Instrumental food analysis
Course Outline

General

SCHOOL	Agricultural Sciences		
DEPARTMENT	Food Science and Nutrition		
ACADEMIC LEVEL	*Undergraduate*		
CORSE CODE	MK411	**SEMESTER**	4th
COURSE TITLE	Instrumental food Analysis (Instructor: S. Lalas)		

INDEPENDENT TEACHING ACTIVITIES *In case credits are awarded separately for different parts of the course (e.g., Lectures, Laboratory Exercises, etc.), if credits are awarded as a whole for the entire course, specify the weekly teaching hours and the total credits.*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	3	6
Laboratory Exercises	3	

COURSE TYPE Background, General Knowledge, Scientific Area, Skill Development	Skill Development
PREREQUISITE COURSES:	-
LANGUAGE OF INSTRUCTION AND EXAMINATION:	Greek
COURSE OFFERED TO ERASMUS STUDENTS:	Yes
COURSE WEBSITE (URL):	-

LEARNING OUTCOMES

Learning Outcomes

This course involves the study of modern methods used in the analysis of food and the theoretical principles upon which techniques, organology, and the functioning of instruments rely. Additionally, it familiarizes students with modern separation methods and instumental analysis techniques, as well as the acquisition of the ability to handle, correlate, and present results.

Upon successful completion of the course, students will be able to:

- Understand the theory and techniques of sampling, correlation, processing, and presentation of results.
- Apply Spectrophotometric techniques [UV-Vis Spectrophotometry, Fluorimetry, FT-IR Spectrophotometry, Turbidimetry].
- Understand refractive index and polarimetry.
- Apply Atomic Absorption Spectrometry (AAS) and Flame Photometry.
- Measure food oxidation (Rancimat).
- Apply Differential Scanning Calorimetry (DSC).
- Apply chromatography techniques - gas chromatography (GC) with various detectors (flame ionization, mass spectrometry).
- Apply high-performance liquid chromatography (HPLC) with various detectors (photodiode, fluorescence, refractive index).
- Analyze texture.
- Apply other methods of food analysis.

General Skills

Search, analyze, and synthesize data and information using the necessary technologies. Decision making, autonomous work, teamwork, work in an international environment, work in an interdisciplinary environment.

Course Content

Week 1: Introduction - Safety Issues

Week 2: Ultraviolet-Visible (UV-Vis) Spectrophotometry/Fluorimetry
Week 3: Chromatometry
Week 4: Viscosity Analysis
Week 5: Refractive Index - Polarimetry
Week 6: Food Oxidation Measurement (Rancimat)
Week 7: Fourier Transform Infrared Spectroscopy (FT-IR)
Week 8: Atomic Absorption Spectrometry (AAS) - Flame Photometry
Week 9: Differential Scanning Calorimetry (DSC)
Week 10: High-Performance Liquid Chromatography (HPLC-FD/DAD/RID)
Week 11: Gas Chromatography (GC-FID/MS)
Week 12: Texture Analysis
Week 13: Other Food Analysis Methods

Teaching and Learning Methods - Evaluation

Teaching Method	Face-to-face lectures in the amphitheater/classroom and face-to-face laboratory exercises in the appropriate laboratory space.
Use of Information and Communication Technologies	Yes. Course delivery is supported by electronic presentations and other audio-visual materials. Supplementary notes are posted on E-Class.
Teaching Organization - Workload Activities of the Semester	

Activity	***Workload***
Lectures	39
Laboratory exercises	39
Self-study	72
Total Course Workload (25 hours of workload per credit):	***150***

Student Assessment	Language of Examination: Greek. Students have access to supplementary notes posted on the E-Class platform, and they also receive a textbook of their choice from those available in the EUDOXUS system. The final grade for the course is determined by 50% from the theoretical part (lectures) and 50% from the laboratory exercises. Examinations (Theoretical and Laboratory parts) include multiple-choice questions. Specifically: Written examination with multiple-choice questions in the case of face-to-face evaluation. Electronic examination through E-Class with multiple-choice questions in the case of remote evaluation.

RECOMMENDED BIBLIOGRAPHY

- *Recommended Textbook: "Principles of Inorganic Analysis" by Skoog, Holler, Crouch.*

- *Relevant scientific journals (indicative):*

- Food Chemistry, Elsevier.
- Journal of American Oil Chemists' Society, Springer.
- European Food Research and Technology, Springer.
- Journal of Food Composition and Analysis, Elsevier.
- Food Analytical Methods, Springer.
- International Journal of Food Science and Technology, Blackwell Publishing.
- Food and Bioprocess Technology, Springer.
- Journal of Separation Science, Wiley.
- European Journal of Lipid Science and Technology, Wiley.
- Analytica Chimica Acta, Elsevier.
- Analytical Methods, RSC Publishing - Royal Society of Chemistry.