

**UNIVERSITY OF WEST ATTICA**

**DEPARTMENT OF FOOD SCIENCE AND TECNOLOGY**

**SCHOOL OF FOOD SCIENCES**

**COURSE OUTLINE**

**POSTGRADUATE MASTER’S PROGRAM (MSc)**

**“FOOD INNOVATION, QUALITY AND SAFETY”**

**ACADEMIC YEAR 2024-2025**

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**A1. PRINCIPLES & METHODS OF FOOD PROCESSING AND PRESERVATION**

**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | FOOD SCIENCES | | | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | | | |
| **LEVEL OF STUDIES** | POSTGRADUATE | | | | |
| **COURSE CODE** | **A1** | **SEMESTER** | | **A** | |
| **COURSE TITLE** | **PRINCIPLES & METHODS OF FOOD PROCESSING AND PRESERVATION** | | | | |
| **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 TEACHINGHOURS** | | **CREDITS** |
| Lectures | | | 2-4 | |  |
|  | | |  | |  |
| **Total** | | | 32 | | 6 |
| *Add rows if necessary. The organization o fteaching 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** | No | | | | |
| **COURSE WEBSITE (URL)** |  | | | | |

1. **LEARNING OUTCOMES**

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| **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 understand the role of steady and unsteady heat transfer during thermal processing * To use the general method for the thermal process calculation and compare the different combinations of temperature-time during thermal processing. * To use the mathematical method for process time calculation during thermal processing of foods within containers and unpackaged foods (continuous process) * To estimate the efficiency of thermal process concerning the safety and quality of foods. * To understand the critical parameters for safety within the cold chain * To understand the importance of freezing rate in food texture and to select the suitable equipment for specific applications. * To use Plank’s, Nagaoka’s and Pham’s models to predict freezing time of foods of different geometry and to understand each model’s limitations. * To understand the refrigeration cycle. * To estimate the drying and concentration of foods, considering the operation efficiency and food quality. * To distinguish the membrane processes in terms of driving force, the pore size of membranes and applied pressure. * To explain the mechanisms for the decrease of mass flux of permeate of a membrane. * To define the membrane properties for a certain application * To understand the principles and potential of freeze concentration * To understand the mechanisms and the applications of ionizing radiation in foods. |

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

1. **SYLLABUS**

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| **Description**:  The course is designed to give to the students the knowledge to understand the technological and mathematical aspects of food technology and to estimate the range and complexity of modern food industry. Emphasis is given on defining the fundamentals and principles necessary to understand the processing and preservation techniques as applied to foods.  Further, the course is designed for better understanding of principles and practical application of food preservation methods. The main goal is to analyze various preservation methods in terms of safety, quality and suitability for industrial application. Emphasis is given on design of thermal processes, the unsteady state heat transfer and its application in modelling thermal and freezing processes. Moreover, the preservation of foods in low temperatures is analyzed, as well as the transportation of chilled food products. Also, they are included the water activity of foods and the calculation of food stability, the dehydration processes (air-drying, spray-drying, freeze drying etc.) and concentration processes (evaporation, freeze concentration, membrane separation etc.), along with other food preservation methods for the extension of food product shelf life and the production of high-quality safe food products. Moreover, the analysis and application of mass and energy balances during food processing is developed and their application in food formulations.  **Course Objectives**  Mass and energy balances: application of material and energy balances in food processes and in product design.  Heat transfer: steady and unsteady state heat transfer, conduction, convention and radiation. Surface and total heat transfer coefficients.  Thermal processing of foods: thermal resistance, heat penetration, thermal process calculation, thermal process modeling and optimization, analysis of continuous and batch processing systems, foods thermal degradation, thermal process application, spoilage of thermally processed foods.  Food preservation by low temperatures: Principles of low temperature preservation, Food Refrigeration, Food Freezing, Transportation and display of low temperature preserved and frozen foods.  Food Radiation  Water activity of foods  Food Dehydration: Basic principles of food dehydration, industrial food dehydration, Spray Drying, Freeze Drying, Effect of drying process in food quality characteristics.  Food Concentration: Evaporation, Freeze Concentration, Membrane concentration |

1. **TEACHING and LEARNING METHODS-EVALUATION**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DELIVERY**  *Face-to-face,Distancelearning,etc.* | Face-to-face | | | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**  *Use of ICT in teaching, laboratory education,*  *communication with students* | Use of Information Technologies in Teaching, Laboratory Education and Communication. Presentations using powerpoint. 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, artworkshop, 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*** | ***Semesterworkload*** |  | |
| Lectures | 126 |  | |
| Essay writing | 42 |  | |
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| **Course Total** | **168** |  | |
| **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 exami nation of patient, art interpretation, other*  *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Assessment methods: Multiple Choice Tests, Short Answer Questions, Text Development Questions, Problem Solving,  Written Assignments, Reviews. | | | |

1. **ATTACHED BIBLIOGRAPHY**

|  |
| --- |
| - **Suggested bibliography:**  Lazos E., Lazou A. (2017). Food Processing 1: Preservation processes using heating, low temperatures and radiation energy. Papazisis SA publications  Lazos E., Lazou A. (2016). FoodProcessing 2: Preservation processes using physicochemical, biological, new and emerging technologies, Papazisis SA publications  Saravacos G D, Maroulis ZB (2010) Food Process Engineering Operations. Taylor and Francis  Rahman MS (2020) Handbook of Food Preservation, Second Edition. Food Science and Technology. CRC Press  - **Related journals:**  Journal of Food Engineering  Journal of Food Processing and Preservation  Food and Bioproducts Processing |

**Α2. TOPICS IN FOOD MICROBIOLOGY**

**COURSE OUTLINE**

**(1) GENERAL**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SCHOOL** | FOOD SCIENCES | | | | |
| **DEPARTMENT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | | | |
| **LEVEL OF STUDY** | POSTGRADUATE | | | | |
| **CODE** | **A2** | SEMESTER | | **A** | |
| **COURSE TITLE** | **TOPICS IN FOOD MICROBIOLOGY** | | | | |
| **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** | | **CREDIT UNITS** |
| Lectures | | | 2-4 | |  |
| Laboratory exercises | | | 1 | |  |
| **Total** | | | 3-5 | | 6 |
| *Add rows if necessary. The teaching organization and the teaching methods used are described in detail in (d).* | | |  | |  |
| **TYPE OF COURSE**  *general background,*  *special background, specialization*  *general knowledge, skill development* | Special background, skill development | | | | |
| **PREREQUISITE COURSES:** | - | | | | |
| **LANGUAGE OF LECTURES and EXAMINATIONS:** | Greek | | | | |
| **THE COURSE IS OFFERED TO ERASMUS STUDENTS** | YES (in Greek) | | | | |
| **COURSE WEBSITE (URL)** | e-class: https://eclass.uniwa.gr/courses/FST414/ | | | | |

