

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	SCHOOL OF SCIENCES		
<b>DEPARTMENT</b>	DEPARTMENT OF CHEMISTRY		
<b>LEVEL OF STUDIES</b>	ISCED level 6 – Bachelor's or equivalent level		
<b>COURSE CODE</b>	EN8	<b>SEMESTER</b>	7 <sup>th</sup> or 8 <sup>th</sup> Semester
<b>COURSE TITLE</b>	Forensic Chemistry		
<b>TEACHING ACTIVITIES</b> <i>If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.</i>		<b>TEACHING HOURS PER WEEK</b>	<b>ECTS CREDITS</b>
	Theory	3	
		3	3
<i>Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.</i>			
<b>COURSE TYPE</b> <i>Background, General Knowledge, Scientific Area, Skill Development</i>	Specialized Background, Specialization, Skills Development		
<b>PREREQUISITES:</b>	NO		
<b>TEACHING &amp; EXAMINATION LANGUAGE:</b>	GREEK		
<b>COURSE OFFERED TO ERASMUS STUDENTS:</b>	NO		
<b>COURSE URL:</b>			

### (2) LEARNING OUTCOMES

<p><b>Learning Outcomes</b> <i>Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.</i></p>
<p>The course aims to introduce students to the basic concepts of Toxicology and Forensic Chemistry. Upon successful completion of the course, the student will have acquired the following skills:</p> <ol style="list-style-type: none"> <li>1. To understand the significance of the general principles of Forensic Chemistry.</li> <li>2. To be familiar with forensic applications of Clinical Chemistry, Biochemistry and Genetics.</li> <li>3. To be familiar with modern molecular techniques applied in Forensic Chemistry.</li> <li>4. To acquire in-depth knowledge of modern techniques such as ELISA, PCR and DNA analysis.</li> <li>5. To understand modern techniques for DNA isolation, including:             <ul style="list-style-type: none"> <li>• Isolation of total DNA from peripheral blood samples</li> <li>• Isolation of total DNA from small quantities of blood</li> <li>• Isolation of total DNA from “forensic” samples</li> <li>• Isolation of total DNA from buccal cells</li> <li>• Isolation of total DNA from bones and teeth</li> <li>• Isolation of total DNA from hair</li> </ul> </li> <li>6. To understand procedures and analyses for paternity testing and disputed paternity cases.</li> <li>7. To understand procedures and analyses for investigating sibling relationships and other kinship cases.</li> <li>8. To understand procedures and analyses for determining cause of death.</li> <li>9. To understand procedures and analyses related to reproductive function and obstetric issues.</li> <li>10. To understand procedures and analyses for investigating poisonings by gases.</li> <li>11. To understand procedures and analyses for investigating poisonings by liquids, metals and drugs.</li> <li>12. To understand the role and impact of substances of abuse and their analysis, including:</li> </ol>

- Basic principles of neurotransmitters
- Neuropeptides
- Opioid peptides
- Receptors
- Classification of addictive substances
- Drugs antagonizing addictive agents – analgesics
- Cocaine in Europe
- Detoxification and treatment of dependence
- Psychotropic drugs
- The brain and opioids
- Effects of addictive substances
- Infectious diseases associated with substance abuse
- Diseases and deaths due to opioids
- Addictive substances in schools
- Addictive substances in the workplace

### General Skills

*Name the desirable general skills upon successful completion of the module*

*Search, analysis and synthesis of data and information,  
ICT Use*

*Adaptation to new situations*

*Decision making*

*Autonomous work*

*Teamwork*

*Working in an international environment*

*Working in an interdisciplinary environment*

*Production of new research ideas*

*Project design and management*

*Equity and Inclusion*

*Respect for the natural environment*

*Sustainability*

*Demonstration of social, professional and moral responsibility and sensitivity to gender issues*

*Critical thinking*

*Promoting free, creative and inductive reasoning*

More generally, upon completion of the course, the student will have further developed the following general competences:

- Searching for, analyzing and synthesizing data and information, using the necessary technologies
- Adaptation to new situations
- Decision-making
- Autonomous work
- Teamwork
- Exercise of criticism and self-criticism
- Respect for the natural environment
- Promotion of free, creative and inductive thinking

