# UNIVERSITY OF WEST ATTICA

**DEPARTMENT OF FOOD SCIENCE AND TECNOLOGY**

SCHOOL OF FOOD SCIENCES

# COURSE OUTLINE

ACADEMIC YEAR 2023-2024

## Table of Contents

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF FOOD SCIENCES | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **1011** | **SEMESTER** | **1** |
| **COURSE TITLE** | **MATHEMATICS** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 4 | 6 |
| | | |
| TOTAL | 4 | 6 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Background/General Knowledge/Skills Development |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES |
| **COURSE WEBSITE (URL)** | |

## (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*

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

• Understand absolute values, slopes and tangents
• Understand the rates of change and the limits
• Understand the concept of infinity as a limit and the concept of continuity and determine whether or not some elementary functions are continuous
• Produce different types of explicit functions
• Produce entangled functions and functions elevated by fractional force
• Use the rule of derivation of a complex function and differentiate different trigonometric functions
• Graph various functions
• Find the local extremes of various functions
• Solve various rate-related problems, understand the Mean Value Theorem, and use De L'Hospital's rule to find limits
• Complete elementary functions and use the substitution method for this purpose
• Complete trigonometric functions and know how to use the specified integral to calculate

the area under a curve
• Calculate the definite integral of elementary functions with partial integration
• Understand and be able to apply the Basic Theorems of Integral Calculus
• Use the substitution method to calculate integrals
• Find the area between curves and some rotating volumes
• Understand the meaning of generalized integrals and the use of various integration tables
• Understand the properties of arrays and determinants and,
• Be able to use arrays and determinants to solve linear systems

## (3) SYLLABUS

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

1. Adaptation to new situations.
2. Decision making.
3. Autonomous work.
4. Teamwork
5. Exercise criticism and self-criticism.
6. Promoting free, creative and inductive thinking.
7. Search, analysis and synthesis of data and information, in order to apply the theory in practice

**Description:** Functions, Limits, Continuity. Slope and Derivative. Function Generation. Applications in Kinetic, Physical Development, Graphs and Extremes of Functions.
Definite integral. Integration techniques.
Introduction to table theory, determinants and applications in solving linear systems.
In more detail, the content of the course includes:
• The Tangent, the Slope and the Derivative
• Rates of change and limits
• Infinity as a limit and continuity
• Derivatives of products, quotients and exponents
Derivative of a complex form of a function and a linear approach
• The rule of derivation of a complex function in trigonometric functions
• Newton's parametric equations and method
• Curve design and derivatives
• Maximum and minimum
• Relative price (or true price) and De L'Hospital's rule
• Indefinite integrals and the method of replacement
• Integrals of trigonometric functions and areas
• Fundamental Theorems of integral calculus
• The replacement in the approximate method of calculating certain integrals

- Inverse functions
- The Natural Logarithm
- Table theory
- Definitive

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to Face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | |

**TEACHING METHODS**

*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 visits, project, essay writing, artistic creativity, etc.*

*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*

| *Activity* | *Semester workload* |
|---|---|
| Lectures | 145 |
| | |
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| | |
| Course total | 145 |

**STUDENT PERFORMANCE EVALUATION**

*Description of the evaluation procedure*

*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*

*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*

Written examination in matters of graded difficulty, which include
- problem solving & exercises
- comprehension questions.

The access of the students to the criteria and the results of the exams is done through the site of the department and / or the e-class.

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

**Greek**

1. Εφαρμοσμένα Μαθηματικά για Οικονομολόγους και Μηχανικούς, Χαλιδιάς Νικόλαος
2. Απειροστικός Λογισμός, Γραμμική Άλγεβρα και Εφαρμογές 2η έκδοση, Χαλιδιάς Νικόλαος
3. ΓΕΝΙΚΑ ΜΑΘΗΜΑΤΙΚΑ, ΚΑΡΤΣΑΚΛΗΣ ΑΝΑΣΤΑΣΙΟΣ
4. Μαθηματικά Ι., Edwards C. Henry, Penney E. David (Επιμ. Ματζάκος Ν.)
5. Εφαρμοσμένη Ανάλυση και Στοιχεία Γραμμικής Αλγεβρας, Φιλιππάκης Μ. THOMAS 6.ΑΠΕΙΡΟΣΤΙΚΟΣ ΛΟΓΙΣΜΟΣ, [George B. Thomas], Jr., Joel Hass, Christopher Heil, Maurice D. Weir
7.Μαθηματικά Ι β έκδοση, Ρασσιάς Θ

**English**

1.Fundamentals of University Mathematics (Third Edition) C.M. McGregor, J.J.C. Nimmo and W.W. Stothers Oxford University Press
2.Introduction to Linear Algebra Gilbert Strang, Massachusetts Institute of Technology Date Published: August 2016 Wellesley-Cambridge Press

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF FOOD SCIENCES | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **1021** | **SEMESTER** | **1** |
| **COURSE TITLE** | **PRINCIPLES IN ECONOMICS** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 3 | 4 |
| | | |
| TOTAL | 3 | 4 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | General background |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | |

## (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*

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

• Understand the techniques of economic analysis and become familiar with their application in the Food Industry

• Get familiar with production and consumption and review the techniques used in the estimation of demand and supply

• Assess now price formation in the food industry, with emphasis on space and time, seasonality and inventories, location effects, pricing and profit margins

• Interpret the market: function, future, efficiency

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

## (3) SYLLABUS

**Description:** Economic analysis for food industries. Theories of consumption and production. Estimation of demand and supply. Price configuration. Seasonality and stocks. Effect of location. Markets, market formation, market effectiveness testing.
In more detail, the content of the course includes:
Introduction to supply and demand analysis
The theory of consumption.
Applied demand analysis
- From theory to practice
- Time series
- Household budget studies

The theory of production
Applied analysis of production
- Production functions
- Cost functions
- Profit functions
- Functions of supply - offer

Price setting in food markets
Value and time depth relationship
- Price trends and cycles
- Developments in the cob – web model
- Seasonal price fluctuation and storage

Price and market relationship.
- Trade between two countries
- Trade between many countries
- The transport model

Relationship between prices and market level
Future (forecast) prices

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to Face | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | *Use of ICT in teaching, laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
| | Lectures | 117 |
| | | |
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| | Course total | 117 |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | *multiple choice questionnaires, short-answer questions, open-ended questions, problem solving* | |

## (5) ATTACHED BIBLIOGRAPHY


*- Suggested bibliography:*

*1. Jeffrey H. Dorfman (2013). Economics and Management of the Food Industry. Routledge Textbooks in Environmental and Agricultural Economics*

*2. Parkin Michael, Powell Melanie, Matthews Kent (2013). Αρχές οικονομικής. ΕΚΔΟΣΕΙΣ ΚΡΙΤΙΚΗ ΑΕ*

*3. Stephen Ison (2002). Εισαγωγή στην Οικονομική. ΕΚΔΟΣΕΙΣ ΚΛΕΙΔΑΡΙΘΜΟΣ ΕΠΕ*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF FOOD SCIENCES | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **1031-1033** | **SEMESTER** | **1** |
| **COURSE TITLE** | **GENERAL CHEMISTRY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| *Lectures* | 3 | |
| *Tutorial* | 1 | |
| *Laboratory exercises* | 2 | |
| *Total* | 6 | 8 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | *General background, general knowledge, skills development* |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greeks |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

## (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*

Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.
Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.
Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large.
Students will gain an understanding of:
the fundamental properties of atoms, molecules, and the various states of matter with an emphasis on the particulate nature of matter,
the fundamental atomic structure and the periodicity of elements in the periodic table,
simple quantum mechanical treatments of atoms and molecules,
how to predict molecular geometries of selected molecular species,
the fundamentals of acid/base reactions, redox reactions and precipitation reactions
chemical reactions involve the flow of energy,
current bonding models for simple inorganic and organic molecules in order to predict structures and important bonding parameters,

the idea of a mole and the use of stoichiometry,
the basic properties of solutions
the fundamentals of acid/base equilibria, including pH calculations, buffer behavior, acid/base titrations, and their relationship to electrophiles and nucleophiles
the thermodynamic and kinetic forces involved in chemical reactions which determine how much and how soon products are formed
the basics of electrochemistry, and the relationship of electrical parameters to thermodynamic and stoichiometric parameters
general chemical equilibria
solubility and complex ion equilibria

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

*Analysis and synthesis of data and information, using the necessary technologies*
*Working independently*
*Team work*
*Production of new research ideas*

## (3) SYLLABUS

**Course Objectives**

Unit Systems. Properties and phenomena. Structure of atom, Isotopes, Molecules, Atomic and Mass number. The meaning of mol. Chemical formulas. Solutions, solubility. Ways of expressing the concentration of solutions. Nomenclature of inorganic compounds. Chemical reactions, chemical equations and stoichiometry.

Atomic theories, quantum numbers, atomic orbital, electron construction. Pauli Prohibition Principle, Minimum Energy Principle, Hund Rule. Periodic Table of Elements.

Chemical bonds. Ionic and molecular bond. Molecular orbitals. Lewis electron types.

Chemical thermodynamics. Chemical kinetics, reaction speed, theory of collisions, theory of the activated complex, mechanisms of reactions.

Chemical equilibrium, law of chemical equilibrium, principle of Le Chatelieur.

Solution chemistry, Aqueous solutions of electrolytes. Ionization of water, product of water ions. Ionic balances (acids – bases, pH, markers, acid-base volumetrics). Effect of a common ion. Effect of non-common ion. Buffer solutions. Heterogeneous balances. Principle of solubility product, constant of solubility product.

Oxidation-reduction reactions, Study of redox reactions, methods of supplementation of equations of redox reactions.

**Laboratory Objectives**

Laboratory Safety Rules and Regulations
Introductory Laboratory Techniques
Mass Measurements, Volume Measurements, Measurements and Density
Preparation of chemical Solutions
Titration of Acids and Bases
Measurement of pH and Indicators

| |
|---|
| Preparation of buffer solution – Properties of buffer solutions |

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face | |
| **USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of Information Technologies in Teaching, Laboratory Education and Communication. Presentations using powerpoints. Information via web (e-class). | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
| | Lectures | 117 |
| | Tutorial | 20 |
| | Laboratory Exercises and Writing Papers | 52 |
| | | |
| | | |
| | | |
| | Course total | **189** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Assessment methods they can use: Multiple Choice Test, Short Answer Questions, Development Questions, Problem Solving, Written Assignment, Report, Oral Examination, Public Presentation, Laboratory Thesis | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

Ebbing and Gammon. General Chemistry 11th edition. Belmont: Brooks/Cole Cengage Learning, 2016. (Hardcover, Loose Leaf, or eBook)

*- Related academic journals:*

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

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF FOOD SCIENCES | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **1041** | **SEMESTER** | **1** |
| **COURSE TITLE** | **BIOLOGY** | | |
| **INDEPENDENT TEACHING ACTIVITIES** *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* | | **WEEKLY TEACHIN GHOURS** | **CREDITS** |
| LECTURES | | 3 | 4 |
| | | | |
| TOTAL | | 3 | 4 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | | |
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | GENERAL BACKGROUND | | |
| **PREREQUISITE COURSES:** | - | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO | | |
| **COURSE WEBSITE (URL)** | https://eclass.uniwa.gr/courses/FST306/ | | |

## (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*

The students will acquire the following specific knowledge with the successful completion of the program:

- The structure, function and significance of the basic biomolecules of the cells (carbohydrates, lipids, proteins, nucleic acids)
- The structure and properties of different cells (microbial, fungal, animal, plant)
- The understanding of the cell metabolism
- Cell division (mitosis, meiosis)
- Basic genetics (the chromosomal and molecular basis of inheritance, gene expression)
- The tools of Biotechnology
- Basic characteristics of viruses

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

## (3) SYLLABUS

Unit 1: Introduction to Biology
Unit 2: The Chemistry of Life
Unit 3: The Structure and Function of Large Biological Molecules
Unit 4: The Cell (structure eukaryotic and prokaryotic cells, cell communication)
Unit 5: Membrane Structure and Function
Unit 6: An Introduction to Metabolism
Unit 7: Cellular Respiration, Fermentation
Unit 8: Photosynthesis
Unit 9: Cell cycle (mitosis, meiosis, Chromosomal Basis of Inheritance)
Unit 10: The Molecular Basis of Inheritance
Unit 11: Gene Expression: From Gene to Protein
Unit 12: DNA Tools and Biotechnology
Unit 13: Viruses

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching: all educational material such as slides, videos, quiz, is uploaded in the electronic class (e-class) of the University. Communications with students via e-class or emails. | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.* | ***Activity*** | ***Semester workload*** |
| | Lectures | 117 |
| | | |
| | | |
| | | |
| | | |

| | | |
|---|---|---|
| *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* | | |
| | | |
| | | |
| | | |
| | Course total | *117* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Language evaluation: Greek<br>• Method of evaluation: multiple choice/short-answer/open-ended questions in the final exam | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*


- *Lisa A Urry; Michael L Cain; Steven Alexander Wasserman; Peter V Minorsky; Jane B Reece, "Campbell Biology" New York, NY : Pearson Education, Inc., [2017]*


*- Related academic journals:*

- *Journal of Cell Biology*
- *Journal of Cell and Molecular Biology*
- *Biomolecules*
- *Microbiology and molecular biology reviews*
- *Nature Cell Biology*
- *Microorganisms*

## COURSE OUTLINE

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF FOOD SCIENCES | | |
| **DEPARTMENT** | DEPARTMENT OF FOOD SCIENCE & TECHNOLOGY | | |
| **LEVEL OF STUDY** | UNDERGRADUATE | | |
| **COURSE CODE** | **1051** | **SEMESTER** | **1** |
| **COURSE TITLE** | **INTRODUCTION TO FOOD SCIENCE AND TECHNOLOGY** | | |

| **SELF-ENDED TEACHING ACTIVITIES** in case the credits are awarded in separate parts of the course e.g., Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits | **WEEKLY TEACHING HOURS** | **ECTS** |
|---|---|---|
| Lectures | 3 | 4 |
| | | |
| **Total** | 3 | 4 |
| *Add rows if necessary. The teaching organization and the teaching methods used are described in detail in (d).* | | |

| | |
|---|---|
| **COURSE TYPE** general background, special background, specialization, general knowledge, skill development. | Special background<br>Skill development |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF LECTURES AND EXAMINATIONS:** | Greek |
| **THE COURSE IS OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | https://eclass.uniwa.gr/courses/FST394/ |

### (2) LEARNING OUTCOME

**Learning Outcome**

*The learning outcomes of the course are described as well as the specific knowledge, skills, and abilities of an appropriate level that the students will acquire after successful completion of the course.*

*Consult Appendix A*

- *Description of the Level of Learning Outcomes for each course of study according to the Qualifications Framework of the European Higher Education Area*
- *Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B*
- *Comprehensive Guide to writing Learning Outcomes*

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

The course aims to enable students to understand the composition and nutrients of food, the properties they impart to food as well as their role in human nutrition, the basic principles of processing and preservation methods, forms of packaging, the role of additional ingredients, the basic rules of hygiene and safety in the production - transport and storage areas, as well as the nutritional value of the various food categories.

At the end of the course students will have understood the importance and nutritional value of food nutrients and the functional properties they impart to food, the basic principles of processes applied to food, preservation methods and the basic rules of hygiene and safety to be applied to food. They will also know reliable relevant sources and online tools.

**General skills**

*Considering the general skills that the graduate must have acquired (as stated in the Diploma Appendix and listed below) which / which of them is the course aimed at?*

| | |
|---|---|
| *Search, analysis and synthesis of data and information, using the necessary technologies.* | *Project planning and management* |
| *Adaptation to new situations* | *Respect for diversity and multiculturalism* |
| *Decision making* | *Respect for the natural environment* |
| *Autonomous work* | *Demonstrating social, professional, and ethical responsibility and sensitivity to gender issues* |
| *Teamwork* | *Exercise criticism and self-criticism* |
| *Work in an international environment* | *Promoting free, creative, and inductive thinking.* |

| *Work in an interdisciplinary environment* *Generating new research ideas* | *Other…….* |
|---|---|

- Search, analysis and synthesis of data and information, using the necessary technologies.
- Autonomous work.
- Encouraging free, creative, and inductive thinking.

## (3) SYLLABUS

**Theoretical Part of the Course**

- Introduction to Food Science and Technology
- Food ingredients - Carbohydrates
- Food ingredients - Proteins
- Food ingredients - Fats, Lipids, and oils
- Food ingredients - Water, Minerals, Vitamins
- The functional properties of the basic nutrients in food
- Food additives
- Valid organizations, trusted links, and useful online applications
- Basic Principles of Microbiology
- Food hygiene and safety
- Conventional Food Preservation methods
- Food and beverage packaging
- Quality and aesthetic assessment of food

## (4) TEACHING AND LEARNING METHODS – EVALUATION

| | |
|---|---|
| **COURSE METHODOLOGY**<br>Face to face, Distance learning etc. | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES**<br>Use of T.P.E. in Teaching, in Laboratory Education, in Communication with students | Use of IT technologies in data-information collection, teaching, and communication. Updates via Web, communication with students via e-mail. |
| **TEACHING ORGANIZATION**<br>The way and methods of teaching are described in detail.<br>Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc.<br><br>The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed | **Activity** — **Semester Workload**<br>Lectures — 117<br><br>**Total** — **117** |
| **STUDENT EVALUATION**<br>Description of the evaluation process<br><br>Assessment Language, Assessment Methods, Formative or Deductive, Multiple-Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others | • **Lectures**<br>The grade results from the final exam of the theoretical course with written exams. |

| | |
|---|---|
| Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students. | |

## (5) ATTACHED BIBLIOGRAPHY

**Book:** [77271643]: Εισαγωγή στην Επιστήμη και την Τεχνολογία Τροφίμων, Σφλώμος Κωνσταντίνος, Βαρζάκας Θεόδωρος

**Recommended links**
https://www.eufic.org/en/ European Food Information Council
https://www.ift.org/ Institute of Food Technologists
https://www.ifst.org/ Institute of food science and technology
https://www.effost.org/ The European Federation of food Science and Technology

**Scientific Journals**
Journal of Food Science and Technology
Trends in Food Science & Technology
Current Research in Food Science
Current Opinion in Food Science
Food Frontiers
Journal of the Science of Food and Agriculture
Journal of Food Science
Journal of the Science of Food and Agriculture
Nutrition & Food Science
British Food Journal

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF FOOD SCIENCES | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **1061-1062** | **SEMESTER** | **1** |
| **COURSE TITLE** | **INFORMATION TECHNOLOGY APPLICATIONS** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 2 | |
| LABORATORY EXERCISES | 1 | |
| TOTAL | 3 | 4 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Background/General Knowledge/Skills Development |
| **PREREQUISITE COURSES:** | .. |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES |
| **COURSE WEBSITE (URL)** | |

## (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*

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

• To use the Excel program and more specifically to be familiar with:
• - cell management
• - management of functions (logical, statistical, economic, etc.)
• -creation of graphical expressions
• - use of macros
• -creation of statistics
• - creation of tables

• To use the Powerpoint program and more specifically to be familiar with:
• -creation and management of presentation
• -insert graphical representations of tables and graphics

• -use of multimedia (video and audio)
• To use the Word program and more specifically to be familiar with:
• - text formatting
• -inserting image tables and graphs
• -introduction of mathematical equations
• -insert reference (captions, footnotes contents, etc.)
• -bibliography introduction

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

Adaptation to new situations.
Autonomous work.
Working in an international environment.
Teamwork
Working in an international environment
Project planning and management

## (3) SYLLABUS

**COURSE CONTENT**

Description: Learning Excel , Word, Powerpoint programs

More specifically, the course content includes:

1.Excel

Cell management ,Formatting,Protect cells ,Functions Statistical, reasonable,informative,economic,date-time, Graphs, Column/row chart, Scatter chart, Pie chart , Conditional configuration and data validation , formatting,Filters,Macros, Statistics

22.Powerpoint

Create a presentation , Insert slides, Slide drawings , Ordinance , Presentation Management , Insert effects , Insert graphs, tables, and graphics, Enter data into tables , Tables interconnected (with Excel), Insert/change graph title , Manage graph caption , Insert a picture , Image editing (crop, rotate) ,Use media ,Insert video , Insert audio

3.Word
Format text , Fonts (bold, italic, color, etc.) , Paragraphs (indentation, spacing, etc.) , Columns, Page layout, Insert tables, pictures, and graphs , Merge/split table cells , Import images from computer / internet , Graph management (caption, titles, etc.), Introduction of mathematical equations , References , Image/table captions , Footnotes , Table of Contents,
Index , Literature , Bibliography, Management (import, edit)

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Educational material is available, information via the Web & communication with students and via e-mail. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Written examination on issues of graded difficulty, including<br>• solving problems &exercises<br>• comprehension questions.<br><br>Students have access to both the criteria and the results of the examinations through the department's website and/or the e-class. |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures 2 hours | 78 |
| Laboratory 1 hour | 39 |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Course total | *117* |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

***Greek***

1.Βιβλίο [94700753]: 7 ΣΕ 1 WINDOWS 10 - OFFICE 2019 / MICROSOFT 365, ΓΚΛΑΒΑ ΜΑΙΡΗ Λεπτομέρειες
2.Βιβλίο[122079399] Μαθαίνετε εύκολα Microsoft Office 2021, Ξαρχάκος Κωνσταντίνος Ι., Καρολίδης Δημήτριος Α. Λεπτομέρειες
3.Βιβλίο[ **112690771**] Πλήρης Οδηγός Microsoft Office 365 και Office 2019
Beskeen David W., Cram Carol M., Friedrichsen Lisa, Wermers Lynn

***English***

*1.Kevin Wilson, Essential PowerPoint 2016, Elluminet Press*
*2.Jeff L Hutchinson, Comprehensive Excel 2016 - A Step-By-Step Training Guide, Create Space Publishing*

*3.Jeff L Hutchinson, Excel 2016 Advanced Features, Create Space Publishing*
*4.Lisa A. Bucki, Microsoft Word 2013 Bible The Comprehensive Tutorial Resource, Wiley*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| SCHOOL | SCHOOL OF FOOD SCIENCES | | |
| ACADEMIC UNIT | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | |
| LEVEL OF STUDIES | UNDERGRADUATE | | |
| COURSE CODE | 2011-2012 | SEMESTER | 2 |
| COURSE TITLE | **PHYSICS** | | |
| INDEPENDENT TEACHING ACTIVITIES *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* | | WEEKLY TEACHING HOURS | CREDITS |
| | LECTURES | 5 | |
| | LABORATORY EXERCISES | 1 | |
| | **TOTAL** | 6 | 8 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | | |
| COURSE TYPE *general background, special background, specialised general knowledge, skills development* | Background/General Knowledge/Skills Development | | |
| PREREQUISITE COURSES: | | | |
| LANGUAGE OF INSTRUCTION and EXAMINATIONS: | GREEK | | |
| IS THE COURSE OFFERED TO ERASMUS STUDENTS | YES | | |
| COURSE WEBSITE (URL) | | | |

## (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*

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

• To apply the laws of Physics in the various fields
• To understand the correlation of Physics with the control of matter
• To study with the help of Mathematics both quantitatively and qualitatively the various phenomena
• To understand the various changes and how they can affect them
• To understand in larger semesters difficult to understand concepts such as thermochemical changes
• To lay the foundations in relevant directions of science, such as that of physical chemistry
• To understand the potential of an impact on the microcosm, such as detection, measurement and neutralization of microbes
• Be able to understand qualitative and quantitative control methods
• To be able to perceive effects on a large scale, such as those of the environment
At the same time, the laboratory part will have acquired knowledge in order to:
• Be able to handle measuring devices
• Process metering results
• To understand directly the changes in experimental results

## (3) SYLLABUS

| *General Competences*<br>*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*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| 1. Adaptation to new situations.<br>2. Decision making.<br>3. Autonomous work.<br>4. Teamwork<br>5. Criticism and self-criticism.<br>6. Promotion of free, creative and inductive thinking.<br>7. Search, analysis and synthesis of data and information, in order to apply theory in practice | |

**COURSE CONTENT**
**Theoretical Part of the Course**

Introduction. Physical sizes (fundamentals and derivatives), dimensions of physical sizes. Measurement systems and units of measurement. Vector calculus data. Coordinate systems, vectors, unit vectors, inner and outer vector product. Vector definition of forces, torques, moment of force in terms of point and axis, torque of a pair of forces, synthesis of forces and torques.
Newton's laws. Material point balance conditions. Solid body balance.

Kinematics and dynamics of the material point and the solid body. Metaphorical and rotational motion. Linear and angular velocity. Linear and angular acceleration. Linear momentum, angular momentum. Principles of maintaining linear momentum and angular momentum.
Work, kinetic energy (linear and rotary), dynamic energy. Energy theorems.
Oscillations. Periodic movement. Simple harmonic oscillation. Oscillation development condition, rebound force and damping force. Oscillation of point material. External periodic forces. Free and forced oscillations.
Waves. Transverse and longitudinal waves. Speed, energy and wave intensity. Wave interference. Wave properties. Standing waves.
Heat propagation, thermal properties of matter, thermodynamic sizes, thermodynamic axioms.
Electric charge, movement of charged particles within electric fields. Electrostatic fields, electrical flow. Voltage and potential in vacuum and matter, electric dipole, metals – insulators. Capacitors, dielectrics, polarization of dielectrics, energy of electric field. Electrical conductivity and resistance to metals and insulators, conductivity and resistance dependence on temperature. Electric current, electrical power, thermal current results. Electrical sources. Ohm Law. Magnetic field, Biot-Savart law, Laplace forces on loads and conductors. Electromagnetic induction, Faraday law, inductance, mutual induction, magnetic field energy. Electromagnetic waves, electromagnetic spectrum.
Structure of the atom. Energy states of matter. Spectra. Quantization and radiation. Emission and absorption spectra. Optics, waves, reflection and refraction. Lenses. Idol formation, interference and

diffraction of light. Photometric sizes. Principles of quantization of the atom and nucleus. Stimulation of nucleus, radioactivity and radioactive materials.