**(2) LEARNING OUTCOME**

|  |  |
| --- | --- |
| **Learning outcome** | |
| *The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the 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* | |
| The learning object of this module is to present in a holistic and interconnected way some of the main axes of Food Microbiology, like the factors that affect the growth and death of microorganisms in the food environment. Yet special attention is given to the “food – bacterial” interactions which are further analyzed into "positive" and "negative". The positive ones include fermentations and the foods produced from them, while the negative ones include and analyze the food spoilage of microbial origin. Emphasis is given on specific food borne pathogenic micro-organisms as well as into emerging food-borne risks as identified in recent years. Also, the basic principles of calculating the microbiological shelf life of foods are presented along with selected techniques and equipment for rapid microbiological and food analysis. After the completion of the lectures the intended learning outcomes are:  - The understanding of those conditions (pH, Temperature, etc.) which favor or not the growth of microorganisms in each food.  - To know the main groups of microorganisms that cause food spoilage of various categories.  - To know the main genera and types of pathogenic microorganisms that respond to food as well as the methodologies to prevent their presence in them in order to ensure food safety.  - To be familiar with the basic principles of food fermentations as well as with the physiology of the microorganisms that participate in them.  - To know the methodology for estimating the microbiological shelf life of food  - To have the knowledge for the selection of appropriate microbiological food analysis methods and the interpretation of their results. | |
| **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.*  *Adaptation to new situations*  *Decision making*  *Autonomous work*  *Teamwork*  *Work in an international environment*  *Work in an interdisciplinary environment*  *Generating new research ideas* | *Project planning and management*  *Respect for diversity and multiculturalism*  *Respect for the natural environment*  *Demonstrating social, professional and ethical responsibility and sensitivity to gender issues*  *Exercise criticism and self-criticism*  *Promotion of free, creative and inductive thinking*  *Others……* |
| *- Search, analysis and synthesis of data and information, also using the necessary technologies*  *- Decision making*  *- Adaptation to new situations*  *- Promotion of free, creative and inductive thinking* | |

**(3) SYLLABUS**

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| **Course content of Food Microbiology** |
| 1. Factors affecting the growth & death of microorganisms - Ι  2. Factors affecting the growth and death of microorganisms - II  3. Microbial spoilage of food  4. Microbial indicators,  5. Specific pathogenic organisms of muscle foods (Meat/Fish)  6. Food fermentations  7. Spore-forming bacteria  8. Rapid Methods of Microbiological Analysis  9. Applications of molecular biology in food microbiology  10. Fungi and mycotoxins  11. Pathogenic microorganisms in food - I  12. Pathogenic microorganisms in food - II  13. Emerging foodborne hazards in food  14. Microbiological assessment of food shelf life  15. Challenge test design |

**(4) TEACHING AND LEARNING METHODS - EVALUATION**

|  |  |
| --- | --- |
| **Teaching Method** *Face to face, Distance learning etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES - ICT**  *Use of I.C.T. in Teaching, in Laboratory Education, in Communication with students* | Use of Information Technologies in Teaching and Communication. Presentations using PowerPoint.  Update via Web (e-class). |
| **TEACHING ORGANIZATION**  *The way and methods of teaching are described in detail.*  *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.*  *The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed* | |  |  | | --- | --- | | ***Activities*** | ***Work load of semester*** | | Lectures | 126 | | Assay | 42 | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | | **Total** | ***168*** | |
| **STUDENT EVALUATION**  Description of the evaluation process  *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*  *Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.* | Evaluation language: Greek.  Assessment methods they can use: Multiple Choice Test, Short Answer Questions, Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination.  **Detailed Description of the evaluation process**  **A)** Within the framework of the course, at the beginning of the semester, a “literature review” assignment on different topics is given, which is submitted by the end of the semester. The grade of the assignment corresponds to 20% of the final grade.  **B)** The final exam of the course is a written one and may be multiple-choice, short answer questions or Problem Solving. The grade of the written exam contributes 80% to the final grade. |

**(5) SUGGESTED LITERATURE**

|  |
| --- |
| 1. Adams, M. R.; Moss, M. O. Food Microbiology; Royal Society of Chemistry, 2008. 2. De W Blackburn, C. Food Spoilage Microorganisms; Woodhead Publishing, 2006. 3. Bhupendra S. Kharayat, Yogendra Singh, Mycotoxins in Foods: Mycotoxicoses, Detection, and Management, Editor(s): Alina M., Holban, A., Mihai G., Handbook of Food Bioengineering, Microbial Contamination and Food Degradation, Academic Press, 2018. 4. Galanakis, C. M. Food Quality and Shelf Life; Academic Press, 2019. 5. Bamforth, C. W.; Cook, D. J. Food, Fermentation, and Micro-Organisms; John Wiley & Sons, 2019. |

**A3. STRUCTURE AND FUNCTIONS OF FOOD INGREDIENTS**

**COURSE OUTLINE**

1. **GENERAL**

|  |  |  |  |  |  |
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| **SCHOOL** | FOOD SCIENCES | | | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE & TECHNOLOGY | | | | |
| **LEVEL OF STUDIES** | POSTGRADUATE | | | | |
| **COURSE CODE** | **A3** | **SEMESTER** | | **A** | |
| **COURSE TITLE** | **STRUCTURE AND FUNCTIONS OF 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 | |  |
| Written assignment | | | 1 | |  |
| **Total** | | | **3** | | **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* | Special background, skills development | | | | |
| **PREREQUISITE COURSES:** |  | | | | |
| LANGUAGE OF INSTRUCTION and  EXAMINATIONS: | Greek | | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes (Greek) | | | | |
| **COURSE WEBSITE (URL)** |  | | | | |

1. **LEARNING OUTCOMES**

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| --- |
| **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 relationships between the structure of basic food components (proteins, carbohydrates and lipids) and their functional properties in food * Interpret the mechanism of action of the functional properties (gelling, foaming, emulsification, etc.) as well as the behavior and interactions of the main components in food systems * Describe the physicochemical and biochemical processes that degrade quality during food processing and preservation * Understand the destabilization conditions of food systems and control the physicochemical processes involved * Understand the technological applications of food micronutrients and food additives aimed at improving food functionality and quality |

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

1. **SYLLABUS**

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| The module "Structure and Functions of Food Ingredients" aims to acquaint postgraduate students with the structure and basic properties of the main food components (proteins, carbohydrates and lipids), in order to understand the relationship between their structure and the functional properties they confer on food systems. Specifically, the course is designed to emphasize the mechanism of action of the functional properties (gelling, foaming, emulsification, etc.), the effect of food ingredients on the organoleptic, nutritional quality as well as on food safety. An additional objective of the course is the understanding of the physicochemical and biochemical processes that degrade the quality during food processing and preservation as well as the study of the technological applications of micronutrients and food additives, with the aim of improving the functionality and quality of food.  **Content of "Structure and Functions of Food Ingredients" course lectures:**   * Carbohydrates (Part A): Food mono- and oligosaccharides, structure, characteristic reactions, functional properties * Carbohydrates (Part B): Food polysaccharides, structure, functional properties, use in food * Water and Ice (Structure-Physical and Chemical Properties of Water and Ice, Forms of Water in Food) * Lipids (Part A): Structure & classification, classes of lipids * Lipids (Part B): Properties, biological role, uses in food * Proteins (Part A): Amino acids, polypeptides and proteins (structure, physicochemical properties) * Proteins (Part B): Functional properties of proteins in food systems * Innovative non-conventional protein sources (plant-marine-microbial origin) - Cultured meat * Enzymes: Use and Applications in Food Technology * Vitamins and minerals in food * Natural food colorings * Flavor compounds of food * Food additives * Nutraceuticals and toxic food components * Physicochemical interactions of components in food systems |

