

COURSE OUTLINE

(1) GENERAL

SCHOOL	HEALTH AND CARE SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF BIOMEDICAL SCIENCES		
LEVEL OF STUDIES	UNDERGRADUATE STUDIES		
COURSE CODE	6031-6032	SEMESTER	6th
COURSE TITLE	Quality Control of Cosmetic Products		
INDEPENDENT TEACHING ACTIVITIES <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>	WEEKLY TEACHING HOURS	CREDITS	
Teaching & Laboratory	6 (3 T +3 L)	7	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Compulsory / Qualification		
PREREQUISITE COURSES:	Cosmetic Science I		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	http://www.teiath.gr/userfiles/vgardiki/perigrammataneo.pdf https://eclass.teiath.gr/modules/auth/opencourses.php?fc=96, https://eclass.teiath.gr/courses/AISTH142/		

(2) LEARNING OUTCOMES

<p>Learning outcomes</p> <ul style="list-style-type: none"> ➤ <i>The aim of the course is to teach the basic methods of quality control - analysis of cosmetics and topical products on the skin, their active ingredients, commonly used excipients of possible impurities and substances banned for cosmetic products.</i> ➤ <i>Target of the course is for students to understand the increased demands on quality control and production assurance of cosmetics and topical application products on the skin in accordance with the guidelines of International Organizations, the National Medicines Agency and the European Union.</i> ➤ <i>Learning Outcomes: After the end of the course students will be able to know:</i> <ul style="list-style-type: none"> ✓ <i>The increased requirements in the level of quality control and quality assurance of cosmetics in the European area</i> ✓ <i>The basic preparation methods required for the separation and quantification of the active ingredients and excipients of cosmetic products in various cosmetic forms</i> ✓ <i>The physicochemical analytical methods of identification of raw materials</i> ✓ <i>The analytical methods (mainly instrumental analysis) for the quantitative determination and identification of ingredients, excipients, impurities</i> ✓ <i>The identification methods of the chemical structure</i> ✓ <i>The methods of microbiological control of raw materials, containers, semi-finished and finished cosmetic products and medicinal products of local application on the skin as recommended by the Pharmacopoeia.</i> ✓ <i>To investigate and solve stability problems of raw materials and finished products</i> ✓ <i>To develop and validate methods of instrumental analysis</i>
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General Competences

Autonomous work, Group work, work in an interdisciplinary environment, work in an international environment, Production of new research ideas, Demonstration of social, professional and moral responsibility. Respect for the natural environment, promotion of free, creative and inductive thinking.

(3) SYLLABUS

Theoretical Part of the Course

1. Physicochemical methods for the identification and existence of impurities of raw materials. Refractive index, Density, Melting point, etc.
2. Classification of analytical methods based on: a) the analysis applications and b) the measured property of the sample. Classical and instrumental methods of analysis. Errors of Analytical methods and devices. Characteristics of analytical methods Accuracy, Sensitivity, etc. Validation of analytical method.
3. Preparation of samples of cosmetic products and topical products for analysis: Emulsified products, Shampoos, Lipsticks. Liquid-liquid extraction and solid phase extraction.
4. Ultraviolet-visible spectrophotometry, Differential spectrophotometry, Applications in cosmetics-Paints-Sunscreens, Tanning products with dihydroxy-acetone, Bleaching cosmetics.
5. Infrared (IR) spectroscopy, Fourier Transform (FT-IR), Application to topical skin products.
6. Atomic spectrophotometry, Emission spectrophotometry, Atomic absorption spectrophotometry, Ignition spectrophotometry, Atomic absorption spectrophotometry-Applications in cosmetics-Determination of lead in lipstick and lipstick. Atomic emission flame spectrophotometry.
7. Principles of mass spectroscopy-Applications for the identification of cosmetic raw materials and the determination of impurities.
8. Chromatography. Classification according to the physicochemical phenomenon and the static phase. Paper Chromatography-Development Techniques-Appearance Methods, Applications in cosmetic products e.g. Essences
9. Thin layer chromatography-Development-Appearance-Comparison with paper chromatography
10. High Performance Liquid Chromatography, Columns, Detector Types-Comparison. Applications in the separation of active ingredients and excipients e.g. preservatives. Electrochemical detection of antioxidants used in cosmetics.
11. Combination of Liquid chromatography with mass spectroscopy. Identification.
12. Gas chromatography and application to flavorings. Gas chromatography and in combination with mass spectroscopy-Detection and identification of prohibited substances in oxidative dyes.
13. Basic principles of nuclear magnetic resonance-Structure identification.
14. Microbiological control of raw materials and containers. Microbiological control of semi-finished and finished cosmetic products according to the European Pharmacopoeia