### (3) COURSE CONTENT

1. Forensic applications of Clinical Chemistry, Biochemistry and Genetics
2. Modern molecular techniques applied in Forensic Chemistry
3. ELISA, PCR and DNA analysis
4. DNA isolation:
  - Isolation of total DNA from peripheral blood samples
  - Isolation of total DNA from small quantities of blood
  - Isolation of total DNA from “forensic” samples
  - Isolation of total DNA from buccal cells
  - Isolation of total DNA from bones and teeth
  - Isolation of total DNA from hair
5. Paternity testing – disputed paternity cases
6. Investigation of sibling relationships – kinship verification
7. Determination of cause of death
8. Reproductive function and obstetric issues
9. Poisonings by gases
10. Poisonings by liquids, metals and drugs
11. Substances of abuse:

- Basic principles of neurotransmitters
- Neuropeptides
- Opioid peptides
- Receptors
- Classification of addictive substances
- Drugs antagonizing addictive agents – analgesics
- Cocaine in Europe
- Detoxification and treatment of dependence
- Psychotropic drugs
- The brain and opioids
- Effects of addictive substances
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- Addictive substances in schools
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#### (4) LEARNING & TEACHING METHODS - EVALUATION

<p align="center"><b>TEACHING METHOD</b></p> <p align="center"><i>Face to face, Distance learning, etc.</i></p>	Face to face	
<p align="center"><b>USE OF INFORMATION &amp; COMMUNICATIONS TECHNOLOGY (ICT)</b></p> <p align="center"><i>Use of ICT in Teaching, in Laboratory Education, in Communication with students</i></p>	Use of ICT in teaching, in laboratory education, and in communication with students: <ul style="list-style-type: none"> <li>• Organization of course material in ppt slides</li> <li>• Support of the learning process via the e-class electronic platform</li> <li>• Communication via email</li> </ul>	
<p align="center"><b>TEACHING ORGANIZATION</b></p> <p><i>The ways and methods of teaching are described in detail.</i></p> <p><i>Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research &amp; analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.</i></p> <p><i>The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.</i></p>	<b>Activity</b>	<b>Workload/semester</b>
	Lectures	39
	Bibliographic research & analysis	23
	Interactive learning	13
	Total	75
<p align="center"><b>STUDENT EVALUATION</b></p> <p><i>Description of the evaluation process</i></p> <p><i>Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others</i></p> <p><i>Please indicate all relevant information about the course assessment and how students are informed</i></p>	Written examination (mid-term and final examination) Evaluation of assignments in the context of interactive teaching	

## (5) SUGGESTED BIBLIOGRAPHY

- Forensic Medicine, 3rd edition, Eudoxus Book Code: 68373951, Edition: 3rd/2018, Author: Dimitrios Psaroulis, ISBN: 9789601223537, Type: Textbook, Publisher: UNIVERSITY STUDIO PRESS
- Clinical Chemistry, 9th English / 3rd Greek edition, Eudoxus Book Code: 112691131, Edition: 3/2023, Authors: W.J. Marshall, M. Lapsley, A. Day, K. Shipman, ISBN: 9789925350896, Type: Textbook, Publisher: BROKEN HILL PUBLISHERS LTD
- Experimental Biochemistry, Eudoxus Book Code: 112981268, Edition: 1/2022, Authors: Maria Trapali, Georgios Albertos Karikas, Petros Karkalousos, Christina Foundzoula, ISBN: 9786185667559, Type: Electronic Book, Publisher: KALLIPOS Open Academic Editions
- Tselemis, A., Pantazi, D., & Tellis, K. (2024). Clinical Biochemistry – Diagnostics. [Undergraduate textbook] Kallipos, Open Academic Editions. (<http://dx.doi.org/10.57713/kallipos-964>)
- Principles of Clinical Chemistry and Molecular Diagnostics, Eudoxus Book Code: 45480, Edition: 1st/2009, Author: A. Skorilas, ISBN: 9789602662717, Type: Textbook, Publisher: S. Athanasopoulos & Co. I.K.E.
- Various scientific papers or review articles, which may be of general interest or cover recent developments in Biochemistry (and more broadly in the biological sciences) that, as is the case everywhere, take time to be incorporated into textbooks and may change every year, are uploaded on the e-class platform.
- Relevant scientific journals:
  - Forensic Chemistry
  - Forensic Chemistry (duplicate entry in original list)
  - Frontiers in Analytical Science
  - Forensic Science International
  - Science & Justice
  - Forensic Science International: Genetics
  - Journal of Pharmaceutical and Biomedical Analysis