

**DOCTORAL SCHOOL OF WROCLAW UNIVERSITY OF SCIENCE AND
TECHNOLOGY**

SUPERVISOR DECLARING/~~CONDUCTING~~ COURSE: prof. Małgorzata Kabsch-Korbutowicz, PhD, DSc
DEPARTMENT:
SCIENTIFIC DISCIPLINE: environmental engineering, mining and energy

COURSE CARD

Nazwa w języku polskim: Najnowsze kierunki badań w inżynierii środowiska, górnictwie i energetyce

Nazwa w języku angielskim: The latest research directions in environmental engineering, mining and energy

Course language: ~~polish~~ / english

The course is intended for all PhD students: YES / ~~NO~~

1) ~~BASIC COURSE~~

2) ~~SPECIALIST COURSE~~

3) ~~SEMINAR~~

4) ~~HUMANISTIC COURSE~~

5) ~~LANGUAGE~~

Subject code: IGQ100219W

* delete as applicable

	Lecture	Foreign language course	Seminar	Mixed forms
Number of hours of organized classes in university (ZZU)	30			
Grading	Exam	Exam	Oral presentation	Exam, inspection, evaluation classes

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. none
- 2.

COURSE OBJECTIVES

C1. Gaining knowledge about new developments in the environmental engineering, mining and energy discipline.

C2. Gaining inspiration to apply and create new ideas in different areas of discipline research

PROGRAM CONTENTS

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Form of classes		Number of hours
Lec 1	Alternative water sources (Małgorzata Kabsch-Korbutowicz)	2
Lec 2	Innovative processes and technologies in air and climate protection (Izabela Sówka)	2
Lec 3	New approaches of buried infrastructure's technical condition modelling (Małgorzata Kutylowska)	2
Lec 4	Flexibility technologies in future energy systems (Ara Sayegh)	2
Lec 5	Measurement systems in environmental engineering (Andrzej Szczurek)	2
Lec 6	Profitability of conveyor belts refurbishment in the light of the circular economy and the full and efficient use of resources (Leszek Jurdziak)	2
Lec 7	Opportunities of geoenery (heat mining) on Lower Silesia area (Herbert Wirth)	2
Lec 8	The future of "Geospatial" in the next decade: where we are - where we are heading (Kazimierz Bęcek)	2
Lec 9	Forest biomass - this is our lifeline: how much we have and how quickly we squander it (Kazimierz Bęcek)	2
Lec 10	Unmanned Geomatics Engineering: how to make maps without leaving office (Kazimierz Bęcek)	2
Lec 11	Next generation of nuclear and thermonuclear energy systems - challenges and solutions (Maciej Chorowski)	2
Lec 12	Transformation of district heating towards zero-emission sources and climate neutrality (Norbert Modliński)	2
Lec 13	Cryogenics in power engineering (Jarosław Poliński)	2
Lec 14	Renewable energy sources - selected issues (Sławomir Pietrowicz)	2
Lec 15	Modern refrigeration - challenges in the age of changing climate (Bartosz Zajązkowski)	2
Total hours		30

TEACHING TOOLS USED
N1. Information lecture N2. Problematic lecture

ACHIEVED SUBJECT LEARNING OUTCOMES		
Type of learning outcome	Code of learning outcome	Assessment of learning outcome
Knowledge	P8S_WG	has knowledge at an advanced level of discipline and subject matter relevant to the field of research carried out, including the most recent research findings and scientific achievements
Knowledge	P8S_WK	understands the significance of copyright and unauthorised use of intellectual property of third parties in the preparation of a doctoral dissertation

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PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

1. Valuing Water. The United Nations World Water Development Report (2021).
<https://unesdoc.unesco.org/ark:/48223/pf0000375724>
2. Innovation in Climate Change Adaptation, Editor: Walter Leal Filho, Springer (2016)
<https://link.springer.com/book/10.1007/978-3-319-25814-0>
3. Ernest O.Doebelin "Measurement Systems Application & Design" McGraw-Hill, 2007, 5th Edition
4. Anani, Nader. (2020). Renewable Energy Technologies and Resources. Artech House.
<https://app.knovel.com/hotlink/toc/id:kpRETR0003/renewable-energy-technologies/renewable-energy-technologies>
5. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.. (2018). 2018 ASHRAE® Handbook - Refrigeration (SI Edition). American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).
<https://app.knovel.com/hotlink/toc/id:kpASHRAER1/ashrae-handbook-refrigeration/ashrae-handbook-refrigeration>
6. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.. (2018). 2018 ASHRAE® Handbook - Refrigeration (SI Edition). American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).
<https://app.knovel.com/hotlink/toc/id:kpASHRAER1/ashrae-handbook-refrigeration/ashrae-handbook-refrigeration>
7. Jha, A.R.. (2006). Cryogenic Technology and Applications. Elsevier.
<https://app.knovel.com/hotlink/toc/id:kpCTA00008/cryogenic-technology/cryogenic-technology>
8. Rosen, Marc A. Koohi-Fayegh, Seama. (2016). Cogeneration and District Energy Systems - Modeling, Analysis and Optimization. Institution of Engineering and Technology.
<https://app.knovel.com/hotlink/toc/id:kpCDESMAO1/cogeneration-district/cogeneration-district>
9. UK geospatial Commission (2020) Unlocking the power of location: the UK's geospatial strategy 2020 to 2025
10. The Future of Geospatial. <https://www.gim-international.com/content/article/the-future-of-geospatial-are-we-everyone-s-friend-or-do-they-not-know-we-exist>
11. K. Becek, (2014). The Internet of Things: Are We at the Fringes of a Paradigm Shift in Geomatics
https://www.academia.edu/7436151/The_Internet_of_Things_Are_We_at_the_Fringes_of_a_Paradigm_Shift_in_Geomatics
12. K. Becek, Real-Time Mapping: Contemporary Challenges and the Internet of Things as the Way Forward. GEODESY AND CARTOGRAPHY Vol. 65, No 2, 2016, pp. 129-138. DOI: 10.1515/geocart-2016-0009.
- 13.K. Becek, (2010). Biomass Representation in Synthetic Aperture Radar Interferometry Data Sets.
https://www.academia.edu/26629231/Biomass_Representation_in_Synthetic_Aperture_Radar_Interferometry_Data_Sets
14. Bujakowski W,.(2015) Geologiczne, Środowiskowe i Techniczne uwarunkowania projektowania i funkcjonowania zakładów geotermalnych w Polsce. Studia Rozprawy Monografie nr 193. IGSMiE PAN.Kraków.
15. Fowler C.M.R., (2018) The solid Earth. An Intruduction to Global Geophysics. Cambridge University Press.

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

Małgorzata Kabsch-Korbutowicz (malgorzata.kabsch-korbutowicz@pwr.edu.pl)