**Laboratory Part of the Course**

Laboratory presentation of the theoretical part with the help of laboratory exercises. The modules studied are the following:

1. Errors and statistical processing of experimental measurements; Graphs, curve gradient, least square method
2. Determination of linear expansion coefficient
3 Heat exchange phenomena
4 Determination of lens focal length
5. Spectroscope rating

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| DELIVERY<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>*Use of ICT in teaching, laboratory education, communication with students* | |
| TEACHING METHODS<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | *Activity* — *Semester workload*<br>Lectures — 195<br>Laboratory — 26<br><br><br><br><br><br><br><br>**Total** — 221 |
| STUDENT PERFORMANCE EVALUATION<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Theoretical part:<br><br>Written examination on issues of graded difficulty, including<br>• solving problems &exercises<br>• comprehension questions.<br><br>Laboratory part:<br><br>Written examination in every laboratory exercise.<br><br>Students have access to both the criteria and the results of the examinations through the department's website and/or the e-class. |

## (5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

**Greek**

.Θεμελιώδης πανεπιστημιακή φυσική, Wolfson Richard (Συγγρ.) - Κατσικίνη Μαρία, Κουνάβης Παναγιώτης, Κουσουρής Κωνσταντίνος (Επιμ.)

2. ΦΥΣΙΚΗ ΓΙΑ ΕΠΙΣΤΗΜΟΝΕΣ ΚΑΙ ΜΗΧΑΝΙΚΟΥΣ: ΜΗΧΑΝΙΚΗ, ΤΑΛΑΝΤΩΣΕΙΣ ΚΑΙ ΜΗΧΑΝΙΚΑ ΚΥΜΑΤΑ, ΘΕΡΜΟΔΥΝΑΜΙΚΗ, ΣΧΕΤΙΚΟΤΗΤΑ, RAYMOND A. SERWAY, JOHN W. JEWETT

3.Φυσική, Halliday David, Resnick Robert, Walker Jearl, Παπανικόλας Κώστας (γενική επιμέλεια), Καραμπαρμπούνης Α., Κοέν Σ., Σπυράκης Π., Τζανετάκης Π., Στυλιάρης Ε. (επιστημονική επιμέλεια), Τζαμτζής Γ. (συντονισμός)

4.ΦΥΣΙΚΗ Ι, ΚΩΝΣΤΑΝΤΙΝΙΔΗΣ Σ., ΝΤΡΙΒΑΣ Ν., ΠΡΕΛΟΡΕΝΤΖΟΣ Λ.

**English**

1) Doug Giancoli, Physics for Scientists & Engineers with Modern Physics Vol. 1: Pearson New International Edition (4e), Published date 02/08/2013

2) Ohanian H.C. and Market J.T., Physics for Engineers and Scientists, Vol. 1, 3rd edition, Norton W.W. & Company Inc., 2006.

3) Tipler P.A. and Mosca G., Physics for Scientists and Engineers, Volume 1: 6th edition, W.H. Freeman Publ., 2007.
4) Nolan P.J. and Bigliani R., Experiments in Physics, McGraw-Hill, 2nd edition, 1994.
5) Fishbane, P.M., Gasiorowicz, S., Thornton, S.T., Physics for Scientists and Engineers, Prentice-Hall, 1993. (βιβλιοθήκη TEI-A)
6) Keller F.J., Gettys W.E. and Skove M.J., Physics: Classical and Modern, 2nd edition, McGraw-Hill, 1992.

- Related academic journals:

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **2021-2022** | **SEMESTER** | 2 |
| **COURSE TITLE** | **ORGANIC CHEMISTRY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| Tutorials | 2 | |
| Laboratory | 2 | |
| **TOTAL** | 7 | 9 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialized general knowledge, skills development* | Special background / Skills development |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes (project, essay writing) |
| **COURSE WEBSITE (URL)** | .. |

## (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*

After the end of this course, students will be able to:

- understand the basic principles of Organic Chemistry, with a particular emphasis on Food Science
- understand basic chemical reactions and mechanisms associated with them
- identify the functional groups of organic compounds and become familiar to basic identification reactions
- perform basic organic syntheses

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

## (3) SYLLABUS

**Course Objectives**

**Theory:** The scope of the course is the students become familiar with the basic principles of Organic Chemistry with applications in Food Science. The course attempts to provide the required scientific background to students, including the following sections:

- Classification and nomenclature of organic compounds
- Chemical compounds structures and bonds
- Structural formulas of organic molecules
- Coordination chemistry/structures
- Stereochemistry
- Alcohols, Ethers, Aldehydes, Ketones, Alkyl halides, Amines
- Carboxylic acids, Esters
- Aromatic compounds
- Phenols
- Carbohydrates
- Amino acids, Peptides & Proteins
- Lipids

**Laboratory Exercises on:**

- ➢ Application of qualitative organic reactions to basic categories of organic compounds
- Alcohols-Phenols & Aldehydes-Ketones
- Carbohydrates
- Amino acids, Peptides and Proteins
- ➢ Structural and physicochemical properties
- ➢ Organic synthesis
- Synthesis of isoamyl acetate (Banana oil)
- ➢ Isolation of natural compounds - Separation techniques - Recrystallization of organic compounds
- Caffeine Isolation from Instant Coffee

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face / Additionally with distance learning |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching, laboratory education, communication with students. Presentations with powerpoint. Informing students via Web, communication with students via e-mail. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 119 |
| Tutorials | 50 |
| Laboratory | 52 |
| | |
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| | |
| Course total | ***221*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Multiple choice questionnaires<br>• Short-answer questions<br>• Open- ended questions<br>• Problem solving |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

*Greek*

*1) Basic Organic Chemistry, Bruice P.Y. Greek Edition, Broken Hill Publishers Ltd, 2023. Editing T. M. Mavromoustakos.*

*2) Microscale and Miniscale organic chemistry laboratory experiments, Schoffstall A. M., Gaddis A. B., Druelinger M. L. Mc Graw-Hill. Papazisi Publishers, 2012. Editing Xaris Semidalas*

*3) Organic Chemistry, Marc Loudon, Jim Parise. Greek Edition, Broken Hill Publishers Ltd, 2019. Editing T. M. Mavromoustakos.*

*English*

*1. Carrey F. A. (2007). Organic Chemistry, Mc Graw-Hill*

*2. L. G. Wade, J.W. Simek (2016) Organic Chemistry 9th Edition.*

*- Related academic journals:*

*The Journal of Organic Chemistry, ACS Publications*

*European Journal of Organic Chemistry, Wiley Publications*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | F OOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **2031-2033** | **SEMESTER** | **2** |
| **COURSE TITLE** | **QUANTITATIVE ANALYTICAL CHEMISTRY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 2 | |
| TUTORIALS | 2 | |
| LABORATORY EXERCISES | 2 | |
| TOTAL | 6 | 8 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | GENERAL BACKGROUND, GENERAL KNOWLEDGE, SKILLS DEVELOPMENT |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | |

## (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*

Quantitative Analytical Chemistry forms the core of most chemical analyzes applied in the laboratories of the food industry and beyond. The primary goal is to understand the method applied for each quantitative determination, the theoretical interpretation and the knowledge of each reagent and instrument used. Analytical results obtained after statistical control must be given with clarity and scientific accuracy. The most important chapters of the course concern volumetric and gravimetric analysis

Upon completion of the course students will:

- have acquired the basic knowledge needed to understand the basic concepts and apply them to laboratory experiments referring to basic determinations.
- have understood the working method and acquired the theoretical background in

order to present the quantitative result of the chemical analysis scientifically substantiated and accurately.

| ***General Competences***<br>*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma*<br>*Supplement and appear below), at which of the following does the course aim?* | |
|---|---|
| *Search for, analysis and synthesis of data and information,*<br>*with the use of the necessary technology*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and*<br>*sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |

- Search for, analysis and synthesis of data and information with the use of the necessary technology
- Working independently
- Team work
- Production of new research ideas
- Production of free, creative and inductive thinking

## (3) SYLLABUS

**Theoretical course content:**
Introduction to Analytical Chemistry, The Analytical Process. Solutions, concentration of solutions, units of concentration. Statistical processing of analytical data, measurements and experimental error. Volumetric analysis, stoichiometry, volumetric errors. Classification of volumetric analysis methods.
**Neutralization titrations.** oximetry and alkalimetry. Select marker. Applications of Oximetry - Alkalimetry.
**Precipitation titrations.** Equilibria involving sparingly soluble compounds and their ions, solubility product. Argyrometry Mohr Method. Complex ion equilibria.
**Complexometric titrations.** Metal ion indicators. Complexometric analysis techniques. Theoretical basis of water hardness determination. Statistical analysis, applications.
**Redox titrations.** Balances of redox systems. Redox indicators. Manganometry, Iodimetry. Iodometry.

**Gravimetric** Stages of gravimetric immersion methods. Analytical techniques and applications of gravimetric analysis.

**Content of laboratory course:**
**1) Neutralization titrations, oximetry and alkalimetry**
Titration of a standard solution of hydrochloric acid and caustic soda
Determination of solution content in CH3COOH and NH3

Determination of sodium hydroxide/sodium carbonate and sodium carbonate/sodium bicarbonate mixture (double indicator method).
Use of titration curves to identify the equivalence point.

**2) Precipitation volumetric titrations**

Mohr's Method (Formation of Colored Precipitate)

**3) Complexometric volumetric titrations**

Determination of metal cations $Zn^{2+}$ and $Al^{3+}$

Determination of water hardness

**4) Redox titrations**

Manganometry, Iodimetry and Iodometry

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face and distance learning (synchronous) when necessary. Asynchronous material is available in Greek. |
| **USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching: all educational material such as slides, videos, is uploaded in the electronic class (e-class) of the University. Communications with students via e-class or emails. |

**TEACHING METHODS**

*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 visits, project, essay writing, artistic creativity, etc.*

*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*

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 106 |
| Tutorials | 50 |
| Laboratory practice | 52 |
| | |
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| | |
| | |
| | |
| Course total | *208* |

**STUDENT PERFORMANCE EVALUATION**

*Description of the evaluation procedure*

*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*

*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*

- Language evaluation: Greek
- Method of evaluation: multiple choice/short-answer/open-ended questions in the final exam

## (5) ATTACHED BIBLIOGRAPHY

1. Book: Quantitative Chemical Analysis Tenth Edition, Daniel C. Harris, Charles A. Lucy

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | F OOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **2041** | **SEMESTER** | **2** |
| **COURSE TITLE** | **STATISTICS** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 3 | 5 |
| | | |
| | | |
| TOTAL | 3 | 5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | GENERAL BACKGROUND, GENERAL KNOWLEDGE, SKILLS DEVELOPMENT |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | |

## (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*

The aim of the course is the introduction of the students to the principles and models of statistical science and also to empower them to proficiently employ the appropriate methods for data analysis. This will ensure that the resultant conclusions are reliable with scientific rigor and are applied in the most optimal and cost-effective manner.

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

- • Computes and applies location measures and measures of dispersion for clustered and unclustered data
- • Understands and correctly interprets statistical significance
- • Knows how to apply discrete and continuous probability distributions to various

problems

- • Performs hypothesis testing as well as calculates the confidence interval for a population parameter for one sample and two samples. Understands the concept of p-values
- • Knows non-parametric tests as X2 tests
- • Calculates and interprets the results of regression and correlation analysis, analysis of variance (ANOVA) and F & t test
- • Understand the meaning and application of a dummy variable as well as the assumptions underlying a regression model and perform multiple regression using computer software

| ***General Competences***<br>*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma*<br>*Supplement and appear below), at which of the following does the course aim?* | |
|---|---|
| *Search for, analysis and synthesis of data and information,*<br>*with the use of the necessary technology*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and*<br>*sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| • Adapting to new situations<br>• Working independently<br>• Team work<br>• Criticism and self-criticism<br>• Production of free, creative and inductive thinking | |

## (3) SYLLABUS

**Description:** Fundamental aspects of statistical models, sampling, variability of elements, distributions, parameter estimation, simple significance tests, t-tests, analysis of variance, chi-square tests, simple regression and correlation. Specific examples from the Food Technology field. Analysis of variance with multiple rankings, covariance, multiple regression, multiple and partial correlation. Non-parametric statistics. Elements of experimental design.
In more detail, the course content includes:
Definition and basic concepts of statistics. Data collection and organization. Statistical measures of central tendency and dispersion. Data presentation (tables, graphs). Probability theory elements. Distributions (binomial, Poisson, normal). Sampling, sampling distributions. Confidence intervals, significance tests (t-test, F-test, chi-square test). Statistical quality control. Introduction to analysis of variance (ANOVA), methods for comparing means and variables for one, two, and three factors. Correlation coefficient, introduction to spectral density analysis, correlation and spectral density analysis functions. Linear regression and interaction models

(quadratic model), multiple regression. Parametric and non-parametric methods. Experimental design and parametric estimation (factorial designs).

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face. | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching, laboratory, education. Presentations using PowerPoint. Communications with students via Web (e-class). | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
| | Lectures | 130 |
| | | |
| | | |
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| | | |
| | | |
| | Course total | *130* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Language evaluation: Greek<br>• Written examination on topics of varying difficulty, including problem-solving and exercises, as well as comprehension questions. | |

## (5) ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*

1. Montgomery Douglas- Runger C. George (2017). Εφαρμοσμένη Στατιστική και Πιθανότητες για Μηχανικούς, 6η Έκδοση. Εκδόσεις ΤΖΙΟΛΑ.
2. Πετρίδης Δ. (2016). Εφαρμοσμένη Στατιστική, με Έμφαση στην Επιστήμη Τροφίμων. BACK-OFFICE-

## COURSE OUTLINE

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **3011** | **SEMESTER** | **3** |
| **COURSE TITLE** | **FOOD ENGINEERING I** | | |

| **INDEPENDEN TTEACHIN GACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures,laboratoryexercises,etc.Ifthecreditsareawardedforthewholeofthe course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | 4 |
| | | |
| **Total** | 3 | 4 |
| *Add rows if necessary. The organization of teaching and the teaching Methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialized general knowledge, skills development* | Specific background, specialization, skills development |
| **PREREQUISITECOURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE(URL)** | https://eclass.uniwa.gr/courses/TTT111/ |

### (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*

**After successful completion the student will:**

- Be able to apply laws of Thermodynamics in open and closed systems
- Understand the production, distribution and use of steam in food industry, equipment used; performance of heating and cooling engines.
- Understand the psychrometric properties of air, the psychrometric processes and equipment needed for the production of air with specific quality for applications in food storage and processing.
- Apply the principles and laws of heat transfer in food processing applications.
- Apply the principles of fluid flow engineering, estimate the total losses in pipelines, understand the principles of flow measurement devices and select the appropriate mechanical systems for the fluid food transfer.

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

- Retrieve, analyze and synthesize data and information, with the use of necessary technologies
- Individual work
- Team work
- Advance free, creative and causative thinking

## (3) SYLLABUS

### (1) Course content

**Description**: The aim of the course is the understanding of basic laws and principles of Applied Thermodynamics, Heat Transfer and Fluid Engineering and their application in the unit operations applied in food process engineering.

**More specifically, course content includes:**

- Units and Dimensions
- Introduction to Applied Thermodynamics, liquid-vapor phase Equilibrium, Thermodynamic Steam Tables, Thermodynamic Processes, 1$^{st}$ and 2$^{nd}$law of thermodynamics, thermodynamic cycles heating and cooling engines, steam production and distribution, psychrometry.
- Steady state heat transfer: conduction (Fourier law), convention (Newton Law) and radiation (Stefan –Boltzman law). Heat exchange systems, modern heat exchange systems characteristics (equipment, design, dimensioning).
- Unsteady state heat transfer
- Fluid Flow Engineering, viscosity, fluid flow equations (Continuity equation, Bernoulli's equation). Estimation of losses in pipelines, pump selection. Flow measurement devices (pitot tube, Venturi meter, oriffice meter etc.) Fluid suction, equipment used (pumps, compressors, blowers etc).

## (4) TEACHING and LEARNING METHODS-EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face |
| **USEOFINFORMATIONAND COMMUNICATIONSTECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, Communication with students* | Power point presentations and self-assessment test in the Blackboard.<br>Student contact electronically (web & email). |

| **TEACHINGMETHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
|---|---|---|
| | Lectures | 117 |
| | | |
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| | | |
| | | |
| | | |
| | | |
| | | |
| | Course total | *117* |
| **STUDENTPERFORMANCEEVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Literature surveys<br>• Projects<br>• Case studies<br>• Presentations<br>• Mid-term exams<br>• Final exams | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

*Zogzas N. (2017). Principles of Food Engineering. Ed. Tziola.*
*R. Paul Singh, Dennis R. Heldman (2016). Introduction to Food Engineering, Ed. Parisianou A.E., Athens*
*Anandharamakrishnan, C. and Ishwarya, S. P. 2019. Essentials and Applications of Food Engineering. CRC Press.*
*Berk, Z. 2018. Food Process Engineering and Technology (Third Edition). Academic Press.*
*Ibarz, A. and Barbosa-Canovas, G. V. 2014. Introduction to Food Process Engineering. CRC Press: Boca Raton*
*Mc Cabe, Warren L., Smith, Julian C., Harriot, Peter, 2002, "Unit operations of Chemical Engineering", Ed. Tziola.*

*- Related academic journals:*

Journal of Food Engineering
International Journal of Food Engineering
Food Engineering Reviews
Journal of Food Process Engineering
International Journal of Food Engineering and Technology

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **3021-3023** | **SEMESTER** | **3** |
| **COURSE TITLE** | **BIOCHEMISTRY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 3 | |
| TUTORIALS | 2 | |
| LABORATORY EXERCISES | 2 | |
| TOTAL | 7 | 7 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | SPECIAL BACKGROUND |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES (ESSAYS) |
| **COURSE WEBSITE (URL)** | |

## (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*

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

• knows the structure and organization of biomolecules with an emphasis on proteins, lipids and carbohydrates

• knows the basic principles of biochemical changes in living organisms, the main metabolic processes, their regulation and control as well as their interdependence and combination,

• can apply their knowledge to basic biochemical changes that food undergoes and explain the specific phenomena with them.

• can apply the basic laboratory techniques of isolation, separation and identification of micro- and macromolecules that are also applicable in the food sector.

• has the basic knowledge background in Biochemistry to understand other courses in the Department in which this basic background is necessary.

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

- Search for, analysis and synthesis of data and information with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Respect for the natural environment
- Production of new research ideas
- Production of free, creative and inductive thinking

## (3) SYLLABUS

**The course is divided into two parts (A) structural biochemistry and (B) metabolism.**
The first part includes the structure and organization of biomolecules with an emphasis on proteins. The second part focuses on the main metabolic pathways, their regulation and control. The laboratory part of the course includes basic laboratory techniques for the isolation, separation and determination of biomolecules that are also applicable in the field of food.

In more detail:
**Theoretical Part of the Course**
**PART A: STRUCTURAL BIOCHEMISTRY**
Introduction, basic characteristics of biomolecules. Amino acids, Proteins (structures, properties), Enzymes (classification, kinetics and influencing parameters, regulation, explanation of their catalytic action, isozymes). Use of free computational tools to study the tertiary/quaternary structure of proteins, enzyme active sites and other building blocks.
Isolation, receipt of proteins and determination of their structure.
Polysaccharides (main classes, biosynthetic pathways and bioactivity, examples)
Lipids (main classes, biosynthetic pathways and bioactivity, examples)

**PART B: METABOLISM**
Basic principles of metabolism, connection of anabolism and catabolism.
Glycolysis
Gluconeogenesis
Citric acid cycle
Oxidative phosphorylation
Pentose phosphate pathway
Catabolism of Fatty Acids
Amino Acid Oxidation and Urea Production

Photosynthesis
Lipid biosynthesis
Biosynthesis of amino acids
Metabolic/hormonal regulation
**Laboratory Part of the Course**
1. Study of the factors affecting the action of enzymes with application to the peroxidase enzyme system (from radish). The following are studied in detail:
The effect of enzyme quantity
The effect of pH and temperature
The effect of substrate and inhibitor
Finding reaction mechanism and type of inhibition
2. Basic separation and isolation techniques of biomolecules:
Isolation of lipids by Bligh-Dyer
TLC of amino acids and lipids
Isolation of DNA from plant tissue
PCR (Polymerase Chain Reaction) Polymerase Chain Reaction
Electrophoretic separation of DNA fragments

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face and distance learning (synchronous) when necessary. Asynchronous material is available in Greek. |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching: all educational material such as slides, videos, is uploaded in the electronic class (e-class) of the University. Communications with students via e-class or emails. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 107 |
| Literature study and analysis | 20 |
| Tutorials | 30 |
| Laboratory exercise | 52 |
| | |
| | |
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| | |
| Course total | *209* |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Language evaluation: Greek<br>• Method of evaluation: multiple choice/short-answer/open-ended questions in the final exam |

## (5) ATTACHED BIBLIOGRAPHY

1. Book: Biochemistry. Concepts and Connections, Second edition, Appling Dean R., Anthony-Cahill Spencer J., Mathews Christopher K., Pearson.
2. Book: BIOCHEMISTRY, Jeremy M. Berg, John L. Tymoczko, Gregory J. Gatto, Jr., Lubert Stryer

**COURSE OUTLINE**

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **DEPARTMENT** | FOOD SCIENCE & TECHNOLOGY | | |
| **LEVEL OF STUDY** | UNDERGRADUATE | | |
| **COURSE CODE** | **3031-3032** | **SEMESTER** | **3** |
| **COURSE TITLE** | **INTRODUCTION TO FOOD MICROBIOLOGY** | | |

| **SELF-ENDED TEACHING ACTIVITIES** in case the credits are awarded in separate parts of the course e.g., Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits | **WEEKLY TEACHING HOURS** | **ECTS** |
|---|---|---|
| Lectures | 3 | |
| Laboratory exercises | 3 | |
| **Total** | 6 | 7 |
| *Add rows if necessary. The teaching organization and the teaching methods used are described in detail in (d).* | | |

| | |
|---|---|
| **COURSE TYPE** general background, special background, specialization, general knowledge, skill development. | Special background<br>Skill development |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF LECTURES AND EXAMINATIONS:** | Greek |
| **THE COURSE IS OFFERED TO ERASMUS STUDENTS** | Yes Only as «Assignment» |
| **COURSE WEBSITE (URL)** | https://eclass.uniwa.gr/courses/FST235/ |

## (2) LEARNING OUTCOME

**Learning Outcome**

*The learning outcomes of the course are described as well as the specific knowledge, skills, and abilities of an appropriate level that the students will acquire after successful completion of the course.*
*Consult Appendix A*

- *Description of the Level of Learning Outcomes for each course of study according to the Qualifications Framework of the European Higher Education Area*
- *Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B*
- *Comprehensive Guide to writing Learning Outcomes*

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

- Understands the structure and function of the microbial cell.
- Acquire basic knowledge of bacterial metabolism.
- Understands the systematic classification of microorganisms and particularly those of interest to the Food Industry.
- Understands microbial growth principles and the factors that affect it.
- Understands the processes of bacterial sporulation and the effects on food quality and safety.
- Understands the causes of microbial food spoilage and relates them to groups of microorganisms involved.
- Understands the causes of foodborne illness and the prediction of pathogens that can grow in food during preparation, production, and storage.
- Develops abilities to predict the necessary measures for the control of pathogenic and spoilage micro-organisms in food.

- Acquires basic knowledge required for the installation and operation of a Quality Assurance system in the Food Industry.
- Understands the role of beneficial microorganisms in food processing, preservation and safety, and the potential health benefits of consuming such microorganisms.

**General skills**

*Considering the general skills that the graduate must have acquired (as stated in the Diploma Appendix and listed below) which / which of them is the course aimed at?*

| | |
|---|---|
| *Search, analysis and synthesis of data and information, using the necessary technologies.* | *Project planning and management* |
| *Adaptation to new situations* | *Respect for diversity and multiculturalism* |
| *Decision making* | *Respect for the natural environment* |
| *Autonomous work* | *Demonstrating social, professional, and ethical responsibility and sensitivity to gender issues* |
| *Teamwork* | *Exercise criticism and self-criticism* |
| *Work in an international environment* | *Promoting free, creative, and inductive thinking.* |
| *Work in an interdisciplinary environment* | *Other…….* |
| *Generating new research ideas* | |

- Adaptation to new situations.
- Decision making.
- Autonomous work.
- Teamwork
- Exercise criticism and self-criticism.
- Promotion of free, creative, and inductive thinking.

## (3) SYLLABUS

**Theoretical Part of the Course**

- Classification of the most important microorganisms for the Food Industry.
- Bacteria, yeasts, and fungi
- Microbial Biochemistry
- Factors affecting the growth of microorganisms in food: moisture, water activity, redox potential, hydrogen ion concentration, pH, nutrients, etc.
- Sources of food contamination by microorganisms.
- Food preservation from a microbiological point of view.
- Microbial spoilage of various food categories.
- Pathogenic microorganisms and food poisoning (physiology, sources and causes of infections, disease and symptoms, preventive measures).
- Basic methods of enumeration and detection of microorganisms in food

**Laboratory Part of the Course**

- Introduction to the basic functions of a Microbiology Laboratory.
- Classic food Microbiology laboratory equipment
- Microbiological laboratory safety rules
- Strain isolation techniques
- Microscope – Microscopy Techniques
- Bacterial staining
- Gram stain
- Nutrient media/ categories – use
- Disinfection - sterilization techniques
- Bacteria identification techniques

- Biochemical tests – API test

## (4) TEACHING AND LEARNING METHODS - EVALUATION

| | |
|---|---|
| **COURSE METHODOLOGY**<br>Face to face, Distance learning etc. | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES**<br>Use of T.P.E. in Teaching, in Laboratory Education, in Communication with students | Use of IT technologies in data-information collection, teaching, and communication. Updates via Web, communication with students via e-mail. |
| **TEACHING ORGANIZATION**<br>The way and methods of teaching are described in detail.<br>Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc.<br><br>The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed | **Activity** — **Semester Workload**<br>Lectures — 117<br>Laboratory exercises — 65<br><br>**Total** — **182** |
| **STUDENT EVALUATION**<br>Description of the evaluation process<br><br>Assessment Language, Assessment Methods, Formative or Deductive, Multiple-Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others<br><br>Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students. | • **Theory Lectures**<br>Written examination on subjects of graded difficulty based on already posted questions.<br>• **Laboratory Course**<br>Preparation and Public Presentation of a subject on microbiology topics and<br>Assessment on multiple choice tests |

## (5) RECOMMENDED LITERATURE


- Κοτζεκίδου-Ρουκά Π. (2016). Μικροβιολογία-Μικροβιολογική Ανάλυση Τροφίμων. Εκδόσεις ΓΙΑΧΟΥΔΗ Keweloh (2013). Μικροβιολογία και Υγιεινή Τροφίμων. Εκδοτικός Όμιλος ΙΩΝ
- Bibek Ray, Arun Bhunia (2013). Fundamental Food Microbiology, Fifth Edition. CRC Press
- Martin R Adams, Maurice O Moss, Peter McClure (2016). Food Microbiology. Royal Society of Chemistry James M. Jay, Martin J. Loessner, David A. Golden (2008). Modern Food Microbiology. Springer Science & Business Media

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **3041** | **SEMESTER** | **3** |
| **COURSE TITLE** | **MOLECULAR BIOLOGY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 3 | 4 |
| | | |
| | | |
| TOTAL | 3 | 4 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | SPECIAL BACKGROUND, SPECIALISED |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES |
| **COURSE WEBSITE (URL)** | |

## (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*

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

- Understand the fundamental concepts of Molecular Biology related to information flow and the nature of genetic material.
- Learn the basic principles of transcription and regulatory mechanisms in prokaryotes and compare the structure of their genetic material with that of eukaryotes.
- Comprehend the applications of these molecular techniques in basic and applied research.