1. **TEACHING and LEARNING METHODS - EVALUATION**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DELIVERY**  *Face-to-face, Distance learning, etc.* | Face-to-face  Distance learning | | | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**  *Use of ICT in teaching, laboratory education,*  *communication with students* | Use of information technologies in data-information collection, teaching and communication. Powerpoint presentations. 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 | 128 |  | |
| Written assignment | 40 |  | |
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| **Course total** | **168** |  | |
| **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.* | Evaluation methods:  Multiple Choice Test, Short Answer Questions, Development Questions, Written Assignment, Final Exam  Students undertake a theoretical written paper reviewing the literature on specific topics, which they submit on a specified date before the end of the theoretical lectures. The grade of the written paper contributes 20% to the final grade.  The final course exam is written and may include various categories of topics for student evaluation (Multiple Choice, Short Answer Questions, Essay Questions, Problem Solving). The grade of the written exam contributes 80% to the final grade. | | | |

1. **ATTACHED BIBLIOGRAPHY**

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| --- |
| *Suggested bibliography:*   * 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 * 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 * Gunstone, F. (2009). The Chemistry of Oils and Fats: Sources, Composition, Properties and Uses. Wiley-Blackwell   *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 |

**A4. FOOD ANALYSIS**

**COURSE OUTLINE**

1. **GENERAL**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SCHOOL** | Food Science | | | | |
| **ACADEMIC UNIT** | Department of Food Science and Technology | | | | |
| **LEVEL OF STUDIES** | Postgraduate | | | | |
| **COURSE CODE** | **A4** | **SEMESTER** | | **A** | |
| **COURSE TITLE** | **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 | | | 2-4 | |  |
| Study and analysis of bibliography and essay writing | | | 1 | |  |
| **Total** | | | 3-5 | | 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* | Special background, skills development | | | | |
| **PREREQUISITE COURSES:** | - | | | | |
| **LANGUAGE OF INSTRUCTION and**  **EXAMINATIONS:** | Greek | | | | |
| **IS THE COURSE OFFERED TO**  **ERASMUS STUDENTS** | No | | | | |
| **COURSE WEBSITE (URL)** |  | | | | |

1. **LEARNING OUTCOMES**

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| --- |
| **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.  After completing the course, the intended learning outcomes are:  The possibility of choosing a method/or methods to solve specific analytical problems from research or from industrial practice.  The understanding of HPLC, GLC, UV/Vis, IR/FTIR, NMR, etc. techniques, as well as the role and limitations in the analysis of individual components.  The selection of appropriate methods and processes for the analysis of foods in terms of their constituents  Learning the correct process of sampling, measuring, receiving and processing data  The acquisition of the ability to design an analytical protocol and its implementation.  The assessment and evaluation of the results of qualitative and quantitative measurements.  The correct and thorough presentation of the results. |

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

1. **SYLLABUS**

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| --- |
| **Course Objectives**  Introduction to Food Analysis, Theory of Sampling  Quality characteristics of analytical methods -Validation of analytical methods  Review of methods for determining general chemical composition, their scope and limitations  Advanced Extraction Techniques for Food Ingredients  Experimental Design Methodology  Spectroscopic techniques (visible-ultraviolet spectrophotometry, atomic absorption spectrometry, fluorometry, etc.) and their applications in food analysis (part A)  Spectrochemical techniques (visible-ultraviolet spectrophotometry, atomic absorption spectrometry, fluorometry, etc.) and their applications in food analysis (part B)  Basic principles and techniques of chromatography - detectors and applications in food analysis (part A)  Basic principles and techniques of chromatography - detectors and applications in food analysis (part B)  Basic principles of mass spectrometry and applications in food  Spectroscopic techniques [Infrared (IR) and Nuclear Magnetic Resonance (NMR)] and applications in food analysis (part A)  Spectroscopic techniques [Infrared (IR) and Nuclear Magnetic Resonance (NMR)] and applications in food analysis (part B)  Holistic Approach in Food Analysis - examples and applications  Introduction to statistical processing of analytical data  Analysis of variances (univariate and bivariate analysis of variance) Part A  Analysis of variances (univariate and bivariate analysis of variance) Part B |

1. **TEACHING and LEARNING METHODS - EVALUATION**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DELIVERY**  *Face-to-face, Distance learning, etc.* | Face-to-face | | | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**  *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 | 118 |  | |
| study and analysis of bibliography and essay writing | 50 |  | |
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| **Course Total** | **168** |  | |
| **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, Review. | | | |

1. **ATTACHED BIBLIOGRAPHY**

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| *-* 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, Foods, Antioxidants |

**A5. FOOD QUALITY MANAGEMENT**

**COURSE OUTLINE**

1. **GENERAL**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SCHOOL** | FOOD SCIENCES | | | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | | | |
| **LEVEL OF STUDIES** | POSTGRADUATE | | | | |
| **COURSE CODE** | **A5** | **SEMESTER** | | **A** | |
| **COURSE TITLE** | **FOOD QUALITY MANAGEMENT** | | | | |
| **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 | | | 2-4 | |  |
|  | | |  | |  |
| **TOTAL** | | | **36** | | **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* | SPECIALISED KNOWLEDGE - 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/FST401 | | | | |

1. **LEARNING OUTCOMES**

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| --- |
| **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 subject of the course "FOOD QUALITY MANAGEMENT" is to introduce postgraduate students to the basic concepts of food quality management and to acquaint them with basic prerequisites for the implementation of integrated food safety and quality management systems. First, the concept of quality and its management at a holistic level is introduced, followed by an introduction to supply chain management. Students become familiar with the key legislative prerequisite principles and programs of Food Hygiene and Safety by focusing on specific legislative requirements for GMP & GHP such as manufacturing practice for food production facilities, cleaning and disinfection and use of water. Key elements of Quality control are introduced through quality assessment methods but also sampling methods and statistical tools for quality control and management.  After completing the course, the intended learning outcomes are:   * Familiarization of students with the concepts of quality and its management * Understanding the role of legislation in regulating quality parameters. * The ability to search and apply the appropriate prerequisite programs for FSMS development. * Learning the appropriate methods for food quality assessment * The use of tools for quality assessment and management. |

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

1. **SYLLABUS**

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| --- |
| Content of course lectures:   1. Introduction to Quality - Total Quality Management (TQM) 2. Supply Chain Management 3. Supply Chain Management- Logistics 4. GMP & GHP I 5. GMP & GHP II 6. Quality of water intended for human consumption – Legislation 7. Evaluation of nutritional supplements 8. Introduction to Food Legislation 9. Food recall, handling & destruction procedures 10. Design and construction rules of food production factories 11. Cleaning and disinfection 12. Rapid methods for food quality and safety assessment I 13. Rapid methods for food quality and safety assessment II 14. Food Sampling 15. Applications of statistics in food Quality Control |

