

Course name **Protection of Atmosphere/Ochrona powietrza** *Code* *Credit points* **3**

Language of instruction **English**

Programme IS: B1; Intelligent Energy, & Biotechnology for Environmental Protection

Type of studies Three-year BSc studies

Unit running the programme Department of Energy Engineering

Course coordinator and academic teachers **R. Kobyłecki, Ph. D.**
R. Kobyłecki, Ph. D. (Lec.), R. Włodarczyk, Ph. D. (Tut.)

Form of classes and number of hours

Semester	Lec.	Tut.	Lab.	Proj.	Sem.	Credit points
VII	30	30	-	-	-	3

Learning outcomes Knowledge on the Earth's atmosphere and technologies and main sources of emission of pollutants to the atmosphere. Information on the main ways to get rid or minimize the pollutant emission. Information on the fundamental design principles of the main pollutant removal to tools/equipment.

Prerequisites Basic knowledge of thermodynamics, chemistry, mathematics, physics and fluid mechanics.

Course description The atmosphere – composition, features, etc. Air protection acts and documents. Emission standards and monitoring procedures and systems. Main pollution types and their environmental effect: SO₂, NO_x, N₂O, CO, CO₂, soot & tar, VOC, particulate matter (incl. PM10 & PM2.5), trace elements, etc.. Measurement and monitoring techniques. Primary and secondary pollutant removal technologies: SO₂, NO_x, dust removal. Greenhouse effect. Waste management and land recultivation. Data sampling and analysis.

TUTORIALS:
see lecture content

LABORATORY
Not applicable

PROJECT
Not applicable

SEMINAR

Not applicable

Form of assessment Written exam/colloquium

Basic reference materials D. Snow, Plant Engineers Reference Book, Butterworth and Heinemann, 2002.
Seinfeld, John H.; Pandis, Spyros N., Atmospheric Chemistry and Physics - From Air Pollution to Climate Change - 2nd edition, John Wiley & Sons September 2006, ISBN 9780471720188
Scientific publications & journals: *Climate Policy, Progress in Energy and Combustion Science, Resource and Energy Economics, Applied Energy, Energy, Energy & Power.*

Other reference materials D. Laudym, M. Pawlik, F. Strzelczyk, *Elektrownie*, WNT, 2006
J. Kucowski, D. Laudym, M. Przekwas, *Energetyka a ochrona środowiska*, WNT, 1994
J. Jarosiński, *Techniki czystego spalania*, WNT, 1996
P. Kabsch, *Odpylanie i odpylacze*, WNT, 1992
P. Kabsch, *Odpylanie mokre i elektrostatyczne*, WNT, 1995
Praca zbiorowa, *Pomiary cieplne cz.1 i 2*, WNT, 1993

e-mail of the course coordinator and academic teachers	rafalk@is.pcz.czest.pl , rwlodarczyk@is.pcz.czest.pl
Average student workload (teaching hours + individ)	4 hours of teaching hours + 4 hours of individual work per week
Remarks:	
<i>Updated on:</i>	