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

## (3) SYLLABUS

With this course, students become familiar with the molecular mechanisms governing the function of prokaryotic or eukaryotic cells. Emphasis is placed on the storage of genetic information in DNA, DNA replication, gene transcription, and RNA translation into proteins. The fundamental elements of DNA technology and modern genetics are analyzed. Students also become familiar in Recombinant DNA Technology. Cloning, cloning vectors - Southern, Northern, DNA sequencing, PCR, modern techniques for gene analysis, and the utilization of the genome.

Theoretical Part of the Course

- Structure and organization of prokaryotic and eukaryotic cells – Levels of DNA organization, chromosomes – Transmission of genetic information.
- Regulation of transcription in eukaryotic cells.
- Genetic code – The structure and role of tRNA and ribosomes in mRNA translation.
- The translation mechanism in prokaryotic and eukaryotic cells.
- Post-translational modifications of proteins, Protein degradation (proteasomes-lysosomes).
- Cloning, cloning vectors –
- Southern, Northern blot
- DNA sequencing, PCR, Modern technologies for gene analysis and genome utilization.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching: all educational material such as slides, videos, is uploaded in the electronic class (e-class) of the University. Communications with students via e-class or emails. | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.* | ***Activity*** | ***Semester workload*** |
| | Lectures | 117 |
| | | |

| | | |
|---|---|---|
| *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.*<br><br>*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* | | |
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| | | |
| | Course total | *117* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Language evaluation: Greek<br>• Method of evaluation: final exam | |

## (5) ATTACHED BIBLIOGRAPHY


1. Cell and Molecular Biology: Concepts and ExperimentsGerald Karp6th Edition2006
2.Modern Biotechnology, J. Tramper, Yang Zhu, 2011.
3. Molecular Biology of the Cell, Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter, 5th Edition 2008

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **3051** | SE**MESTER** | 3 |
| **COURSE TITLE** | **MARKETING FOOD PRODUCTS** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 3 | 4 |
| | | |
| TOTAL | 3 | 4 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | SPECIAL BACKGROUND |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES (essays) |
| **COURSE WEBSITE (URL)** | |

## (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*

The purpose of the course is to understand:
- the basic principles of marketing and how they apply to the food industry.
- the ability to recognize the key concepts of value creation and differentiation
- the limitations of the concept of marketing as a basic business principle
- the key communication methods and ensure value to consumers.
- the marketing research tools as well as the use of primary and secondary data
- the way and mechanisms of decision-making

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

- Decision-making
- Working independently
- Teamwork
- Criticism and self-criticism
- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Project planning and management
- Respect for the natural environment
- Production of free, creative and inductive thinking
- Showing social, professional and ethical responsibility and sensitivity to gender issues
- Production of new research ideas
- Empower presentation skills

## (3) SYLLABUS

**Description:**

Does the subject of the course focus on 4 main axes?

1. Fundamental Principles of Marketing
2. Creating value for Customers - Consumers
3. Communication - Content creation
4. Planning and Marketing Strategy

Through case studies, emphasis is placed on Marketing in the food sector.
In more detail, the content of the course includes:

- **Introduction to Marketing & its Fundamentals**

Marketing and operations
The marketing environment
Consumer's behavior
B2B level marketing
Marketing, Ethics and Society
Marketing Research (Primary, Secondary data, Process stages, use of research tools)
Market segmentation, targeting and product placement.
Creating value for Customers/Consumers.

- **Products and value.**

Value through brand, through service, through relationships, through innovation, through price.
Marketing communication
Types of marketing communication
Digital marketing
Content creation

- **Planning and Marketing Strategy**

Marketing Planning
Competition analysis
Product life cycle, development

- *Presentation skills in a business environment*

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face, distance -synchronous e-learning when necessary. |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of IT technologies in the collection of secondary data - information from relevant electronic bases - repositories. Presentation of semester work using a presentation application (eg Microsoft Powerpoint). Communication with students via e-class, teams, e-mail. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 54 |
| Study & Analysis of literature | 10 |
| Study and discuss cases in class | 15 |
| Writing and Presentation of Papers | 38 |
| | |
| | |
| | |
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| | |
| Course total | *117* |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Language evaluation: Greek<br>• Method of evaluation:<br>Participation in study groups<br>Written essay<br>Presentation & oral examination |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

*Principles and practice of marketing. David Jobber & Fiona Ellis-Chadwick, Ninth edition. McGrow-Hill Education.*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **3061** | **SEMESTER** | 3 |
| **COURSE TITLE** | **FOOD LEGISLATION** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 3 | 4 |
| | | |
| **TOTAL** | **3** | **4** |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | SPECIALISED KNOWLEDGE |
| **PREREQUISITE COURSES:** | NO |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | https://fst.uniwa.gr/course/nomothesia-trofimon/ |

## (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*

**Aim**

The course aims to introduce to the students the main principles and the aspects of the National and European Food Legislation framework

**Learning Outcomes**

Upon successful completion of the course the students shall be able to:

- Know the structure and the institutions of the EU and the evolution of European legislation.
- Be familiar with the objectives of the legislation, the structure and the operation of the European Food Safety Authority and the early warning systems.
- Understand the scope of the general and specific Regulations for food hygiene and their applications.
- Be familiar with the International Codes and current National/European Food Laws.

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

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Development of free, creative and inductive thinking
- Working in an international environment

## (3) SYLLABUS

- Introduction to Food Legislation: The European Union and its Institutions and Bodies.
- The evolution of the European Food Legislation and the harmonization of Greek legislation
- National and International Food Codes.
- General and special Regulations for food hygiene and official controls (178/2002, 852/2003. 853/2003, 1169/2011).
- Legislation in key areas related to food: Additives, Pollutants - Contaminants, Residues, Materials and objects intended to come into contact with food, Biotechnology

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to Face, e class notes | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | E class extra material<br>Communication ith students through e-mails and e-class tools | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
| | LECTURES (including case studies, demonstration of on-line tools etc) | 117 |
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| | | |

| | | |
|---|---|---|
| | Course total | *117* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Case Studies<br>Final examination in Greek which includes: multiple choice questions, essay questions and short answer questions. | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

- EU Regulations 178/2002, 852/2003. 853/2003, 1169/2011, *1333/2008, 1334/2008, 1129/2011, 1881/2006, 470/2009, 1935/2004, 1829/2003, 1830/2003*
- Codex Alimentarius FAO-WHO
- Greek Food and Drinks Code
- Bernd van der Meulen and Bart Wernaart (Eds). (2020( EU Food Law Handbook. Wageningen Academic Publishers

*- Related academic journals:*

- EFSA Journal
- Food Policy
- European Food and Feed Law Review

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| SCHOOL | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **3071** | **SEMESTER** | **3** |
| **COURSE TITLE** | **INTRODUCTION TO PHYSICAL CHEMISTRY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 2 | 3 |
| | | |
| Total | 2 | 3 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Background |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | .. |

## (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*

Upon successful completion of the course the student will be able to:

• Calculates changes in thermodynamic properties related to phase transitions and chemical reactions.

• Calculates changes in thermodynamic properties as a result of changes in the environment (e.g. temperature, pressure).

• Mathematically exports the thermodynamic equations.

• Mathematically extracts the equations of the kinetics of chemical reactions for reactions with different complexity.

• Calculates changes in the speed of chemical reactions as a result of changes in the environment.

• Knows elements of spectroscopy, quantum mechanics and statistical thermodynamics

| ***General Competences***<br>*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*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| • Independent work<br>• Teamwork | |

## (3) SYLLABUS

**COURSE CONTENT**

Description: Introduction to the physical principles that explain and predict the behavior of atoms and molecules. It includes introductory thermodynamics, chemical equilibrium, chemical kinetics, introductory in quantum mechanics, spectroscopy and statistical thermodynamics. Emphasis is placed on the concepts of physical chemistry that are particularly related to the biological sciences.

More specifically, the content of the course includes:

• Introduction, kinetic theory of gases, microscopic basis of macroscopic properties (e.g. P and T).

• 1st thermodynamic law (energy conservation), Internal energy and enthalpy, Energy transfer mechanisms (heat and work), Reversibility. Gases, State variables, System and environment contrast.

• 2nd thermodynamic law, 3rd thermodynamic law, Micro- and macroscopic description of entropy

• Spontaneous processes and balance, Energies Gibbs and Helmholtz, The relationship between Gibbs' energy and project.

• Natural equilibrium applications (phase equilibrium),

• Mixture thermodynamics, Chemical potential, Ideal solutions. Activity and real solutions, Prosthetic properties (relationship with entropy).

Chemical equilibrium applications, Gibbs energy of reactions as a function of synthesis, Standard Gibbs energy, equilibrium constant, effects of catalysts, pressure, temperature on equilibrium.

• Introduction to Quantum Mechanics.

• Elements of spectroscopy (fluorescence, IR, Raman, etc.).

• Statistical Thermodynamics and Temperature.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
|---|---|

| | |
|---|---|
| **USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of Information Technologies in data collection, information, teaching and communication. Powerpoint presentations, Information via Web & communication with students and via e-mail |

| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
|---|---|---|
| | Lectures | 78 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | Course total | *78* |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Progress<br>• Final Exam |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

**Greek**

1.Βιβλίο[94643666] ΦΥΣΙΚΟΧΗΜΕΙΑ, Chang R., Thoman W.J.
2 .Βιβλίο [94690187]: ΦΥΣΙΚΟΧΗΜΕΙΑ, Peter Atkins, Julio de Paula, James Keeler Λεπτομέρειες
3.Βιβλίο [77115195]: Φυσικοχημεία για τις Βιολογικές Επιστήμες, Hammes Λεπτομέρειες

**English**

1) Hammes, G. G. and Hammes-Schiffer, S. (2015). Physical Chemistry for the Biological Sciences, Wiley.
2) Atkins, P. and de Paula, J. (2011). Physical Chemistry for the Life Sciences. W. H. Freeman. 3) Ananya Ganguly, Fundamentals of Physical Chemistry, Pearson Education India, 2011
4) Dhawan, Physical Chemistry, McGraw-Hill Education (India) Pvt Limited

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **4011-4012** | **SEMESTER** | 4 |
| **COURSE TITLE** | **FOOD ENGINEERING II** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| Laboratory Exercises | 3 | |
| Total | 6 | 7 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | *special background, Specialized* |
| **PREREQUISITE COURSES:** | 3011 Food Engineering I |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

## (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*

After successful completion of the course students will:

- Be able to apply the basic principles and the laws of heat and mass transfer to the food engineering operations.
- Be able to set up and solve the appropriate heat and mass balances for the above operations.
- Understand the mechanical separation processes and to specify the parameters that influence the operation of the equipment used.
- Be able to experimentally determine the basic characteristic factors that are involved in the above processes.

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

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment

## (3) SYLLABUS

Heat exchangers design and optimization.
Mass diffusion and transfer (1st & 2nd Fick's laws), moisture transmission in foods (sorption & desorption curves).
Mass and Energy balances, application examples in food engineering operations.
Food rheology (Newtonian and non-Newtonian fluids, viscoelastic behavior).
Mechanical separations (sedimentation, centrifugation, filtration, membrane separation).
Heating, cooling and freezing of foods.
Food engineering operations (drying, evaporation, distillation, extraction and crystallization).

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of Information Technologies in Teaching, Laboratory Education and Communication. Presentations using powerpoints. Information via web (e-class). |

**TEACHING METHODS**

*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 visits, project, essay writing, artistic creativity, etc.*

*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*

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 117 |
| Laboratory Exercises | 78 |
| | |
| | |
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| | |
| | |
| Course total | **195** |

| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Lab reports,<br>Problem Solving,<br>Case Studies,<br>Final examination. |
|---|---|

## (5) SUGGESTED LITERATURE

- *Suggested bibliography:*


Νικόλαος Π. Ζόγκζας, 2017, «Βασικές Αρχές Μηχανικής Τροφίμων», εκδόσεις Τζιόλα.
Mc Cabe, Warren L., Smith, Julian C., Harriot, Peter, 2002, "Βασικές Διεργασίες Χημικής Μηχανικής", εκδόσεις Τζιόλα.
Singh R. P., Heldman R. D., 2016, «Εισαγωγή στη Μηχανική Τροφίμων», Εκδόσεις Παρισιανού.
Σαραβάκος, Γ.Δ., 1979, «Τεχνική Θερμικών Διεργασιών» Β΄εκδ., εκδόσεις Ε.Μ.Π., Αθήνα.
Σαραβάκος, Γ.Δ., 1984, «Τεχνική Σωματιδίων - Μηχανικοί Διαχωρισμοί», Β΄εκδ., εκδόσεις Ε.Μ.Π., Αθήνα.
Foust, A. S., Wenzel, L. A., Clump, C. W., Maus, L. & Anderson, L.B., 1980, *Principles of Unit Operations*, 2nd ed., John Wiley &Sons.
Fryer P. J., Pyle D. L., Rielly C.D., 1997, "Chemical Engineering for the Food Industry", Blackie A. & P., Chapman & Hall, London.
Harper, C.J., 1976, *Elements of Food Engineering*, AVI Publishing Co., Westport, Connecticut.
Heldman, R.D., and Lund, B.D., 2007, *Handbook of Food Engineering*, CRC Press, Taylor & Francis Group, Boca Raton, London New York.
Singh, R.P. and Heldman, R.D., 2009, *Introduction to Food Engineering*, 4th ed., Academic Press, San Diego.
Toledo, R.T., 2007, *Fundamentals of Food Process Engineering*, 3d ed., Van Nostrand Reinhold, New York.
Valentas, J.K., Rotstein, E., and Singh R.P., 1997, *Handbook of Food Engineering Practice*, CRC Press, Boca Raton, New York.

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE & TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **4021-4022** | **SEMESTER** | 4 |
| **COURSE TITLE** | **FOOD CHEMISTRY I** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| Laboratory classes | 2 | |
| Total | 5 | 7 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Special background, specialized knowledge, skills development |
| **PREREQUISITE COURSES:** | 2021-2022 Organic Chemistry |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | No |

## (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*

Upon successful completion of the course the student will be able to:

- understand the functional properties of proteins, carbohydrates and lipids in food
- interpret the behavior and interactions of the main ingredients in food systems
- describe the physicochemical and biochemical processes that degrade quality in food processing and preservation
- understand surface phenomena and factors that affect the stability of dispersion systems
- understand the destabilization conditions in food systems and to control the physicochemical processes involved

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

- Search for, analysis and synthesis of data and information, using the necessary technologies
- Project design and management
- Decision making
- Independent Work
- Teamwork
- Respect for the natural environment
- Promotion of critical, creative and inductive thinking

## (3) SYLLABUS

**Theoretical part**

General description: Main food ingredients (water-ice, carbohydrates, lipids, amino acids, peptides, proteins, enzymes). Structure, chemical and biochemical properties, reactions. Food dispersion systems, surface phenomena. Functional properties of proteins, polysaccharides, fats. Ingredient interactions in food systems. Physicochemical and biochemical processes that reduce the quality and shelf life of food.

More specifically, the content of the theoretical part includes:

- Water: Natural constants, water-ice structure, water / soluble interactions, adsorption effects, water activity and food stability.
- Carbohydrates: Classification, nomenclature, structure and dietary function. Monosaccharides, oligosaccharides, polysaccharides. Saccharide reactions. Hydrolysis, dehydration, thermal degradation, non-enzymatic tarnishing. Functions of mono- and oligosaccharides in food. Hydrophilic character, sweetness, tanning products and food flavor. Functional properties of polysaccharides. Relationship between structure and physical properties, polysaccharide-water interaction, acidic polysaccharides. Starch, starch granule structure, gelatinization, starch gels, starch rearrangement. Modified starches. Glycogen, cellulose, hemicelluloses. Pectins, vegetable gums.
- Lipids: Nomenclature, classification. Fatty acids, acylglycerols, phospholipids, glycolipids, lipoproteins. Physical and chemical properties. Fats and oils, composition, properties, chemical activity. Emulsions - emulsifiers. Lipid changes in food, lipolysis, autoxidation, thermal degradation. Chemistry of processed fats - oils. Role of lipids in food odor and taste. Normal action of lipids.
- Amino acids, peptides, proteins: Physicochemical properties, denaturation of proteins.

Functional properties of proteins (water retention, solubility, viscosity, coagulation and foaming capacity, emulsification of fat, viscoelastic properties of gluten, binding of aromatic and flavor compounds). Nutritional properties of proteins. Chemical and enzymatic modification of proteins. Changes in food processing and preservation.

**Laboratory classes**

General description: Enhancement of students' learning experience in the principles and applications of food chemistry, by performing experiments, problem solving, individual / group work and discussions. Application of classical chemical methodology and modern laboratory techniques for the study of basic categories of chemical compounds found in food. Emphasis is placed on performing experiments on the properties and reactions of food ingredients, on changes in processing and preservation, and on evaluating, processing, and presenting experimental data.

More specifically, the content of the laboratory classes includes:

Carbohydrates

- Reducing sugars
- Chemical hydrolysis of sugars - Determination of total and reducing sugars
- Non-enzymic browning: Caramelization
- Gelatinization: Starch gels
- Pectins: Fruit gels

Amino Acids – Proteins

- Coagulation test - Pigment reactions
- Non-enzymic browning: Maillard reaction
- Water holding capacity
- Gelling properties of proteins
- Foaming capacity of ovalbumin
- Viscoelastic properties of gluten

Lipids

- Oxidative rancidity
- Enzymic lipid hydrolysis
- Emulsions - Emulsifiers

Special topics of interest in Food Chemistry

- Enzymic browning
- Degradation of vitamins
- Changes in natural pigments
- Allergen detection

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of information technologies in data-information collection, teaching and communication. Information via Web, communication with students via e-mail. | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*The student's study hours for each learning* | ***Activity*** | ***Semester workload*** |
| | Lectures | 117 |
| | Laboratory classes | 52 |
| | | |
| | | |
| | | |
| | | |
| | | |

| | | |
|---|---|---|
| *activity are given as well as the hours of non-directed study according to the principles of the ECTS* | | |
| | | |
| | Course total | ***169*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Language of assessment: Greek<br>Evaluation methods<br>- Multiple choice questionnaires<br>- Short-answer questions<br>- Public presentation<br>- Laboratory work<br>- Final examination | |

## (5) ATTACHED BIBLIOGRAPHY


*- Suggested bibliography:*
*Σφλώμος, Κ. (2017). Χημεία Τροφίμων: Θεωρία και Ασκήσεις. Κορωπί: Εκδόσεις ΝΟΤΑ.*
*Belitz, H.D., Grosch, W. & Schieberle, P. (2006). Χημεία Τροφίμων, 3η Έκδοση. Θεσσαλονίκη: Εκδόσεις Τζιόλα.*
*Damodaran, S. & Parkin, K.L. (2017). Fennema's Food Chemistry, fifth edition. Boca Raton: CRC Press.*
*Weaver, C.M. & Daniel, J.R. (2003). The Food Chemistry Laboratory: A Manual for Experimental Foods, Dietetics, and Food Scientists, Second Edition. Boca Raton: CRC Press.*
*Walstra, P. (2002). Physical Chemistry of Foods. Boca Raton: CRC Press.*
*Weder, J.K.P. & Belitz, H-D. (2003). Protein, Chemistry. In Encyclopedia of Food Sciences and Nutrition, 2nd Edition (edited by B. Caballero, L. Trugo & P. Finglas). Pp. 4805-4818. London: Academic Press.*
*Weder, J.K.P. & Belitz, H-D. (2003). Protein, Functional Properties. In Encyclopedia of Food Sciences and Nutrition, 2nd Edition (edited by B. Caballero, L. Trugo & P. Finglas). Pp. 4835-4841. London: Academic Press.*
*Brewer, M.S. (2004). Chemical and Physical Characteristics of Meat, Water-Holding Capacity. In Encyclopedia of Meat Sciences (edited by W. Jensen, C. Devine, & M. Dikeman). Pp. 242-249. London: Academic Press.*
*Cornforth, D.P. & Jayasingh, P. (2004). Chemical and Physical Characteristics of Meat, Colour and Pigment. In Encyclopedia of Meat Sciences (edited by W. Jensen, C. Devine, & M. Dikeman). Pp. 249-256. London: Academic Press.*
*Pearce, K.L., Rosenvold, K., Andersen, H.J. & Hopkins, D.L. (2011). Water distribution and mobility in meat during the conversion of muscle to meat and ageing and the impacts on fresh meat quality attributes — A review. Meat Science, 89, 111-124.*
*Puolanne, E. & Halonen, M. (2010). Theoretical aspects of water-holding in meat. Meat Science, 86, 151-165.*
*Zayas, J.F. (1997). Functionality of Proteins in Food. New York: Springer-Verlag.*
*Coupland, J. (2014). An Introduction to the Physical Chemistry of Food. New York: Springer-Verlag.*
*Bekes, F. & Wrigley, C. (2004). Cereals, Protein Chemistry. In Encyclopedia of Grain Science (edited by C. Wrigley, H. Corke & C. Walker). Pp. 254-262. London: Academic Press.*
*Hodge, J.E. & Osman, E.M. (1976). Carbohydrates. In Principles of Food Science, Part I, Food Chemistry (edited by O.R. Fennema). Pp. 41-138. New York: Marcel Dekker, Inc.*
*Tester, R.F. & Karkalas, J. (2003). Carbohydrates – Interactions with Other Food Components. In Encyclopedia of Food Sciences and Nutrition, Second Edition (edited by B. Caballero, L. Trugo & P. Finglas). Pp. 875-881. London: Academic Press.*
*Dupont, J.L. (2005). Lipids/Chemistry and Classification. In Encyclopedia of Human Nutrition, Second Edition (edited by B. Caballero, L. Allen & A. Prentice). Pp. 126-132. London: Academic Press.*
*Gordon, M.H. (2003). Fats/Classification. In Encyclopedia of Food Sciences and Nutrition, Second Edition (edited by B. Caballero, L. Trugo & P. Finglas). Pp. 2287-2292. London: Academic Press.*
*Gunstone, F. (2009). The Chemistry of Oils and Fats: Sources, Composition, Properties and Uses. Wiley-Blackwell.*
*Kalo, P. & Kemppinen, A. (2003). Triglycerides/Structures and Properties. In Encyclopedia of Food Sciences and Nutrition, Second Edition (edited by B. Caballero, L. Trugo & P. Finglas). Pp. 5857-5868. London: Academic Press.*
*Parkin K.L. & Damodaran, S. (2003). Oxidation of food components. In Encyclopedia of Food Sciences and Nutrition, Second Edition (edited by B. Caballero, L. Trugo & P. Finglas). Pp. 4288-4294. London: Academic Press.*
*- - Related academic journals:*
*Food Chemistry*
*Journal of Agricultural and Food Chemistry*
*Journal of Food Science*
*Food Control*
*Food Hydrocolloids*

*Critical Reviews in Food Science and Nutrition*
*International Journal of Food Science and Technology*
*Food Research International*
*LWT - Food Science and Technology*
*European Food Research and Technology*
*Comprehensive Reviews in Food Science and Food Safety*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMICUNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVELOFSTUDIES** | UNDERGRADUATE | | |
| **COURSECODE** | **4031** | **SEMESTER** | **4** |
| **COURSETITLE** | **FOOD PROCESSING I** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures,laboratoryexercises,etc.Ifthecreditsareawardedforthewholeofthe course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| | 3 | 4 |
| | | |
| **Total** | 3 | 4 |
| *Add rows if necessary. The organization of teaching and the teaching Methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSETYPE** *general background, special background, specialized general knowledge, skills development* | Specific background, specialization, skills development |
| **PREREQUISITECOURSES:** | - |
| **LANGUAG EOF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE(URL)** | |

## (2) LEARNINGOUTCOMES

### 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*

**After successful completion the student will:**

- Gain an understanding of the basic principles and practices of the main food processing and preservation operations
- Describes food processing methods, with an emphasis on microbiological, physicochemical, and calculation & design and operation of processing facilities
- Be familiar with food preservation methods including the application of heat, low temperatures and radiation
- Gain an understanding of the basic principles and design methods of these processes
- Gain an understanding of the factors affecting product characteristics and quality
- Become familiar with the equipment used

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

- Retrieve, analyze and synthesize data and information, with the use of necessary technologies
- Individual work
- Team work
- Advance free, creative and causative thinking
- Project planning and management
- Respect for the natural environment

## (3) SYLLABUS

### Course content

**Description**: Application of the principles of chemistry, microbiology and physics in food processing. The course includes an introduction to the food processing industry; general characteristics of raw food materials, processing, and preservation of food materials by heating, low temperatures and radiation (irradiation, radiofrequency, microwaves and infrared); process calculation; processing factors that influence quality.