1. **TEACHING AND LEARNING METHODS EVALUATION**

|  |  |  |  |
| --- | --- | --- | --- |
| **DELIVERY**  *Face-to-face, Distance learning, etc.* | Face to Face, e class notes | | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**  *Use of ICT in teaching, laboratory education,*  *communication with students* | e-class extra material  Communication with students through e-mails and e-class tools | | |
| **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 (including case studies, demonstration of on-line tools etc) | 134 |  |
| Assignment | 34 |  |
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| **Course total** | **168** |  |
| **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.* | The final examination of the course is written and may include different categories of topics for student evaluation such as Multiple Choice, Short Answer Questions, Assay Questions, Problem Solving.  Written Assignment  The grade of the written exam participates by 80% and the assignment by 20% in deriving the final grade | | |

1. **ATTACHED BIBLIOGRAPHY**

|  |
| --- |
| *- Suggested bibliography:*   1. Tsaknis, I. (2009). Food Quality Assurance, Papasotiriou Publications, Athens. 2. GHP rules for Food Industries. D. Kalogridou- Vasseiliadou. University Studio Press (1999) 3. WHO. 2019. Safety and quality of water used in food production and processing: meeting report. Microbiological Risk Assessment Series 33. Geneva 4. FAO & WHO. 2022. Codex Alimentarius: GENERAL PRINCIPLES OF FOOD HYGIENE CXC 1-1969 5. COMMISSION DIRECTIVE (EU) 2015/1787amending Annexes II and III to Council Directive 98/83/EC on the quality of water intended for human consumption |

**B1. SPECIAL TOPICS IN FOOD PROCESSING, PRESERVATION AND PACKAGING**

**COURSE OUTLINE**

1. **GENERAL**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SCHOOL** | Food Sciences | | | | |
| **ACADEMICUNIT** | Department of Food Science and Technology | | | | |
| **LEVELOFSTUDIES** | Postgraduate | | | | |
| **COURSECODE** | **B1** | **SEMESTER** | | **B** | |
| **COURSETITLE** | **Special Topics in Food Processing, Preservation and Packaging** | | | | |
| **INDEPENDENTTEACHINGACTIVITIES**  *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* | | | **WEEKLYTEACHINGHOURS** | | **CREDITS** |
| Lectures | | | 2-4 | |  |
|  | | |  | |  |
| **Total** | | | **32** | | **6** |
| *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** | No | | | | |
| **COURSE WEBSITE(URL)** |  | | | | |

1. **LEARNING OUTCOMES**

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| **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 have an advanced knowledge about the design, operation and application of the analyzed processes. * To apply advanced technical tools and methods for the solution of numerical problems of various processes. * To use the industrial standard tools and techniques for equipment design of the analyzed process. * To evaluate and compare published data in order to design and suggest an advanced processing method. * To know the physicochemical processes and the food components that lead to production, stabilization and formation of food products structure and texture. * To know the functional properties and functional characteristics of food ingredients. * To know the compounds and ingredients that can increase food shelf-life. |

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

1. **SYLLABUS**

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| **Description**: The course will provide knowledge about the novel, new and emerging food processing/preservation methods. It will provide knowledge on the principles, kinetics and application of these methods. Permits the analysis of the physical, chemical and microbiological changes that take place, as well as the involved engineering principles. Among the methods included are; non-thermal processing by applying high pressures, pulsed electric fields, pulsed light and ozonation. Moreover, thermal processing methods such as ohmic heating, and alternative preservation methods are included. In most cases, system engineering aspects are analyzed, as well as their effects on the microbiological, structural and biochemical systems of processed foods. All are intergraded with food shelf-life and quality characteristics. The shelf life of food products is related with the quality parameters. The physical properties of foods that are affected during processing are analyzed, such as glass transition and its application for the prediction of the quality stability or its application for the development of novel and innovative foods, as well as food rheological properties. In addition, the basic principles of food packaging systems are analyzed, as well as new and innovative applications (active and smart food packaging) for the improvement of food quality characteristics and extent of shelf-life.  **Course Objectives**   * Analysis of food rheological characteristics during food processing * Glass transition of foods and correlation with their quality and shelf-life. * High pressure processing: Principles, application and safety, effects of high pressure on microorganisms, enzymes, texture and nutritional compounds. Design and optimization of the method. * Pulsed electric field processing: Principles, equipment and process parameters. Mechanism of microorganism and enzyme inactivation. PEF processing of liquid and solid foods. Safety of PEF processed foods. Combination of PEF processing with high pressure. * Pulsed light processing: Principles, use and safety, effects on microorganisms, enzymes, texture and nutritional compounds, Applications. * Ultrasound Processing: Principle aspects, US as preservation method and as combined method, effects of US processing in food quality. * Alternative thermal processing methods: Ohmic heating (principles, effects, design, applications), Microwave and radiofrequency (principles, dielectric properties, mechanisms, applications) * Food Extrusion * Osmotic Dehydration * Hybrid dehydration methods: Combination with microwaves, vacuum and other processes. Effect on food quality * Modified and controlled atmospheres in foods. * Food Packaging: General characteristics, materials. Prediction of shelf-life of packaged foods–modelling. Active and intelligent packaging of Foods |

1. **TEACHING AND LEARNING METHODS EVALUATION**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DELIVERY**  *Face-to-face, Distance learning, etc.* | Face-to-face | | | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**  *Use of ICT in teaching, laboratory education,*  *Communication with students* | Use of Information Technologies in Teaching, Laboratory Education and Communication. Presentations using power points. 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*** | ***Semesterworkload*** |  | |
| Lectures | *126* |  | |
| Essay writing | *42* |  | |
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| **Course total** | ***168*** |  | |
| **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: Multiple Choice Tests, Short Answer Questions, Text Development Questions, Problem Solving,  Written Assignments, Reviews. | | | |

1. **ATTACHED BIBLIOGRAPHY**

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| --- |
| *-* **Suggested bibliography:**  Lazos E., Lazou A. (2017). Food Processing 1: Preservation processes using heating, low temperatures and radiation energy. Papazisis SA publications  Lazos E., Lazou A. (2016). Food Processing 2: Preservation processes using physicochemical, biological, new and emerging technologies, Papazisis SA publications  Saravacos G D, Maroulis Z B (2010) Food Process Engineering Operations. Taylor and Francis  Rahman MS (2020) Handbook of Food Preservation, Second Edition. Food Science and Technology. CRC Press  - **Related journals:**  Journal of Food Engineering, Journal of Food Processing and Preservation, Food and Bioproducts Processing |

**Β2. CHEMICAL AND MICROBIOLOGICAL FOOD SAFETY**

**COURSE OUTLINE**

**(1) GENERAL**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SCHOOL** | FOOD SCIENCES | | | | |
| **DEPARTMENT** | FOOD SCIENCE AND TECHNOLOGY | | | | |
| **LEVEL OF STUDY** | POSTGRADUATE | | | | |
| **CODE** | **B2** | SEMESTER | | **Β** | |
| **COURSE TITLE** | **CHEMICAL AND MICROBIOLOGICAL FOOD SAFETY** | | | | |
| **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** | | **CREDIT UNITS** |
| Lectures | | | 2.5 | |  |
| Laboratory exercises | | | 1 | |  |
| **Total** | | | 3.5 | | 6 |
| *Add rows if necessary. The teaching organization and the teaching methods used are described in detail in (d).* | | |  | |  |
| **TYPE OF COURSE**  *general background,*  *special background, specialization*  *general knowledge, skill development* | Special background, skill development | | | | |
| **PREREQUISITE COURSES:** | - | | | | |
| **LANGUAGE OF LECTURES and EXAMINATIONS:** | Greek | | | | |
| **THE COURSE IS OFFERED TO ERASMUS STUDENTS** | YES (in Greek) | | | | |
| **COURSE WEBSITE (URL)** | e-class: https://eclass.uniwa.gr/courses/FST414/ | | | | |

