STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Surface Phenomena and Catalysis	**1010702211010700632**

Field of study	Profile of study (general academic, practical)	Year /Semester
Chemical Technology	**general academic**	**1 / 1**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Composites and Nanomaterials	**Polish**	**obligatory**

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

No. of hours	No. of credits
Lecture: **30** Classes: **-** Laboratory: **-** Project/seminars: **-**	**4**

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

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**4 100%**
Technical sciences	**4 100%**

Responsible for subject / lecturer:

prof. dr hab. Elżbieta Frąckowiak
email: elzbieta.frackowiak@put.poznan.pl
tel. 616653632
Faculty of Chemical Technology
ul. Berdychowo 4 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	A preliminary knowledge in surface and supramolecular chemistry is required; student should be familiar with nomenclature of interfacial processes (adsorption, absorption, etc.)
2	**Skills**	Student should be communicative in English and should be able to study proposed literature with understanding.
3	**Social competencies**	Student should realize the need of knowledge improvement.

Assumptions and objectives of the course:

The course aims to provide knowledge of preparation, characterization and relevant applications of heterogeneous and homogenious catalysts and enzymes, the development of skills to select proper catalysts for specific processes and methodology of efficiency evaluation of catalysts. Moreover, students will become familiar with interpretation of experimental research results.

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

Knowledge:

1. Student should be familiar with backgrounds of physical chemistry - [K_W02, K_W07]
2. Student should be familiar with backgrounds of material chemistry - [K_W02, K_W07]
3. Student should be familiar with backgrounds of chemical engineering - [K_W02, K_W07]

Skills:

1. Student should be familiar with chemical vocabulary in English - [K_U03]

Social competencies:

1. Student understands the need for further education and improving the personal - [K_K01]
2. Student can cooperate and work in a group, taking different roles - [K_K03]

Assessment methods of study outcomes

Examination tests after lecture.

Course description

Description and explanation of fundamental properties of various solids applied as heterogeneous catalysts. The focus is on interaction between reagent molecules and active centres of catalysts. Students will be introduced to modern spectroscopic techniques applied in characterization of structure and texture of the catalysts, their active centres, adsorbed molecules and interactions between them. Information on preparation of the catalysts and their applications in industry and environmental protection will be included.

Basic bibliography:

1. Hagen, J., Industrial catalysis; a practical approach, Wiley-VCH, Weinheim, 1999.
2. Heiz, U., Landman, U. (Eds.), Nanocatalysis, Springer, 2008

Additional bibliography:

Result of average student's workload

Activity	Time (working hours)
1. Lecture	30
2. Consultations to lecture	20
3. Self-education in the field	20
4. Solving a selected problem	10
5. Consultations to solving problem	10
6. Exam	2

Student's workload

Source of workload	hours	ECTS
Total workload	100	4
Contact hours	60	0
Practical activities	0	0