**More specifically, course content includes:**

- Introduction to Food Processing
- Establishment of Food Production Units
- Thermal Processing of Foods
    - Thermal Resistance
    - Heat Transfer
    - Heat Treatment Calculation
    - Thermal Degradation of Foods
    - Application of Heat Treatment
    - Spoilage of Thermally Processed Foods
- Preservation by Low Temperatures
    - Low Temperature Preservation Principles
    - Food Chilling
    - Controlled – Modified Atmospheres
    - Freezing Foods
    - Transport & Disposal of Low Temperature Preserved Foods
- Processing with Using Radiation
    - Food Irradiation
    - Processing by Radio Frequency
    - Processing by Microwaves
    - Processing by Infrared

## (4) TEACHING and LEARNING METHODS-EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face,Distancelearning,etc.* | Face to face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, Communication with students* | Power point presentations and self-assessment test in the Blackboard.<br>Student contact electronically (web & email). |

**TEACHING METHODS**

*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 visits, project, essay writing, artistic creativity, etc.*

*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 theECTS*

| *Activity* | *Semester workl oad* |
|---|---|
| Lectures | 117 |
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| | |
| Course total | *117* |

**STUDENT PERFORMANCE EVALUATION**

*Description of the evaluation procedure*

*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, arti nterpretation, other*

*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*

- Literature surveys
- Projects
- Case studies
- Presentations
- Mid-term exams
- Final exams

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

*Lazos E., Lazou A. (2017). Food Processing 1: Preservation Processes using heating, loe temperatures and radiative energy. PAPAZISI Publications*
*Rahman MS (2020) Handbook of Food Preservation, Second Edition. Food Science and Technology. CRC Press*
*Ramaswamy HS, Marcotte M (2006) Food Processing: Principles and Applications. CRC Press*
*Brennan JG, Grandison AS (2011) Food Processing Handbook. John Wiley & Sons*
*Fellows PJ (2023) Food Processing Technology - Principles and Practice (5th Edition). Woodhead Publishing*
*Holdsworth SD, Simpson R (2016). Thermal Processing of Packaged Foods. Food Engineering Series. Springer International Publishing*
*Saravacos GD, Maroulis ZB (2010) Food Process Engineering Operations. Taylor and Francis*

*- Related academic journals:*

Journal of Food Processing and Preservation
Food and Bioproducts Processing
Journal of Food Science
Innovative Food Science and Emerging Technologies
LWT - Food Science and Technology
Trends in Food Science & Technology
European Food Research and Technology
Comprehensive Reviews in Food Science and Food Safety

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **4041** | **SEMESTER** | **4** |
| **COURSE TITLE** | **NUTRITION** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures,laboratoryexercises,etc.Ifthecreditsareawardedforthewholeofthe course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | 4 |
| | | |
| **Total** | 3 | 4 |
| *Add rows if necessary. The organization of teaching and the teaching Methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialized general knowledge, skills development* | Specialized, general knowledge |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek (and English) |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes |
| **COURSE WEBSITE (URL)** | https://fst.uniwa.gr/announcements/analytiko-programma-proptychiakon-spoydon/ |

## (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*

Upon completion of the course the student will

- understand the role of the nutrient to body health and well being and their recommended daily values, as well as their main food sources
- be able to calculate energy needs, healthy body weight ranges, as well as to assess somatometric data
- ab able to assess the nutrient status by comparing with the official dietary guidelines both on a food and a nutrient level.

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

- *Search for, analysis and synthesis of data and information, with the use of the necessary technology*
- *Adapting to new situations*
- *Decision-making*
- *Working independently*
- *Production of free, creative and inductive thinking*

## (3) SYLLABUS

Basics of Nutrition, nutrients and non- nutrients regarding human health, well being and disease-free longevity. The courses refers topics related to:
1. the role of Nutrition
2. Carbohydrates
3. Fats and oils
4. Proteins
5. Vitamin
6. Minerals
7. Water
8. Assimilation and metabolism
9. Energy needs and body weight
10. Dietary recommendation on a nutrient level
11. Dietary recommendations on a food level
12. Food Composition Tables
13. Nutritional Assessment

## (4) TEACHING and LEARNING METHODS-EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, Communication with students* | Use of ICT in teaching,<br>communication with students via platform (eclass) and emails | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.* | ***Activity*** | ***Semester work load*** |
| | Lectures | 91 |
| | | |

| | | |
|---|---|---|
| *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.*<br><br>*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* | | |
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| | | |
| | Course total | *91* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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, arti nterpretation, other*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Language of evaluation is Greek (and English in case of Erasmus student participation), methods of evaluation is conclusive, written examination is comprising multiple choice questionnaires, short-answer questions, open- ended questions, problem solving, | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography: (in Greek)*

1. Η Επιστήμη της Διατροφής
   Κωδικός Βιβλίου στον Εύδοξο: 102124811
   Έκδοση: 4/2021
   Συγγραφείς: Thompson, Manore, Vaughan
   ISBN: 978-618-5296-26-1
   Τύπος: Σύγγραμμα
   Διαθέτης (Εκδότης): ΛΑΓΟΣ ΔΗΜΗΤΡΙΟΣ ΔΙΑΤΡΟΦΗ του ΑΝΘΡΩΠΟΥ
2. Σφλώμος Κωνσταντίνος
   ISBN: 978-618-83264-2-2 Έκδοση: 1/2017
   Διαθέτης (Εκδότης): ΚΥΡΙΑΚΟΣ ΑΛΕΞΙΟΥ & ΣΙΑ ΕΕ
3. Η διατροφή στον κύκλο της ζωής
   Judith E. Brown
   ISBN: 978-960-7875-89-1 Έκδοση: Πέμπτη/2015
   Διαθέτης (Εκδότης): ΛΑΓΟΣ ΔΗΜΗΤΡΙΟΣ

*- Related academic journals:*

- Journal of Nutrition,
- Public Health Nutrition,

British Journal of Nutrition

## COURSE OUTLINE

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **DEPARTMENT** | FOOD SCIENCE & TECHNOLOGY | | |
| **LEVEL OF STUDY** | UNDERGRADUATE | | |
| **COURSE CODE** | **4051-4052** | **SEMESTER** | **4** |
| **COURSE TITLE** | **FOOD MICROBIOLOGY AND MICROBIOLOGICAL ANALYSIS** | | |

| **SELF-ENDED TEACHING ACTIVITIES** in case the credits are awarded in separate parts of the course e.g., Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits | **WEEKLY TEACHING HOURS** | **ECTS** |
|---|---|---|
| Lectures | 3 | |
| Laboratory exercises | 3 | |
| **Total** | 6 | 8 |
| *Add rows if necessary. The teaching organization and the teaching methods used are described in detail in (d).* | | |

| | |
|---|---|
| **COURSE TYPE** general background, special background, specialization, general knowledge, skill development. | Special background<br>Skill development |
| **PREREQUISITE COURSES:** | 3031-3032 Introduction to Food Microbiology |
| **LANGUAGE OF LECTURES AND EXAMINATIONS:** | Greek |
| **THE COURSE IS OFFERED TO ERASMUS STUDENTS** | Yes Only as "Assignment" |
| **COURSE WEBSITE (URL)** | https://eclass.uniwa.gr/courses/FST243/ |

### (2) LEARNING OUTCOME

**Learning Outcome**

*The learning outcomes of the course are described as well as the specific knowledge, skills, and abilities of an appropriate level that the students will acquire after successful completion of the course.*
*Consult Appendix A*

- *Description of the Level of Learning Outcomes for each course of study according to the Qualifications Framework of the European Higher Education Area*
- *Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B*
- *Comprehensive Guide to writing Learning Outcomes*

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

- Acquire basic knowledge about the groups of food-born microorganisms.
- Evaluate the importance of the presence of groups of microorganisms in food.
- Identify technologically beneficial microorganisms found in fermented foods.
- Understand the effect of food processing and preservation technologies on microorganisms.
- Acquire critical thinking and skills in understanding appropriate technologies to ensure food quality and safety.
- Choose the most appropriate method of microbiological analysis and interpret its results.
- Evaluate and apply new and innovative proposed methods of microbiological analysis and compares them with classical methodology.

**General skills**

*Considering the general skills that the graduate must have acquired (as stated in the Diploma Appendix and listed below) which / which of them is the course aimed at?*

| | |
|---|---|
| *Search, analysis and synthesis of data and information, using the necessary technologies.* | *Project planning and management* |
| *Adaptation to new situations* | *Respect for diversity and multiculturalism* |
| *Decision making* | *Respect for the natural environment* |
| *Autonomous work* | *Demonstrating social, professional, and ethical responsibility and sensitivity to gender issues* |
| *Teamwork* | *Exercise criticism and self-criticism* |
| *Work in an international environment* | *Promoting free, creative, and inductive thinking.* |
| *Work in an interdisciplinary environment* | *Other…….* |
| *Generating new research ideas* | |

- Adaptation to new situations.
- Decision making.
- Autonomous work.
- Teamwork
- Exercise criticism and self-criticism.
- Promotion of free, creative, and inductive thinking.

## (3) COURSE CONTENT

**Theoretical Part of the Course**

- Categories of Microorganisms present in food: Spoilage, pathogenic, beneficial.
- Microbiology of products according to their processing and preservation methods

-Preserved at low temperatures.
-Preserved under modified packaging atmosphere.
-Preserved with additives.
-Heat treated – Canned foods.
-Dehydrated foods.
-Irradiated foods.

- Fermented foods.
- Modern food processing methods.
- Microbiological criteria and methods of microbiological food analysis

**Laboratory Part of the Course**

- Objectives of Microbiological Analysis
- Classical microbiological techniques – Quantitative methods
- Serial dilution method and plate counting
- Method of the Most Probable Number – MPN
- Application of the above methods to groups of bacteria in properly selected real foods.
- Aerobic Mesophilic Bacteria
- Psychrophilic/ Psychrotrophic bacteria.
- Coliforms
- *S. aureus*
- Classical microbiological techniques – Qualitative methods
- *Listeria monocytogenes*
- *Salmonella* spp.
- Microbiological analysis of air and surfaces of production areas
- Microbiological analysis of water
- Evaluation of microbiological results of food analyses

## (4) TEACHING AND LEARNING METHODS - EVALUATION

| | |
|---|---|
| **COURSE METHODOLOGY**<br>Face to face, Distance learning etc. | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES**<br>Use of T.P.E. in Teaching, in Laboratory Education, in Communication with students | Use of IT technologies in data-information collection, teaching, and communication. Updates via Web, communication with students via e-mail. |
| **TEACHING ORGANIZATION**<br>The way and methods of teaching are described in detail.<br>Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc.<br><br>The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed | **Activity** — **Semester Workload**<br>Lectures — 117<br>Laboratory exercises — 65<br><br>**Total** — **182** |
| **STUDENT EVALUATION**<br>Description of the evaluation process<br><br>Assessment Language, Assessment Methods, Formative or Deductive, Multiple-Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others<br><br>Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students. | • **Theory Lectures**<br>Written examination on subjects of graded difficulty based on already posted questions.<br><br>• **Laboratory Course**<br>Preparation and Public Presentation of a subject on microbiology topics and<br>Assessment on multiple choice tests |

## (5) RECOMMENDED LITERAURE


1. Κοτζεκίδου-Ρουκά Π. (2016). Μικροβιολογία-Μικροβιολογική Ανάλυση Τροφίμων. Εκδόσεις ΓΙΑΧΟΥΔΗ Keweloh (2013). Μικροβιολογία και Υγιεινή Τροφίμων. Εκδοτικός Όμιλος ΙΩΝ
2. Bibek Ray, Arun Bhunia (2013). Fundamental Food Microbiology, Fifth Edition. CRC Press
3. Martin R Adams, Maurice O Moss, Peter McClure (2016). Food Microbiology. Royal Society of Chemistry James M. Jay, Martin J. Loessner, David A. Golden (2008). Modern Food Microbiology. Springer Science & Business Media

## COURSE OUTLINE

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **DEPARTMENT** | FOOD SCIENCE & TECHNOLOGY | | |
| **LEVEL OF STUDY** | UNDERGRADUATE | | |
| **COURSE CODE** | **4061** | **SEMESTER** | **4** |
| **COURSE TITLE** | **FOOD INDUSTRY MANAGEMENT** | | |

| **SELF-ENDED TEACHING ACTIVITIES** in case the credits are awarded in separate parts of the course e.g., Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, enter the weekly teaching hours and total credits | **WEEKLY TEACHING HOURS** | **ECTS** |
|---|---|---|
| Lectures | 2 | 3 |
| | | |
| **Total** | 2 | 3 |
| *Add rows if necessary. The teaching organization and the teaching methods used are described in detail in (d).* | | |

| | |
|---|---|
| **COURSE TYPE** general background, special background, specialization, general knowledge, skill development. | General background<br>Skill development |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF LECTURES AND EXAMINATIONS:** | Greek |
| **THE COURSE IS OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (2) LEARNING OUTCOME

**Learning Outcome**

*The learning outcomes of the course are described as well as the specific knowledge, skills, and abilities of an appropriate level that the students will acquire after successful completion of the course.*
*Consult Appendix A*

- *Description of the Level of Learning Outcomes for each course of study according to the Qualifications Framework of the European Higher Education Area*
- *Descriptive Indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B*
- *Comprehensive Guide to writing Learning Outcomes*

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

- Understand the principles of Administration and Management in the Food Industry
- They understand the abilities that characterize the administrator
- They understand the importance of the manager's ability to combine and present financial data
- Focus on business organization and management processes
- Develop financial reporting skills
- Prepare and use internal financial and management information

**General skills**

*Considering the general skills that the graduate must have acquired (as stated in the Diploma Appendix and listed below) which / which of them is the course aimed at?*

| | |
|---|---|
| *Search, analysis and synthesis of data and information, using the necessary technologies.* | *Project planning and management*<br>*Respect for diversity and multiculturalism* |

| | |
|---|---|
| *Adaptation to new situations*<br>*Decision making*<br>*Autonomous work*<br>*Teamwork*<br>*Work in an international environment*<br>*Work in an interdisciplinary environment*<br>*Generating new research ideas* | *Respect for the natural environment*<br>*Demonstrating social, professional, and ethical responsibility and sensitivity to gender issues*<br>*Exercise criticism and self-criticism*<br>*Promoting free, creative, and inductive thinking.*<br>*Other…….* |

- Search, analysis and synthesis of data and information, using the necessary technologies
- Work in an interdisciplinary environment
- Decision making.
- Work in an international environment
- Project planning and management
- Exercise criticism and self-criticism

## (3) COURSE CONTENT

Description: Principles of administration and management of food industries. Possibilities and importance of the link between management and finance. Business organization procedures.
In more detail, the content of the course includes:

- Introduction to Administration and Management
- Functions of Administration and Management
- Business structures
- Finance: Analysis – Interpretation
- Profits and losses
- Preparation and use of accounting data
- Preparation of a budget
- Evaluation of investments in the Food Industry
- Analysis of investment decisions
- Investments and capital assurance
- Risk analysis. Applications
- Financial management and role of Financial Managers

## (4) TEACHING AND LEARNING METHODS - EVALUATION

| | |
|---|---|
| **COURSE METHODOLOGY**<br>Face to face, Distance learning etc. | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES**<br>Use of T.P.E. in Teaching, in Laboratory Education, in Communication with students | Use of IT technologies in data-information collection, teaching, and communication. Updates via Web, communication with students via e-mail. |
| **TEACHING ORGANIZATION**<br>The way and methods of teaching are described in detail.<br>Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Art Workshop, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing Paper / Assignments, Artistic Creation, etc. etc. | **Activity** — **Semester Workload**<br>Lectures — 52<br><br>**Total** — **52** |

| | |
|---|---|
| The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed | |
| **STUDENT EVALUATION**<br>Description of the evaluation process<br><br>Assessment Language, Assessment Methods, Formative or Deductive, Multiple-Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Interpretation, Other / Others<br><br>Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students. | • Written assignment<br>• Case studies<br>• Report on the Greek Food Industry<br>• Final examination |

## (5) RECOMMENDED LITERAURE


1. Robbins Stephen P., Decenzo David A., Coulter Mary (2017). Διοίκηση επιχειρήσεων, Αρχές και εφαρμογές. ΕΚΔΟΣΕΙΣ ΚΡΙΤΙΚΗ ΑΕ
2. Williams Kate,Johnson Bob (2005). Εισαγωγή στο μάνατζμεντ, Ένας πρακτικός οδηγός ανάπτυξης. ΕΚΔΟΣΕΙΣ ΚΡΙΤΙΚΗ ΑΕ
3. Στειακάκης Εμμανουήλ- Κωφίδης Νίκος (2016).Διοίκηση Παραγωγής και Υπηρεσιών. ΕΚΔΟΣΕΙΣ ΤΖΙΟΛΑ
4. Jeffrey H. Dorfman (2013). Economics and Management of the Food Industry. Routledge Textbooks in Environmental and Agricultural Economics

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **5011-5012** | **SEMESTER** | **5** |
| **COURSE TITLE** | **FOOD PROCESSING II** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| Laboratory Exercises | 3 | |
| Total | 6 | 7 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | *special background, Specialized* |
| **PREREQUISITE COURSES:** | 4031 Food Processing I |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

## (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*

After successful completion of the course students will:

- Understand the basic principles and applications of the main methods of food processing and preservation.
- Be able to describe the methods of food processing with emphasis to the preservation of foods and to the calculations for design-operation of the food processing installations.
- Be familiar with the methods of food preservation which involve heat and mass transfer, low temperatures and irradiation.
- Understand the basic principles of the design methods for these processing methods.
- Understand the factors which influence the characteristics and the quality of the products.
- Be familiar with the equipment used.

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

## (3) SYLLABUS

**The theory lectures cover the following subjects:**
Water activity of foods. Food drying. Concentration of liquid foods. Extrusion. Frying. High pressure processing. Food fermentations. Food preservation through the addition of preservatives. Ohmic heating. Processing with pulsed electric fields, oscillating magnetic fields. Hurdle technology.

**Laboratory exercises deal with the subjects:**
Thermal processing of foods. Food refrigeration. Food freezing. Water activity of foods. Food drying. Concentration of liquid foods. Extrusion. Frying. Food fermentations. Food preservation through the addition of preservatives.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of Information Technologies in Teaching, Laboratory Education and Communication. Presentations using powerpoints. Information via web (e-class). | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
| | Lectures | 117 |
| | Laboratory Exercises | 91 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | Course total | **208** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Lab reports,<br>• Problem Solving,<br>• Case Studies,<br>• Final examination. |

## (5) SUGGESTED LITERATURE


- *Suggested bibliography:*
Λάζος Ε., Λάζου Α. (2016). Επεξεργασία τροφίμων: 2, Διεργασίες συντηρήσεως με φυσικοχημικές, βιολογικές, νέες & αναδυόμενες τεχνολογίες. ΕΚΔΟΣΕΙΣ ΠΑΠΑΖΗΣΗ
Rahman MS (2007) Handbook of Food Preservation, Second Edition. Food Science and Technology. CRC Press
Ramaswamy HS, Marcotte M (2006) Food Processing: Principles and Applications. CRC Press
Brennan JG, Grandison AS (2011) Food Processing Handbook. John Wiley & Sons
Fellows PJ (2009) Food Processing Technology - Principles and Practice (3rd Edition). Woodhead Publishing
Karel M, Lund DB (2003) Physical Principles of Food Preservation. Marcel Dekker
Saravacos GD, Maroulis ZB (2010) Food Process Engineering Operations. Taylor and Francis
Barbosa-Cánovas GV, Vega-Mercado H (2010) Dehydration of Foods. Springer
*Mujumdar AS (2006) Handbook of Industrial Drying. CRC/Taylor & Francis*

- *Related academic journals:*
Journal of Food Processing and Preservation
Food and Bioproducts Processing
Journal of Food Science
Innovative Food Science and Emerging Technologies
LWT - Food Science and Technology
Trends in Food Science & Technology
European Food Research and Technology
Critical Reviews in Food Science and Nutrition
*Comprehensive Reviews in Food Science and Food Safety*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **5021** | **SEMESTER** | **5** |
| **COURSE TITLE** | **FOOD CHEMISTRY II** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | 4 |
| | | |
| Total | 3 | 4 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | *special background, Specialized* |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

## (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*

After successful completion of the course students will:

- Understands the structure and properties of secondary components in foods.
- Describes the function of enzymes and the factors affecting their activity in food.
- Regulates and controls the action of endogenous enzymes during food preservation and processing.
- Understands the use of additives in food and the role of vitamins and inorganic components in nutrition and physiology.
- Understands the biochemical processes involved in converting muscle tissue into meat.
- Knows the conditions for controlling post-harvest changes in fruits and vegetables.
- Understands the causes and factors of food contamination.

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

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Respect for the natural environment
- Production of free, creative and inductive thinking

## (3) SYLLABUS

**Description:** Secondary components of food. Enzymes, vitamins, inorganic components, flavor and aromatic compounds, natural colorants, food additives, bioactive compounds. Structure, properties, reactions, changes during food preservation and processing. Post-mortem physiology of edible animal tissues. Post-harvest physiology of edible plant tissues.
In more detail, the course content includes:

- *Enzymes*: Nomenclature, enzymatic catalysis, kinetics of enzymatic reactions, mechanisms of action, factors influencing enzyme activity, regulation and control of enzyme action, action of endogenous enzymes during food preservation and processing, use of exogenous enzymes in technology and food analysis, categories of commonly used enzymes.
- *Vitamins*: Fat-soluble (A, D, E, K1), water-soluble (thiamine/B1, riboflavin/B2, pyridoxine/B6, cyanocobalamin/B12, niacin, pantothenic acid, biotin, folic acid, L-ascorbic acid/C). Biological roles, dietary requirements, stability, and degradation.
- *Inorganic Components*: Major elements, trace elements. Chemical and functional properties, roles in nutrition and physiology. Reactions catalyzed by metals that degrade the quality of foods.
- *Aromatic Substances*: Natural aromatic compounds, origin, isolation, organoleptic significance, structure-odor relationship. Interactions of aromatic substances with other food components. Alteration odors. Natural and synthetic flavoring substances.
- *Food Additives*: Colorants, sweeteners, flavor enhancers, gelling agents, thickeners, emulsifiers and stabilizers, fat replacers, antimicrobial agents, antioxidants, bleaching and clarifying agents, food preservatives, complexing agents.
- *Food Contamination*: Toxic trace elements, pesticides, veterinary drugs, bacterial toxins, mycotoxins, marine biotoxins, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons, dioxins, nitrosamines, detergents, disinfectants.
- *Biochemical Changes during the Conversion of Muscle Tissue into Meat*: Composition, muscle contraction, post-mortem changes, ATP, glycolysis, proteins, colorants, tenderness.
- *Biochemical Changes in Fruits and Vegetables*: Respiration, climacteric and non-climacteric species, ripening, control, ethylene and its effects. Changes in color, texture, aroma, taste, and during storage.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of Information Technologies in Teaching, Laboratory Education and Communication. Presentations using powerpoints. Information via web (e-class). |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** — ***Semester workload***<br>Lectures — 117<br>Course total — **117** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Language evaluation: Greek<br>• Methods of evaluation<br>  ○ Final examination |

## (5) SUGGESTED LITERATURE


- *Suggested bibliography:*
Σφλώμος, Κ. (2017). Χημεία Τροφίμων: Θεωρία και Ασκήσεις. Κορωπί: Εκδόσεις ΝΟΤΑ.
Belitz, H.D., Grosch, W. & Schieberle, P. (2006). Χημεία Τροφίμων, 3η Έκδοση. Θεσσαλονίκη: Εκδόσεις Τζιόλα.
Κουσίσης, Σ. (2013). Εργαστηριακή Βιοχημεία. Αθήνα.
Damodaran, S. & Parkin, K.L. (2017). Fennema's Food Chemistry, fifth edition. Boca Raton: CRC Press.
Whitaker, J. (1994). Principles of Enzymology for the Food Sciences, 2nd edition. New York: Marcel Dekker.
Tucker, G.A. & Woods, L.F.J. (1991). Enzymes in Food Processing, 2nd edition. Glasgow: Blackie Academic & Professional.
Eskin, N.A. & Shahidi, F. (2012). Biochemistry of Foods, 3rd edition. Academic Press.
- *Related academic journals:*
Food Chemistry
Journal of Agricultural and Food Chemistry
Journal of Food Science
Food Control
Critical Reviews in Food Science and Nutrition
International Journal of Food Science and Technology
Food Research International
LWT - Food Science and Technology
European Food Research and Technology
Food and Chemical Toxicology
*Comprehensive Reviews in Food Science and Food Safety*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCEs | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **5031-5032** | **SEMESTER** | **5** |
| **COURSE TITLE** | **CHEMICAL COMPOSITION AND FOOD QUALITY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| lectures | 2 | |
| laboratory exercises | 2 | |
| Total | 4 | 5 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | specialised, skills development |
| **PREREQUISITE COURSES:** | 2031-2033 Quantitative Analytical Chemistry |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greeks |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

## (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*

The aim of the course is to familiarize students at a theoretical and practical level with the control of the chemical composition and quality of food The following results are:
a) The acquisition of knowledge about the composition of foods and the methods of analysis of food ingredients.
b) Monitoring through analytical measurements of possible changes in the composition of food during their processing and preservation.
c) The acquisition of knowledge on the control of adulteration and the compliance of foodstuffs on the basis of the applicable legislation.
d) The acquisition of knowledge about the authenticity of food
e) Determination by analytical measurements of bioactive food ingredients and/or toxic substances.

***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*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| *Analysis and synthesis of data and information, using the necessary technologies*<br>*Working independently*<br>*Team work*<br>*Production of new research ideas* | |

## (3) SYLLABUS

**Course Objectives**

Importance of chemical analysis of food. Introduction to chemical analysis of foods. Methods of analysis of food, principles of quality control, specifications, legislation. Sampling and preparation of laboratory samples for analysis. Macroscopic control. Presentation of results of analytical methods for the composition and quality of food.

Analytical methods of determining moisture, ash, acidity, pH, proteins, carbohydrates, fats, vitamins, enzymes, cellulose, additives, minerals and natural antioxidants. Applications of the above methods of analysis in basic categories of foods. Phytonutrients in food. Modern methods of determining adulteration in food. Authenticity check. Monitoring of the analytical methods proposed by the Community Legislation.

**Laboratory Objectives**

Moisture determination by oven drying and infrared drying (Sauter thermobalance) Determination of food ash

Determination of titrated acidity - Quantitative determination of formalin number in orange juice

Volumetric determination of sodium chloride in selected foods

Volumetric determination of vitamin C - Iodimetric determination of SO2

Determination of wet and dry gluten in flour

Control of adulterated honey with starch syrup

Determination of total protein by the Kjeldahl method.