**(2) LEARNING OUTCOME**

|  |  |
| --- | --- |
| **Learning outcome** | |
| *The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the 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* | |
| The aim of this course is to introduce postgraduate students to a range of topics related to chemical and microbiological hazards that threaten Food Safety, their detection methodologies as well as the current European Union and National legal regime that frames them. Extensive reference is made to cases of food adulteration as well as to their detection methodologies. Special reference is made of chemical environmental pollutants such as polycyclic aromatic hydrocarbons, dioxins, and heavy metals. Emphasis is given on analytical techniques and the legislative framework of the pesticides used in agriculture as well as the detection of mycotoxins and allergens in food. The lectures also include the study of cases regarding the detection of biotoxins in food as well as migration phenomena of compounds from food packaging materials in contact with foods. The lectures include the methodological approach regarding the use of food additives in food and drinks. Finally, the management of nutritional crises is analyzed by examples. After the completion of the lectures the intended learning outcomes are:   * The recognition of chemical and microbiological risks that threaten, as the case may be, food. * To choose the appropriate methodology for food analysis in terms of the chemical and microbiological risks that threaten them. * To be aware of the existing Legislative framework concerning some of these Risks. * To know the correct and lawful Legislative approach to the use of Food Additives. * To introduce measures to deal with these risks in the Quality Assurance Systems. * Have basic knowledge of Food Crisis Management. | |
| **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.*  *Adaptation to new situations*  *Decision making*  *Autonomous work*  *Teamwork*  *Work in an international environment*  *Work in an interdisciplinary environment*  *Generating new research ideas* | *Project planning and management*  *Respect for diversity and multiculturalism*  *Respect for the natural environment*  *Demonstrating social, professional and ethical responsibility and sensitivity to gender issues*  *Exercise criticism and self-criticism*  *Promotion of free, creative and inductive thinking*  *Others……* |
| * Search, analysis and synthesis of data and information, also using the necessary technologies * Decision making * Adaptation to new situations * Project planning and management * Promotion of free, creative and inductive thinking | |

**(3) SYLLABUS**

|  |
| --- |
| **Course content of “CHEMICAL AND MICROBIOLOGICAL FOOD SAFETY”** |
| 1. Legislation of additives (part A) 2. Legislation of additives (part B) 3. Counterfeiting: case study and detection methods (part A) 4. Counterfeiting: case studies and detection methods (part B) 5. Allergens: case studies, legislation and detection methods 6. Chemical pollutants (polycyclic aromatic hydrocarbons, dioxins): Categories, legislation and detection methods 7. Mycotoxins: case studies, legislation and detection methods 8. Pesticides: Categories, legislation and detection methods 9. Heavy metals: case studies, legislation and detection methods 10. Biotoxins: case studies, legislation and detection methods 11. Case study of growth prediction of L. m. in ready-to-eat foods 12. Migration phenomena from materials in contact with food 13. Genetically modified foods 14. Cloned meat and cell culture meat 15. Management of nutritional crises |

**(4) TEACHING AND LEARNING METHODS - EVALUATION**

|  |  |
| --- | --- |
| **Teaching Method** *Face to face, Distance learning etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES - ICT**  *Use of I.C.T. in Teaching, in Laboratory Education, in Communication with students* | Use of Information Technologies in Teaching and Communication. Presentations using PowerPoint.  Update via Web (e-class). |
| **TEACHING ORGANIZATION**  *The way and methods of teaching are described in detail.*  *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.*  *The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed* | |  |  | | --- | --- | | ***Activities*** | ***Work load of semester*** | | Lectures | 126 | | Essay | 42 | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | | **Total** | ***168*** | |
| **STUDENT EVALUATION**  Description of the evaluation process  *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*  *Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.* | Multiple Choice Test, Short Answer Questions, Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination.  The final examination of the course is carried out by an oral presentation of a topic related to the lectures in Chemical and Microbiological Food Safety. The topics are assigned by the course instructors at the beginning of the semester and are presented in person in the form of a poster on a specified date after the end of the examination period. The assignments are graded on the structure, content, presentation and answers to the instructors' questions. |

**(5) SUGGESTED LITERATURE**

|  |
| --- |
| 1. Spink, J.; Chen, W.; Zhang, G.; Speier-Pero, C. Introducing the Food Fraud Prevention Cycle (FFPC): A Dynamic Information Management and Strategic Roadmap. Food Control **2019**, 105, 233–241. 2. Dellafiora, L.; Dall’Asta, C. Masked Mycotoxins: An Emerging Issue That Makes Renegotiable What Is Ordinary. Food Chemistry **2016**, 213, 534–535. 3. Scutarașu, E. C.; Trincă, L. C. Heavy Metals in Foods and Beverages: Global Situation, Health Risks and Reduction Methods. Foods **2023**, 12 (18), 3340. 4. Visciano, P.; Schirone, M.; Berti, M.; Milandri, A.; Tofalo, R.; Suzzi, G. Marine Biotoxins: Occurrence, Toxicity, Regulatory Limits and Reference Methods. *Frontiers in Microbiology* **2016**, *7*. 5. Muzeza, C.; Ngole-Jeme, V.; Msagati, T. A. M. The Mechanisms of Plastic Food-Packaging Monomers’ Migration into Food Matrix and the Implications on Human Health. Foods **2023**, 12 (18), 3364. 6. Bryant, C. J. Culture, Meat, and Cultured Meat. *Journal of Animal Science* **2020**, *98* (8). https://doi.org/10.1093/jas/skaa172. |

**Β3. FOOD PRODUCT INNOVATION AND DEVELOPMENT**

**COURSE OUTLINE**

**(1) GENERAL**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SCHOOL** | FOOD SCIENCES | | | | |
| **DEPARTMENT** | FOOD SCIENCE AND TECHNOLOGY | | | | |
| **LEVEL OF STUDY** | POSTGRADUATE | | | | |
| **CODE** | **B3** | SEMESTER | | **Β** | |
| **COURSE TITLE** | **FOOD PRODUCT INNOVATION AND DEVELOPMENT** | | | | |
| **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** | | **CREDIT UNITS** |
| Lectures | | | 2-4 | |  |
| Laboratory exercises | | | 2 | |  |
| **Total** | | | 4-6 | | 6 |
| *Add rows if necessary. The teaching organization and the teaching methods used are described in detail in (d).* | | |  | |  |
| **TYPE OF COURSE**  *general background,*  *special background, specialization*  *general knowledge, skill development* | Special background, skill development. | | | | |
| **PREREQUISITE COURSES:** | - | | | | |
| **LANGUAGE OF LECTURES and EXAMINATIONS:** | Greek | | | | |
| **THE COURSE IS OFFERED TO ERASMUS STUDENTS** | YES (in Greek) | | | | |
| **COURSE WEBSITE (URL)** | https://eclass.uniwa.gr/courses/FST415/ | | | | |

