

Course title:	Catalytic processes
Institute/Division:	FACULTY OF CHEMICAL ENGINEERING AND TECHNOLOGY
Number of contact hours:	15 hours (15 h seminar)
Course duration:	1 semester (6 th semester of regular I cycle studies - spring)
ETCS credits:	2

Course description:

The course aims at a comprehensive understanding of the catalytic processes in chemical technology. Specific goals include gaining: - an understanding of catalysis basics; - an understanding of basic methods of catalysts preparation and modification; - an understanding of elementary steps in catalysis; - an understanding of theoretical modeling in catalyst design - an understanding of the catalyst characterization; - an understanding of the reaction mechanism during the catalytic processes; - an understanding of role of catalysis in industrial applications; - an understanding principles of catalyst design; - an understanding of catalytic reactors design

Lectures content: Introduction in Catalysis: General Principles of Catalysis, Thermodynamics and kinetics, History of catalysis, Importance of R&D in catalysis, Types of catalytic processes, Process selectivity / Homogeneous Catalysis: Enzymes as catalysts in organic synthesis / Heterogeneous Catalysis: Steps of catalytic reaction, Types of Catalysts: Transition metals, Oxide catalysts, Zeolites, Role of support, Adsorption and Reaction at Solid Surfaces, Mechanisms of catalytic process at surface / Heterogeneous Supported Catalysts / Catalysts characterization methods / Theoretical modeling in the search of prospective catalysts / Heterogeneous Catalytic Reactors / Catalyst Poisonin: / Design of catalytic process for novel chemical technology: Catalysts screening and selecting, Catalyst design principles, Industrial catalysis, Catalysts in Nanotechnology and Chemical Industry, Role of chemists and chemical engineers team work / Recent and future trends in Catalytic Processes: Role of catalysis in an economy.

Education effects :

- knowledge: Student should be able to describe and explain : - the basic methods of the catalyst preparation;
- basic steps and reaction mechanism in catalytic processes; - basic problems in catalytic reactors construction and design; - methods of catalysts characterization;
- skills: Student should be able to explain the different types of reaction mechanisms at catalysts surfaces. Student should be able choose and describe materials preparation for the catalytic processes
- social: -

Literature:	[1] G. Ertl, H. Knözinger, F. Schuth, J. Weitkamp — Handbook of Heterogeneous Catalysis, Weinheim,2008, Wiley-VCH [2] G. Ertl, H. Knözinger, J. Weit — Preparation of Solid Catalysts, Weinheim, 2008, Wiley-VCH
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Assessment method:	Final test
Prerequisites:	none.
Primary target group:	Students from all specialties

Lecturer:	dr hab. Inż. Izabela Czekaj, prof. PK
Contact person:	dr hab. Inż. Izabela Czekaj, prof. PK (e-mail: iczekaj@chemia.pk.edu.pl)

Remarks:	The course is regular
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