



УНИВЕРЗИТЕТ У БАЊОЈ ЛУЦИ
UNIVERSITY OF BANJA LUKA
ПРИРОДНО-МАТЕМАТИЧКИ ФАКУЛТЕТ
FACULTY OF NATURAL SCIENCES AND MATHEMATICS



CHEMISTRY DEPARTMENT

PhD STUDIES

Course name	Chemical Formulation and Characterization of Drug Delivery Systems			
Course code	Course status	Semester	Hours of instruction	ECTS
DHEM23HFL	elective	I or IV	5+0	10
Teacher(s)	Prof. Milan Antonijević, PhD			

Prerequisite course(s)	Entry requirements
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Course goals
The aims of this module are to: <ul style="list-style-type: none">• Train students to formulate and characterize semisolid systems for drug delivery.• Equip students with the knowledge about principles behind the successful formulation of semisolid drug delivery systems for cosmetic applications.• Provide further skills related to the analysis of semisolid systems which should include, but not be limited to rheology, texture analysis, drug penetration through the skin (Franz cells), spreadability, transepidermal water loss (TEWL)

Learning outcomes
After the successful completion of studies, students will be able to: <ul style="list-style-type: none">• Critically evaluate the role of different ingredients used for the formulation of creams and gels• Independently suggest, prepare, and characterize semisolid formulation• Systematically analyze experimental data and propose further steps in product development and/or additional analytical investigation.

Course content
Semi-solid formulations. Formation of emulsions. Oil in water (O/W) and water in oil (W/O) emulsion systems. Micro and nanoemulsions. Formation of stable emulsions and the role of emulsifier in the formation of a stable emulsion. Determination of the pH, viscosity, and stability of emulsions. Newtonian and non-Newtonian liquids. Rheological assessment – determination of viscosity, viscoelastic region, and complex viscosity. Textural properties of the product, Transepidermal water loss (TEWL). <i>In-vitro</i> determination of drug penetration through the skin using Franz Cells. Use of cadaver skin in transdermal research.

Teaching methods
Lectures, Experimental work

Books and other learning materials
Transdermal Drug Delivery Systems: Revised and Expanded (Drugs and the Pharmaceutical Sciences) 2nd Edition, Richard H. Guy, Jonathan Hadgraft, 2002, CRC Press, ISBN: 9780824708610 Delivery System Handbook for Personal Care and Cosmetic Products: Technology, Applications, and Formulations (Personal Care and Cosmetic Technology), Meyer Rosen, 2006, William Andrew, ISBN: 0815515049, 9780815515043 The Rheology Handbook: 4th Edition, Thomas G. Mezger, 2019, Vincentz Network, ISBN: 3866308426, 9783866308428

Course activities and grading method			
Oral exam			
Experimental work	30	Final exam	60
Attendance	10		

Additional course notes

Name of the teacher who prepared this form	Milan Antonijević
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