**(2) LEARNING OUTCOME**

|  |  |
| --- | --- |
| **Learning outcome** | |
| *The learning outcomes of the course are described, the specific knowledge, skills and abilities of an appropriate level that the students will acquire after the 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* | |
| This course is structured around the interactive use of lectures, discussions, collaborations, studies and presentations, with the aim the students, using and applying the knowledge they have acquired from the rest of the PMS courses, to deepen, in a holistic way, to topics such as : design, methodology and development of innovative foods and food packaging concepts, food marketing and food distribution, food sustainability, food safety, economically sustainable food production, discovery of innovative ways to develop the food business sector, design and development of functional foods, nutritional labeling-claims nutrition and health and legislation, design of food industries, utilization of blockchain technology, use of biosensors in the production line in the food industry, etc. This deepening will be implemented by attending relevant lectures and also undertaking a design study of the steps required for the development of a food, which will be carried out with the collaboration of students and teachers and will be presented at the end of the course. After the completion of the lectures, the intended learning outcomes are:   * Understand in a holistic way the development of a food, starting from its design to its production in a production unit. * To design the production line of a food * To develop an integrated quality assurance system | |
| **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.*  *Adaptation to new situations*  *Decision making*  *Autonomous work*  *Teamwork*  *Work in an international environment*  *Work in an interdisciplinary environment*  *Generating new research ideas* | *Project planning and management*  *Respect for diversity and multiculturalism*  *Respect for the natural environment*  *Demonstrating social, professional and ethical responsibility and sensitivity to gender issues*  *Exercise criticism and self-criticism*  *Promotion of free, creative and inductive thinking*  *Others……* |
| * Search, analysis and synthesis of data and information, using the necessary technologies. * Decision making * Teamwork * Project planning and management * Exercise criticism and self-criticism * Promotion of free, creative, and inductive thinking | |

**(3) SYLLABUS**

|  |
| --- |
| **Course content of “FOOD PRODUCT INNOVATION AND DEVELOPMENT”** |
| 1. Food product development (Introduction)  2. Food product development (work organization)  3. Food marketing (part A)  4. Food marketing (part B)  5. Transfer of innovation in the food sector  6. Propensity and sustainability models  7. Study and calculation of food preservation  8. Functional foods  9. Personalized diet  10. New search techniques for bioactive compounds with applications in food  11. Planning of food industries (part A)  12. Planning of food industries (part B)  13. Applications of “Internet of things” IoT technologies in the food supply chain: Utilization of blockchain technology  14. Application of biosensors on the production line in the food industry  15. Presentation of work |

**(4) TEACHING AND LEARNING METHODS - EVALUATION**

|  |  |
| --- | --- |
| **Teaching Method** *Face to face, Distance learning etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES - ICT**  *Use of I.C.T. in Teaching, in Laboratory Education, in Communication with students* | Use of Information Technologies in Teaching and Communication. Presentations using PowerPoint.  Update via Web (e-class). |
| **TEACHING ORGANIZATION**  *The way and methods of teaching are described in detail.*  *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.*  *The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed* | |  |  | | --- | --- | | ***Activities*** | ***Workload of semester*** | | Lecture | 68 | | Essay | 100 | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | | **Total** | ***168*** | |
| **STUDENT EVALUATION**  Description of the evaluation process  *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*  *Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.* | Multiple Choice Test, Short Answer Questions, Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination.  **Detailed Description of the evaluation process**  At the beginning of the semester, the students in groups of 4-5 members undertake a modular work dealing with topics on Innovation and Development of food products, which, upon completion, they submit as a thesis and present it publicly and live on a predetermined date. Assignments will be graded for structure, content, presentation of the assignment and answers to questions from the instructors. |

**(5) SUGGESTED LITERATURE**

|  |
| --- |
| 1. Linnemann, A. R.; Schroën, C. G. P. H.; Van Boekel, M. A. J. S. Food Product Design; Brill Wageningen Academic, 2011. 2. Fuller, G. W. New Food Product Development; CRC Press, 2016. 3. Gunter, B. Food Advertising; Springer, 2016. 4. Piatti, C.; Graeff-Hönninger, S.; Khajehei, F. Food Tech Transitions; Springer Nature, 2019. 5. Dar, B. N.; Shah, M. A.; Shah, S. A. Shelf Life and Food Safety; CRC Press, 2022. 6. Eskin, M.; Robinson, D. S. Food Shelf-Life Stability; CRC Press, 2000. 7. Baker, C. G. J. Handbook of Food Factory Design; Springer Science & Business Media, 2013. 8. Ahamed, T. IoT and AI in Agriculture; Springer Nature, 2023. 9. Egbuna, C.; Tupas, G. D. Functional Foods and Nutraceuticals; Springer Nature, 2020. 10. Mutlu, M. Biosensors in Food Processing, Safety, and Quality Control; CRC Press, 2016. |

**B4. FOOD SAFETY MANAGEMENT SYSTEMS - CERTIFICATION AND ACCREDITATION**

**COURSE OUTLINE**

1. **GENERAL**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SCHOOL** | FOOD SCIENCES | | | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY | | | | |
| **LEVEL OF STUDIES** | POSTGRADUATE | | | | |
| **COURSE CODE** | **B4** | SEMESTER | | **B** | |
| **COURSE TITLE** | **FOOD SAFETY SYSTEMS - CERTIFICATION AND ACCREDITATION** | | | | |
| **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 | | | 2-4 | |  |
|  | | |  | |  |
| **TOTAL** | | | **36** | | **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* | SPECIALISED KNOWLEDGE - 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/FST412/ | | | | |

1. **LEARNING OUTCOMES**

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| --- |
| **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 aim of the course "Food Safety Systems - Certification and Accreditation" is the introduction, familiarization and deepening of postgraduate students in the development and management of Food Safety Management Systems (FSMS) and Food Quality as well as understanding the concepts of accreditation and certification including the rules for their applications. The principles of HACCP are introduced and then the main standards that exist for the certification of FSMS and Quality (including Environmental Management) are analyzed. In addition, emphasis is given on individual common requirements of the standards and current trends for the development of integrated FSMSs. An important element on the applications which are covered by Case Studies  After completing the course, the intended learning outcomes are:   * Students' familiarization with Food Safety and Quality Management Systems * Understanding the structure and requirements of the various Safety and Quality standards * Familiarity with inspection procedures. * Ability to develop and implement FSMS and Quality Systems |

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

1. **SYLLABUS**

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| Content of course lectures:  1. The Role of HACCP in the evolution & development of food safety management systems  2. Preparation for the introduction of the HACCP System  3. Basic specifications of a traceability system  4. Development of a Food Defense Plan  5. Food Fraud and Bioterrorism  6. International standard for FSMS - ISO 22000:2018  7. International Food Standard (I.F.S.) and British Retail Consortium (B.R.C.) certification  8. Case study: Development of a Food Safety Management System in fish farms (part A)  9. Case study: Development of a Food Safety Management System in fish farms (part B)  10. Case study: Development of a Food Safety Management System in fish farms (part C)  11. Case study: Development of a Food Safety Management System in Catering (part A)  12. Case study: Development of a Food Safety Management System in Catering (part B)  13. Case study: Development of a Food Safety Management System for dairy products  14. Environmental Management Certification (ISO:14001 & EMAS Regulation):  15. Calculation of Carbon Footprint in Extra Virgin Olive Oil (ISO 14064:1)  16. Halal and Kosher certification  17. Inspections by Audit Authorities  18. FSMS inspections by certification bodies |

