

ENVIRONMENTAL AND FOOD TOXICOLOGY

COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Food and Nutritional Sciences		
ACADEMIC UNIT	Department of Food Science and Human Nutrition		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	3540	SEMESTER	6 th
COURSE TITLE	Environmental and Food Toxicology		
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	
Lectures and Practice Exercises	3	3	
<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>	special background		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	https://w1.aua.gr/etda/en/courses/environmental-and-food-toxicology/		

(2) LEARNING OUTCOMES

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

Among the aims of the course are that students who successfully complete it will understand the importance of environmental protection in the quality of life of citizens of every modern society. Also, the practical application of basic principles of Ecology and Environmental Sciences contributes substantially to solving the major environmental problems facing the planet today. An additional aim is the thorough understanding of the fundamental concepts of the science of Ecotoxicology and the mechanisms of transfer of toxic substances in the environment and in the food chain.

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	Project planning and management
Adapting to new situations	Respect for difference and multiculturalism
Decision-making	Respect for the natural environment
Working independently	Showing social, professional and ethical responsibility and sensitivity to gender issues
Teamwork	Criticism and self-criticism
Working in an international environment	Production of free, creative and inductive thinking
Working in an interdisciplinary environment
Production of new research ideas	Others...

The course aims to: Respect for the natural environment. Design and management of projects based on environmental impact assessment, with an emphasis on food. Supports the decision-making process related to food quality management. Promotes the production of new research ideas. Also, as the problems of Environmental and Food Toxicology are quite complex, the course promotes work in an interdisciplinary environment.

(3) SYLLABUS

ENVIRONMENTAL TOXICOLOGY...

- Toxicology - Environmental Toxicology - Ecotoxicology - Definitions - Historical review
- Ecosystems - Food chains - Bioconcentration-Bioaccumulation-Biomagnification.
- Environment: Definitions - Units of measurement of pollutants.
- Atmospheric Pollution: Gaseous Pollution - Particulate Pollution - Toxicity limits. Photochemical smog - The case of Athens.
- Atmospheric Pollution and Health - Air Quality Indicators.
- Heavy Metals in the Environment - Sources - Bioavailability - phytotoxicity - Toxicity limits for human health: Lead (Pb), Arsenic (As), Cadmium (Cd), Chromium (Cr), Aluminum (Al), Mercury (Hg) - The case of Minamata. Heavy metals in Attica.
- Other toxic substances/Toxic materials in the environment: DDT - Asbestos.
- (Bio)Toxins in the Environment - From Field to Shelf - Mycotoxins, Aflatoxins, Emetoxin, Fumonisin, Ochratoxin, Solanine. Transfer of Biotoxins from nectar to honey.
- Climate Change and Toxic Substances in Crops - Nitrates - Hydrogen Cyanide.
- Bioassays-Bioindicators: Biomarker of exposure - Biomarker of effect - Biomarker of susceptibility: Biomarker organisms: Lemna minor, Daphnia magna, Artemia salina, algae, Bacteria. Mutagenesis tests (Ames test).
- Toxicological studies at the level of populations and “cosms” - effects on populations of species of r and K selection. Cosm studies: Microcosm - Mesocosm studies.
- Exposure - Dose - Concentration: Dose-Response - LD50/EC50: Lethal dose/concentration - The Probit analysis - NOEC/NOEL - LOEC/LOEL. The Urmesis phenomenon
- Ecological Risk Assessment

...FOOD TOXICOLOGY

- Introduction to the science of Food Toxicology
- Toxicity
- Toxicokinetics
- Toxic Substances in Food - Detection and Quantification

- Toxicity Assessment - Toxicity Tests
- Food Poisonings - Allergens
- Alcohol Poisonings
- Toxins in foods of animal origin
- Toxins in foods of plant origin
- Toxins from fungi-Mushrooms
- Industrial Pollution-Heavy Metals-Pesticides in foods
- Food additives
- Toxic substances formed during food processing Chemical Carcinogenesis

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Lectures in the amphitheatre.														
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Using PowerPoint presentations. Communication with students via e-mail. Learning process support through e-class access, online databases, etc.														
TEACHING METHODS The manner and methods of teaching are described in detail. <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> 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	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Activity</th> <th style="text-align: center;">Semester workload</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td style="text-align: center;">39</td> </tr> <tr> <td>Written individual work and presentation</td> <td style="text-align: center;">36</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td>Course total</td> <td style="text-align: center;">75</td> </tr> </tbody> </table>	Activity	Semester workload	Lectures	39	Written individual work and presentation	36							Course total	75
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Lectures	39														
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STUDENT PERFORMANCE EVALUATION Description of the evaluation procedure <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> Specifically defined evaluation criteria are given, and if and where they are accessible to students.	I. The language of assessment is Greek II. The course grade is derived from the final written exam, supplemented by the performance grade of students attending the course in the auditorium, in intermediate tests or progress tests. II. The written exam will change periodically and may be a Multiple-Choice Test, or Short Answer Questions, or even Essay Development Questions. Among the topics is usually included an exercise solution topic. Oral exams are provided for those who wish (e.g. for health reasons). V. The course has only Theory, with parallel preparation of individual assignments. V. The Course Teachers reserve the right to change the nature and time of the exam.														

(5) ATTACHED BIBLIOGRAPHY

-Suggested Bibliography: University Textbooks:

- James Girard. 2018. Principles of Environmental Chemistry". Greek Edition Editor: M. Polysiou, P. Tarantilis, C. Pappas". Parisianou Scientific Publications S.A.
- Shibamoto T., Bjeldanes L. Introduction to Food Toxicology. Editor: Petros Tarantilis. P.H. Paschalidis Publications.
- Valavanidis A. 2007. Ecotoxicology and Environmental Toxicology. Publication: Department of Chemistry, University of Athens. [Available from the author in electronic format free of charge (via the website of the Department of Chemistry: http://www.chem.uoa.gr/courses/organiki_1/val_oikotox.htm)]

- Related scientific journals: Environmental Toxicology (Wiley - Edited By: PAUL B. TCHOUNWOU).