Determination of total fat by the Soxhlet method

Volumetric determination of Ca in food

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face | |
| **USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of Information Technologies in Teaching, Laboratory Education and Communication. Presentations using powerpoints. Information via web (e-class). | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational* | ***Activity*** | ***Semester workload*** |
| | Lectures | 78 |
| | Laboratory Exercises | 26 |
| | Writing and presenting a literature review | 26 |
| | | |

| | | |
|---|---|---|
| *visits, project, essay writing, artistic creativity, etc.*<br><br>*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* | | |
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| | Course total | **130** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Assessment methods they can use: Multiple Choice Test, Short Answer Questions, Development Questions, Problem Solving, Written Assignment, Report, Oral Examination, Public Presentation, Laboratory Thesis | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*H. D., Belitz, W., Grosch, P., Schieberle (2012). Food Chemistry*
*- Related academic journals:*
*Food Research International*
*Food Chemistry*
*Analytical Letters*
*Analytical and Bioanalytical Chemistry*
*Journal of Food Composition and Analysis*
*Foods*
*Antioxidants*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **5041-5042** | **SEMESTER** | 5 |
| **COURSE TITLE** | **FOOD PACKAGING** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| Laboratory Exercises | 2 | |
| Total | 5 | 6 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | *Specialized* |
| **PREREQUISITE COURSES:** | 4031 Food Processing I |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes, the theory lectures in English |
| **COURSE WEBSITE (URL)** | |

## (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*

**After successful completion of the course students will:**

- Know the basic functions of packaging and how they are related to processing, preservation, distribution and marketing of foods.
- Know the materials, forms and packaging systems and understand the ways the properties of packaging materials influence the safety, quality and shelf life of packaged foods.
- Know the design, manufacture and applications of food packaging.
- Know the packaging of the various food groups.
- Be able to select appropriate materials and forms of packaging for a food of interest.
- Be able to solve problems concerning the quality and shelf life of packaged foods, which are related to packaging.
- Be able to carry out quality control of the packaging materials and means.

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

## (3) SYLLABUS

**The theory lectures cover the following subjects:**
Definitions and functions of food packaging. Glass packaging. Metal packaging. Corrosion of metallic containers. Plastic packaging. Permeability and mechanical properties of thermoplastic polymers. Processing and converting of thermoplastic polymers. Paper and paper-based packaging materials. Filling and sealing of food packages. Aseptic processing and packaging. Modified atmosphere packaging.

**Laboratory exercises deal with the subjects:**
Evaluation of the double seam of metal containers. Integrity evaluation of aseptic packages. Study of the internal corrosion of tinplate cans. Study of the corrosion of Fe and Al. Modified atmosphere packaging. Permeability of thermoplastic polymers to water vapor. Shelf life determination of moisture sensitive foods. Identification of plastic resins with the burning test and the density test. Layers' separation of laminates and thickness measurement of each layer. Mechanical properties of polymers. Edible membranes.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of Information Technologies in Teaching, Laboratory Education and Communication. Presentations using powerpoints. Information via web (e-class). | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.* | ***Activity*** | ***Semester workload*** |
| | Lectures | 117 |
| | Laboratory Exercises | 65 |
| | | |
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| | | |
| | | |

| | | |
|---|---|---|
| *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* | Course total | **182** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Lab reports,<br>• Problem Solving,<br>• Case Studies,<br>• Final examination. | |

## (5) SUGGESTED LITERATURE


- *Suggested bibliography:*
Παπαδάκης, Σ.Ε., (2018). *Συσκευασία Τροφίμων*, 2η έκδοση, Εκδόσεις ΤΖΙΟΛΑ, Θεσσαλονίκη
Robertson, G.L., (2013). *Food Packaging: Principles and Practice*, Third Edition, CRC Press, Taylor & Francis Group, Boca Raton, FL.
Lee, D.S., Yam, K.L. and Piergiovanni, L. (2008). *Food Packaging Science and Technology*, CRC Press, Taylor & Francis Group, Boca Raton, FL.
Yam, K.L. (ed), (2009). *The Wiley Encyclopedia of Packaging Technology*, 3rd edn., John Wiley & Sons *Inc., New York.*

- *Related academic journals:*
Packaging Technology and Science
Food Packaging and Shelf Life
Journal of Packaging Technology and Research
Journal of Food Engineering
Journal of Food Science
Food Additives and Contaminants
Food Technology

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **5051** | **SEMESTER** | 5 |
| **COURSE TITLE** | **FOOD BIOTECNOLOGY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | 4 |
| | | |
| Total | 3 | 4 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | *Special background, Specialized* |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes |
| **COURSE WEBSITE (URL)** | |

## (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*

**After successful completion of the course students will:**

- Have a fundamental background in Food Biotechnology.
- Have studied the biotechnological applications in food production.
- Gain an in-depth understanding of the legislation regarding the production and consumption of biotechnological products.
- Have conducted research, using bibliographic data, on raw materials or foods derived from genetically modified organisms that are still circulating in the market, including countries outside the European Union.

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

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Respect for the natural environment
- Production of free, creative and inductive thinking
- Production of free, creative and inductive thinking

## (3) SYLLABUS

**COURSE CONTENT**

In this course, students delve into the understanding of modern applications of genetic engineering in food biotechnology, tracing its evolution over centuries. Following the Molecular Biology course, students gain a deeper understanding of genetic modification techniques in prokaryotic and eukaryotic organisms (plants and animals), which can lead to the production of raw materials or even food products. This course combines knowledge from traditional and contemporary enzymatic and microbial biotechnology. Furthermore, students explore the legislation related to the production and consumption of food or materials used in food production originating from genetically modified organisms. The course also examines the fundamental principles of bioethics that currently define the scope of genetic modifications in food biotechnology.

**COURSE DESCRIPTION**

Introduction to Food Biotechnology - Historical Overview

• Recombinant DNA Technology

• Enzymatic and Microbial Biotechnology

• Enzyme Purification Technology, Chromatographic Techniques (Permeation Chromatography, Ion-Exchange Chromatography, Affinity Chromatography), Liquid Chromatography Scale-Up, Product Formulation.

• Bioreactors: Types of Bioreactors (Stirred Tank Bioreactor, Continuous Stirred-Tank Bioreactor, Column Bioreactor, Fluidized Bed Bioreactor).

• Plant Biotechnology: Genetically Modified Plants in Food Production, Construction of Transgenic Plants Using the Ti Plasmid, Viral Delivery, Direct DNA Transfer, Regulation of Gene Expression. Exploiting Transgenic Plants on a Commercial Scale.

• Animal Biotechnology - Transgenic Animals

• Modern Applications of -omics Technologies in Food Biotechnology

• Applications of Biotechnology in the Food Industry: Winemaking, Brewing, Baking, Cheese Production, Edible Oil Production, Fruit Product Manufacturing, Utilization of Agro-Industrial Waste for High-Value Product Generation

• Pharmaceutical Applications: Antibiotic Production, Insulin Production

• Legislation for the Production and Consumption of Biotechnological Products

• Literature Review to Identify Raw Materials or Foods Originating from Genetically Modified Organisms Circulating in the Market, Including Countries Outside the European Union

• Ethical Issues in Food Biotechnology

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of Information Technologies in Teaching, Laboratory Education and Communication. Presentations using powerpoints. Information via web (e-class). |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** / ***Semester workload***<br>Lectures: 117<br>Course total: **117** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Language of evaluation: Greek<br>• Methods of evaluation<br>  ○ Final examination<br>  ○ Progress test<br>  ○ Written work |

## (5) SUGGESTED LITERATURE


- *Suggested bibliography:*
1. Fundamentals of Food Biotechnology, Byong H. Lee, 2014
2. Food Biotechnology, AnthonyPometto, Kalidas Shetty, GopinadhanPaliyath, Robert E. Levin 2th edition, 2009.
3. Modern Biotechnology, J. Tramper, Yang Zhu, 2011.]
4. Food Biotechnology: Microorganisms Y. H. Hui, 1995

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMICUNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVELOFSTUDIES** | UNDERGRADUATE | | |
| **COURSECODE** | **5061** | **SEMESTER** | **5** |
| **COURSETITLE** | **PHYSICAL & STRUCTURAL PROPERTIES OF FOODS** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures,laboratoryexercises,etc.Ifthecreditsareawardedforthewholeofthe course ,give the weekly teaching hours and the total credits* | **WEEKLY TEACHINGHOURS** | **CREDITS** |
|---|---|---|
| | 3 | 4 |
| | | |
| **Total** | 3 | 4 |
| *Add rows if necessary. The organization of teaching and the teaching Methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSETYPE** *general background, special background, specialized general knowledge, skills development* | Specific background, specialization, skills development |
| **PREREQUISITECOURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFEREDT O ERASMUS STUDENTS** | No |
| **COURSE WEBSITE(URL)** | https://eclass.uniwa.gr/courses/FST233/ |

## (2) LEARNINGOUTCOMES

**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*

**After successful completion the student will:**

- Get knowledge of physicochemical processes and food components leading to the production, stabilization and formation of texture and structure of food products.
- Get knowledge of functional properties and functional characteristics of food components.
- Get knowledge of compounds and constituents related to the increase of shelf life of foods.
- Get knowledge how physical properties affect the quality of food and its assessment
- Get knowledge how to use physical properties in the design of food processing processes and equipment
- Get knowledge of properties involvement in simulations of food processing processes
- Get knowledge of how the properties involved in the handling, processing, preservation, packaging, storage and distribution of foods
- Get knowledge of the compounds and ingredients that lead to the increase in the shelf life of foods

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

- Retrieve, analyze and synthesize data and information, with the use of necessary technologies
- Individual work
- Team work
- Advance free, creative and causative thinking

## (3) SYLLABUS

### (1) Course content

**Description**: Application of specific topics of physical-chemistry in the phenomena occurring in food systemsduring food production and storage. Use of food properties in food characterisation and shelf life. Use of food properties in food process and equipment design. Among the properties water activity and sorption phenomena, glass transition, surface properties, rheological, mechanical and thermal properties are included. In addition, electrical and electromagnetic properties, geometrical properties (shape, size, volume and related characteristics) optical and acoustical properties.

**More specifically, course content includes:**

- Introduction in physical properties of foods.
- Water: Structure, Properties, water in food systems
- Water activity
    - Definition
    - Chemical potential
    - Moisture sorption isotherms – isotherm modelling – temperature dependence
    - Moisture movement & stability isotherms
- Glass transition
    - Phase and state transitions
    - Glass transition – Theories of glass transition – Mathematical modelling
    - State diagrams
- Glass transition in foods
- Rheological properties of foods
    - Mater flow
    - Viscosity - Viscosity measurement
    - Materials deformation
    - Viscoelastisity
    - Extensive flow
    - Mechanical models

    - Food Texture
    - Dough Rheology
- Surface properties
    - Surface tension
    - Mechanical analogue of surface energy
    - Wetting and spreading
    - Fundamental Thermodynamics of Interfaces
    - Surface activity
    - Interfacial Tension
    - Dispersion systems in foods
    - Colloidal food systems
    - Colloidal suspension
    - Gels
    - Emulsions
    - Foams
    - Adhesion
    - Stickinessoffoods
    - Measurement of surface properties
- Thermal Properties
    - Fourier Law of Heat Transfer
    - Thermal conductivity
    - Specific heat
    - Enthalpy and latent heat
    - Thermal diffusivity
- Electric and Dielectric properties
    - Conductivity
    - Electrolytic conductivity
    - Electric Conductivity and Ohmic heating
    - Electric Capacity
    - Temperature Effect
    - Electrolyte solutions
    - Dielectric properties of foods
- Optical properties of foods
    - The Light
    - Material and light interaction
    - Refractive index
    - Absorption measurement
    - Food colour
    - Objective colour indices
    - Image acquisition systems
    - Mechanical vision
    - Spectral imaging (Hyper-spectral - multispectral)
    - Colour measurement
- Mechanical properties (mass and geometric properties - shape, size, volume, density, porosity)
- Acoustical properties
    - The Sound
    - Sound velocity
    - Intensity
    - Noise

- Ultrasounds
- Food applications

- Mass transfer properties
  - Permeability
  - Unsteady-state diffusion
  - Conductivity, permeation and resistance
  - Transfer through multiple layers
  - Applications to food packaging
- Structure, Matrix & Food Properties
  - Composition and Structure
  - Cellular structure of foods
    Formation and development of food structure
  - Relationship between structure and food properties
  - Food matrix and chemical reactivity
  - Designed food structure

## (4) TEACHING and LEARNING METHODS-EVALUATION

| | | | |
|---|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face | | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, Communication with students* | Power point presentations and self-assessment test in the Blackboard.<br>Student contact electronically (web & email). | | |
| **TEACHINGMETHODS**<br>*The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, field work, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*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 theECTS* | | ***Activity*** | ***Semester workload*** |
| | | Lectures | 117 |
| | | | |
| | | | |
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| | | | |
| | | Course total | *117* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Literature surveys<br>• Projects<br>• Case studies<br>• Presentations<br>• Mid-term exams<br>• Final exams | | |

## (5) ATTACHED BIBLIOGRAPHY


*- Suggested bibliography:*
*Lazou A.E. (2019). Physical Properties of Foods, Ed. Papazisis, Athens*
*Serpil Sahin, Servet Gülüm Sumnu (2006). Physical Properties of Foods. Springer International*
*Ignacio Arana (2016). Physical Properties of Foods: Novel Measurement Techniques and Applications. CRC Press*
*M. Shafiur Rahman (2009). Food Properties Handbook, Second Edition. CRC Press*
*M.A. Rao, Syed S.H. Rizvi, Ashim K. Datta, Jasim Ahmed (2014). Engineering Properties of Foods, Fourth Edition. CRC Press*

*- Related academic journals:*
International Journal of Food Properties
Journal of Food Engineering

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCEσ | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **6011-6012** | **SEMESTER** | 6 |
| **COURSE TITLE** | **INSTRUMENTAL FOOD ANALYSIS** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| *lectures* | 3 | |
| *tutorial* | 1 | |
| *laboratory exercises* | 2 | |
| *Total* | 6 | 8 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | *specialised, skills development* |
| **PREREQUISITE COURSES:** | 5031-5032 CHEMICAL COMPOSITION AND FOOD QUALITY |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greeks |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

## (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*

This course will be concerned with the theory and practice of instrumental methods for the separation, identification and quantitative analysis of chemical substances. Satisfactory completion of this course will afford students a working knowledge of analytical instrumentation typically employed in chemical and food research laboratories. It will also provide the student with an appreciation of the relative strengths and limitations of different instrumental based analysis methods.
Specific Course Learning Objectives Include:
Learn how to select an appropriate instrumental method.
Assess sources of error in chemical and instrumental analysis and account for errors in data analysis.
Understand the theory behind chemical instruments
Recognize interferences in chemical and instrumental analysis.
Comprehend the concept of and perform instrument and method calibration.
Integrate a fundamental understanding of the underlining physics principles as they
relate to specific instrumentation used for atomic, molecular, and mass spectrometry, spectroscopy and chromatography.
Understand and be able to apply the theory and operational principles of analytical instruments.
Distinguish between qualitative and quantitative measurements and be able to effectively compare

and critically select methods for elemental and molecular analyses.

| ***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*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| *Analysis and synthesis of data and information, using the necessary technologies*<br>*Working independently*<br>*Team work*<br>*Production of new research ideas* | |

## (3) SYLLABUS

**Course Objectives**

Introduction to the analytical process, Basic electronics, Signals and noise, Introduction to Spectroscopic Methods, Components of Optical Systems,
Molecular Spectroscopy – Electronic transitions, Introduction to UV-Vis molecular spectroscopy, Beers Law, absorbance, and transmittance, Applications of UV-Vis spectroscopy, Spectrophotometers: wavelength selectors detectors configurations and sources
Fluorescence, phosphorescence and chemiluminescence
Molecular Spectroscopy – Vibrational excitation, IR absorption spectroscopy, Applications of Infrared Spectrometry, Infrared spectroscopy instrumentation
Atomic Spectroscopy, An Introduction to Optical Atomic Spectroscopy, Atomic absorption spectroscopy, Atomic Emission Spectroscopy
Non-spectrometric techniques. Polarimetry. Identification of optically active compounds.
Separation Science, Introduction to chromatography, Fundamentals of chromatographic separations, Gas chromatography, High performance liquid chromatography

**Laboratory Objectives:**

Spectrophotometric determination of sorbic acid in wine.
Spectrophotometric determination of total phenolics in infusions. Spectrophotometric determination of wine color.
Structure Determination and Identification of Chemical Compounds by Infrared Spectrophotometry. Measurement and Study of the IR Spectra of Simple Organic Compounds – Bands of Characteristic Groups.
Fluorimetric determination of quinine in tonic waters.
Fluorophotometric determination of sodium in water.
Polarimetric determination of sugars.
Determination of fatty acids by GC-FID.
Determination of lipid classes in food fat by Iatroscan TLC-FID.
Determination of phenolic acids by HPLC-DAD

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of Information Technologies in Teaching, Laboratory Education and Communication. Presentations using powerpoints. Information via web (e-class). |

**TEACHING METHODS**

*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 visits, project, essay writing, artistic creativity, etc.*

*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*

| *Activity* | *Semester workload* |
|---|---|
| Lectures | 117 |
| Tutorial | 28 |
| Laboratory Exercises writing of projects using statistical programs, Writing and presenting a literature review | 60 |
| | |
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| | |
| Course total | **205** |

**STUDENT PERFORMANCE EVALUATION**
*Description of the evaluation procedure*

*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*

*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*

Assessment methods they can use: Multiple Choice Test, Short Answer Questions, Development Questions, Problem Solving, Written Assignment, Report, Oral Examination, Public Presentation, Laboratory Thesis

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*Principles of Instrumental Analysis (6th Edition) by Skoog, Holler and Crouch*
*- Related academic journals:*
Analytica Chimica Acta, Analytical Letters, Analytical and Bioanalytical Chemistry
Journal of Food Composition and Analysis , Food Chemistry, Food Analytical Methods

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **6021** | **SEMESTER** | **6** |
| **COURSE TITLE** | **INDUSTRIAL MICROBIOLOGY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 3 | 4 |
| | | |
| TOTAL | 3 | 4 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialized general knowledge. Skills development |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES |
| **COURSE WEBSITE (URL)** | https://eclass.uniwa.gr/courses/TTT198/ |

## (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*

The students will acquire the following specific knowledge with the successful completion of the program:

- Knowledge of basic microbial biochemistry and the metabolic processes that lead to the production of fermentation products
- Familiarization with the industrial microorganisms (bacteria, yeasts, filamentous fungi) used for the production of microbial products
- Knowledge of the basic principles of microbial kinetics applied in microbial productions in bioreactors (microorganism growth curves, measure of specific growth rate, substrate utilization, yield of products)
- Rapid and automated methods for assessing the growth of a microbial culture and the production of metabolites in a microbial production system
- Analysis of various types of food fermentations and their applications (alcoholic, lactic acid, acetic acid, propionic, butanediol)

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

## (3) SYLLABUS

- Introduction to Industrial Microbiology
- Microorganisms used in fermentations and their characteristics (bacteria, yeasts, filamentous fungi)
- Microbial Biochemistry and Metabolism
- Microbial kinetics
- Factors affecting the growth and production of metabolites of microorganisms in bioreactors
- Design of bioreactors
- Applications of *Saccharomyces cerevisiae* in fermentations
- Microbial products used in the Food industry (citric acid, amino-acids, enzymes, polysaccharides)
- Application of the cell immobilization technology for microbial production
- Microbial production of aromatic compounds (gamma-decalactone)
- The fermentation of olives
- The fermentation of vegetables
- The fermentation of vinegar
- Probiotics and Functional foods
- Rapid methods for assessing the growth of a microbial culture

## (4) TEACHING and LEARNING METHODS - EVALUATION

| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face |
|---|---|

| | |
|---|---|
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching: all educational material such as slides, videos, quiz, is uploaded in the electronic class (e-class) of the University. Communications with students via e-class or emails. |

**TEACHING METHODS**

*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 visits, project, essay writing, artistic creativity, etc.*

*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*

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 117 |
| Presentation of projects | |
| | |
| | |
| | |
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| | |
| | |
| | |
| Course total | *117* |

**STUDENT PERFORMANCE EVALUATION**

*Description of the evaluation procedure*

*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*

*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*

- Language evaluation: Greek
- Method of evaluation:
  - multiple choice/short-answer/open-ended questions in the final exam
  - oral presentation of a project

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*


- Paul, P. E. V., Sangeetha, V., & Deepika, R. G. (2019). Emerging trends in the industrial production of chemical products by microorganisms. Recent developments in applied microbiology and biochemistry, 107-125.
- Hutkins, R.W. (2006). Microbiology and Technology of Fermented Foods. IFT Press
- Hui, Y. H. (2012). Handbook of Animal-Based Fermented Food and Beverage Technology. Taylor & Francis Group, LLC.
- McNeil, B., & Harvey, L. (Eds.). (2008). Practical fermentation technology. John Wiley & Sons.
- Montet, D. and Ray, R.C. (2015). Fermented Foods, Part I: Biochemistry and Biotechnology. CRC Press.
- Waits et al. (2001) Industrial Microbiology: An Introduction, Blackwell Science Ltd, UK
- Stanbury, P. F., Whitaker, A., & Hall, S. J. (2013). Principles of fermentation technology. Elsevier.


*- Related academic journals:*

Food Biotechnology
Fermentations
Industrial Bioprocesses

## COURSE OUTLINE

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **6031-6032** | **SEMESTER** | **6** |
| **COURSE TITLE** | **MEAT AND MEAT PRODUCTS SCIENCE AND TECHNOLOGY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 3 | |
| LABORATORY | 2 | |
| TOTAL | 5 | 7 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialized Skills development |
| **PREREQUISITE COURSES:** | -3021-3023 Biochemistry |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | |
| **COURSE WEBSITE (URL)** | |

### (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*

Learning the basic elements of muscle anatomy with the aim of recognizing the segments that arise during the gross and detailed dissection of carcasses and their proper use, the chemical and biochemical composition, post-mortem changes, as well as methods of anesthesia and slaughter of animals with the purpose of understanding the impact of these procedures on the quality of the carcass and meat, the welfare of animals, and the safety of personnel.
Familiarization with methods of measurement and evaluation of important physicochemical characteristics of meat quality.
The classification of meat products, selection of raw materials, processing methods, packaging, preservation of thermally processed products, and aging, prevention, and assessment of defects that degrade the quality, with the aim of producing high-quality and healthy products.

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

- *Search for, analysis and synthesis of data and information, with the use of the necessary technology*
- Working independently
- Production of free, creative and inductive thinking

## (3) SYLLABUS

Content of the theoretical course:

1. Structure of skeletal muscle (muscle bundles, connective tissue, adipose tissue, blood vessels, and nerves).
2. Structure of muscle fibers (sarcolemma, myofibrils, sarcoplasm, nuclei, color of muscle fibers, white and red muscle fibers).
3. Chemical and biochemical composition of muscle (muscle fiber proteins, function of skeletal muscle, proteins of connective tissue and organelles, lipids, carbohydrates, inorganic constituents, water, water-holding capacity of muscle tissue).
4. Conversion of muscle tissue into meat (the effect of ATP on post-mortem changes, post-mortem glycolysis, rigor mortis progression, post-mortem changes in proteins and ATP, meat maturation).
5. Cooling and preservation of chilled meat (meat chilling, methods of carcass and meat cooling, preservation of chilled meat, problems and changes in meat during cooling and under refrigeration).
6. Abnormal meat quality deviations (PSE, DFD meat, glycolysis, formation, controlling conditions, effects on meat and meat products).
7. Pasteurized processed meats (selection of raw materials, sodium chloride, water, spices, additives, and auxiliaries, water and fat binding – structure formation of pasteurized processed meats, meat paste preparation, gel formation, color maintenance, casing, heat treatment, cooling, preservation, and packaging).
8. Quality of pasteurized processed meats (defects due to inappropriate selection of raw materials, casings, NaCl, water, additives and auxiliaries, meat paste preparation, nitrate, coloring auxiliary substances, meat paste filling, heat treatment, smoking, packaging, preservation, defects in composition, color, appearance, taste, and aroma).
9. Cured meat products (microbiological stability of cured meat products, cured meats, selection of raw materials, sodium chloride – auxiliaries – spices – additives, meat mass preparation, filling, maturation, factors and control parameters during production of cured meat products, the importance of microorganisms in production, defects due to microorganisms, smoking of cured meats, maturation – dehydration, packaging, sale, preservation, preventive control measures).

10. Quality of cured meat products (defects due to inappropriate selection of raw materials, casings, additives, and auxiliaries, potassium sorbate, meat paste preparation, filling, maturation – appearance, internal and control factors, dehydration, packaging, preservation, defects in composition, color, appearance, taste, and aroma).

Content of the laboratory:

1. About slaughterhouses – Technology of converting animal carcasses into meat.
2. Elements of anatomy and comparative anatomy of animals.
3. Carcass cutting of animals.
4. Classification into categories and qualitative grading of carcasses.
5. Determination and evaluation of pH in meat and its products.
6. Water-holding capacity (WHC) – Effects on meat and its products.
7. Measurement of meat and its products' color.
8. Measurement of meat tenderness.
9. Meat products.
10. Pasteurized processed meats – Pâté preparation.
11. Cured meat products.
12. Defects of meat products.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face |
| **USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching: all educational material such as slides, videos, quiz, is uploaded in the electronic class (e-class) of the University. Communications with students via e-class or emails. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 117 |
| Laboratory | 60 |
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| Course total | *177* |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | The theory degree is determined by the final examination.<br>The laboratory grade is determined by:<br>a) Careful and successful execution of experiments.<br>b) The way experimental results are presented and evaluated in laboratory reports.<br>c) The final examination. |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*


- Ραμαντάνης, Σ.Β., (2006): Τεχνολογία και Ποιότητα του Κρέατος και των προϊόντων του. Εκδόσεις Σύγχρονη Παιδεία, Θεσσαλονίκη.
- Ραμαντάνης Σ.Β., (2001): Τεχνολογία και Ποιότητα Κρέατος και Κρεατοσκευασμάτων (εργαστηριακές ασκήσεις).
- Γεωργάκης, Σ.Α., (2005): Το κρέας και τα προϊόντα του. Εκδόσεις Σύγχρονη Παιδεία, Θεσσαλονίκη.
- Lawrie, R.A., (1998): Meat Science, 6th edition, Woodhead publishing Ltd.
- Warris P.D., (2000): Meat Science. An Introductory Text. CABI publishing.