1. **TEACHING AND LEARNING METHODS EVALUATION**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DELIVERY**  *Face-to-face, Distance learning, etc.* | Face to Face, e-class notes | | | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**  *Use of ICT in teaching, laboratory education,*  *communication with students* | E-class extra material  Communication With students through e-mails and e-class tools | | | |
| **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 (including case studies, demonstration of on-line tools etc) | 134 |  | |
| Assignment | 34 |  | |
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|  |  |  | |
| **Course total** | ***168*** |  | |
| **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.* | The final examination of the course is written and may include different categories of topics for student evaluation such as Multiple Choice, Short Answer Questions, Assay Questions, Problem Solving.  Written Assignment  The grade of the written exam participates by 80% and the assignment by 20% in deriving the final grade. | | | |

1. **ATTACHED BIBLIOGRAPHY**

|  |
| --- |
| *- Suggested bibliography:*   1. Pieternel A. Luning and Willem J. Marcelis. Food quality management:Technological and managerial principles and practices. 2020. eISBN: 978-90-8686-899-5; ISBN: 978-90-8686-348-8; <https://doi.org/10.3920/978-90-8686-899-5> 2. Mark Clute. Food Industry Quality Control Systems. 2008. CRC Press. ISBN 9780849380280 3. Ronald F. Cichy, and JaeMin Cha. Food Safety and Quality Management, Third Edition. 2019, ISBN: 978-1-949324-75-4 4. Safety and Quality Management in Food Supply Chain:A Farm to Fork Approach. K P Sudheer and Bindu Lakshmanan (Eds). 2021. CRC Press. ISBN 9781032007045 5. Tsaknis, I. (2009). Food Quality Assurance, Papasotiriou Publications, Athens. |

**B5. STATISTICAL METHODOLOGIES FOR THE QUALITY AND**

**ORGANOLEPTIC EVALUATION OF FOODS**

**COURSE OUTLINE**

**(1) GENERAL**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SCHOOL** | FOOD SCIENCES | | | | |
| **DEPARTMENT** | FOOD SCIENCE AND TECHNOLOGY | | | | |
| **LEVEL OF STUDY** | POSTGRADUATE | | | | |
| **CODE** | **B5** | SEMESTER | | **Β** | |
| **COURSE TITLE** | **STATISTICAL METHODOLOGIES FOR THE QUALITY AND ORGANOLEPTIC EVALUATION OF FOODS** | | | | |
| **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** | | **CREDIT UNITS** |
| Lectures | | | 2-4 | |  |
| Laboratory exercises | | | 1 | |  |
| **Total** | | | 3-5 | | 6 |
| *Add rows if necessary. The teaching organization and the teaching methods used are described in detail in (d).* | | |  | |  |
| **TYPE OF COURSE**  *general background,*  *special background, specialization*  *general knowledge, skill development* | Special background, skill development. | | | | |
| **PREREQUISITE COURSES:** | - | | | | |
| **LANGUAGE OF LECTURES and EXAMINATIONS:** | Greek | | | | |
| **THE COURSE IS OFFERED TO ERASMUS STUDENTS** | YES (in Greek) | | | | |
| **COURSE WEBSITE (URL)** | https://eclass.uniwa.gr/modules/document/index.php?course=TTT228&openDir=/5c5045dan0gk/5c50463fq012 | | | | |

**(2) LEARNING OUTCOME**

|  |  |
| --- | --- |
| **Learning outcome** | |
| *The learning outcomes of the course are described, the specific knowledge, skills, and abilities of an appropriate level that the students will acquire after the 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* | |
| The subject of the course concerns the qualitative and sensory evaluation of foods with the use of statistical tools. The concepts of the sensory evaluation of foods are discussed, as well as the recommended good practices that must be followed. Human senses are also described as an analytical tool for sensory evaluation of food, as well as its different methodologies (e.g., descriptive, dynamic, preference-acceptance). In addition, the necessity of the qualitative and sensory evaluation of foods is discussed and commented on in order to draw conclusions in relation to authenticity, shelf-life, nutritional value, consumer preference, etc., with comparative scientific studies of published cases. The food sensory evaluation is implemented by statistical methods (dispersion control, non-parametric tests, regression-correlation, discriminant analysis, etc.), which, after appropriate processing of the research results, lead to the extraction of conclusions, such as the correlation of parameters such as quality, discriminative food analysis, sustainability prediction models, etc.  Following the completion of the lectures, the learning outcomes for the students will be:  - Apply the principles of the sensory evaluation of food.  - Apply sensory evaluation techniques focused on consumer acceptance.  - Correlate sensorial evaluation with instrumental analysis techniques for the assessment of food quality.  - To know organoleptic methodology and terminology, and the differences between emotional and analytical quality assessment methods  - To apply sensory evaluation techniques in food product development and shelf-life assessment  - Correlates sensory and instrumental food quality measurement data  - Applies principles of statistics to the processing and presentation of results  - Understands and correctly interprets statistical significance  - Be familiar with discrete and continuous probability distributions to various problems  - Be familiar to non-parametric tests  - Calculates and interprets the results of analysis with regression and correlation, analysis of variance (ANOVA)  - 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 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.*  *Adaptation to new situations*  *Decision making*  *Autonomous work*  *Teamwork*  *Work in an international environment*  *Work in an interdisciplinary environment*  *Generating new research ideas* | *Project planning and management*  *Respect for diversity and multiculturalism*  *Respect for the natural environment*  *Demonstrating social, professional, and ethical responsibility and sensitivity to gender issues*  *Exercise criticism and self-criticism*  *Promotion of free, creative and inductive thinking*  *Others……* |
| * Search, analysis and synthesis of data and information, using the necessary technologies. * Decision making * Adaptation to new situation * Project planning and management * Promotion of free, creative, and inductive thinking | |

**(3) SYLLABUS**

|  |
| --- |
| 1. Sensory evaluation of foods – Practical considerations  2. Introduction- Good practices for sensory evaluation  3. Human senses as an analytical tool  4. Descriptive methods of sensory evaluation  5. Dynamic methods of sensory evaluation  6. Preference-acceptance methods  7. Selection and training of testers - Experimental design of sensorial tests  8. Control of variances (univariate and bivariate analysis of variance)  9. Non-parametric tests (univariate and bivariate analysis of variance)  10. Regression – Correlation  11. Multivariate analysis (principal component analysis and multivariate analysis of variance)  12. Introduction to Discriminant Analysis |

**(4) TEACHING AND LEARNING METHODS – EVALUATION**

|  |  |
| --- | --- |
| **Teaching Method** *Face to face, Distance learning etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES - ICT**  *Use of I.C.T. in Teaching, in Laboratory Education, in Communication with students* | Use of Information Technologies in Teaching and Communication. Presentations using PowerPoint.  Update via Web (e-class). |
| **TEACHING ORGANIZATION**  *The way and methods of teaching are described in detail.*  *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.*  *The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed* | |  |  | | --- | --- | | ***Activities*** | ***Workload of semester*** | | Lecture | 126 | | Essay | 54 | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | | **Total** | ***168*** | |
| **STUDENT EVALUATION**  Description of the evaluation process  *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*  *Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.* | Multiple Choice Test, Short Answer Questions, Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination. |

