

Study Program: Pharmaceutical engineering
Course Unit Title: Delivery systems in cosmetic and pharmaceutical industries
Course Unit Code: DSFI02
Name of Lecturer(s): Associate professor Lidija Petrović, Assistant professor Jadranka Fraj
Type and Level of Studies: Doctor Academic Degree
Course Status (compulsory/elective): Elective
Semester (winter/summer): Summer
Language of instruction: English
Mode of course unit delivery (face-to-face/distance learning): Face-to-face
Number of ECTS Allocated: 10
Prerequisites: None
<p>Course Aims:</p> <p>Introducing students with modern forms of active substance carriers in pharmaceutical and cosmetic products, their structure, formation conditions, specificities, manner of application and action.</p>
<p>Learning Outcomes:</p> <p>Acquisition of theoretical bases and skills in the field of active substance carriers, necessary for the creation of cosmetic and pharmaceutical products with prolonged and/or controlled delivery. Training of students for independent selection of pharmacologically active substance carriers and cosmetically active substances suitable for incorporation into modern forms of drugs and formulations of active cosmetic preparations – cosmeceuticals.</p>
<p>Syllabus:</p> <p><i>Theory</i></p> <p>Systems used as carriers of active substances in cosmetics and pharmacy. Selection of emulsifiers, co-emulsifiers, polymers, proteins, molecular complexes and other materials suitable for particular types of carriers. Active substances and selection of the appropriate carrier. Theoretical basis for the formation and action of certain active carriers: micelles, liquid crystals, solubilizers, emulsions, multiple emulsions, micro emulsion, gel emulsions, nano emulsions, micro and nano capsules, liposomes, niosomes, various molecular complexes, hydrogels and polymer particles. Physicochemical characteristics of individual carriers and methods of characterization. The release profile of active substances, methods, equations. Stability, biocompatibility, possible interactions with other system components. Biodegradation. Path and mechanism of action. Contemporary forms of cosmetic products based on active substance carriers.</p> <p><i>Practice</i></p> <p>Review of scientific and professional literature, processing, analysis and discussion of the latest knowledge in the area within the seminar paper.</p>
<p>Required Reading:</p> <ol style="list-style-type: none"> 1. M. Rosen, Delivery system Handbook for Personal Care and Cosmetic Products, W.A.P. 2005. 2. E. Mathiowitz, Encyclopedia of Controlled Drug Delivery, Wiley & Sons, 1999. 3. S. Benita, Microencapsulation, Methods and Industrial Applications, Marcel Dekker, 1996. 4. M. Malmsten, Surfactant and Polymers in Drug Delivery, M. Dekker, 2002.

Weekly Contact Hours:	Lectures: 4	Practical work: 2	
Teaching Methods: Interactive lectures or consultations, depending on the number of students.			
Knowledge Assessment (maximum of 100 points): 100			
Pre-exam obligations	points	Final exam	points
Active class participation	-	written exam	-
Practical work	-	oral exam	60
Preliminary exam(s)	-	
Seminar(s)	40		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			