*-Related academic journals:*

Meat Science

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **6041** | **SEMESTER** | **6** |
| **COURSE TITLE** | **FOOD QUALITY AND SAFETY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 3 | 4 |
| | | |
| **TOTAL** | **3** | **4** |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | SPECIALISED KNOWLEDGE - SKILLS DEVELOPMENT |
| **PREREQUISITE COURSES:** | 2041 - STATISTICS |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES |
| **COURSE WEBSITE (URL)** | https://fst.uniwa.gr/course/nomothesia-trofimon/ |

## (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*

**Aim**

The course aims to enable students to: apply Quality and Safety Management Systems in the production, processing, storage, transport and sale of food AND apply Environmental Management Systems as well as Integrated Management Systems to the various food categories.

After the end of the course students will be able to:

- They understand the principles of Quality
- To develop HACCP studies
- Implement Food Safety Management Systems based on various standards
- Develop and implement Quality Management Systems according to various standards
- To implement Environmental Management and Integrated Management Systems

| ***General Competences***<br>*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma*<br>*Supplement and appear below), at which of the following does the course aim?* | |
|---|---|
| *Search for, analysis and synthesis of data and information,*<br>*with the use of the necessary technology*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and*<br>*sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| • Search for, analysis and synthesis of data and information, with the use of the necessary technology<br>• Working independently<br>• Team work<br>• Development of free, creative and inductive thinking | |

## (3) SYLLABUS

- Quality (of food) – definitions & basic principles
- Basic principles of quality management.
- Quality Assurance – Systems
- Quality Control- Quality assessment (standardization, certification, accreditation)
- Food safety: Food Safety Management Systems (requirements – legal framework)
- HACCP: definition, necessity, prerequisite programs, terminology, the 7 principles, system structure, system development
- Hazard Analysis and Hazard Assessment
- Example (Workshop) of analysis, evaluation and categorization of control measures
- ISO series standards (history, development, structure)
- Detailed description of ISO 22000:2018 structure and requirements
- FSMS audits
- Traceability

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to Face, e class notes | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education,*<br>*communication with students* | E class extra material<br>Communication ith students through e-mails and e-class tools | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.* | ***Activity*** | ***Semester workload*** |
| | LECTURES (including case studies, demonstration of on-line tools etc) | 117 |

| | | |
|---|---|---|
| *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.*<br><br>*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* | | |
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| | | |
| | Course total | *117* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final examination in Greek which includes: multiple choice questions, essay questions and short answer questions. | |

**(5) ATTACHED BIBLIOGRAPHY**


- *Suggested bibliography:*

1.Abuhav, I. (2016). ISO 9001:2015 A Complete Guide to Quality Management Systems, Taylors and Francis, Portland, USA.

2 ISO 19011:2011. Guidelines for auditing management systems, International Organization for Standardization.

3.Mortimore, S. and Wallace, C. (2001). HACCP, Oxford Blackwell Science, London, U.K.

4.Walker, E., Pritchard, C. and Forsythe, S. (2003). Hazard Analysis Critical Control Point and Prerequisite Programme implementation in small and medium size food businesses, Food Control, 14, 169-174.

5.Pierson, M. D. And Corlett, Jr. D.A. (1992). HACCP Principles and Applicαtions, published by Van Norstand Reinhold, New York.

6.Microorganisms in Foods 7 (2002). International Commission on Microbiological Specifications for Foods (ICMSF), Kluwer.

7.Sansawat, S. and Muliyil, V. (2011). Comparing Global Food Safety Initiative (GFSI) Recognised Standards.

8.Total Quality Management (1994): The European Model for Self-Appraisal, European Foundation for Quality Management, Brussels.

9.Earley, R. (1995). Guide to Quality management Systems for the Food industry, Blackie Academic & Professional, London.

10.Gould, W. A. (1992). Total Quality management for the Food /industries. CTI Publications INC., Baltimore, USA.

11.British Retail Consortium (2015). Global Standard Food Safety. Issue 7. London, www.brcglobalstandards.com.

12.Dimadama, Z. (2010). “Knowledge, innovation and sustainability: The implementation of voluntary environmental policies in Greece: The case of environmental management systems”, Journal of US-China Public Administration, 7 (7).
13.hah Syed Alam Nazura Mohamed Sayut (2011). Applying the theory of planned behavior in Halal food purchasing, International Journal of Commerce and Management, 21(1), 8-20.
14.Wenk, M. (2005). The European Union’s Eco-Management and Audit Scheme (EMAS), The Netherlands: Springer.
15.Bubbart, M.R.(1996). Statistical Quality Control for the Food /industry, 2nd Edition, Chapman & Hall, London.
Greek
1. Kalogridou – Vasiliadou, D. (1999). Rules of Good Industrial Practice for Food Businesses, University Studio Press, Thessaloniki.
2. Tsaknis, I. (2009). Food Quality Assurance, Papasotiriou Publications, Athens.

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE & TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **6051-6052** | **SEMESTER** | **6** |
| **COURSE TITLE** | **SENSORY EVALUATION OF FOODS** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| Laboratory classes | 2 | |
| Total | 5 | 7 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Special background, specialized knowledge, skills development |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | No |

## (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*

Upon successful completion of the course the student will be able to:

- understand the importance of sensory quality in food acceptance
- understand the principles of sensory assessment and psychophysics
- know the organoleptic methodology and terminology, and the differences between emotional and analytical methods of quality assessment
- organize and manage, in an effective way, sensory quality assessment
- use sensory analysis techniques in food product development and in estimating shelf life
- correlate data of sensory and instrumental quality measurements of foods
- apply principles of statistics in the processing and presentation of results

| ***General Competences***<br>*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*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| Search for, analysis and synthesis of data and information, using the necessary technologies<br>- Project design and management<br>- Decision making<br>- Independent Work<br>- Teamwork<br>- Respect for the natural environment<br>- Promotion of critical, creative and inductive thinking | |

## (3) SYLLABUS

Theoretical part

General description: Hunan senses, fundamentals of physiological and psychological sensory functions. Sensory characteristics of food (appearance, smell and aroma, taste, texture, flavor). Factors influencing sensory measurements. Design of sensory testing facilities, selection and training of panelists. Analytical and emotional sensory tests: description and applications. Collecting and analyzing sensory data. Importance of sensory analysis in food product development. Case studies.

More specifically, the content of the theoretical part includes:

- Anatomy, physiology and functions of human senses
- Sensory characteristics and food acceptance, objectives of sensory analysis
- Appearance and internal visual properties of food
- Odor and aroma, nature of aromatic constituents
- Taste, perception of taste qualities
- Chemical “heat and cooling”, other irritative sensations
- Characteristics depending on food structure, texture profile analysis
- Sensory interactions
- Experimental design, principles of good practice, sample selection, data analysis and presentation
- Consumer-oriented and product-oriented tests, protocol and panelist considerations
- Sensory analysis and predictive spoilage models, shelf-life determination

Laboratory classes

General description: Enhancement of students' learning experience in the principles and applications of sensory analysis, by performing experiments, problem solving, individual and group work, presentations and discussions. Selection and training of panelists for conducting laboratory tests, evaluation of sensorial properties using emotional and analytical methods, statistical processing and presentation of results.

More specifically, the content of the laboratory classes includes:

- Establishing an internal sensory panel, selection and screening of panelists
    - Odor recognition, ability to distinguish, use of sensory terminology
- Discriminative tests
    - Paired comparison test, duo – trio, triangular test, ranking test (Friedman)
- Descriptive tests
    - Structured scaling, quality Index method (QIM), profiling analysis, quantitative

descriptive analysis
- Preference - acceptance tests
  - Paired comparison preference test, ranking test, hedonic scaling test
- Statistical evaluation of results
  - Significance tests, analysis of variance (ANOVA), Student's distribution (t-test), use Excel for statistical tests

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of information technologies in data-information collection, teaching and communication. Information via Web, communication with students via e-mail. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** — ***Semester workload***<br>Lectures — 117<br>Laboratory classes — 65<br>Course total — *182* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Language of assessment: Greek<br><br>Evaluation methods<br>- Multiple choice questionnaires<br>- Short-answer questions<br>- Public presentation<br>- Laboratory work<br>- Final examination |

## (5) ATTACHED BIBLIOGRAPHY


*- Suggested bibliography:*

*Blakemore, C. & Jennett, S. (2001). The Oxford Companion to the Body. Oxford, UK: Oxford University Press.*

*Bourne, M.C. (2002). Food Texture and Viscosity: Concept and Measurement, 2nd edition. New York: Academic Press.*

*Bourne, M.C. & Szczesniak, A.S. (2003). Texture. In: Caballero, B., Trugo, L. & Finglas, P.M. (eds) Encyclopedia of Food Sciences and Nutrition, 2nd edn, pp. 5167-5174. London: Academic Press.*

*Chambers, E. & McGuire, B. (2003). Sensory Evaluation – Practical Considerations. In: Caballero, B., Trugo, L. & Finglas, P.M. (eds) Encyclopedia of Food Sciences and Nutrition, 2nd edn, pp. 5136-5141. London: Academic Press.*

*Csillag, A. (2005). Atlas of the Sensory Organs: Functional and Clinical Anatomy. Totowa, New Jersey: Humana Press.*

*Delarue, J., Lawlor, B. & Rogeaux, M. (2014). Rapid Sensory Profiling Techniques - Applications in New Product Development and Consumer Research. Wood House Publishing.*

*Doty, R.L. (2015). Handbook of Olfaction and Gustation, Third Edition. John Wiley & Sons, Inc.*
*Guichard, E., Salles, C., Morzel, M. & Le Bon, A.M. (2017). Flavour: From Food to Perception, 1st Edition. West Sussex, UK: John Wiley & Sons, Ltd.*
*Hawkes, C.H. & Doty, R.L. (2009). The Neurology of Olfaction. Cambridge, UK: Cambridge University Press.*
*Jha, S.N. (2010). Non-Destructive Evaluation of Food Quality; Theory and Practice. New York, NY: Springer.*
*Kahle, W. & Frotscher, M. (2010). Color Atlas of Human Anatomy, Vol.3; Nervous System and Sensory Organs, 6th edition. Harrogate, UK: Thieme Publishing Group.*
*Kemp, S.E., Hollowood, T. & Hort, J. (2011). Sensory Evaluation: A Practical Handbook. John Wiley & Sons.*
*Kemp, S.E., Hort, J. & Hollowood, T. (2018). Descriptive Analysis in Sensory Evaluation. John Wiley & Sons.*
*Lawless H.T. (2012). Laboratory Exercises for Sensory Evaluation. New York, NY: Springer Science & Business Media.*
*Lawless, H.T. & Heymann, H. (2010). Sensory Evaluation of Food - Principles and Practices (2nd edition). New York, NY: Springer.*
*MacDougall DB (2003). Appearance. In: Caballero, B., Trugo, L. & Finglas, P.M. (eds) Encyclopedia of Food Sciences and Nutrition, 2nd edn, pp. 5161-5167. London: Academic Press.*
*McEwan JA and Lyon DH (2003). Sensory Rating and Scoring Methods. In: Caballero, B., Trugo, L. & Finglas, P.M. (eds) Encyclopedia of Food Sciences and Nutrition, 2nd edn, pp. 5148-5152. London: Academic Press.*
*Meilgaard, C.M., Civille, G.V. & Carr, B.T. (2015). Sensory Evaluation Techniques (5th edition). Boca Raton: CRC Press.*
*Mottram DS and Elmore JS (2003). Aroma. In: Caballero, B., Trugo, L. & Finglas, P.M. (eds) Encyclopedia of Food Sciences and Nutrition, 2nd edn, pp. 5174-5180. London: Academic Press.*
*Murray JM and Baxter IA (2003). Food Acceptability and Sensory Evaluation. In: Caballero, B., Trugo, L. & Finglas, P.M. (eds) Encyclopedia of Food Sciences and Nutrition, 2nd edn, pp. 5130-5136. London: Academic Press.*
*Nollet, L.M.L. & Toldra, F. (2010). Sensory Analysis of Foods of Animal Origin. Boca Raton: CRC Press.*
*Rousseau B (2003). Sensory Difference Testing. In: Caballero, B., Trugo, L. & Finglas, P.M. (eds) Encyclopedia of Food Sciences and Nutrition, 2nd edn, pp. 5141-5147. London: Academic Press.*
*Soderquist, D.R. (2002). Sensory Processes. London: SAGE Publications Inc.*
*Stone H and Sidel JL (2003). Descriptive Analysis. In: Caballero, B., Trugo, L. & Finglas, P.M. (eds) Encyclopedia of Food Sciences and Nutrition, 2nd edn, pp. 5152-5161. London: Academic Press.*
*Stone, H. & Sidel, JL (2004). Sensory evaluation practices, 3rd ed. London: Academic Press.*
*Valentová H and Panovská Z (2003). Taste. In: Caballero, B., Trugo, L. & Finglas, P.M. (eds) Encyclopedia of Food Sciences and Nutrition, 2nd edn, pp. 5180-5187. London: Academic Press.*
*Zou, X. & Zhao, J. (2015). Nondestructive measurement in Food and Agro-Products. New York: Springer.*
*York R and Vaisey-Genser M (2003). Sensory Characteristics of Human Food. In: Caballero, B., Trugo, L. & Finglas, P.M. (eds) Encyclopedia of Food Sciences and Nutrition, 2nd edn, pp. 5125-5130. London: Academic Press.*
*- Related academic journals:*
Food Quality and Preference
International Journal of Food Science and Technology
Food Research International
LWT - Food Science and Technology
Journal of Food Science
Food Chemistry
Critical Reviews in Food Science and Nutrition
*European Food Research and Technology*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE & TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **6061** | **SEMESTER** | **6** |
| **COURSE TITLE** | **RESEARCH METHODOLOGY - TERMINOLOGY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| | | |
| Total | 2 | 3 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | General background |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | - |

## (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*

The aim of the course is to provide students with knowledge, access to terminology, and the ability to conduct scientific information searches. It aims to make students proficient in both quantitative and qualitative research methods and equip them with the capability to interpret and evaluate published scientific works in the field of food science. Furthermore, the course intends to provide students with the necessary tools to develop the skills required for designing, preparing, and conducting research projects at both undergraduate and postgraduate levels.

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

- Search for, analysis and synthesis of data and information, using the necessary technologies
- Decision making
- Teamwork
- Promotion of critical, creative and inductive thinking
- Production of new research ideas

## (3) SYLLABUS

Phases of the Research Process (Research Problem, Research Question, Research Proposal, Research Protocol, Research Designs, Research Hypothesis):
Exploration of a Scientific Question - Selection of a Scientific Topic - Originality
This phase includes exploring a scientific question, selecting a scientific topic, and ensuring originality.
Literature Review - Familiarity with Electronic Databases
English Terminology
Quantitative and Qualitative Research, Sampling, Research Threats, Reliability, and Validity in Research, Data Collection, and Organization
Basic Principles of Systematic Review and Meta-Analysis
Reading, Understanding, and Evaluating a Research Article
Presentation of Research Results, Critique of Research, Guidelines for Critical Reading, and Writing of a Research Paper

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of information technologies in data-information collection, teaching and communication. Information via Web, communication with students via e-mail. |

**TEACHING METHODS**

*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 visits, project, essay writing, artistic creativity, etc.*

*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*

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 78 |
| | |
| | |
| | |
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| | |
| | |
| | |
| | |
| Course total | *78* |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Language of assessment: Greek<br><br>Evaluation methods<br>- Problem solving<br>- Presentations<br>- Final examination |

## (5) ATTACHED BIBLIOGRAPHY


*- Suggested bibliography:*

*1. Stewart, G.F. and Amerine, M.A., 2012. Introduction to food science and technology. Elsevier.*

*2. Miller, J. and Deutsch, J., 2009. Food studies: an introduction to research methods. Berg Publisher.*

*3.Ζαφειρόπουλος Κ. Πως γίνεται μια επιστημονική εργασία; Επιστημονική έρευνα και συγγραφή εργασιών, Εκδόσεις Κριτική, 2005*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **7011-7012** | SEMESTER | **7** |
| **COURSE TITLE** | **FRUITS AND VEGETABLES SCIENCE AND TECHNOLOGY** | | |
| **INDEPENDENT TEACHING ACTIVITIES** *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* | | **WEEKLY TEACHIN GHOURS** | **CREDITS** |
| Lectures | | 3 | |
| Laboratory | | 2 | |
| Total | | 5 | 7 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | | |
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialization, Skill development | | |
| **PREREQUISITE COURSES:** | Food Processing I | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO | | |
| **COURSE WEBSITE (URL)** | | | |

## (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*

**After concluding this course, students are expected to:**

- Understand the main principles and methods of the main fruit and vegetables preservation methods
- Describe the basic steps of food processing techniques focusing on the preservation obtained, analyzing also the main microbiological, physicochemical and process design aspects
- Understand the key principles of quality control of fruits and vegetables
- Understand and explain the main deterioration modes of important crops
- Understand and apply quality requirements and food legislation.
- Understand and predict the main effects of food preservation methods on fruit and vegetables quality attributes
- Be familiar with the main factors that affect food spoilage due to microorganisms growth and be able to suggest methods of shelf life extension, depending on the specific vegetative tissue

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

- Research, analysis and critical assessment of literature information, using modern methods
- Skills in literature searching and understanding
- Capability to work individually, and/or in a team project.

*Consider effect of processes on the environment/social and economical impact*.

## (3) SYLLABUS

**Theoretical part:**

The main properties (physicochemical, microbiological, sensory, etc) of fruits and vegetables are investigated and their content is studied, focusing on the parameters that affect the quality of the final, processed product. Post-harvest behavior, the criteria of crops collection and the effect of processing technologies are detailed for a number of fruits and vegetables. A main objective of this course is the comprehension of the effect of several preservation methods on the safety, quality and shelf life of important fruit and vegetable products. Thermal treatment (blanching, pasteurization and commercial sterilization) are studied, combined to other, novel preservation methods (osmotic dehydration, high pressure, etc). The processing conditions, the corresponding flow charts and the main points of quality control are also detailed for products of special interest for the Greek market, giving emphasis to the technological aspects of the procedures.

**Laboratory**: The main laboratory exercises refer to:

1. Production of syrups and salt solutions/measurement of sugar/salt concentration
2. Canning of fruits-all process steps implemented in a laboratory scale, with the corresponding equipment.
3. Study of tomato products/ketchup production and quality assessment
4. Jam production and quality evaluation of the final product
5. Preliminary, pre-processing procedures before chilling/freezing
6. Fruit and vegetable freezing in a commercial, horizontal freezer, etc

## (4) TEACHING and LEARNING METHODS - EVALUATION

| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face |
|---|---|

| | |
|---|---|
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Utilization of modern e-techniques and WEB communication. Web communication& contact with students. Material upload for students' optimized learning. Literature recommendation and exercises/assays available on-line. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** — ***Semester workload***<br>Lectures — 117<br>Laboratory — 65<br>Course total — **182** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Assays/presentations<br>• Seminars<br>• Case studies<br>• Laboratory reports<br>• Intermediate assignments and evaluation<br>• Final assessment |

## (5) ATTACHED BIBLIOGRAPHY


*Ron B.H. Wills, John Golding (2017). Advances in Postharvest Fruit and Vegetable Technology. CRC Press Nirmal K. Sinha (2011). Handbook of Vegetables and Vegetable Processing. Wiley*
*Sueli Rodrigues, Fabiano Andre Narciso Fernandes (2016). Advances in Fruit Processing Technologies. CRC Press*
*Nirmal K. Sinha, Jiwan S. Sidhu, József Barta, James S. B. Wu, M. Pilar Cano (2012). Handbook of Fruits and Fruit Processing, Second Edition. Wiley*
*Chakraverty A. and R. Paul Singh. (2014). Postharvest Technology and Food Process Engineering. CRC Press*
*Anagnostopoulou A, Talelli A. (2014). Technology and quality of fruits and vegetables. New Technologies Editions.*
*Bloukas J. (2004) Food processing and preservation. Stamoulis Editions. Athens.*
*Vassilakakis M. (2014). Postharvest physiology, management of fruits and vegetables and their technology. Nutritional aspects of fruits and vegetables. Gartagani Editions, Athens.*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **7021-7022** | **SEMESTER** | **7** |
| **COURSE TITLE** | **FATS AND OILS SCIENCE AND TECHNOLOGY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| Laboratory exercises | 2 | |
| Total | 5 | **7** |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Special background<br>Specialised general knowledge<br>Skills development |
| **PREREQUISITE COURSES:** | 2021-2023 Organic Chemistry |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes (English) |
| **COURSE WEBSITE (URL)** | . |

## (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*

The course aims to make students head of laboratory and/or head of quality control production in the oil and fat industries. The course target is:

- To familiarize students with the analytical techniques for controlling the quality of fatty substances and detecting possible adulteration
- To enable students to evaluate and classify the oilseeds that are the raw materials for the production of fatty substances
- to familiarize students with the production of fatty substances
- to enable students to design new products and solve technological problems of the fat industry related to the production, handling, oxidation and maintenance of final products

| ***General Competences***<br>*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*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| Analysis and synthesis of data and information, with the use of adequate technology<br>Project planning and management<br>Promoting critical, creative and inductive thinking<br>Adapting to new situations<br>Decision-making<br>Working independently<br>Team work<br>Working in an interdisciplinary environment<br>Respect for the natural environment | |

## (3) SYLLABUS

**Lecture courses:**

Introduction to lipids. Classification of lipids. Classes and types of edible lipids. Components of fatty substances. Physical and chemical properties of lipids. Vegetable fats and oils. The olive oil industry. Criteria for olive oil quality. Organoleptic evaluation of olive oil. Biological value of olive oil. Animal fats  fish oils. Refinement of vegetable oils. Hydrogenation of fatty substances. Oxidation of fatty substances. Margarines and shortenings.

**Laboratory Practicals**

- Determination of chemical characteristics of stable fatty substances (fat saponification number, iodine number)
- Determination of free fatty acids (acidity)
- Assessment of oxidation state of fatty substances – determination of peroxide value and p-anisidine value
- UV Spectrophotometry (K232, K270, ΔK)
- Estimation of oxidative stability with the Rancimat method
- Refinement process (refining)

## (4) TEACHING and LEARNING METHODS - EVALUATION

| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
|---|---|

| | |
|---|---|
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of scientific databases, lab-sessions, e-class, communication through e-mails and e-class messages |

| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
|---|---|---|
| | *Lectures* | 117 |
| | *Laboratory practicals* | 60 |
| | | |
| | | |
| | | |
| | | |
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| | | |
| | | |
| | Course total | ***177*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Written final and/or midterm written exams examination in Greek with multiple choice questionnaires, short-answer questions, open- ended questions, problem solving and essay questions<br>• Laboratory practicals examination<br>• Assignment: Students in pairs shall deliver a text on a related subject and make a short presentation |

## (5) ATTACHED BIBLIOGRAPHY


- Lecturer's notes, posted on the UNIWA Open eClass e-learning and e-learning platform
- Gunstone, F. (2009). *Oils and fats in the food industry*. John Wiley & Sons.
- Akoh, C. C. (Ed.). (2017). *Food lipids: chemistry, nutrition, and biotechnology*. CRC press.
- Bockisch, M. (Ed.). (2015). *Fats and oils handbook (Nahrungsfette und Öle)*. Elsevier.
- O'brien, R. D. (2008). *Fats and oils: formulating and processing for applications*. CRC press.
- Hernandez, E. M., & Kamal-Eldin, A. (2013). *Processing and nutrition of fats and oils*. John Wiley & Sons.
- Hoffmann, G. (2013). *The chemistry and technology of edible oils and fats and their high fat products*. Academic press.
- Belitz, H.D. and Grosh, W. (1987). Lipids and Edible Fats. In: Food Chemistry. (English translation by D. Hadziyev), pp 128-200, 472-493, Springer Verglar publ., New York.
- R. S. Kirk, R. S. and R. Sawyer (eds.). (1991). Pearson's Composition and Analysis of Foods. 9th ed. Longman Group, UK Ltd
- Bakeet, ZAN., Alobeidallah, F.M.H. and Arzoo, S. (2013). Fatty acid composition with special emphasis on unsaturated trans fatty acid content in margarines and shortenings marketed in Saudi Arabia, International Journal of Biosciences, 3, 86-93.
- Bongers, P. and Almeida-Rivera, C. (2011). Dynamic modelling of the margarine production process, Computr Aided Chem Eng., 29, 1301-1305.

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **7031-7032** | **SEMESTER** | **7** |
| **COURSE TITLE** | **FISH AND FISHERY PRODUCTS SCIENCE & TECHNOLOGY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 3 | |
| LABORATORY EXERCISES | 2 | |
| TOTAL | 5 | 7 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Special background<br>Specialised general knowledge<br>Skills development |
| **PREREQUISITE COURSES:** | 4051-4052 Food Microbiology and Microbiological Analysis |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES (ESSAYS) |
| **COURSE WEBSITE (URL)** | |

## (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*

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

- understand the principles of traditional and modern technologies applied in the processing and preservation of fishery products
- carry out macroscopic controls and laboratory tests on fishery products
- assess the quality of fish and their products
- understand the impact of post-harvest handling and processing on the safety and quality of the final products
- understand the nutritional risks associated with the consumption of fishery products
- effectively implement available safety and quality management systems for fishery products

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

Search for, analysis and synthesis of data and information, using the necessary technologies

- Project design and management
- Decision making
- Independent work
- Team work
- Respect for the natural environment
- Promotion of critical, creative and inductive thinking

## (3) SYLLABUS

**Theoretical Part of the Course**

**Description:** Aquatic resources and their utilization. European strategy for the marine environment and sustainable fisheries. Classification and anatomy of fish. Physical properties, composition and yield, nutritional value. Postmortem changes (sensory, biochemical, microbiological). Evaluation of freshness quality of fish and shellfish. Fish processing technologies. Quality changes and shelf life of fishery products. Public health aspects. Organization of controls and implementation of safety and quality management systems for fishery products. Good hygienic and manufacturing practices (GHP/GMP). European legislative framework for the safety and quality of fish and their products.

