

Formularz opisu przedmiotu (formularz sylabusu) – dotyczy studiów I i II stopnia

A. Informacje ogólne (wypełnia koordynator przedmiotu z wyjątkiem pól *Kod przedmiotu, Przyporządkowanie do grupy przedmiotów*).

Nazwa pola		
Course title		Technology of polymer materials
Faculty/Institute		Faculty of Chemistry /Department of Chemical Technology
Programme for which the course is offered		
Course ID		
Erasmus code		13304
Course group		
Didactic cycle		1 M
Type/form of class		Lecture 15 h/semester
Brief course description		Characteristics of polymer materials. Basic terms in polymer chemistry. Production of common polymers in Poland and worldwide. Polymer vs. polymer material large-scale methods of polymer production. Polyethylene types and methods of large-scale production. Reactor types and conditions of synthesis. Polypropylene, polystyrene, poly(vinyl chloride) – methods of synthesis. Stereospecific Ziegler-Natta catalysts. Suspension vs emulsion polymerization. Rheology, Physical and chemical methods of polymer modifications. Processing of thermoplastic polymers, thermo- and chemo setting resins:
Full course description		<p>Topics of the lecture:</p> <ol style="list-style-type: none"> 1. Polymer definition (homopolymer, copolymer, terpolymer) <ol style="list-style-type: none"> 1.1. Basic terms in polymer chemistry: Molecular weight and molecular weight distribution 2. Production of common polymers in Poland and worldwide 3. Polymer and polymer material 4. Polyethylene, characteristics of PE types <ol style="list-style-type: none"> 4.1. Continuous Reactor 4.2. Autoclave reactor <ol style="list-style-type: none"> 4.2.1. HDPE: blown film extrusion, injection, pipes 4.2.2. LLDPE: film 4.2.3. LDPE: film, extrusion with coating 5. Ziegler Natta catalysts and newer concepts 6. Polypropylene <ol style="list-style-type: none"> 6.1.1. Ziegler-Natta catalysts in PP synthesis 7. Polystyrene <ol style="list-style-type: none"> 7.1.1. Polymerization methods (In bulk, suspension and emulsion) 7.1.2. PS types 7.1.3. Copolymers with styrene 8. Poly(vinyl chloride) <ol style="list-style-type: none"> 8.1. Rheological characteristics of polymers. 8.2. Processing of polymers <ol style="list-style-type: none"> 8.2.1. Thermoplastic processing 8.2.2. Chemo setting of polymers 8.2.3. Thermoplastic processing
Prerequisites	Formal prerequisites	Licentiate in chemistry
	other prerequisites	Before the course the student should: – demonstrate basic knowledge of polymer chemistry, – demonstrate skills in scientific literature search and study - know roughly conditions of big scale production
Learning outcomes		After the course the student should: – demonstrate skills in forecasting possible methods of synthesis for given polymers – demonstrate understanding relations between experiment and enlarged scale of production - defines methods of processing of polymers
ECTS credits		2 weeks of work (and presence at the lecture) is sufficient to get 1.5 ECTS points

Assessment methods and criteria	Exam
Type of examination	Skills required to pass the exam: Skills sufficient to pass the exam. To proof the acquired skills the student is obligated to answer questions connected to the main topics of the lecture. Passing the exam means to get > 50% of max. number of points There are approximately 6 open questions of varying difficulty expressed in points of a settled scale (scale 0-20 pts).
Type of course	According to the program of the study the lecture is an optional course in the 1st year of the 2 nd level (M) specially for those who use polymer materials or/and polymer chemistry methods during specialization
Mode of delivery	Multimedia aided lecture. Stimulation to active participation (questions, discussion, digressions to research and scientific problems)
Language of instruction	Polish
Bibliography	Supplementary bibliography: - „Chemia polimerów”, tom I,II,III, praca zbiorowa pod red. Z. Florjańczyka i S. Penczka, Oficyna Wyd. Pol. Warszawskiej, 1995-98. - J. Pielichowski i A. Puszyński Technologia tworzyw sztucznych”, WNT, Warszawa 2003. - Nicholson J. W., Chemia polimerów WNT, Warszawa 1996.
Work placement(s)	Lecture room
Course coordinator	dr hab. Inż. Andrzej Kaim
Academic teachers	dr hab. Inż. Andrzej Kaim
Remarks	

B. Informacje szczegółowe (wypełnia prowadzący zajęcia, z wyjątkiem pól: *Limit miejsc w grupie, Terminy odbywania zajęć, Miejsce odbywania zajęć* – pola te prowadzący zajęcia wypełnia w porozumieniu z administracją).

Nazwa pola	
Name of the academic teacher	Andrzej Kaim
Academic degree	PhD, Ing.
Form of the class	lecture
Learning outcomes	After the course the student should: – demonstrate skills in forecasting possible methods of synthesis for given polymers – is able to determine conditions for planned synthesis of given polymer - - - demonstrate skills in analysis of applicability of a given polymer and its relations with the method of synthesis
Assessment methods and criteria for this course	Passing the exam means to get > 50% of max. number of points There are approximately 6 open questions of varying difficulty expressed in points of a settled scale (scale 0-20 pts).
Type of examination	Witten exam
A list of topics	<ol style="list-style-type: none"> 1. Polymer definition (homopolymer, copolymer, terpolymer) <ol style="list-style-type: none"> 1.1. Basic terms in polymer chemistry: Molecular weight and molecular weight distribution 2. Production of common polymers in Poland and worldwide 3. Polymer and polymer material 4. Polyethylene, characteristics of PE types <ol style="list-style-type: none"> 4.1. Continuous Reactor 4.2. Autoclave reactor <ol style="list-style-type: none"> 4.2.1. HDPE: blown film extrusion, injection, pipes 4.2.2. LLDPE: film 4.2.3. LDPE::film, extrusion with coating 5. Ziegler Natta catalysts and newer concepts 6. Polypropylene <ol style="list-style-type: none"> 6.1.1. Ziegler-Natta catalysts in PP synthesis 7. Polystyrene <ol style="list-style-type: none"> 7.1.1. Polymerization methods (In bulk, suspension and emulsion) 7.1.2. PS types 7.1.3. Copolymers with styrene 8. Poly(vinyl chloride) <ol style="list-style-type: none"> 8.1. Rheological characteristics of polymers. 8.2. Processing of polymers <ol style="list-style-type: none"> 8.2.1. Thermoplastic processing 8.2.2. Chemosetting of polymers 8.2.3. Thermoplastic processing
Learning activities and teaching methods	Multimedia aided lecture. Stimulation to active participation (questions, discussion, digressions to research and scientific problems)

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Limit of places available	
Time	
Place	