



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Process equipment (Design of cyclone)

### Course

Field of study

Chemical and process engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

Polish

Requirements

elective

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

15

### Number of credit points

1

### Lecturers

Responsible for the course/lecturer:

dr hab. inż. Szymon Woziwodzki

Responsible for the course/lecturer:

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### Prerequisites

basics math, physics and chemistry; principles of creation of design documentation; basis of materials science and mechanical engineering; principles of technical drawing; ability to use CAD software (AutoCAD); ability to use calculation software; ability to create a design documentation; ability to obtain information from international standards and catalogues; A student is aware of the advantages and limitations of individual and group work in solving the problems of an industrial nature and design; A student knows the limits of his knowledge and sees the need to deepen their knowledge

### Course objective

The major objectives of the course is to obtain skills and knowledge about design of gas-solid separators (cyclone)



### Course-related learning outcomes

#### Knowledge

1. A student knows construction of cyclones - [K\_W12, K\_W15]
2. A student knows methods and principles of cyclones design - [K\_W14, K\_W15]

#### Skills

1. A student knows how to design a cyclone for separation of gas-solid systems - [K\_U06]
2. A student knows how to solve computational problems appearing during the design. - [K\_U13]
3. A student knows how to optimize the size of cyclone and to estimate the costs of separator - [K\_U20]

#### Social competences

1. A student has the awareness and understanding of aspects of the practical application of knowledge. - [K\_K01]
2. A student knows the limits of his own knowledge and understands the need for continuing education. - [K\_K02]

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The skills acquired in the project classes are verified in the form of a defense taking place in the last and penultimate classes or remote mode using eKursy system. The final assessment is the sum of the sub-points for documentation (40points) and project defense (60points). The credit threshold is 50 pts. For the remote defense mode, the student must turn on the camera and microphone.

### Programme content

principles of construction of cyclones; principles of design of cyclones; calculation of separation efficiency; pressure drop in cyclone; selection, calculation and optimization of cyclone size; estimation of the costs.

### Teaching methods

Multimedia presentation, presentation illustrated with examples on the table, and resolving tasks provided by the lecturer

### Bibliography

#### Basic

1. J. Warych, Procesy oczyszczania gazów. Problemy projektowo-obliczeniowe, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1999.
2. J. Warych, Oczyszczanie przemysłowych gazów odlotowych, WNT, Warszawa 1994.
3. J. Warych, Aparatura chemiczna i procesowa, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2004.



Additional

1. Aparatura chemiczna, Pikoń J., Państwowe Wydawnictwa Naukowe, Warszawa, 1983
2. A. Heim, B. Kochanski, K.W. Pyć, E. Rzycki, Projektowanie aparatury chemicznej i procesowej, Wydawnictwo Politechniki Łódzkiej, Łódź 1993.

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	25	1,0
Classes requiring direct contact with the teacher	15	5,0
Student's own work (literature studies, preparation for classes/project defence, project preparation) <sup>1</sup>	10	5,0

<sup>1</sup> delete or add other activities as appropriate