



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Process equipment (Design of static mixer)

### 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

2/4

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:

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Faculty of Chemical Technology

ul. Berdychowo 4 61-131 Poznań

Responsible for the course/lecturer:

### Prerequisites

basics math, physics and chemistry; principles of creation of design documentation; basis of materials science and mechanical engineering; principles of technical drawing; construction and principles of design of stirred vessels; construction of momentum exchange equipment; ability to use CAD software (AutoCAD); ability to use calculation software; ability to create a digital 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 are to obtain skills and knowledge about design of static mixers



### Course-related learning outcomes

#### Knowledge

1. A student knows construction of static mixers - [K\_W12]
2. A student knows principles of mixing dynamics in static mixer [K\_W14]
3. A student knows methods and principles of design of static mixers - [K\_W15]

#### Skills

1. A student knows how to select static mixer in various flow regimes - [K\_U01]
2. A student knows how to estimate homogeneity degree in static mixer. - [K\_U06]
3. A student knows how to calculate the pressure drop in static mixer - [K\_U07]
4. A student knows how to calculate shear rate and shear stress in static mixer - [K\_U19]
5. A student knows how to estimate an effect of physiochemical properties on mixing in static mixer [K\_U21]

#### 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\_K04]
3. A student knows the limitation of work in group [K\_K04]

### 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. The final assessment is the sum of the sub-points for documentation (40points) and project defense (60points). The credit threshold is 50 pts.

### Programme content

principles of construction of static mixers; pressure drop in static mixers; calculation of the drag coefficient for static mixers; calculation of the homogeneity degree in static mixers; length of static mixer; mixing of two-phase systems in static mixers

### Teaching methods

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

### Bibliography



Basic

1. F. Stręć, Mieszanie i mieszalniki, WNT, Warszawa 1981.
2. J. Kamiński, Mieszanie układów wielofazowych, WNT, Warszawa 2004.
3. E.L. Paul, V.A. Atiemo-Obeng, S.M. Kresta, Handbook of industrial mixing. Science and practice, Wiley&Sons, Hoboken 2004.

Additional

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

**Breakdown of average student's workload**

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

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