Laboratory part of the lesson

1. Determination of refractive index in a final product - finding a relative ratio of oil contents in massage products and raw material (Comparison - identification)
2. Determination of density in a final product. Finding a relative ratio in water / alcohol mixtures (water-alcoholic lotion).
3. Quality control of final product: Emulsion stability test (centrifugation, microscope observation), emulsion type control, viscosity control, microscopic control (dispersion, stability, micelle size control)
4. Identification of sunscreen by UV spectroscopy-Quantification of sunscreen-Calibration curve. Identification of sunscreen and determination of specific absorption
5. Emulsion formulation: a) with organic sunscreen and b) placebo. Preparation of emulsions, isolation of

sunscreen, and quantification of sunscreen by UV spectrophotometry

6. Determination of anti-dandruff agent in shampoo
7. Simultaneous determination of parabens by thin layer chromatography
8. Simultaneous detection of parabens in a cosmetic product by high performance liquid chromatography with ultraviolet detector
9. Quantification of preservatives in a cosmetic product by high performance liquid chromatography with an ultraviolet detector.
10. Liquid chromatographic determination of lipoic acid in an emulsified product with an electrochemical detector
11. Determination of hydrogen peroxide in an oxidizing emulsion for hair dye by titration with potassium permanganate
12. Liquid chromatographic separation in a cosmetic product of organic sunscreens with an ultraviolet detector.
13. Determination of relative proportion of surfactants by IR spectroscopy in shampoos and identification of raw materials
14. Quantification of fluoride in toothpaste with selective fluoride electrode

(4) TEACHING and LEARNING METHODS - EVALUATION

<p>DELIVERY <i>Face-to-face, Distance learning, etc.</i></p>	Lectures in the classroom	
<p>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	Support of learning process through e-class in the theoretical and laboratory part, Questions-exercises-answers through e-class	
<p>TEACHING METHODS <i>The manner and methods 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>	Activity	Semester workload
	Lectures	80
	Group autonomous laboratory work-presentation and processing of experimental results	50
	Excursion	10
	Independent study	70
Course total	210	
<p>STUDENT PERFORMANCE EVALUATION <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>THEORETICAL PART Greek language Multiple choice, development, characterization of sentences as Correct or Incorrect, problem solving (100%)</p> <p>LABORATORY PART Greek language</p> <ol style="list-style-type: none"> 1. Delivery of sheets of experimental results per laboratory exercise (30%) 2. Written exams in the laboratory exercise of the day (35%) 3. Final written examination: Multiple choice, development, characterization of sentences as Correct or Incorrect, problem solving (35%) 	

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. Βαρβαρέσου Α. και Ιακώβου Κ. Σημειώσεις Ποιοτικού Ελέγχου Καλλυντικών Προϊόντων, Αθήνα 2018
2. Βαρβαρέσου Α., Παπαγεωργίου Σ., Μέλλου Φ. και Ιακώβου Κ. Εργαστηριακές Ασκήσεις Ποιοτικού Ελέγχου Καλλυντικών Προϊόντων, Αθήνα 2017
3. Watson D.G. Φαρμακευτική ανάλυση 978-960-583-038-0, ΕΠΙΣΤΗΜΟΝΙΚΕΣ ΕΚΔΟΣΕΙΣ ΠΑΡΙΣΙΑΝΟΥ ΑΕ, 2014.

- Related academic journals:

1. González Z.L. Percutaneous Absorption of UV Filters Contained in Sunscreen Cosmetic Products: Development of Analytical Methods ISBN-13: 978-3319011882, Springer, 2013.
2. Salvador A. and Chisvert A. Analysis of Cosmetic Products, Elsevier, 2007