Study Programme: Master Academic Studies in Chemistry

Course Unit Title: Microwave Organic Synthesis

Course Unit Code: IHO-502

Name of Lecturer(s): Assistant professor Ksenija Pavlović

Type and Level of Studies: Master of Science Degree

Course Status (compulsory/elective): Elective

Semester (winter/summer): Winter

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 6

Prerequisites: None

Course Aims:

Acquiring knowledge about the microwave catalyzed reactions in organic synthesis, enabling students to apply the microwave methodology in organic synthesis, self-planning and execution of the microwave synthesis and critical analysis of the results.

Qualifying for independent learning and further professional development.

Learning Outcomes:

Students should be able to demonstrate advanced knowledge and understanding of microwave organic synthesis; choose, plan, design and conduct microwave organic synthesis; accurately and clearly record, analyze and interpret the results with risk assessment and environmental impact; successfully communicate with professionals in the same or another scientific field or discipline; plan further professional development.

Syllabus:

Theory

Theory of microwave radiation, conduction and dipolar polarization mechanism. The effect of microwaves on the heating, acceleration and yields of synthetic processes. Specific microwave effects. Microwave household oven and microwave reactors. Basic techniques of microwave synthesis: the reaction in the absence of solvent, phase-transfer catalysts, synthesis on inorganic supports. Water as a solvent, non-polar solvents and ionic solvents. Microwave synthesis in closed and open systems.

Practice

Selected synthesis on a small scale in open and closed system microwave reactor CEM Discover Bench Mate.

Required Reading:

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. A. Loupy: Microwaves in Organic Synthesis, Wiley-VCH Verlag GmbH & Co. KgaA, Weinheim, 2002.

Weekly Contact Hours:	**Lectures:** 2	**Practical work:** 3

Teaching Methods:

Lectures, laboratory work, desk study projects, seminar

Knowledge Assessment (maximum of 100 points): 100

Pre-exam obligations	points	**Final exam**	points
Active class participation	5	written exam	50
Practical work	15		
Preliminary exam(s)	10	…….	
Seminar(s)	20		