FACULTY/SCHOOL	FACULTY OF ENVIRONMENT				
DEPARTMENT	FOOD SCIENCE AND TECHNOLOGY				
LEVEL OF STUDY	UNDERGRADUATE				
COURCE UNIT CODE	FST502		SEMESTER	5	
COURCE TITLE	FAT AND OILS SCIENCE AND TECHNOLOGY				

INDEPENDENT TEACHING ACTIVITIES *in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits*	WEEKLY TEACHNG HOURS	CREDITS (ECTS)
Lectures	2	
Tutoring	---	
Laboratory	2	
Total	**4**	**6**

Add rows if necessary. The organization of teaching and the teaching methods used are described in detail under section 4

COURSE TYPE *Background knowledge, Scientific expertise, General Knowledge, Skills Development*	*Scientific expertise, Skills Development*
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION:	Greek
LANGUAGE OF EXAMINATION/ASSESSMENT:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning Outcomes
The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail.
It is necessary to consult:
APPENDIX A
- *Description of the level of learning outcomes for each level of study, in accordance with the European Higher Education Qualifications' Framework.*
- *Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and*
APPENDIX B
- *Guidelines for writing Learning Outcomes*

The course aims to provide students with the necessary general and specific knowledge required to master the science and technology of fatty substances. Special attention is paid to the technology, quality, and evaluation of olive oil as well as quality control and spoilage of fatty substances.

Specifically, the course addresses the concepts required to comprehend the science and technology of fatty substances so that graduates can manage quality control laboratories as well as design, organize and manage production in the fatty substance industry, design new products, and troubleshoot technical problems related to production, transport, and preservation of products. In the lab, students are trained in the methodologies that enable them to apply analytical techniques for quality control of fatty substances, detect adulteration, and evaluate oilseeds used as raw materials in the production of fatty substances.

After completing this course, students must be able to:
- Design, organize and manage production in the fatty substance industry
- Apply analytical techniques for quality control of fatty substances
- Identify fatty substances and detect adulteration
- Research and troubleshoot technical problems of the fatty substance industry related to production, transport, and preservation of products

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,
Adapting to new situations
Decision-making
Individual/Independent work
Group/Team work
Working in an international environment
Working in an interdisciplinary environment
Introduction of innovative research

Project planning and management
Respect for diversity and multiculturalism
Environmental awareness
Social, professional and ethical responsibility and sensitivity to gender issues
Critical thinking
Development of free, creative and inductive thinking
……
(Other…….citizenship, spiritual freedom, social awareness, altruism etc.)
…….

- Individual/Independent work
- Group/Team work
- Decision-making
- *Working in an international environment*
- Project planning and management
- Respect for the natural environment
- Researching, analyzing, and synthesizing data and information with the use of suitable technologies

COURSE CONTENT

Theory

1. Structure of fatty substances, determination of physical properties.
2. Categories of fatty substances.
3. Vegetable fats and oils, animal fats, fish oils. Extraction of vegetable and animal fats.
4. Processing of fats and oils, production methods for butter and margarines.
5. Olive oil. Qualitative characteristics of olives, composition of olive fruit, formation of olive oil, chemical composition of olive oil, cultivation practices and factors that contribute to the development of flavor and taste.
6. Harvest and post harvest processing of olive fruit, table olives and olive paste.
7. Extraction of olive oil; types of olive mills, olive mill by-products, storage and grading of olive oil.
8. Factors affecting olive oil quality; qualitative criteria and grades, tasting and sensory evaluation of olive oil and other fats and oils.
9. Spoilage of fatty substances, antioxidants.
10. Techniques for determining oxidative resilience, quality control and determination of constants and constituents of fatty substances; detection of adulteration.
11. Chemical and physical processes for the refinement of olive oil, oilseed oil, and olive pomace oil. Refinement of fatty substances, new technologies, hydrogenation of fatty substances.
12. By-products of olive mills and other industries of fatty substances, utilization of by-products, soap and saponification.

Laboratory

1. Fatty substance production; extraction, determination of physical properties, density; refraction index.
2. Saponification number of fatty substances, determination of unsaponifiable constituents.
3. Determination of free fatty acids (acidity); neutralization of free fatty acids.
4. Determination of foreign matter in fatty substances, determination of moisture content.
5. Iodine number; determination of degree of saturation of fatty substances.
6. Determination of oxidation state of fatty substances; determination of peroxide value; Kreis reaction.
7. Spectrophotometry in UV wavelengths.
8. Detection of foreign constituents in olive oil with the Synodinos Constas method; detection of oilseed oil via the Bellier reaction.
9. Refining, removal of resins, color and margarine.
10. Detection and determination of soap in fatty substances; testing for neutralization effectiveness.
11. HPLC analyses.
12. Soap making, emulsions.

TEACHING METHODS--ASSESSMENT

MODES OF DELIVERY *Face-to-face, in-class lecturing, distance teaching and distance learning etc.*	Face-to-face, in-class lecturing, at the field part of lab work
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in teaching, Laboratory Education, Communication with students*	Power point presentation, Whiteboard writing, Communication with students through e-class and e-mails

	Activity/Method	Semester workload	
OURSE DESIGN	Lectures	60	
Description of teaching techniques, practices and methods:	In class lab work	26	
	Autonomous lab work	18	
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.			
The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.	Total contact hours and training	***104***	

STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS *Detailed description of the evaluation procedures:* *Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work, other……etc.* *Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students.*	**Theory:** Final written examination that includes: -multiple choice questions -fill-in the blanks questions -short answer questions **Laboratory:** 75% from final written examination in laboratory that includes: -fill-in the blanks questions -short answer questions -multiple choice questions 25% from lab reports

SUGGESTED READING:

Books

1. Kiritsakis, A., and Shahidi, F. (2017) Olives and Olive Oil as Functional Foods Bioactivity, Chemistry and Processing. John Wiley & Sons Ltd, Oxford UK.
2. Hamilton, R.J., and A. Bhati, A. (1987). Recent Advances in Chemistry and Technology of Fats and Oils. Elsevier Applied Science, London.
3. Bockisch M. (1998). Fats and Oils Handbook. Academic Press and AOCS Press, Urbana, IL.
4. O'Brien, R.D. (2009). Fats and Oils:Formulating andProcessing for Applications.3rd ed.CRC Press, Boca Raton, FL.
5. Bongers, P. and C. Almeida-Rivera (2011). Dynamic Modelling of the Margarine Production Process. Computer-Aided Chemical Engineering 29:1301–1305.
6. Hiramatsu, M. (1997). Food and Free Radicals. Springer, New York.
7. Roller, S. and S. A. Jones (1996). Handbook of Fat Replacers. CRC Press, Boca Raton, FL.

Scientific Journals

- Food Research International
- Food Chemistry
- Analytical Letters
- Analytical and Bioanalytical Chemistry
- Journal of Food Composition and Analysis
- Foods
- Antioxidants

Performance Statistics of the last 2years			
Grade (descending order)	absolute frequency	relative frequency %	sum of success rates per class
SCIENCE AND TECHNOLOGY OF FATS & OILS			
10	1	1%	1%
9	13	11%	11%
8	20	16%	28%
7	49	40%	67%
6	40	33%	100%
	123	100%	