In more detail, the content of the course includes:

- The natural environment of fish, world fisheries production, key axes of the reformed European common fisheries policy.
- Anatomy and physiology of fish, crustaceans and molluscs.
- Physical properties (mechanical, thermal, electrical), weight composition and yield, chemical composition and nutritional value of fish.
- Energy metabolism in muscle tissue, postmortem production of energy, rigor mortis, autolysis of muscle tissue.
- Effect of postharvest handling and endogenous enzymes on the quality and shelf life of fish.
- Methods of assessing freshness quality of fish.
- Saprophytic organisms and fish spoilage, specific spoilage organisms of iced, VP and MAP fishery products.
- Relative rate of spoilage and shelf life of fishery products, predictive spoilage models, equivalent storage time in ice and remaining storage life.
- Fish processing technologies (chilling, freezing, thermal processing–canning, salting, smoking, drying, marinating).
- Specialty fish products (fish roe, sauces and fermentation products, fish sausages).
- Quality defects of fresh, frozen and processed fishery products.
- Health concerns, hygienic rules and official controls for fishery products.
- Application of the HACCP system in the production of fishery products, species- and process-related hazards.

**Laboratory Part of the Course**

*Description*: Enhancing the students' learning experience in the principles and applications of fish and fishery products science and technology by performing experiments, problem solving, individual/group work, presentations and discussions. Anatomy–physiology of fish. Industrial yield data. Chill storage of fishery products using conventional and slurry ice. Application of sensory, chemical and microbiological methods for assessing freshness quality and storage life. Implementation of processing technologies. Specific spoilage organisms of fresh fishery products. Quality attributes of frozen fish. Microbiological stability and safety of processed fishery products.

More specifically, the content of the laboratory classes includes:

- Anatomy of finfish, cephalopods, bivalve molluscs and crustaceans
- Physical composition and yield of fish: edible part, waste utilization
- Ice storage of fresh fish: cooling rate, ice consumption, compensation for heat losses
- Sensory quality of fish: EU freshness categories (Regulation 2406/96), Quality Index Method (QIM), freshness classification based on cooked fish odour and flavour
- Shelf-life assessment of wet fish: data collection, time-temperature history, QIM rating, impedance data (Torrymeter), predictive spoilage models, equivalent time in ice, remaining storage life
- Microbial indices: APC, specific spoilage bacteria (*Pseudomonas* spp., *Shewanella* spp.)
- Chemical indicators of spoilage: volatile bases (TMA-N, TVB-N), histamine
- Fish freezing: freezing time, glazing – glaze determination/recovery errors, oxidative rancidity, colour changes (*CIE L*a*b**)
- Salting, drying, smoking, marinating: mechanisms of wet and dry salting, weight changes, wps, aw, pH, microbiological stability, quality attributes of salted cod
- Fish fraud: detection of boric acid and sulfites in crustaceans, distinguishing fresh from thawed-frozen fish, screening for parasitic worms

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face and distance learning (synchronous) when necessary. Asynchronous material is available in Greek. |
| **USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching: all educational material, such as text documents, slides, videos, etc., is uploaded in the electronic class (e-class) of the University. Communication with students via e-class or emails. |

**TEACHING METHODS**

*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 visits, project, essay writing, artistic creativity, etc.*

*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*

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 117 |
| Laboratory classes | 65 |
| | |
| | |
| | |
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| | |
| | |
| Course total | ***182*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Language of assessment: Greek<br>Evaluation methods<br>– Multiple choice questionnaires<br>– Short-answer questions<br>– Public presentation<br>– Laboratory work<br>– Final examination |

## (5) ATTACHED BIBLIOGRAPHY

*Suggested bibliography:*


- *Λουγκοβόης, Β.Π. (2023). Επιστήμη και Τεχνολογία Αλιευτικών Προϊόντων. Εκδόσεις Τζιόλα. Θεσσαλονίκη.*
- *U.S. Food and Drug Administration - Center for Food Safety & Applied Nutrition (2022). Fish and Fishery Products Hazards and Controls Guidance, fourth edition. Fish and Fishery Products Hazards and Controls | FDA*
- *FAO and WHO (2020). Code of Practice for Fish and Fishery Products. Rome. https://doi.org/10.4060/cb0658en.*
- *FAO/WHO (2013). Public Health Risks of Histamine and other Biogenic Amines from Fish and Fishery Products. Meeting report. https://www.who.int/publications/i/item/9789240691919.*
- *Kramer, D.E. & Brown, L. (2008). International Smoked Seafood Conference Proceedings. Fairbanks: Alaska Sea Grant Program, University of Alaska Fairbanks. International Smoked Seafood Conference proceedings (noaa.gov)*
- *Kolbe, E. & Kramer, D. (2007). Planning for Seafood Freezing. Alaska Sea Grant College Program. University of Alaska Fairbanks. planning-for-seafood-freezing.pdf (oregonstate.edu)*
- *Huss, H.H., Ababouch, L. & Gram, L. (2004). Assessment and Management of Seafood Safety and Quality. FAO Fisheries Technical Paper 444. Rome: FAO. y4743e.pdf (fao.org)*
- *FAO (2004). Marine Biotoxins. FAO Food and Nutrition Paper 80. Rome: Food and Agriculture Organization of the United Nations. y5486e00.pdf (fao.org)*
- *Haard, N.F. & Simpson, B.K. (2000). Seafood Enzymes: Utilization and Influence on Post-harvest Seafood Quality. New York, Basel: Marcel Dekker, Inc.*


*- Related academic journals:*

- *International Journal of Food Science and Technology*
- *Food Research International*
- *LWT - Food Science and Technology*
- *International Journal of Food Microbiology*
- *Aquatic Food Product Technology*
- *Food Chemistry*
- *Journal of Agricultural and Food Chemistry*
- *Journal of Food Science*
- *Food Control*
- *Aquaculture*
- *Critical Reviews in Food Science and Nutrition*
- *Comprehensive Reviews in Food Science and Food Safety*
- *Journal of Food Engineering*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **7041** | **SEMESTER** | **7** |
| **COURSE TITLE** | **GENERAL PRINCIPLES OF FOOD HYGIENE** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 3 | 5 |
| | | |
| **TOTAL** | **3** | **5** |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | SPECIALISED KNOWLEDGE<br>SKILLS DEVELOPMENT |
| **PREREQUISITE COURSES:** | NO |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | https://fst.uniwa.gr/course/genikes-arches-ygieinis-trofimon/ |

## (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*

**Aim**

The course aims to introduce to the students the main principles of Food Hygiene as descripted by National and International Codes of Practices.

**Learning Outcomes**

Upon successful completion of the course the students shall be able to:

- Know the unified approach for the production of healthy and safe food in the global food chain.
- Be familiar with food safety management tools as applied worldwidely, with particular emphasis on risk analysis.
- Know the good practices of applying hygiene rules in all food businesses and understand their application and the means of controlling their observance.
- Be familiar with the additional specific hygiene rules to be applied in specific categories of food.

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

- Working independently
- Team work
- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Development of free, creative and inductive thinking
  Working in an interdisciplinary environment

## (3) SYLLABUS

- Introduction to Good Hygiene Practices
- International Code of Practice (FAO CODEX ALIMENTARIUS): General principles of food hygiene in the food chain
  - Primary Production
  - Establishment: Design and Facilities
  - Control of Operation
  - Establishment: Maintenance and Sanitation
  - Establishment: Personal Hygiene
  - Transportation
  - Product Information and Consumer Awareness
  - Training
- Food Hazards and Food Safety Management Tools / HACCP
- Design and construction rules of food production plants
- Product handling & Food storage
- Cleaning & Disinfection
- Pest Control
- Individual Health & Personnel Hygiene
- Special hygiene rules per food category

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to Face, e class notes | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | E class extra material<br>Communication with students through e-mails and e-class tools | |
| **TEACHING METHODS** | ***Activity*** | ***Semester workload*** |

| | | |
|---|---|---|
| *The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | LECTURES (including case studies, demonstration of on-line tools etc) | 130 |
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| | Course total | *130* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Case Studies<br>Final examination in Greek which includes: multiple choice questions, essay questions and short answer questions. | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*


- Kalogridou- Vassileiadou, D. (1999) Rules of Good Hygiene Practice for Food Units. University Studio Press.
- Codex Alimentarius FAO-WHO


*- Related academic journals:*

## COURSE OUTLINE

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **7051** | **SEMESTER** | **7** |
| **COURSE TITLE** | **NEW FOOD PRODUCT DEVELOPMENT** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 2 | 2 |
| | | |
| **TOTAL** | **2** | **2** |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | SPECIALISED GENERAL KNOWLEDGE |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK (and ENGLISH) |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES |
| **COURSE WEBSITE (URL)** | https://fst.uniwa.gr/announcements/analytiko-programma-proptychiakon-spoydon/ |

### (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*

Upon completion of the course the student will

- Know the current state of art regarding innovative food product on the market
- Know how to evaluated the consumer needs towards nutrition and distinguish trends
- Be able to electronically compose an innovative recipe, based on its ingredients by using valid Food composition tables
- Be able to create food labels by following EU and national regulations

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

## (3) SYLLABUS

Introduction to the many aspects of the food product development approach:

1. Current and future innovative approaches
2. The consumer need and the market trends
3. Steps of the food product development
4. Super Market Safari
5. Focus Groups – Brainstorming for a new idea
6. Assessing consumer trends with digital questionnaires
7. Food composition tables for the nutrient value calculation
8. Recipes conduction (digital) and available tools on the market
9. EU and national Regulations regarding nutrient and health claims
10. Sensoric analysis
11. Food Science issues of the product development

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to Face | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching,<br>communication with students via platform (eclass) and emails | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.* | ***Activity*** | ***Semester workload*** |
| | *Lectures* | 50 |
| | *study and analysis of bibliography,* | 6 |

| | | |
|---|---|---|
| *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.*<br><br>*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* | *interactive teaching* | 7 |
| | *essay writing,* | 15 |
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| | Course total | *78* |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Language of evaluation is Greek (and English in case of Erasmus student participation), methods of evaluation is, written examination comprising multiple choice questionnaires, short-answer questions, open- ended questions. Additionally, assessment of written essay upon public presentation |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*
*Έρευνα και Ανάπτυξη νέων προϊόντων και Επιχειρηματικών Σχεδίων*
*Κωδικός Βιβλίου στον Εύδοξο: 68403328*
*Έκδοση: 1/2017*
*Συγγραφείς: Σφλώμος Κωνσταντίνος, Βαρζάκας Θεόδωρος*
*ISBN: 978-618-83264-4-6*
*Τύπος: Σύγγραμμα*
*- Related academic journals:*

- Current Opinion in Food Science https://www.journalguide.com/journals/current-opinion-in-food-science
- Food Culture & Society https://www.journalguide.com/journals/food-culture-and-society
- Food Quality and Preference https://www.journalguide.com/journals/food-quality-and-preference

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **7052** | **SEMESTER** | **7** |
| **COURSE TITLE** | **CURRENT TOPICS IN NUTRITION** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 2 | 2 |
| | | |
| **TOTAL** | **2** | **2** |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | SPECIALISED GENERAL KNOWLEDGE |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK (and ENGLISH) |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES |
| **COURSE WEBSITE (URL)** | https://fst.uniwa.gr/announcements/analytiko-programma-proptychiakon-spoydon/ |

## (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*

Upon completion of the course the student will

- Know the dietary needs and concerns regarding public health nutrition issues
- Be able to evaluate the available food choices offered by the market to the consumer
- Recognize the market trends and consumer needs and the relative dietary solutions

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

## (3) SYLLABUS

Available approaches and applications regarding food and nutrition:

1. Nutrition today
2. Dietary supplements
3. Reduced (light) food products
4. Functional food – superfoods – nutraceuticals
5. Advanced Glycation endproducts -AGEs
6. Genetically modified organisms -GMO
7. Probiotics – Prebiotics
8. Alternative dietary patterns (vegan, vegetarian etc)
9. Fasting
10. Weight loss
11. Organic food
12. Anti-inflammatory food
13. Antioxidative substances in food

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to Face | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching,<br>communication with students via platform (eclass) and emails | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop,* | ***Activity*** | ***Semester workload*** |
| | *Lectures* | 78 |
| | *study and analysis of bibliography,* | |
| | *interactive teaching* | |
| | *essay writing,* | |

| | | |
|---|---|---|
| *interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*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* | | |
| | | |
| | | |
| | | |
| | | |
| | Course total | *78* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Language of evaluation is Greek (and English in case of Erasmus student participation), methods of evaluation is conclusive, written examination is comprising multiple choice questionnaires, short-answer questions, open- ended questions, problem solving, | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

Βιολειτουργικά συστατικά και Πρόσθετα τροφίμων

Σφλώμος Κωνσταντίνος ISBN: 978-618-83264-5-3, Έκδοση: 1/2017, Διαθέτης (Εκδότης): ΚΥΡΙΑΚΟΣ ΑΛΕΞΙΟΥ & ΣΙΑ ΕΕ

*- Related academic journals:*

- Current Nutrition and Food Science https://www.journalguide.com/journals/current-nutrition-and-food-science
- Nutrition Bulletin https://www.journalguide.com/journals/nutrition-bulletin

## COURSE OUTLINE

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **7053** | **SEMESTER** | **7** |
| **COURSE TITLE** | **WASTE MANAGEMENT AND FOOD BY-PRODUCTS VALORIZATION** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 2 | 3 |
| | | |
| Total | 2 | 3 |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialization, Skills development |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (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*

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

• recognize the nature, sources, methods and techniques of processing and management of waste
• Know the recovery of by-products from food industry waste
• Analyze and calculate the basic principles of the food waste processing and recovery
• Make preliminary planning of waste treatment facilities

| ***General Competences***<br>*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*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| • Research, analysis and critical assessment of literature information, using modern methods<br>• Skills in literature searching and understanding<br>• Capability to work individually, and/or in a team project. | |

## (3) SYLLABUS

Description: Critical issues and solutions for dealing with waste in the food processing industry, including solid and liquid waste treatment, environmental, economic and technical issues of food industry waste treatment. Utilization and recovery of by-products from food industry waste. Approach from the point of view of sustainability.

In detail, the content of the course includes:

- Detailed description of the nature of food industry waste
- Pollutants, definitions-description of pollutant loads
- Food industry waste generation
- Types of solid waste.
- Waste management options and their application in the food industry (eg source reduction, reuse, recovery, recycling, composting, etc.).
- Development, use and management of biodegradable polymers.
- Types of liquid waste
- Biological treatment processes (aerobic, anaerobic, activated sludge, etc.).
- Chemical processes.
- Water softening, Disinfection, Gas transfer and coagulation. Natural processes.
- Sorting, mixing, flocculation, sedimentation, filtration, industrial waste management.
- Reactor kinetics.
- Waste management by industry (fruits & vegetables, grains, meat & meat products, fish & fish, milk & dairy).
- Recovery of by-products from food industry waste (pectin, citric acid, gelatin, biologically active substances, pet food)
- Regulations on waste management options.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face |
|---|---|

| | |
|---|---|
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Web communication & contact with students. Material upload for students' optimized learning. Literature recommendation and exercises/assays available on-line. |

| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
|---|---|---|
| | Lectures | 50 |
| | Essay writing and Presentation | 28 |
| | | |
| | | |
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| | | |
| | | |
| | Total | **78** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Presentation of essays<br>• Final assessment |

## (5) ATTACHED BIBLIOGRAPHY


- Anil Kumar Anal (2017). Food Processing By-Products and their Utilization. Wiley-Blackwell
- Lawrence K. Wang, Yung-Tse Hung, Howard H. Lo, Constantine Yapijakis (2005). Waste Treatment in the Food Processing Industry. CRC Press
- Keith W. Waldron (2007). Handbook of Waste Management and Co-Product Recovery in Food Processing. Woodhead Publishing
- M. Chandrasekaran (2012). Valorization of Food Processing By-Products. CRC Press


***Related scientific journals***

Food by-products processing

Waste management

## COURSE OUTLINE

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **7054** | **SEMESTER** | **7** |
| **COURSE TITLE** | **PRECISION NUTRITION** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 2 | 3 |
| | | |
| Total | 2 | 3 |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialized, general knowledge |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek (and ENGLISH) |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes |
| **COURSE WEBSITE (URL)** | https://fst.uniwa.gr/announcements/analytiko-programma-proptychiakon-spoydon/ |

### (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*

| ***General Competences***<br>*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*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| Search for, analysis and synthesis of data and information,<br>• with the use of the necessary technology<br>• Adapting to new situations<br>• Decision-making<br>• Working independently<br>• Production of free, creative and inductive thinking<br>• know to recognize the evidence-based knowledge to applying precision nutrition | |

## (3) SYLLABUS

| | |
|---|---|
| 1. | Introduction to precision nutrition |
| 2. | Dietary assessment methods – Nutrition Epidemiology |
| 3. | Evaluating eating habits |
| 4. | National, European and International dietary guidelines (food and nutrient level) |
| 5. | The science of -omics in Nutrition |
| 6. | Metabolic markers in nutrition, microbiome |
| 7. | Applied nutrigenetics – personalized nutrition |
| 8. | Prevention and treatment of nutrition related diseases |
| 9. | Weight control and eating habits |
| 10. | Apps and tools for nutrition, dieting |
| 11. | Nutritional intervention |
| 12. | Bioethics and society |
| 13. | Case studies – applied nutritgenetics |

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching, communication with students via platform (eclass) and emails. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 50 |
| study and analysis of bibliography, | 6 |
| interactive teaching | 7 |
| essay writing | *15* |
| | |
| | |
| | |
| Total | **78** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Language of evaluation is Greek (and English in case of Erasmus student participation), methods of evaluation is, written examination comprising multiple choice questionnaires, short-answer questions, open- ended questions. Additionally, assessment of written essay upon public presentation |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography: (in Greek)*

1. Precision Nutrition, The Science and Promise of Personalized Nutrition and Health, 1st Edition - November 1, 2023, Editors: David Heber, Zhaoping Li, José Ordovas, Paperback ISBN: 9780443153150
2. Nutrients, Special Issue Reprint, Precision Nutrition, Edited By: Andreu Palou, Barbara Reynés, mdpi.com/books/pdfview/book/7381, ISBN 978-3-0365-7484-4 (hardback), ISBN 978-3-0365-7485-1 (PDF)
3. https://foodinsight.org/personalized-nutrition-ready-for-prime-time/
4. https://nutritionforprecisionhealth.org/

***Related scientific journals***

- Nutrients
- The Journal of Nutrition
- Current Nutrition Reports
- Nutrition Today
- Journal of Nutrition and Health
- Advances in Nutrition
- The proceedings of the nutrition society
- International journal of food science and Nutrition

# COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **7055** | **SEMESTER** | **7** |
| **COURSE TITLE** | **COMPUTATIONAL CHEMISTRY AND CHEMINFORMATICS IN FOOD SCIENCE** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 2 | 3 |
| | | |
| | | |
| **TOTAL** | 2 | 3 |
| *Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialized general knowledge, skills development* | Special background, skills development |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes (project, essay writing) |
| **COURSE WEBSITE (URL)** | .. |

## (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*

After the end of this course, students will be able to:

- understand the basic principles that refer to the scope of computational chemistry and cheminformatics, with a particular emphasis on Food Science,
- possess the theoretical scientific background of computational chemistry techniques, to apply them for the study of bioactive compounds existing in food products,
- manage chemical compounds' databases (e.g. ZINC20 https://zinc.docking.org/) as well as specific platforms (e.g. FooDB https://foodb.ca/, FermFooDb https://webs.iiitd.edu.in/raghava/fermfoodb/index.php), Dr. Duke's Phytochemical & Ethnobotanical Databases https://phytochem.nal.usda.gov/) which compile data related to the chemical composition, properties and biological activity of food products,
- apply computational chemistry and cheminformatics software's/tools for the three-dimensional representation of food chemical compounds, for the prediction of their physicochemical properties, their toxicity and their binding mode to protein targets.

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

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Production of new research ideas
- Production of free, creative and inductive thinking

## (3) SYLLABUS

**Course Objectives**

The aim of the course is the students become familiar with the basic principles and tools of computational chemistry and cheminformatics with applications in Food Science. The course attempts to provide the required scientific background to students, including the following sections:

- Introduction to computational chemistry and cheminformatics
- Online food ingredient resources. Handling and retrieval of information
- Management and preparation of chemical compound databases (chemo-libraries)
- Theoretical background of computational chemistry tools
- Application of specific software's for the design of three-dimensional illustrations of chemical compounds
- Prediction of structural and physicochemical parameters of food components, by performing specific software's
- Quantitative structure-activity relationship models (QSAR models)
- Applications of computational techniques in food products, to correlate the activity of food ingredients with physicochemical-structural parameters
- Computational Chemistry Techniques: Virtual Screening chemo-libraries, Pharmacophore model, Molecular Docking studies, Molecular Dynamics Simulations
- Combinatorial techniques for the discovery of novel bioactive compounds against biological targets.
- Exploration of mechanisms bioactivity.

Additionally, the course teaching includes practical applications of computational chemistry and cheminformatics software's in targeted examples associated with Food Science.

## (4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td colspan="2">Face to face / Additionally with distance learning</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td colspan="2">Use of Information Technologies in Teaching, Laboratory Education and Communication. Informing students via Web, communication with students via e-mail.</td></tr>
<tr><td rowspan="11">TEACHING METHODS<br>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 visits, project, essay writing, artistic creativity, etc.<br><br>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</td><td>Activity</td><td>Semester workload</td></tr>
<tr><td>Lectures</td><td>40</td></tr>
<tr><td>Study and analysis of bibliography</td><td>10</td></tr>
<tr><td>Essay writing</td><td>28</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></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>78</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td colspan="2">• Public presentation<br>• Written work<br>• Multiple choice questionnaires, Short-answer questions, Open- ended questions</td></tr>
</table>

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

*1. Lecturers' notes, which will be given to students and posted on the UNIWA Open eClass asynchronous distance learning and e-learning platform.*

*2. Chontzopoulou Eleni, Kiriakidi Sofia, Zoumpoulakis Panagiotis, Mavromoustakos Thomas, Principles in Computational Chemistry (2021), KALLIPOS open academic editions*

*3. Harvey Jeremy, Computational Chemistry (2018), Oxford University Press*

*- Related academic journals:*

*ChemMedChem*

*Journal of Chemical Information and Modeling*

# COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **7061** | **SEMESTER** | **7** |
| **COURSE TITLE** | **INTERNSHIP** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | | 10 |
| | | |
| | | |
| **TOTAL** | | 10 |
| *Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialized general knowledge, skills development* | Specialized, skills development |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | https://moodle.uniwa.gr/course/view.php?id=1233 |

## (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*

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

- Consolidate and apply theoretical and laboratory knowledge.
- Familiarize themselves with the industrial and business reality.
- Showcase their skills and broaden their interests.

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

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team work
- Decision-making

## (3) SYLLABUS

Internship is a means of gaining experience for the student and is part of the total credit units required to obtain a degree. It is integrated into the curriculum between the 3rd and 4th year of studies and has a minimum duration of eight (8) weeks. It corresponds to 10 ECTS.
More specifically, the internship contributes to:

1. Developing the professional awareness of the intern.
2. Creating lasting connections between the Department and employment opportunities.
3. Enriching their knowledge based on the demands of the market.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | | |
| **TEACHING METHODS**<br>*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 visits, project, essay writing, artistic creativity, etc.*<br><br>*The student's study hours for each learning activity are given as well as the hours of non- directed* | ***Activity*** | ***Semester workload*** |
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|---|---|---|
| *study according to the principles of the ECTS* | | |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Internships are carried out in employment organizations related to the content of Food Science & Technology studies. Evaluation is conducted by both the supervisor from the hosting organization and the supervising professor. | |

**(5) ATTACHED BIBLIOGRAPHY**

| |
|---|
| *- Suggested bibliography:*<br>*- Related academic journals:* |

**COURSE OUTLINE**

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | DEPARTMENT OF SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **8011-8012** | **SEMESTER** | **8** |
| **COURSE TITLE** | **MILK AND DAIRY PRODUCTS SCIENCE AND TECHNOLOGY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 3 | |
| Laboratory exercises | 2 | |
| Total | 5 | 7 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | special background<br>specialised knowledge<br>skills development |
| **PREREQUISITE COURSES:** | 4051-4052 Food Microbiology and Microbiological Analysis |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | .Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes |
| **COURSE WEBSITE (URL)** | https://fst.uniwa.gr/course/epistimi-kai-technologia-galaktos-kai-proionton-toy/ |

## (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*

Upon successful completion of the course the student shall be able to:

- Understand the composition of milk, including the chemistry, structure and function of its components
- Understand the changes that occur in milk and its components during processing
- Understand and have the skills for the production and evaluation of dairy products
- Perform all the necessary analyzes on raw and auxiliary materials and on final dairy products
- Address and evaluate issues of hygiene, nutritional value, packaging, safety and quality assurance.

