STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Process Equipment - Separators: design of cyclone	**1010701131010723470**

Field of study	Profile of study (general academic, practical)	Year /Semester
Chemical and Process Engineering	**(brak)**	**2 / 3**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**elective**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **-** Classes: **-** Laboratory: **-** Project/seminars: **1**	**1**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**1 100%**
Technical sciences	**1 100%**

Responsible for subject / lecturer:

Prof dr hab. Lubomira Broniarz-Press
email: lubomira.broniarz-press@put.poznan.pl
tel. +48 61 6652789
Faculty of Chemical Technology
ul. Piotrowo 3 60-965 Poznań

Responsible for subject / lecturer:

dr inż. Szymon Woziwodzki
email: szymon.woziwodzki@put.poznan.pl
tel. +48 61 6652147
Faculty of Chemical Technology
ul. Piotrowo 3 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	- basics math, physics and chemistry - principles of creation of design documentation, - basis of materials science and mechanical engineering - principles of technical drawing
2	**Skills**	- ability to use CAD software (AutoCAD) - ability to use calculation software - ability to create files according to the ISO 3000:1-2008 standard - ability to create a design documentation - ability to obtain information from international standards and catalogues
3	**Social competencies**	- 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

Assumptions and objectives of the course:

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

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. A student knows construction of cyclones and ways of enter of dust-laden gas - [K_W12]
2. A student knows methods and principles of design of cyclones - [K_W14, K_W15]

Skills:

1. A student knows how to design a cyclone for separation of gas-solid system - [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 competencies:

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]

Assessment methods of study outcomes

Knowledge:

Activity during the course: 1

Skills:

Exam project: 1, 3

Activity during the course: 2

Social competencies:

Exam project: 1-2

Course description

During the course are discussed:

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.

Basic bibliography:

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 bibliography:

1. Aparatura chemiczna, Pikoń J., Państwowe Wydawnictwa Naukowe, Warszawa, 1983

2. A. Heim, B. Kochanski, K.W. Pyć, E. Rzyski, Projektowanie aparatury chemicznej i procesowej, Wydawnictwo Politechniki Łódzkiej, Łódź 1993.

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	15
2. Consultations	5
3. Making the project and Exam project	5

Student's workload

Source of workload	hours	ECTS
Total workload	25	1
Contact hours	20	1
Practical activities	15	1