COURSE DESCRIPTION CARD - SYLLABUS

Course name

Technological project

Course

Field of study

Chemical Technology

Year/Semester

II/3

Area of study (specialization)

Composites and Nanomaterials

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

English

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

45

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Faculty of Chemical Technology

Institute of Chemistry and Technical Electrochemistry

ul. Berdychowo 4, 61-131 Poznań

Responsible for the course/lecturer:

Prerequisites

The candidate should be familiar with a basic concepts of technology for various chemical products manufacturing processes. He/she should know the basics of chemical compounds synthesis from the thermodynamic and process control point of view. Additionally, the knowledge on chemical reactors, industrial instrumentation and engineering graphics is requested from a candidate.

Course objective

The aim of the course is to prepare a student to design the chemical production process taking into

account all technological aspects. He/she will be able to select the proper reactors, instrumentation and conditions in order to achieve the most benefical output of the product. The course will demonstrate the environmental and financial issues which need to be considered during design process. The project will allow the student to consolidate the engineering knowledge gained throughout his/her academic education.

Course-related learning outcomes

Knowledge

K_W1 - student has the extended knowledge on mathematics and informatics required to modelling, design, optimization and characterization of industrial chemical processes

K_W3 - student has the knowledge about the complex processes in chemistry, which include the proper material selection, resources, methods, techniques and chemical instrumentation to the successful realization of chemical processes and characterization of obtained products

K_W4 - he/she has knowledge on kinetcs, thermodynamics, surface phenomena and catalytic effects of various chemical processes

K_W6 - he/she has the extended knowledge on the newest technologies in the production of chemical compounds including advanced engineered materials. He/she knows the modern approach to chemistry

K_W8 - he/she has the knowledge on the enviromental issues presented in the process design

Skills

K_U2 - he/she has the ability to cooperate in the team, has leadership skills

K_U6 - he/she has the ability to present his work in a comprehensive way in the form of report and presentation

K_U7 - student has the ability to use the professional computer aided design programms in the simulation, illustration and calculation

K_U24 - student has the ability to design the complex device, system or process in the area of chemical engineering

Social competences

K_K2 - student is concious about the limitations of science and technology related to the ethical and environmental aspects

K-K4 - he/she follows the rules of teamwork; is concious of the responsibility

K_K6 - he/she can think and act in a creative and economic way

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The basis for the grade will be the final report from the course. The report will include the entire project,

while the additional grades will be given for its consecutive parts to monitor the active engagement of students throughout the course. The grades will be given according to point system:

3	50.1 -70.0 points
4	70.1 -90.0 points
5	90.1 -100 points

Programme content

1. Introduction to the technological project (grading system, examples of technological projects).

2. Fundamentals on material and energy balances.

3. Presentation of the flow-diagrams.

4. Description of the instrumentation for chemical process.

5. Introduction of process control.

6. Thermodynamic approach to the chemical reactions.

7. Safety issues and policy during technological process design.

8. Modeling and simulation.

9. Drawing the final technological sheet.

Teaching methods

Projects will include the regular classes on which the theoretical introduction will be given for each of consecutive part of the design project (ca. 1/3 of the total course duration). The majority of the time will be allocated to student's work in teams (teams of 2-3 people). The important part of the course is the assessment of student's work.

Bibliography

Basic

Robin Smith. Chemical Process: Design and Integration (Wiley, 2005).

Fan Shi, Ed. Reactor and Process Design in Sustainable Energy Technology (Elsevier, 2014).

Additional

James G. Speight. Chemical Process and Design Handbook (McGRAW-HILL, 2002).

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	45	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	15	0,5

[1] delete or add other activities as appropriate