

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Characterization techniques of materials		Code 1010702221010702659
Field of study Chemical Technology	Profile of study (general academic, practical) general academic	Year /Semester 1 / 2
Elective path/specialty Composites and Nanomaterials	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 15 Classes: 15 Laboratory: 15 Project/seminars: -		No. of credits 3
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 3 100% 3 100%
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	Student should be familiar with basic knowledge about material chemistry. Student should be familiar with instrumental analysis techniques.
2	Skills	Student should be able to communicate in English. Student should be able to self-education.
3	Social competencies	Student should understand the need of self-development.
Assumptions and objectives of the course: Students will become familiar with interpretation of experimental research results in material chemistry.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student knows the most common characterization techniques - [K_W07]		
2. Student knows the procedure of data collecting and interpretation - [K_W02]		
Skills:		
1. Student knows the pathway for selecting appropriate method for material characterization - [K_U09]		
Social competencies:		
1. Student is able to self-education - [K_K01]		
Assessment methods of study outcomes		
Written exam after lectures, seminars and laboratory classes.		
Course description		
Students will become familiar with interpretation of experimental research results and practice writing research reports and working in a team. Upon completion of the course, students will have the basic knowledge and understanding of methods of evaluation of material structure/texture and physicochemical properties of the surface (in particular: XRD, TEM, SEM, nitrogen adsorption, FTIR, UV-VIS, XPS, EPR, TGA, TPD, TPO, TPR, test reactions.		

Basic bibliography:		
1. Materials Characterization Techniques, Sam Zhang, Lin Li, Ashok Kumar, CRC Press, 2008		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Lecture	15	
2. Consultations to lecture	10	
3. Seminar	15	
4. Consultations to seminar	9	
5. Laboratory classes (practice)	15	
6. Consultations to laboratory	10	
7. Exam	1	
Student's workload		
Source of workload	hours	ECTS
Total workload	75	3
Contact hours	74	0
Practical activities	15	0