New generation energy technologies

Faculty of	**Mechanical and Power Engineering**
Name in English	**New generation energy technologies**
Name in Polish	**Technologie energetyczne nowej generacji**
Main field of study	**Power Engineering**
Specialization	**-**
Level of studies	**II level**
Form of studies	**full-time**
Kind of subject	**obligatory**
Subject code	**W09ENG-SM2335**
Group of courses	**NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30				
Number of hours of total student workload (CNPS)	50				
Form of crediting	Zaliczenie				
For group of courses mark final course with (X)					
Number of ECTS points	2				
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BU) classes	1,28				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1.	Competence in the field of thermodynamics, combustion process and fuels confirmed at the degree courses of study
2.	

SUBJECT OBJECTIVES

C1	Detailed familiarize students with the development trends of the latest technologies used in the power plant industry, and with some problems with their implementations
C2	

SUBJECT LEARNING OUTCOMES

relating to knowledge:	
PEU_W01	knows the problems of the development trends and the most important developments related to the latest technologies used in the power industry, the development trends and problems in their implementation
PEU_W02	

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec1	Conventional energy generation systems	2
Lec2	Energy generation in an Integrative Gasification Combination Cycle (IGCC) system	2
Lec3	OXY fuel technology, CO2 separation and storage	2
Lec4	Technical solutions for future power plants	2

Lec5	Hydrogen - an alternative to conventional power generation	2
Lec6	Power generation using supercritical circulation of CO2 (S-CO2)	2
Lec7,8	Advanced nuclear power reactor technologies	4
Lec9	Basic safety principles for nuclear power plants	2
Lec10	Small modular nuclear reactor SMR technologies	2
Lec11	Generation IV nuclear reactors	2
Lec12	Basic fusion reactions and basics of nuclear fusion.	2
Lec13	Basics of plasma physics and possibilities of controlling and maintaining plasma.	2
Lec14	Discussion of selected nuclear fusion experiments.	2
Lec15	Crediting with grade	2
Total hours		**30**

TEACHING TOOLS USED	
N1	Information and problem lecture in the form of a multimedia presentation
N2	Consultations
N3	

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F– forming (during semester), C– concluding (at semester end)	Educational effect number	Way of evaluating educational effect achievement
P	PUE_W01	Crediting with grade
P2		

PRIMARY AND SECONDARY LITERATURE

Primary literature	
1	Alexander V. Dimitrov, Introduction to Energy Technologies for Efficient Power Generation, 1st Edition, CRC Press 2017
2	Paul Breeze, Power Generation Technologies, 3rd Edition, Newnes 2019
3	Jean-Claude Sabonnadière (Ed.), Renewable Energy Technologies, Wiley-ISTE 2010
4	Kok K.D., Nuclear Engineering Handbook, 2009
5	Wood J., Nuclear Power, 2007
6	Kenro Miyamoto, Fundamentals of Plasma Physics and Controlled Fusion, NIFS-PROC-48 by National Institute of Fusion Science (NIFS) in Tokio.
Secondary literature	
1	Tadeusz J. Chmielniak, Technologie energetyczne, Wydawnictwo Politechniki Śląskiej 2004
2	Krzysztof Chmielowiec, Zbigniew Hanzelka, Andrzej Firlit Red., Elektrownie ze źródłami odnawialnymi: zagadnienia wybrane, Kraków : Wydawnictwa AGH 2015
3	Cacuci D.G., Handbook of Nuclear Engineering. 2010
4	

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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