

Course title:	Modern methods of synthesis
Institute/Specialty:	FACULTY OF CHEMICAL ENGINEERING AND TECHNOLOGY / Chair of Biotechnology and Physical Chemistry
Number of contact hours:	15 hours (lectures)
Course duration:	1 semester
ETCS credits:	2
Course description:	The course allows the students expanding knowledge on modern methods of chemical synthesis, microwave radiation, ultrasound, mechanochemistry. Understanding possibilities of operation and scaling of microwave, ultrasonic and mechanochemical applicators and devices. Acquisition of the ability to select the method of chemical synthesis and planning the service of units using microwave radiation, ultrasound, mechanochemistry.
Lectures content:	<p>Microwave irradiation - characteristics, interaction with matter - liquids, solids - parameters determining the absorption of radiation. Devices used to generate microwave radiation - magnetrons, applicators, waveguides, chambers, mineralizers and reactors. Scaling of microwave devices and applicators. Examples of using industrial microwave radiation.</p> <p>Ultrasound - characteristics, interaction with matter - liquids, solids - cavitation observations. Devices used to generate ultrasound - applicators, chambers and reactors. Examples of joint use of ultrasound and microwave radiation.</p> <p>Mechanochemistry - principles and examples of devices for conducting chemical reactions.</p> <p>Scaling of ultrasonic devices. Intensification of chemical processes and container "factories".</p>
Literature:	<p>[1] D. Bogdal, M. Galica, <i>Introduction to Microwave Chemistry</i> in: <i>Microwave Engineering of Nanomaterials</i>, Stanford Publishing, 2016, Stanford, USA.</p> <p>[2] Muthupandian Ashokkumar et al., <i>Handbook of Ultrasonics and Sonochemistry</i>, Springer, 2016, Singapore.</p> <p>https://link.springer.com/referencework/10.1007/978-981-287-278-4#toc</p>
Assessment method:	Final test
Prerequisites:	Student should have basic knowledge of organic chemistry
Primary target group:	all specialties students (Chemical Engineering / Chemical Technology)
Lecturer:	Prof. Dariusz Bogdał
Contact person:	Prof. Dariusz Bogdał (dariusz.bogdal@pk.edu.pl)
Deadline for application:	15th of January for students applying for spring semester
Remarks:	The course is selectable