

<b>Study Programme:</b> Chemistry			
<b>Course Unit Title:</b> Microwaves in Green Chemistry			
<b>Course Unit Code:</b> IHO-405			
<b>Name of Lecturer(s):</b> Assistant professor Ljubica Grbović			
<b>Type and Level of Studies:</b> Bachelor Academic Studies			
<b>Course Status (compulsory/elective):</b> Elective			
<b>Semester (winter/summer):</b> Summer			
<b>Language of instruction:</b> English			
<b>Mode of course unit delivery (face-to-face/distance learning):</b> Face-to-face			
<b>Number of ECTS Allocated:</b> 6			
<b>Prerequisites:</b> None			
<b>Learning objectives</b> The acquisition of basic theoretical knowledge in the field of microwave dielectric heating as well as the effects of microwave radiation and microwaves importance in various fields of chemistry, biochemistry and medical nanoparticles. Qualifying students for selecting the appropriate microwave methodology and techniques.			
<b>Learning outcomes</b> After completing this course the student is able to: demonstrate basic experimental and theoretical knowledge in the field of microwave technology and methodology; independently select, plan and carry out experiments; successfully analyze and interpret the results of experiments; developing in the direction of the microwave catalyzed organic synthesis.			
<b>Syllabus</b> <i>Theoretical instruction</i> The nature of the microwave radiation. The effects of temperature, pressure and reaction medium in the microwave catalyzed reactions. Application and importance of microwaves in green chemistry: organic reactions with and without the presence of the solvent, the use of phase transfer catalyst and an open or closed systems. <i>Practical instruction</i> Performing the reactions in the microwave CEM Discover BanchMate microwave reactor with previous optimization of the reaction conditions (choice of the reaction medium, temperature, catalyst, performing the reaction at atmospheric or elevated pressure).			
<b>Required Reading:</b> 1. C. O. Kappe, D. Dallinger, S. S. Murphree: Practical Microwave Synthesis for Organic Chemists: Strategies, Instruments, and Protocols, Wiley-VCH Verlag GmbH & Co. KgaA, Weinheim, 2009. 2. M. Larhed, K. Olofsson: Microwave methods in organic synthesis, Springer-Verlag Berlin Heidelberg 2006. 3. A. Loupy: Microwaves in Organic Synthesis, Wiley-VCH Verlag GmbH & Co. KgaA, Weinheim, 2002.			
<b>Weekly Contact Hours:</b> 75	<b>Lectures:</b> 45		<b>Practical work:</b> 30
<b>Teaching Methods:</b> Lectures and practical problem solution			
<b>Knowledge Assessment (maximum of 100 points):</b> 100			
<b>Pre-exam obligations</b>	points	<b>Final exam</b>	points
Activity	5	Tests	70
Experimental work	20	Written exam	(70)