

FACULTY of Chemistry

SUBJECT CARD**Name of subject in Polish** Nowoczesne polimery**Name of subject in English** Modern polymers**Main field of study (if applicable):** Advanced Nano and Biomaterials - MONABIPHOT**Specialization (if applicable):****Profile:** academic**Level and form of studies:** 2nd level, full-time**Kind of subject:** obligatory**Subject code** W03ANB-SM2005W**Group of courses** NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30				
Number of hours of total student workload (CNPS)	50				
Form of crediting (Examination / crediting with grade)	Zaliczenie na ocenę				
For group of courses mark (X) final course					
Number of ECTS points	2				
including number of ECTS points for practical classes (P)					
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	1,3				

*delete as not necessary

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of organic chemistry
2. Basic knowledge of either polymer chemistry or material science

SUBJECT OBJECTIVES

- C1 To provide students with basic knowledge of polymers structure.
- C2 To provide students with knowledge of main polymerization mechanisms and techniques as well as chosen methods of chemical modification of macromolecules.
- C3 To acquaint students with the most important groups of modern polymers and methods of their fabrication

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU_W01 student knows the principles of polymer syntheses, relationships between type of polymerization and properties of the final product

PEU_W02 student knows the methods of polymer modification and knows how to give the desired properties to the polymers

...

PROGRAMME CONTENT

Lecture		Number of hours
Lec 1	Program of lecture – basic polymers’ features, differences from low molecular compounds, definitions.	2
Lec 2	Methods of polymer syntheses – relationship between polymerization and properties of final product	2
Lec 3	Suspension polymerization and modification of polymers’ morphology; introduction of polymers to modern organic and analytical chemistry; Solid Phase Synthesis (SPS)	2
Lec 4	Chemical modifications leading to polymeric scavengers and carriers for catalysts	2
Lec 5	Syntheses of High Internal Phase Polymers and related multi-phase polymeric materials	2
Lec 6	Obtaining of thermosensitive polymers displaying Lower Critical Solubility Temperature (properties and applications)	2
Lec 7	Fabrication of semi-synthetic materials. Bio-based polymers revisited (a return to Nature)	2
Lec 8	Polymeric carriers for enzymes	2
Lec 9	Hydrogels syntheses and modifications. and their applications	2
Lec 10	Other methods of polymers’ synthesis - plasma modification – superhydrophobic polymers	2
Lec 11	Making of ‘smart’ fibrous polymers – modern superhydrophobic, modern conducting materials. Electrospinning of multifunctional composite fibers	2
Lec 12	Making of conducting polymers - electropolymerization (poly(acetylenes), poli(pyrroles), poly (tiophenes)	2
Lec 13	Ionic polymers – ionophores; ion-exchangers and their synthesis, modern ion-exchangers and coordinating resins	2
Lec 14	Polymeric analogues of Ionic Liquids – synthesis and applications	2
Lec 15	Synthesis of self-healing polymers	2
	Total hours	30
Classes		Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		

	Total hours	
Laboratory		Number of hours
Lab 1		
Lab 2		
Lab 3		
Project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
...		
	Total hours	
Seminar		Number of hours
Semin 1		
Semin 2		
Semin 3		
...		
	Total hours	
TEACHING TOOLS USED		
N1. PowerPoint presentations		
N2. Scientific literature (is also included on each subject slide)		

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F=P	PEU_W01-W02	test

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

- [1] M. Chanda, S.K. Roy, "Industrial Polymers, Specialty Polymers, and Their Applications", Boca Raton etc., CRC Press/Taylor & Francis Group, 2009.
- [2] F. Mohammad (Ed), "Specialty Polymers: Materials And Applications", I. K. International Pvt Ltd, Anshan Ltd, Tunbridge Wells, 2007.
- [3] papers from the scientific journals provided by the lecturer

SECONDARY LITERATURE:

- [1] R. Barbucci (Ed.), "Hydrogels. Biological Properties and Applications", Springer-Verlag Italia, Milan 2009.
- [2] R.M. Ottenbrite, K. Park, T. Okano (Eds.), "Biomedical Applications of Hydrogels Handbook", Springer Science & Business Media New York, 2010.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

Prof. dr hab. inż. Andrzej Trochimczuk, andrzej.trochimczuk@pwr.edu.pl