STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Polymer Chemistry		**1010702211010700506**

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)
Polymer Technology	**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: **45**	Project/seminars: **-**		**5**

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

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**5 100%**
Technical sciences	**5 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge of the basic principles of general, organic, physical chemistry, and chemical engineering. Knowledge of subjects taught at ?Chemical technology ? polymeric materials?.
2	**Skills**	Student knows and applies good practices of laboratory work, is able to operate the scientific equipment. He or she is able to search for information in scientific literature, databases and other properly chosen sources.
3	**Social competencies**	He or she is conscious of the effects of engineering activity

Assumptions and objectives of the course:

Gaining of knowledge in the area of polymerization processes and chemical reactions of polymers on a specialistic level.

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

Knowledge:

1. Student has a well-established and expanded knowledge in the field of methods and mechanisms of synthesis and modification of polymers. - [K_W02, K_W11]

Skills:

1. Student has the ability of analyzing and interpreting of the results of experiments from the area of polymer chemistry. - [-]
2. Student has the ability of presenting the results of laboratory exercises in concise and proper manner - [-]
3. Student is able to choose the synthesis method and the process parameters in order to obtain a polymer with requested properties - [-]

Social competencies:

1. Student is conscious of limitations of science and technology in the area of polymer chemistry, including environment protection. - [-]
2. Student is conscious of limitation of his knowledge and understands the need of further continuous education in area of polymer chemistry. - [-]
3. Students can work in a team and are aware of their responsibility for their work and responsibility for the results of the teamwork - [-]

Assessment methods of study outcomes

Written exam from the area of polymer chemistry, evaluation of laboratory exercises and reports.

Course description

Processes of polymer synthesis and reaction mechanisms.

Thermodynamics of polymerization.

Radical polymerization (initiators, steps of reaction, polymerization kinetics), linear polymerization, polymerization with crosslinking, copolymerization, controlled (?living?) radical polymerization.

Ionic polymerization (anionic, cationic, living). Kinetics of ionic polymerization

Coordination polymerization (process characteristics, catalysts, mechanisms).

Polycondensation (polycondensdation control, kinetics of chain formation, polycondensation of di- and multifunctional monomers, gel point, Flory?s distribution).

Polyaddition

Chemical reactions of polymers, degradation and stabilization of polymers.

Basic bibliography:

1. Chemia polimerów, J. Pielichowski, A. Puszyński , TEZA,, Kraków, 2004

2. Chemia polimerów tom I, . Praca zbiorowa pod red. Z. Floriańczyka i S. Penczka , Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa , 1995

Additional bibliography:

1. Principles of Polymerization, 4-th edition, G. Odian , Wiley-Intersciene:Hoboken, New York, 2004

2. Principles of Polymer Chemistry, 2-nd edition, A.Ravve, Kluver Academic/Plenum Publishers, New York, 2000

Result of average student's workload

Activity	Time (working hours)
1. lecture	30
2. preparation for laboratory	10
3. laboratory	45
4. consultation to laboratory	10
5. exam preparation, exam	30

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	85	0
Practical activities	45	0