**(5) SUGGESTED LITERATURE**

|  |
| --- |
| 1. Bower, J. A. (2013). Statistical methods for food science: Introductory procedures for the food practitioner. John Wiley & Sons. 2. Civille, G. V., & Carr, B. T. (2015). Sensory evaluation techniques. CRC press. 3. Delarue, J., Lawlor, B. & Rogeaux, M. (2014). Rapid Sensory Profiling Techniques - Applications in New Product Development and Consumer Research. Wood House Publishing. 4. Heymann, H., & Lawless, H. T. (2013). Sensory evaluation of food: principles and practices. Springer Science & Business Media 5. 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. 6. Kemp, S.E., Hollowood, T. & Hort, J. (2011). Sensory Evaluation: A Practical Handbook. John Wiley & Sons. 7. Kemp, S.E., Hort, J. & Hollowood, T. (2018). Descriptive Analysis in Sensory Evaluation. John Wiley & Sons. 8. Meilgaard, C.M., Civille, G.V. & Carr, B.T. (2015). Sensory Evaluation Techniques (5th edition). Boca Raton: CRC Press. 9. O'Mahony, M. (2017). Sensory evaluation of food: statistical methods and procedures. Routledge. 10. Owusu-Apenten, R. K., & Vieira, E. R. (2023). Elementary food science (No. 303022). Springer. 11. Rossi, F., & Mirtchev, V. (2015). Statistics for Food Scientists: Making Sense of the Numbers. Academic Press. 12. Stone, H., Bleibaum, R. N., & Thomas, H. A. (2020). Sensory evaluation practices. Academic press. |

**C1. Postgraduate Diploma Thesis**

**COURSE OUTLINE**

**(1) GENERAL**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SCHOOL** | FOOD SCIENCES | | | | |
| **DEPARTMENT** | FOOD SCIENCE AND TECHNOLOGY | | | | |
| **LEVEL OF STUDY** | POSTGRADUATE | | | | |
| **CODE** | **C1** | SEMESTER | | **C** | |
| **COURSE TITLE** | **Postgraduate Diploma Thesis** | | | | |
| **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** | | **CREDIT UNITS** |
| Elaboration, Presentation | | |  | | 30 |
|  | | |  | |  |
| **Total** | | |  | | 30 |
| *Add rows if necessary. The teaching organization and the teaching methods used are described in detail in (d).* | | |  | |  |
| **TYPE OF COURSE**  *general background,*  *special background, specialization*  *general knowledge, skill development* | Skill development | | | | |
| **PREREQUISITE COURSES:** | - | | | | |
| **LANGUAGE OF LECTURES and EXAMINATIONS:** | Greek or English | | | | |
| **THE COURSE IS OFFERED TO ERASMUS STUDENTS** | No | | | | |
| **COURSE WEBSITE (URL)** | https://foodiqs.uniwa.gr/diplomatiki-ergasia/ | | | | |

**(2) LEARNING OUTCOME**

|  |  |
| --- | --- |
| **Learning outcome** | |
| *The learning outcomes of the course are described, the specific knowledge, skills, and abilities of an appropriate level that the students will acquire after the 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* | |
| Following the completion of the thesis, the learning outcomes for the students will be:  - Decision making initiative.  - Apply analytical approach to problem solving.  - Implement effectively communication skills.  - Produce critical review using and citing the information tools.  - Produce and justify a sustainable program proposal and experimental design appropriate in terms of methodologies, available resources, time and cost.  - To undertake a work program that creates data, using data analysis and interpretation with appropriate tools.  - Produce a structured report using the appropriate format and references.  - Demonstrate an in-depth understanding of the project through presentation with poster or  oral presentation. | |
| **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.*  *Adaptation to new situations*  *Decision making*  *Autonomous work*  *Teamwork*  *Work in an international environment*  *Work in an interdisciplinary environment*  *Generating new research ideas* | *Project planning and management*  *Respect for diversity and multiculturalism*  *Respect for the natural environment*  *Demonstrating social, professional, and ethical responsibility and sensitivity to gender issues*  *Exercise criticism and self-criticism*  *Promotion of free, creative and inductive thinking*  *Others……* |
| * Search, analysis and synthesis of data and information, using the necessary technologies. * Decision making * Adaptation to new situation * Project planning and management * Promotion of free, creative, and inductive thinking | |

**(3) SYLLABUS**

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| The subject of the postgraduate thesis may be a research or review study and must be original. The theses allow students to engage in research topics related to Food Science and Technology, with emphasis on Food Innovation, Quality and Safety, which focus on areas of strong scientific and technological interest. The preparation of the M.Sc. thesis is a significant creative challenge for the postgraduate student, offering him/her the opportunity to explore in depth a scientific topic in a systematic and academic manner, applying and utilizing the knowledge acquired during the previous semesters of study. It also enables the postgraduate student to apply scientific methods, to investigate extensively the scientific literature, to search, analyze and synthesize data and information, to promote free, creative and inductive thinking, to write and present an excellent scientific paper and to develop cooperation with the lecturers of the MSc and the scientific collaborators of the Department. The P.D.T. can be structured by a theoretical and experimental part, being an original research work aiming at the investigation of a scientific hypothesis, or it can be a review of the international literature, or it can be a work of processing and post-analysis of experimental results of the international literature. The fields of research interest of the M.Sc. may focus on Food Science and Technology, with emphasis on Innovation, Food Product Design and Development, Food Analysis and Quality, Food Safety, etc. |

**(4) TEACHING AND LEARNING METHODS – EVALUATION**

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| --- | --- |
| **Teaching Method** *Face to face, Distance learning etc.* |  |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES - ICT**  *Use of I.C.T. in Teaching, in Laboratory Education, in Communication with students* |  |
| **TEACHING ORGANIZATION**  *The way and methods of teaching are described in detail.*  *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.*  *The student's study hours for each learning activity as well as unguided study hours according to ECTS principles are listed* | |  |  | | --- | --- | | ***Activities*** | ***Workload of semester*** | | Elaboration, presentation | 840 | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |
| **STUDENT EVALUATION**  Description of the evaluation process  *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*  *Explicitly defined evaluation criteria are mentioned and if and where they are accessible by students.* | The thesis will be evaluated by 3-member examination committee approved by the Department Assembly.  The diploma thesis is evaluated according to:  Α) the scientific quality of the work (degree of originality in dealing with the subject, completeness of the bibliographic search, correctness and adequacy of the methodology, accuracy and completeness of the analysis, analysis and processing of the data, validity, interpretation and critical evaluation of results, conclusions and creating justified proposals for further study), with a weighting factor of 50%  Β) the integrity of the writing (presentation of text and diagrams, coherence of text, correct use of language and scientific terminology, correct citation of references), with a weighting factor of 30%.  Γ) the quality of the oral presentation (effectiveness of the oral speech, adequacy and appropriateness of the audio-visual media used, appropriate utilization of the presentation time, and highlighting the essential contribution of the work through the presentation), with a weighting factor of 20%. |