

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	AGRICULTURAL SCIENCES		
<b>ACADEMIC UNIT</b>	FOOD SCIENCE AND TECHNOLOGY		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	<b>FST_X14</b>	<b>SEMESTER</b>	Winter
<b>COURSE TITLE</b>	MODERN TECHNIQUES FOR FOOD AUTHENTICATION		
<b>INDEPENDENT TEACHING ACTIVITIES</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	
Exercises		1	
<b>TOTAL</b>		<b>4</b>	<b>5</b>
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	ELECTIVE Field of Science		
<b>PREREQUISITE COURSES:</b>	There are not prerequisite courses.		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.upatras.gr/">https://eclass.upatras.gr/</a>		

### 2. LEARNING OUTCOMES

<p><b>Learning outcomes</b></p> <p><i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul>
<p>The “Modern Techniques for Food Authentication” course provides a view of the whole spectrum of food authentication and fraud topics, including an introduction to the fundamental European and national regulations as well as on the advanced analytical/molecular techniques and methodologies. At the end of the course, the students will be able to:</p> <ol style="list-style-type: none"> <li>1. know the legislations for food authenticity and integrity,</li> <li>2. recognize the modern analytical methodologies for identifying food fraud practices,</li> </ol>

3. define the basic principles and know the advantages and disadvantages of the chemical techniques which are presented through the course.

#### 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?*

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Team work</i>	<i>Criticism and self-criticism</i>
<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>
<i>Working in an interdisciplinary environment</i>	.....
<i>Production of new research ideas</i>	<i>Others...</i>
	.....

- *Search for, analysis and synthesis of data and information, with the use of the necessary technology*
- *Production of new research ideas*
- *Decision-making*
- *Working independently*
- *Team work*
- *Project planning and management*
- *Respect for the natural environment*

### 3. SYLLABUS

- Introduction.
- Fluorescence and Ultraviolet-Visible (UV/Vis) Spectroscopy in traceability of dairy products.
- The application of Gas Chromatography (GC) in authenticity of spices and herbs.
- High-Performance Liquid Chromatography (HPLC) in the determination of wine authenticity.
- Application of HPLC in fruit juices authenticity.
- The use of Nuclear Magnetic Resonance (NMR) spectroscopy to investigate the addition of non-naturally produced solutions of acetic acid.
- Application of Stable Isotope Ratio Mass Spectrometry (IRMS) in honey adulteration.
- The role of multi-elemental analysis, with the use of Inductively Coupled Plasma Mass Spectrometry (ICP-MS), in traceability and certification of the authenticity of foods and agricultural products. Application in fruits and vegetables.
- Determination of geographical origin of foods and agricultural products with the use of IRMS and ICP-MS analytical techniques. Example: geographical origin determination of olive oil.
- Differential Scanning Calorimetry (DSC) for detecting adulterations of oils and fats.
- The use of Polymerase Chain Reaction (PCR) to detect foreign DNA in genetically modified foods.
- Determination of the authenticity of meat and meat products by Enzyme-Linked Immunosorbent Assay (ELISA) method.

### 4. TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face to face lectures
<b>USE OF INFORMATION AND</b>	Use of Information and Communication Technologies (ICTs) (e

<p><b>COMMUNICATIONS TECHNOLOGY</b> Use of ICT in teaching, laboratory education, communication with students</p>	<p>.g., ppt presentations, real-time quizzes, videos etc.). Students will be able to download the content of each lecture from the website of the course (<i>eclass</i>) using a password which is provided to them at the beginning of their studies.</p>															
<p><b>TEACHING METHODS</b> The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational</p>	<table border="1"> <thead> <tr> <th data-bbox="673 430 1098 461"><b>Activity</b></th> <th data-bbox="1098 430 1361 461"><b>Semester workload</b></th> </tr> </thead> <tbody> <tr> <td data-bbox="673 461 1098 492">Lectures</td> <td data-bbox="1098 461 1361 492">36</td> </tr> <tr> <td data-bbox="673 492 1098 524">Exercises</td> <td data-bbox="1098 492 1361 524">-</td> </tr> <tr> <td data-bbox="673 524 1098 555">Study and analysis of bibliography</td> <td data-bbox="1098 524 1361 555">61</td> </tr> <tr> <td data-bbox="673 555 1098 586">Essay production</td> <td data-bbox="1098 555 1361 586">25</td> </tr> <tr> <td data-bbox="673 586 1098 618">Final exam</td> <td data-bbox="1098 586 1361 618">3</td> </tr> <tr> <td data-bbox="673 663 1098 694"><b>Course total</b></td> <td data-bbox="1098 663 1361 694"><b>125</b></td> </tr> </tbody> </table>	<b>Activity</b>	<b>Semester workload</b>	Lectures	36	Exercises	-	Study and analysis of bibliography	61	Essay production	25	Final exam	3	<b>Course total</b>	<b>125</b>	
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<p><b>STUDENT PERFORMANCE EVALUATION</b> Description of the evaluation procedure Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, shortanswer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</p>	<p>Language of evaluation: Greek Methods of evaluation: 1. Reports following a subject which has previously discussed in the lecture / Atomic or team projects 2. Written examination after the end of the semester.</p> <p>The evaluation methods are presented and discussed with the students at the begging of the semester.</p>															

## 5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

### 1. in Greek

- ΣΗΜΕΙΩΣΕΙΣ ΜΑΘΗΜΑΤΟΣ “ΣΥΓΧΡΟΝΕΣ ΤΕΧΝΙΚΕΣ ΠΙΣΤΟΠΟΙΗΣΗΣ ΑΥΘΕΝΤΙΚΟΤΗΤΑΣ ΑΓΡΟΤΙΚΩΝ ΠΡΟΪΟΝΤΩΝ ΚΑΙ ΤΡΟΦΙΜΩΝ”, Α. Λάνταβος, Ε. Χ. Μαζαρακιώτη, Αγγίλιο, 2023.
- Αρχές Ενόργανης Ανάλυσης, 7η Έκδοση, D. A. Skoog, F. James Holler, S. R. Crouch (Μετάφραση: Μ. Ι. Καραγιάννης, Κ. Η. Ευσταθίου), Εκδόσεις Κωσταράκη, 2021.

## 2. in English

- Modern Techniques for Food Authentication, 2nd Edition, Edited by Da-Wen Sun, Elsevier Inc., Academic Press 2018, [eBook ISBN: 9780128142653]
- K. Katerinopoulou, A. Kontogeorgos, E.C. Salmas, A. Patakas, A. Ladavos\*, "Geographical Origin Authentication of Agri-Food Products: A Review" Foods 2020, 9, 489.
- E. C. Mazarakioti\*, A. Zotos, A.-A. Thomatou, A. Kontogeorgos, A. Patakas, A. Ladavos\*, "Inductively Coupled Plasma-Mass Spectrometry (ICP-MS), a Useful Tool in Authenticity of Agricultural Products' and Foods' Origin" Foods 2022, 11, 3705.

### - *Related academic journals:*

- Foods
- Food Science
- Journal of Chromatography
- Analytical Methods
- Analytica Chimica Acta
- Food Chemistry
- Food Research International
- Analytical and Bioanalytical Chemistry
- Instrumentation Science & Technology