; Alroza Khaligh, Omar G. Onar; Energy, Power Electronics, and Machines Series; AH Emadi, Series Editor 2021 Stefan C.W. Krauter; Generation - Photovoltaic Energy Systems Modeling of Optical and Thermal, Solar Electric Power Performance, Electrical Yield, Energy Balance, Effect on Reduction of Greenhouse Gas Emissions, Berlin 2006

Kaolgirou, Soteris; Solar energy engineering: processes and systems; Elsevier, 2009

Power systems and renewable energy design, operation, and systems analysis; Gary D. Price; Momentum Press, LLC, New York, 2014

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