

## COURSEOUTLINE

### (1) GENERAL

<b>SCHOOL</b>	SCHOOL OF HEALTH AND CARE SCIENCES		
<b>ACADEMICUNIT</b>	BIOMEDICAL SCIENCES- AESTHETICS AND COSMETIC SCIENCE		
<b>LEVELOFSTUDIES</b>	UNDERGRADUATE		
<b>COURSECODE</b>	<b>6011-6012</b>	<b>SEMESTER</b>	6
<b>COURSETITLE</b>	EFFICACY OF COSMETIC PRODUCTS		
<b>INDEPENDENTTEACHINGACTIVITIES</b> <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>	
Lectures	3		
Laboratory exercises	3		
		7	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSETYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	SC		
<b>PREREQUISITECOURSES:</b>	NO		
<b>LANGUAGEOFINSTRUCTIONand EXAMINATIONS:</b>	GREEK		
<b>ISTHECOURSEOFFEREDTO ERASMUSSTUDENTS</b>	YES		
<b>COURSEWEBSITE(URL)</b>	<a href="https://bisc.uniwa.gr/course/apotelesmatikotitakallyntikon-proionton/">https://bisc.uniwa.gr/course/apotelesmatikotitakallyntikon-proionton/</a> <a href="https://eclass.teiath.gr/courses/AISTH104/">https://eclass.teiath.gr/courses/AISTH104/</a> <a href="https://eclass.teiath.gr/courses/AISTH117/">https://eclass.teiath.gr/courses/AISTH117/</a> <a href="https://ocp.teiath.gr/courses/AISTH_UNDE104/">https://ocp.teiath.gr/courses/AISTH_UNDE104/</a> <a href="https://ocp.teiath.gr/courses/AISTH_UNDE105/">https://ocp.teiath.gr/courses/AISTH_UNDE105/</a>		

### (2) LEARNINGOUTCOMES

#### Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area
- Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

The aim of the course is to teach students the physicochemical methods used to evaluate the effectiveness of cosmetic products and their correlation with the proof of the claims made on cosmetic products.

The aim of the course is to acquaint students with the main biophysical methods used to evaluate the effectiveness of cosmetic products and to enable them to prepare protocols, conduct and evaluate effectiveness studies – claim substantiation according to international clinical practice and international guidelines.

**Learning Outcomes:**

After the end of the course students will be able to:

- To know the basic principles of designing and conducting cosmetic efficacy studies in volunteers in accordance with the international clinical practice (GCP).
- To know the basic principles of the methods (sensory and biophysical) used for the evaluation of the effectiveness of cosmetic products with emphasis on the evaluation studies of the skin protection from ultraviolet radiation and the intra / transdermal absorption studies.
- To know the physicochemical methods for quantification of the biophysical parameters of the skin such as elasticity, hydration of stratum corneum, etc.
- Evaluate the results of effectiveness studies
- Compare the effectiveness of products that "carry" the same claim of action.
- Compare effectiveness evaluation methods for the same action
- Design, organize and conduct studies on the effectiveness of cosmetic products with sensory and biophysical methods, in vivo, in vitro and ex vivo in accordance with international good practice.

**General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

*Search for, analysis and synthesis of data and information, with the use of the necessary technology  
Adapting to new situations  
Decision-making  
Working independently  
Team work  
Working in an international environment  
Working in an interdisciplinary environment  
Production of new research ideas*

*Project planning and management  
Respect for difference and multiculturalism  
Respect for the natural environment  
Showing social, professional and ethical responsibility and sensitivity to gender issues  
Criticism and self-criticism  
Production of free, creative and inductive thinking  
.....  
Others...  
.....*

Working independently, Team work, Working in an interdisciplinary environment, Working in an international environment, Decision making during laboratory practice, Respect for the natural environment, Production of creative and inductive thinking

### 3. SYLLABUS

#### Theory

1. Effectiveness study assays-Study design and organization. Efficacy study writing. Proof of claims. Legislation to substantiate claims in the European Union. Sensorial and biophysical studies. In vivo, in vitro and ex vivo efficacy studies.
2. Analysis of skin surface topography-Analysis of lines, pores, texture. (Optical and Laser Profilometry). Applications and comparison of imaging methods with each other. Evaluation of cell-promoting substances and anti-aging cosmetics.
3. Determination of stratum corneum hydration-Efficiency of moisturizing products. Electrical methods, Absorption of infrared radiation.
4. Determination of transdermal water loss - Evaluation of moisturizing products but also of products that damage the lipid-epidermal barrier. Open and closed chamber method.
5. Physicochemical principles of the sebum determination method of the skin and scalp - Evaluation of sebum regulating products.
6. In vivo methods for the determination of skin melanin. Spectrophotometry in the determination of melanin. Evaluation of whitening cosmetics and dermatological products for vitiligo. In vitro methods for the evaluation of skin whiteners. Biophysical methods for evaluating erythema and effectiveness of anti-inflammatory cosmetics.
7. Skin pH quantification. Effect of cosmetic cleansers on skin pH. Evaluation of cleaning products. Model SPM (Sebum-pollution model, SPM).
8. Physicochemical principles of the method for determining skin elasticity. Evaluation of topical healing products and anti-aging treatments.
9. Use of ultrasound in the evaluation of products to increase skin collagen (anti-aging and healing) and skin hydration. Use of ultrasound to evaluate nail strengthening products.
10. Evaluation of exfoliating products. Dansyl chloride method - keratinocyte collection strips - UV lamp.
11. Electron permeability (TEM) and scanning (SEM) electron microscopy, spectroscopic and mechanical methods for evaluating the effectiveness of hair cosmetics. Differential scan calorimetry for hair repair products. Angular photometry for the evaluation of brightness and color.
12. In vivo evaluation of the effectiveness of a sunscreen product for ultraviolet B radiation: Method of measurement using a solar simulator of the Sun Protection Factor, SPF. In vitro methods
13. Evaluation of the effectiveness of a sunscreen product for ultraviolet A radiation (UVA protection factor). In vivo and in vitro methods. Critical wavelength method.
14. Evaluation of effectiveness of antiperspirants and deodorants. High performance liquid chromatography and gas chromatography applications in combination with mass spectroscopy.
15. In vitro and in vivo methods for the evaluation of transdermal absorption of the ingredients contained in cosmetic and topical products. Structure-action relations. Effect of lipophilicity. In silico models of the effect of lipophilicity on percutaneous absorption. Methods for the determination of lipophilicity of bioactive ingredients and excipients.
16. Skin equivalents and application in the evaluation of the effectiveness of cosmetics and dermal products.

