

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

## SYLLABUS

### COURSE CONTENT

Form of classes - lectures	Hours
The Solar Radiation	2
Photovoltaic Generator	3
Properties of PV Generators in Operation Conditions	3
Shading effects on PV cells	2
Inverters	2
Storage	2
Test	1
Form of classes - tutorials	Hours
Calculation of the work of the PV installation – off grid installation	5
Calculation of the work of the PV installation – on grid installation	5
Calculating the distance between rows	2
PV installation with self-consumption of energy	2
Test	1
Form of classes - laboratories	Hours
Introduction to laboratory exercises, safety rules etc.	2
Physical behaviour of solar cells under varying illuminance and temperature	6
Solar module measurements	8
Application aspects of electrical components for photovoltaic systems	8
Results and processing of the obtained results	4
Defense of studies	2

### COURSE STUDY METHODS

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

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

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

**STUDENT WORKLOAD**

<b>Form of activity</b>	<b>Workload (hours)</b>
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>	<b>95 h / 3,8 ECTS</b>
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	-
<b>SELF-STUDY, hours/ ECTS</b>	<b>80 h / 3,2 ECTS</b>
<b>TOTAL (hours)</b>	<b>175 <math>\Sigma</math></b>
<b>TOTAL ECTS</b>	<b>7 ECTS</b>

**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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