



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Process apparatus [S1TOZ1>AP]

### Course

Field of study

Circular System Technologies

Year/Semester

2/3

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3,00

### Coordinators

dr inż. Piotr Wesółowski

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### Lecturers

### Prerequisites

Knowledge: The student has a basic knowledge of: mathematics, physics, chemistry, information technologies and engineering graphics, obtained during other courses in semesters 1 and 2 in the field of Circular System Technologies, enabling understanding of the principles of designing process apparatus and preparing of technical documentation. Skills: The student is able to acquire and supplement knowledge about the construction and operation of process equipment from academic textbooks, scientific studies and the internet sources. Has the ability to self-education, can work individually and in a team. Student is able to prepare technical drawings of apparatus and their elements and knows the basic principles of preparing technical documentation. Social competencies: The student understands the need to constant improvement of the skills and the need to enrich the knowledge acquired during the course. He/she is aware of the responsibility for the tasks carried out in a team.

### Course objective

Obtaining knowledge of the apparatus used in various unit processes carried out in the chemical industry and other related industries.

### Course-related learning outcomes

#### Knowledge:

1. the student has knowledge of raw materials, products and processes used in circular system technologies (k\_w10).
2. the student has a basic knowledge of the life cycle of products, devices and installations used in circular system technologies (k\_w12).
3. the student knows the methods and principles of graphic notation of the structure (k\_w19).
4. the student knows the nomenclature, construction and principle of operation of structural elements of machines and mechanical devices (k\_w20).

#### Skills:

1. the student is able to plan and organize work individually and in a team (k\_u08).
2. student selects methods of process control and quality assessment of raw materials, products and waste (k\_u10).
3. the student can read and make technical drawings and technological diagrams (k\_u18).

#### Social competences:

1. the student demonstrates independence and inventiveness in individual work, as well as effectively interacts in a team, playing various roles in it; objectively assesses the effects of his own work and that of team members (k\_k02).
2. the student is aware of the negative impact of human activity on the state of the environment and actively counteracts its degradation (k\_k10).

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

Current control activity.

Written exam.

### Programme content

Technical documentation of the designed process apparatus.

### Course topics

The lecture is conducted in parallel with the design classes aimed at acquiring the ability to prepare technical documentation of the designed process apparatus. Students can choose an alternative project. During the lecture, there is a wide review of various design solutions of apparatus enabling the implementation of the exchange processes: momentum, heat and mass in closed-loop technologies.

### Teaching methods

1. Participation in the lecture.
2. Participation in consultations.
3. Written exam.

### Bibliography

#### Basic

1. Wesołowski P., Borowski J.: Aparatura chemiczna i procesowa. I. Wymienniki ciepła i masy, Wydawnictwo Politechniki Poznańskiej, Skrypty, Poznań 2002.
2. Wesołowski P., Szaferski W., Borowski J.: Aparatura chemiczna i procesowa. II. Mieszalniki i separatory, Wydawnictwo Politechniki Poznańskiej, Skrypty, Poznań 2003.

#### Additional

1. Błasiński H., Młodziński B.: Aparatura przemysłu chemicznego, WNT, Warszawa 1976.
2. Pikoń J.: Aparatura chemiczna, t. I, II, III. SUPŚ w Gliwicach, Gliwice 1972/73.
3. Pikoń J.: Podstawy konstrukcji aparatury chemicznej, t. I i II, PWN, Warszawa 1979.
4. Strępek F.: Mieszanie i mieszalniki, WNT, Warszawa 1981.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	38	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	37	1,50