

<b>Course title</b> Wykład monograficzny - Zielone technologie/ Monographic lecture - Green technology		<b>ECTS code</b> 13.3.1030	
<b>Name of unit administrating study</b> Faculty of Chemistry			
<b>Studies</b>			
<b>Field of study</b>	<b>Type</b>	<b>Form</b>	
Chemical business	Masters	Full-time studies	
<b>Teaching staff</b> Prof. dr hab. Ewa Siedlecka			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b> 3	
<b>A. Forms of classes, in accordance with the UG Rector's regulations</b> lecture		classes - 30 h tutorial classes – 10 h student's own work – 35 h	
<b>B. The realization of activities</b> in-class learning		Total: 75 h - 3 ECTS	
<b>C. Number of hours</b> 30 h lecture			
<b>The academic cycle</b> 2020/21 winter semester			
<b>Type of course</b> obligatory		<b>Language of instruction</b> Polish	
<b>Teaching methods</b>  Lecture with multimedia presentation Case study lecture		<b>Form and method of assessment and basic criteria for evaluation or examination requirements</b>	
		<b>A. Final evaluation, in accordance with the UG study regulations</b> course completion (with a grade)	
		<b>B. Assessment methods</b>  Oral test	
		<b>C. The basic criteria for evaluation or exam requirements</b>  grade criteria in accordance with the UG Studies Regulations	
<b>Required courses and introductory requirements</b> basics of general chemistry			
<b>Aims of education</b>  Acquiring knowledge about principles of green technology, sustainable development and chemical safety in industry Familiarization with unconventional reactions, alternative reagents and reaction media in technological processes			
<b>Course contents</b> The philosophy of green chemistry, the principles of green technology. The concept of sustainable development. Chemical safety in industry. Green technologies in organic synthesis: new types of reactions, advanced catalytic processes, alternative reagents and reaction media. Biomass as a substrate in organic synthesis. Ionic and fluoro liquids as modern solvents and reagents. Reactions without solvents. New ways of carrying out the reaction. Electrochemical reactions - the use of new electrode materials. Fuel cells. Photochemical reactions. Synthesis supported by microwave radiation. Reactions supported by acoustic waves. Examples of eco-investments in the chemical and food industry, industrial waste technologies and hazardous substances			
<b>Bibliography of literature</b>			
<b>A. Literature required to pass the course</b>			
1. Burczyk B. Zielona Chemia, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2006			
2. Lewandowski W.M. Proekologiczne źródła energii odnawialnej, WNT W-wa 2001			
3. Gradziuk P., Kowalczyk K., Kościuk B., Biopaliwa, Wydawnictwo Wieś Jutra 2002r.			
<b>B. Extracurricular readings</b>			

**Knowledge**

Student:

1. lists and defines the concepts of green technology, sustainable development, eco-development, eco-innovation, etc.
2. discusses alternative ways of chemical reaction
3. explains the concept of alternative reagents and reactionary media
4. explains the catalysis process
5. lists examples of green technologies in the chemical, food and environmental industries

**Skills****Social competence**

Student:

- understands the importance of further education
- is aware of the dangerous caused by degradation of the natural environment and understand the importance of the improving technology.