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

*Search for, analysis and synthesis of data and information, with the use of the necessary technology*
*Promoting critical, creative and inductive thinking*
*Adapting to new situations*
*Decision-making*
*Working independently*
*Team work*
*Working in an interdisciplinary environment*
*Respect for the natural environment*

## (3) SYLLABUS

**Description**: Scientific and Technical principles related to the commercial processing of milk from the field to the consumer, including liquid, concentrated, dehydrated and frozen dairy products, butter, cheese and other fermented dairy products. Theoretical aspects and practical applications

**Lectures on**:

- Greek and global milk production
- Composition of milk – Ingredients.
- Factors affecting the composition of milk
- Physicochemical and technological characteristics and properties of the main components of milk and factors affecting each of them: proteins, fat, lactose, salts, enzymes
- Organoleptic characteristics, Physicochemical properties, Nutritional value and Bio-functionality of milk
- Data on raw milk's safety and quality – Main controls – Legislation
- Heat-treated milks – Production process of pasteurized, ELS, microfiltered and UHT milk
- Yoghurt and other fermented milks – Technology (Manufacturing process) & controls
- Cheeses - Cheese making process & controls
- Butter – Technology (Manufacturing process) & controls
- Condensed milk- Technology (Manufacturing process) & controls
- Ice cream and frozen desserts - Technology (Manufacturing process) & controls

**Laboratory Exercises on**:

- Physicochemical characteristics of raw milk (pH, titrated acidity, indirect methods of estimating acidity, stability of raw milk, specific gravity)
- Determination of main milk components (e.g. fat content).
- Hygiene testing of raw milk (inhibitors, indirect and direct methods of microbiological assessment, purity control).
- Additional checks on the quality of raw milk (testing for adulteration with water, detection of different types of milk in mixtures).
- Familiarization of students with the basic equipment used by the dairy industries (e.g. homogenizers, heat exchangers).
- Standardization problems and use of a MilkoScan automated device to test milk standardization.
- Testing of the heat treatment degree (phosphatase, peroxidase tests)
- Use of LAB starter cultures, preparation of fermented milk products (yogurt, buttermilk).
- Mechanism of milk coagulation with rennet and study of factors that affect coagulation capacity and synergy.
- Cheese making of traditional Greek cheeses (Feta, Graviera, whey cheeses) -and in the context of an Educational visit to a factory- and pH measurements during cheese making.
- Sensory evaluation of cheeses and determination of fat content and moisture.
- Ice cream making and quality control

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of scientific databases, lab-sessions, e-class, communication through e-mails and e-class messages | |
| **TEACHING METHODS**<br>*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 visits, project, essay writing, artistic creativity, etc.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
| | *Lectures,* | 117 |
| | *laboratory practice* | 65 |
| | | |
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| | | |
| | Course total | *182* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Course 8011: Written final examination in Greek with multiple choice questionnaires, short-answer questions, open- ended questions, problem solving and essay questions<br><br>Course 8012<br>Final examination (80%): multiple choice questionnaires, short-answer questions, open- ended questions, problem solving, essay questions<br>Assignment (20%): Students in pairs shall deliver a text on a given dairy product and make a 15’ presentation<br><br>The assignment is a prerequisite for the successful completion of the course | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*


- *Christos Kehagia & Efstathia Tsakali (2020). Milk and Dairy Science and Technology (2nd Edition). New Tech Pub, Athens.*
- *Mantis, A, Papageorgiou K., Fletouris, I, Aggelides, A. (2015). Hygiene and Technology of milk and its products. Kyriakides Bros Publishing.*
- *P. Walstra, Pieter Walstra, Jan T. M. Wouters, Tom J. Geurts (2005). Dairy Science and Technology, Second Edition. CRC Press*
- *Anil Kumar Puniya (2015) .Fermented Milk and Dairy Products. CRC Press*
- *Richard Robinson, Trevor Britz (2008). Advanced Dairy Science and Technology. Wiley-Blackwell*
- *Tetrapak - Dairy Processing Handbook (available online)*


*- Related academic journals:*

- *Dairy Science & Technology*
- *Journal of Dairy Science*
- *Advances in Dairy Research*
- *Journal of Dairy Research*
- *International Journal of Dairy Technology*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **8021-8022** | **SEMESTER** | **8** |
| **COURSE TITLE** | **CEREALS & CEREAL PRODUCTS SCIENCE AND TECHNOLOGY** | | |

| **INDEPENDENTTEACHINGACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures,laboratoryexercises,etc.Ifthecreditsareawardedforthewholeofthe course, give the weekly teaching hours and the total credits* | **WEEKLYT EACHING HOURS** | **CREDITS** |
|---|---|---|
| | 3 | |
| | 2 | |
| **Total** | 5 | 7 |
| *Add rows if necessary. The organization of teaching and the teaching Methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSETYPE** *general background, special background , special ized general knowledge, skills development* | Specific background, specialization, skills development |
| **PREREQUISITE COURSES:** | 4021-4022 Food Chemistry I |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS :** | Greek |
| **IS THECOURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE(URL)** | https://eclass.uniwa.gr/courses/FST241/ |

## (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*

**After successful completion the student will:**

- Be able to undertake responsibility for the production and the quality of cereal products
- Be able to select and apply the cereal and cereal products processing methods, the technologies and the control of the raw materials and the products.
- Be Able to detect defects in cereal products.
- Be able to find, understand and apply the relevant legislation for the processing of cereal products.
- Recognize the important factors for the growth of microorganisms significant for public health.
- Be able to describe the effects of processing, preservation and storage on the chemical and microbiological changes in cereal products.

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

- Retrieve, analyze and synthesize data and information by using necessary technologies.
- Project design and management
- Respect to the physical environment.

## (3) SYLLABUS

**Course content**

**Description:** Structure and properties of cereals, study of the physical and chemical behavior of cereals and their ingredients, emphasizing the parameters which affect the quality of the final product. Influence of cultivation practices, harvesting and handling methods and processing technologies on the quality and safety of whole, raw and processed cereal products. Analysis of the technological transformation of wheat to flour through the milling process. Basic ingredients (starch, protein) and secondary ingredients (non starch polysaccharides). Study of dough formation, dough fermentation and bread baking process and of the principles of the chemical and physicochemical (rheological) characterization of flours and doughs. Study of sweet baked goods, breakfast cereals and added value products (expanded snack products). Pasta production processes. Processing and technology of rice and corn.

**More specifically, course content includes:**
Theory:

- Cereals and Pseudocereals
- Nutritional value, Composition and structure of cereals (review).
- Quality and classification of cereals
- Milling Process
- Flour – Flour fortification
- Flour quality control (basic quality parameters)
- Bread making Technology (raw materials, dough production, bread and pastry production)
- Dough Rheology and equipment
- Sweet baked products (cake, biscuits etc.)

- Pasta Technology
- Processing of cereals for the production of high added value products (puffs, flakes, extruded products)
- Breakfast cereals
- Rice processing and rice products
- Corn processing and corn products
- Industrial production of starch: characterization of raw materials for starch production
- Starch production technology – Starch products: starch fractionation products, modified starch, substituted starch.

**Laboratory:**

- Equipment flowchart in industrial facilities
- Wheat and cereal characteristics
- Cereal Sampling
- Physical Properties and Cereal classification
- Cereal milling
- Flour quality
- Dough rheological characteristics
- Breadmaking methods
- Production of sweet baked products
- Rice products

**Projects:**
Students individually or in groups (2-3 people) will prepare and present in written form selected topics, for a more complete understanding of the course. The most interesting ones will be presented to an audience in the classroom.

## (4) TEACHING and LEARNING METHODS-EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning,etc.* | Face to face | |
| **USEOFINFORMATIONAND COMMUNICATIONSTECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, Communication with students* | Power point presentations and self-assessment test in the Blackboard.<br>Student contact electronically (web & email). | |
| **TEACHINGMETHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
| | Lectures | 117 |
| | Laboratory classes | 65 |
| | | |
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| | | |
| | Course total | *182* |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Literature surveys<br>• Projects<br>• Case studies<br>• Presentations<br>• Mid-term exams<br>• Final exams |

## (5) ATTACHED BIBLIOGRAPHY


*- Suggested bibliography:*
*Lazos, E.S. & Lazou A.E. (2016). Cereal Science and Technology, Ed. Papazisis, Athens*
*Delcour JA, Hoseney RC (2010) Principles of Cereal Science and Technology. AACC International*
*Rosentrater KA, Evers AD (2017) Kent's Technology of Cereals, Fifth Edition: An Introduction for Students of Food Science and Agriculture. Woodhead Publishing*

*- Related academic journals:*
Journal of Cereal Science
Cereal Chemistry
Journal of Cereals and Oilseeds
Cereal Foods World

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCE | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **8031** | **SEMESTER** | **8** |
| **COURSE TITLE** | **SPECIAL TOPICS OF FOOD PACKAGING** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 2 | |
| | | |
| Total | 2 | 3 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | *Specialized* |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes, in English |
| **COURSE WEBSITE (URL)** | |

## (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*

After successful completion of the course students will:
Understand the problems arising from migration of substances from the packaging to the food and know the relative legislation.
Understand the consequences of packaging to the environment and know the ways of minimizing them through recycling and the development of edible, bio-based and biodegradable packaging.
Be aware of the new developments in food packaging, like active and intelligent packaging, packaging for fresh fruits and vegetables, packaging for microwaveable foods.
Be able to estimate the shelf life of packaged foods.

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

## (3) SYLLABUS

**The lectures cover the following subjects:**
Active and intelligent packaging. Legislation about food packaging. Food – packaging interactions. Food packaging and the environment. Edible and bio-based food packaging. Shelf life of foods. Packaging of fresh fruits and vegetables. Packaging of microwavable foods.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face | |
| **USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of Information Technologies in Teaching, Education and Communication. Presentations using powerpoints. Information via web (e-class). | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
| | Lectures | 78 |
| | | |
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| | | |
| | Course total | **78** |

| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Problem Solving,<br>Case Studies,<br>Final examination. |
|---|---|

## (5) SUGGESTED LITERATURE

- *Suggested bibliography:*

Παπαδάκης, Σ.Ε., (2018). *Συσκευασία Τροφίμων*, 2η έκδοση, Εκδόσεις ΤΖΙΟΛΑ, Θεσσαλονίκη
Robertson, G.L., (2013). *Food Packaging: Principles and Practice*, Third Edition, CRC Press, Taylor & Francis Group, Boca Raton, FL.
Lee, D.S., Yam, K.L. and Piergiovanni, L. (2008). *Food Packaging Science and Technology*, CRC Press, Taylor & Francis Group, Boca Raton, FL.
Yam, K.L. (ed), (2009). *The Wiley Encyclopedia of Packaging Technology*, 3rd edn., John Wiley & Sons *Inc., New York.*

- *Related academic journals:*

Packaging Technology and Science
Food Packaging and Shelf Life
Journal of Packaging Technology and Research
Journal of Food Engineering
Journal of Food Science
Food Additives and Contaminants
Food Technology

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCE | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **8032** | **SEMESTER** | **8** |
| **COURSE TITLE** | **FOOD PLANT DESIGN** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 2 | |
| | | |
| Total | 2 | 3 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | *Specialized, Skills development* |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

## (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*

After successful completion of the course students will:
Be able to evaluate economically the feasibility of an investment idea in the food industry.
Be able to device the necessary flow charts and the mathematical model.
Be able to optimize the production process suggested.

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

**SYLLABUS**

The object of a food plant design, food plant design stages, basic and detailed design.
Economical analysis of a business plan, evaluation of capital and operation cost, methods of economic evaluation (NPV, IRR, capitalized cost estimation), application examples.
Process flow sheet diagrams, construction and optimization of PFDs, application examples.
Mathematical model, degrees of freedom, selection of design variables, application examples.
Parametric and operational optimization, mathematical techniques, computer applications.
Application examples in food plants and operations.

## (3) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of Information Technologies in Teaching, Education and Communication. Presentations using powerpoints. Information via web (e-class). | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
| | Lectures | 78 |
| | | |
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| | Course total | **78** |

| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Written work,<br>Public presentation,<br>Final examination. |
|---|---|

## (4) SUGGESTED LITERATURE

- *Suggested bibliography:*


Μαρούλης Ζ.Β., Μαρίνος – Κουρής Δ., "Σχεδιασμός Χημικών Βιομηχανιών " εκδόσεις Παπασωτηρίου, Αθήνα 1993.
Κροκίδα Μ., Μαρίνος –Κουρής Δ. & Μαρούλης Ζ., Σχεδιασμός Θερμικών Διεργασιών, εκδόσεις ΕΜΠ, 2003.
Fryer P. J., Pyle D. L., Rielly C.D., "Chemical Engineering for the Food Industry", Blackie Academic & Professional, 1st ed., 1997.
López-Gómez, A. and Barbosa-Cánovas G.V., 2005, "Food Plant Design", Boca Raton, CRC Press.
Luyben, W. L., "Process Modelling Simulation and Control for Chemical Engineers", Mc Graw Hill, 2nd ed., New York, 1990.
Maroulis, Z.B. and Saravacos, G.D., 2003, "Food Process Design", Marcel Dekker Inc., New York, Basel.
Maroulis, Z.B. and Saravacos, G.D., 2008, "Food Plant Economics", CRC Press, Taylor & Francis Group, Boca Raton, New York.
Peter M.S., Timmerhaus K.D., 1990, "Plant Design and Economics for Chemical Engineers", McGraw-Hill.

**COURSE OUTLINE**

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCE | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **8033** | **SEMESTER** | **8** |
| **COURSE TITLE** | **BIOFUNCTIONAL FOOD INGREDIENTS** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 2 | 3 |
| | | |
| Total | 2 | 3 |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialization, Skills development |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes (in English) |
| **COURSE WEBSITE (URL)** | |

## (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*

The purpose of the course is to understand the role of functional foods and biofunctional ingredients, through the presentation of recent scientific data on the possible positive effects on human organism. Separate objectives are, on the one hand, the understanding of the legislative framework that governs the development, production and entry of functional foods into the market, and on the other hand, the consolidation of the basic techniques of industrial production of functional foods and the highlighting of the perspective of their development in the light of the food and nutrition scientist.
Upon successful completion of the course, the student will:
• Understand the basic concepts and knowledge related to functional foods
• Critically evaluate, analyze and critically discuss the scientific literature
• Review and evaluate the latest developments in functional ingredient research
• Apply knowledge gained by developing functional foods for the market
He will also have acquired special abilities:
• on the relevance of nutrition and health claims
• on the knowledge of the molecular mechanisms of the effects of nutrients
• on the objective evaluation of the effectiveness of the action of the functional components

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

- Research, analysis and critical assessment of literature information, using modern methods
- Skills in literature searching and understanding
- Capability to work individually, and/or in a team project.

## (3) SYLLABUS

- Introduction to Functional Foods - Definition, categorization, role – Categories of functional food.
- Safety, bioavailability and bioactivity studies. The legal framework of functional foods: Nutrition and health claims. Functional food approval procedures
- Main functional ingredients of Food. Phytochemicals: Natural antioxidants and their role in health. The effect of phytosterols on reducing the risk of cardiovascular disease. Carotenoids and tocopherols
- Fatty acids: Effect of monounsaturated and polyunsaturated fatty acids on health. The beneficial effects of olive oil and fish consumption on health
- Vitamins - Trace elements. Their importance in nutrition
- Dietary Fiber: Effect on the prevention of diabetes and cardiovascular disease. The importance of bioactive peptides for health. Probiotics and prebiotic food ingredients and prevention of degenerative diseases
- Superfoods: Recent data on their role in disease prevention (pomegranate, bilberry, cranberry, tea, goji berry, sea buckthorn, etc.)
- Bioactivity of extracts and essential oils of medicinal plants of the Greek flora
- Novel foods and Nutraceuticals
- Microencapsulation of bioactive ingredients, nanotechnology
- Utilization of industrial by-products as functional components

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Web communication & contact with students. Material upload for students' optimized learning. Literature recommendation and exercises/assays available on-line. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** — ***Semester workload***<br>Lectures — 50<br>Essay writing and Presentation — 28<br><br><br><br><br><br>Course total — **78** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Presentation of essays<br>• Final assessment |

## (5) ATTACHED BIBLIOGRAPHY


- Λειτουργικά Τρόφιμα: Ο ρόλος τους στην Προαγωγή της Υγείας Συγγραφέας: Κουτελιδάκης Αντώνιος, Εκδόσεις Ζήτη, Έτος έκδοσης: 2015, (ISBN: 978-960-456-425-5).
- Shi, J., Mazza, G., & Le Maguer, M. (2016). *Functional Foods: Biochemical and Processing Aspects, Volume 2*. CRC Press.
- Chadwick, R. (2003). *Functional foods* (Vol. 20). Springer Science & Business Media.
- Egbuna, C., & Dable-Tupas, G. (2020). Functional foods and nutraceuticals. *Springer Nature Switzerland AG*, *1*, 1-632.
- Aluko, R. E. (2012). *Functional foods and nutraceuticals* (pp. 37-61). New York, NY, USA:: Springer.
- Vattem, D. A., & Maitin, V. (Eds.). (2015). Functional foods, nutraceuticals and natural products: concepts and applications.

*Related Scientific journals:*
Trends in Food Science & Technology
Journal of Functional Foods
Nutrients

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | .FOOD SCIENCES | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **8034** | **SEMESTER** | **8** |
| **COURSE TITLE** | **PATHOGENIC MICROORGANISMS IN FOODS** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| | 2 | 3 |
| | | |
| | | |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | 2 | 3 |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialized, skills development |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | https://eclass.uniwa.gr/courses/FST244/ |

## (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*

The students will acquire the following specific knowledge with the successful completion of the program:

- To identify the major foodborne pathogenic microorganisms through their biochemical characteristics
- To comprehend the conditions that favor the growth of foodborne pathogenic microorganisms
- To evaluate the food sources, the symptoms and the pathogenicity mechanisms of the major food pathogens
- The parameters required for the inhibition and destruction of foodborne pathogens in foods
- The role of food microbial toxins

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

- *Search for, analysis and synthesis of data and information,*
- *with the use of the necessary technology*
- *Adapting to new situations*
- *Decision-making*
- *Team work*

## (3) SYLLABUS

- Characteristics, physiology, genetics, sources and epidemiology of major foodborne pathogens:
- *Salmonella enterica* and its pathogenic serovars
- *Listeria monocytogenes*
- *E.coli* and its pathogenic strains
- *Campylobacter* spp.
- *Staphylococcus aureus*
- *Clostridium* spp,
- *Bacillus cereus*
- *Yersinia enterocolitica*
- *Vibrio parahaemolyticus*
- Mechanisms of pathogenicity
- Sensitivity in various food processes
- Methods to prevent food contamination from foodborne pathogens
- Microbiological criteria for foodborne pathogens in EU
- Laboratory methods for the detection of foodborne pathogens in various foods
- Analysis of outbreaks from foodborne pathogens
- Symptoms and infection doses

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face | |
| **USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of powerpoint presentations, communication through e-class | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | ***Activity*** | ***Semester workload*** |
| | Lectures | 78 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | Course total | *78* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Evaluation in Greek though:<br>• Multiple choice questionnaires<br>• Public powerpoint presentation | |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*


- Bibek Ray, Arun Bhunia (2013). Fundamental Food Microbiology, Fifth Edition. CRC Press
- Martin R Adams, Maurice O Moss, Peter McClure (2016). Food Microbiology. Royal Society of Chemistry
- James M. Jay, Martin J. Loessner, David A. Golden (2008). Modern Food Microbiology. Springer Science & Business Media


*- Related academic journals:*

- Food Microbiology
- International Journal of Food Microbiology
- Journal of Food Microbiology
- Journal of Applied Microbiology
- Pathogens

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | .FOOD SCIENCES | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **8035** | **SEMESTER** | **8** |
| **COURSE TITLE** | **TOXICOLOGY** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Lectures | 2 | 3 |
| | | |
| | | |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | 2 | 3 |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialized |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

## (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*

The students will acquire the following specific knowledge with the successful completion of the program:

- Understand the basic concepts of toxicology in order to comprehend the nature of the problem that arises in each case.
- Comprehend the toxicological risks that may arise in various foods based on their nature and production and storage conditions.
- Perform calculations to assess and evaluate the risk from exposure to toxic agents.
- Understand the parameters that affect the results of analytical techniques and assess the reliability of a method.
- Be able to search for legislation related to the maximum acceptable levels of residues of a toxic agent and evaluate the results.

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

- *Search for, analysis and synthesis of data and information, with the use of the necessary technology*
- *Decision-making*
- *Respect for the natural environment*
- *Showing social, professional and ethical responsibility and sensitivity to gender issues*
- *Production of new research ideas*

## (3) SYLLABUS

**Course Content:**

Through this course, students become familiar with the basic principles of Toxicology, primarily focusing on exposure, toxicokinetics, and toxicodynamics of xenobiotic substances, as well as the fundamental principles of risk assessment and management related to exposure to toxic agents. Special emphasis is placed on the mechanisms of chemical carcinogenesis and the methods for analytical determination and assessment of the toxicity of xenobiotic substances. Subsequently, students delve into specific categories of toxic substances found in food, which can be either natural endogenous components of food or products of human activity.

**Description**

- Basic concepts related to both Toxicology and Food Toxicology.
- Categories of toxic substances that can be encountered in traditional and novel foods, such as natural toxins, genetically modified foods, dietary supplements, allergenic foods, drinking water, food processing by-products, agricultural chemicals, toxins produced by bacteria and fungi, organic pollutants, food additives, and veterinary drugs.
- Mechanisms of toxic action and the description of resulting harmful effects on consumers.
- Basic principles of risk assessment and management related to exposure to a toxic agent.
- Basic principles of laboratory food analysis for the determination of toxic agents and participation in the practical application of some of these methods.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT teaching, laboratory education, communication with students through e-mail |

**TEACHING METHODS**

*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 visits, project, essay writing, artistic creativity, etc.*

*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*

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 78 |
| | |
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| Course total | *78* |

**STUDENT PERFORMANCE EVALUATION**

*Description of the evaluation procedure*

*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*

*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*

Language of evaluation: Greek
Evaluation in Greek though:

- Final examination

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*


1. Shibamoto T, Bjeldanes LF (2009). Introduction to Food Toxicology. Taylor SL (Editor), Elsevier Inc., California, USA. ISBN: 978-0-12-374286-5.
2. Omaye ST (2004). Food and Nutritional Toxicology. CRC Press. ISBN: 1-58716-071-4.
3. Timbrell TA (2009). Principles of Biochemical Toxicology. InformaHealtcare, USA. ISBN: 978-0-8493-7302-6.
4. W. Helferich, C.K. Winter (2001) Food toxicology.CRC Press. [ISBN: 978-0-8493-2760-5]

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **8036** | **SEMESTER** | **8** |
| **COURSE TITLE** | **ADVANCED METHODS OF ANALYSIS** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| LECTURES | 2 | 3 |
| | | |
| TOTAL | 2 | 3 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Special background, Specialised |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES (essays) |
| **COURSE WEBSITE (URL)** | |

## (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*

The purpose of the course is the students' understanding of the following topics:

-the detection and quantification of components in mixtures using mass spectrometry coupled with liquid and gas chromatography,
- the detection and quantification of components in mixtures using Nuclear Magnetic Resonance Spectroscopy
-holistic analytical approaches with mass spectrometry and nuclear magnetic resonance spectroscopy and their applications in food safety, adulteration and authenticity.

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

- Decision-making
- Working independently
- Teamwork
- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Production of free, creative and inductive thinking
- Production of new research ideas

## (3) SYLLABUS

**Part A: Targeted methods of analysis**

*A.1. Mass spectrometry. General description, Organology, Sample preparation and spectrum acquisition, Fragmentation mechanisms (1 two-hour lecture)*
*A.2 Gas Chromatography coupled with mass spectrometry. processing of spectra, identification of compounds using libraries and using fragments, examples and applications (2 two-hour lectures)*
*A.3 Liquid chromatography coupled with mass spectrometry. processing of spectra, identification of compounds using templates and using fragments, library generation, examples and applications (2 two-hour lectures).*
*A.4 Nuclear Magnetic Resonance Spectroscopy (NMR). Fundamentals of nuclear resonance, sample preparation and spectrum acquisition, acquisition techniques and 1- and 2-dimensional spectra (2 two-hour lectures)*
*A5. Processing of NMR spectra and identification of compounds, examples and applications (1 two-hour lecture)*
*A6. Quantitative NMR. Use of internal standard, pulse trains, specialized software, examples and applications (1 two-hour lecture)*

**Part B: Holistic methods of analysis**

*B1. Introduction to holistic methods, Metabolomics, Lipidomics (1 two-hour lecture)*
*B 2. Applications of holistic analyzes for food authenticity, adulteration, safety and quality studies. Examples. (2 two-hour lectures)*

**Part C: Presentation of essays by students**

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face, distance -synchronous e-learning when necessary. |
| **USE OF INFORMATION ANDCOMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of IT technologies in the collection of secondary data - information from relevant electronic bases - repositories. Presentation of semester work using a presentation application (e.g. Microsoft Powerpoint). Communication with students via e-class, teams, e-mail. |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 45 |
| Writing and Presentation of Essay | 33 |
| | |
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| Course total | *58* |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | • Language evaluation: Greek<br>• Method of evaluation:<br>Participation in study groups<br>Written work/ essay<br>Presentation & oral examination |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

*Principles and practice of marketing. David Jobber & Fiona Ellis-Chadwick, Ninth edition. McGrow-Hill Education.*

## COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | FOOD SCIENCES | | |
| **ACADEMIC UNIT** | FOOD SCIENCE AND TECHNOLOGY | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **8041** | **SEMESTER** | **8** |
| **COURSE TITLE** | **UNDERGRADUATE THESIS** | | |

| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| | | 10 |
| | | |
| TOTAL | | 10 |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised, Skills development, |
| **PREREQUISITE COURSES:** | Students must have successfully completed at least 2/3 of the courses required for their degree, considering to at least 160 ECTS (European Credit Transfer and Accumulation System credits), in order to undertake and present their undergraduate thesis. |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | |

## (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*

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

- Take initiative to make decisions.
- Apply analytical approaches effectively to problem-solving.
- Apply appropriate communication skills efficiently.
- Produce a critical review using proper source referencing.
- Develop and justify a sustainable program proposal and experimental design considering methodologies, available resources, time, and cost.
- Execute a work plan that generates data, followed by analysis and interpretation using suitable methods.
- Produce a structured written report in the appropriate format with proper references.
- Demonstrate an in-depth understanding of the work through presentation, either visual or

oral.

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

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team work
- Decision-making

## (3) SYLLABUS

The undergraduate thesis is an individual study of a specialized topic in the field of food technology. It allows the student to develop and demonstrate initiative, skills, and creativity in an independent manner, which is not feasible during regular lectures and practical teaching methods. The thesis includes a literature review and experimental work and enables the application of acquired knowledge to a real-world problem. Each student carries out the thesis under the guidance of a supervisor, a member of the academic faculty.
The overall goal is to provide students with the opportunity to develop and apply research methodologies. This process will lead to the development of a range of skills and competencies.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | . | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.* | ***Activity*** | ***Semester workload*** |
| | Writing and Presentation | 260 |
| | | |
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|---|---|---|
| *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* | | |
| | | |
| | | |
| | Course total | *260* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | The evaluation of undergraduate theses will be conducted by a committee of three members appointed by the Supervisor Professor, who must have received the thesis document for assessment at least 15 days prior to the oral presentation.<br>The criteria for grading the undergraduate thesis include the diligence during its development, the overall quality and completeness of the study, the quality of the written thesis document, and the presentation and coverage of the topic. | |

## (5) ATTACHED BIBLIOGRAPHY

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|---|
| *- Suggested bibliography:* |