### **Laboratory exercises**

1. Measurement of transdermal water loss by the closed chamber method after the use of degreasing agent. Diagram construction-interpretation.
2. Measurement of transdermal water loss by the closed chamber method after the use of a factor that strengthens the lipid-epidermal barrier. Diagram construction-interpretation.
3. Determination of skin color (Pigment darkening-Evaluation of whitening products after two months of application).
4. Determination of skin hydration after a certain time of application of O / W and W / O cosmetic cream. (Evaluation of moisturizing products). Diagram construction-interpretation-comparison.
5. Measurement of skin sebum with a sebumeter (Evaluation of sebum regulating products). Skin sebum measurement using sebum collection strips. Recording and evaluation of results.
6. Scalp sebum measurement with a sebumeter (Evaluation of sebum regulating shampoos).
7. Identification and imaging of skin exfoliation (Evaluation of moisturizing products). Measurement and imaging of scalp exfoliation (Evaluation of anti-dandruff products). Use of keratinocyte collection films - UVA photography.
8. Skin pH measurement. Effect of cleansing soap and liquid cleanser on skin pH. Measurement of pH at regular intervals after application. Diagram construction. Comparison.
9. Determination of skin elasticity. Evaluation of anti-aging products. Evaluation of healing products.
10. Measurement and imaging of skin microtopography with the method of optical permeability profilometry. 3D copy making. (Evaluation of anti-wrinkle products).
11. Measurement and imaging of skin microtopography with the method of UVA scanning (Evaluation of anti-wrinkle products).
12. Measurement of the Sun Protection Factor (SPF) and critical wavelength in vitro with ultraviolet spectrophotometer (Evaluation of sunscreen products).
13. Determination of lipophilicity of a mixture of preservatives (parabens) with high performance liquid chromatography. In silico prediction of percutaneous absorption.
14. Determination of lipophilicity of a mixture of preservatives (parabens) by the shake flask method in an octanol-water system. In silico prediction of percutaneous absorption.
15. Determination of percutaneous absorption by Franz cells and high performance liquid chromatography. Use of skin equivalents.

#### 4. TEACHING and LEARNING METHODS-EVALUATION

<p><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	Face-to face	
<p><b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	Use of ICT teaching, e-class exercises, laboratory education, communication with students	
<p><b>TEACHING METHODS</b> <i>The manner and method of teaching are described in detail.</i> <i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	<i>Activity</i>	<i>Semester workload</i>
	Lectures	120
	Team, independently laboratory practice- presentation and processing of experimental results	90
Course total	120	
<p><b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p><b>THEORY-LECTURES</b> Greek language Final written examination: multiple choice questionnaires, short-answer questions, True or False questions, problem solving (100%) Or Final written examination: A) multiple choice questionnaires, short-answer questions, True or False questions, problem solving (70%) and B) Presentation of team work (30%) Criteria are given</p> <p><b>LABORATORY EXERCISES</b> Greek language 1. Written work, essay/report per laboratory exercise (30%) 2. Written examination in the laboratory exercise of the day (35%) 3. Final written examination: Multiple choice questionnaires, short-answer questions, True or False questions, problem solving (35%) Criteria are given</p>	

#### 4. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. Varvaresou A., Specific Cosmetic Science, ISBN 9786188397309 Vasiliadis SA, 2018.
2. Schrader K. and Domsch A. Cosmetology-Theory and Practice. Verlag für chemische Industrie. H. Ziolkowsky GmbH, Augsburg, 2005.
3. \_Elsner P and Merch H.F. Cosmetics: Controlled Efficacy Studies and Regulation ISBN-13: 978-3642641602, Springer, 2013.
4. Fluhr J.W. Practical Aspects of Cosmetic Testing: How to Set up a Scientific Study in Skin Physiology, Springer, 2011.

5. Aust L. Cosmetic claims substantiation ISBN-13: 978-0824798550, Taylor and Francis, 1998.

- Related academic journals: International Journal of Cosmetic Science, Journal of Cosmetic Dermatology, International Journal of Cosmetic Science