



**TECHNOLOGY AND QUALITY
OF MEAT AND FISH
PRODUCTS
COURSE OUTLINE**

GENERAL

GENERAL			
SCHOOL	AGRICULTURAL SCIENCES		
DEPARTMENT	FOOD SCIENCE AND NUTRITION		
COURSE LEVEL	Undergraduate		
COURSE CODE	ME813	SEMESTER	8 th
COURSE TITLE	TECHNOLOGY AND QUALITY OF MEAT AND FISH PRODUCTS RESPONSIBLE: M. KAKAGIANNI		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	ECTS
Lectures		3	6
Lab Lectures-exercises		3	
COURSE TYPE Background, General Knowledge, Scientific Area, Skill Development	Scientific Area		
PREREQUISITES:			
LANGUAGE OF TEACHING AND EXAMINATIONS:	GREEK		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES		
URL	https://food.uth.gr/poiotikos-elegxos-kreatos/		

TEACHING RESULTS

Teaching Results
TECHNOLOGY AND QUALITY CONTROL OF MEAT AND FISH is a special science course background in the concepts of meat and fishery technology and quality control. Its material course aims at learning the basic elements of muscle anatomy in order to identify the of pieces resulting from the coarse and detailed cutting of the carcasses and the their indicated use, its chemical and biochemical composition, postmortem changes as well as and the methods of stunning and slaughtering the carcasses in order to understand the effect of their manipulations in the quality of the carcass and meat, the well-being of the animals and the personnel safety, the key factors affecting the quality and technological characteristics of meat and meat products for the purpose of producing food which meet the needs of the modern consumer, familiarity with measurement methods and assessment of the important physicochemical characteristics of carcass and meat quality, the classification of meat products, the selection of raw and other materials, the preparation methods, h packaging, the preservation of heat treatment and ripening products, the prevention, the evaluation of defects that cause quality degradation, with the aim of producing quality and hygienic products. In addition, the course aims to understand the chemical composition and biological value of the flesh of fish, nitrogenous compounds-proteins, fats, polyunsaturated fatty acids and human nutrition, carbohydrates, vitamins, minerals, the main factors that affect the qualitative and technological characteristics of catches and assessment of the quality of fish, of fish evaluation indicators, the preservation and processing of catches (cooling - freezing, drying, salting, smoking, canning), of chemical and microbiological analyses. Byproducts of fish (roe, fishmeal, liver oil, caviar, taramas, brik, surimi). Quality control assessment of processed catches. Products of marine organisms produced with biotechnological methods. Exploitation of fish of small commercial value.



Legislation

The aim of the laboratory part of the course is to enable the student to apply, in an effective way, preservation technologies of meat and fish, to carry out official laboratory controls (organoleptic, physicochemical, microbiological), and meat and fish safety and quality management systems to assess their safety and quality.

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

1. **Identify and classify** carcass and seafood cuts based on anatomical and technological characteristics and their appropriate culinary/processing use.
2. **Critically analyze** the chemical and biochemical composition of muscle and fish flesh, relating it to quality, spoilage, and nutritional value.
3. **Assess the quality and suitability** of meat and seafood using physicochemical, microbiological, and sensory methods.
4. **Understand the impact of post-mortem changes and technological interventions** (slaughtering, aging, preservation) on product quality and safety.
5. **Apply processing and preservation techniques** to meat products and seafood, in accordance with current legal and hygiene standards.
6. **Manage and evaluate food safety and quality systems (e.g., HACCP)** in the processing and distribution of animal-origin products.
7. **Monitor, document, and evaluate** critical parameters throughout production, from sampling to final product release.
8. **Propose improvements and innovations** in meat and seafood production, integrating nutritional, technological, and environmental considerations.

General Skills

- **Retrieval, analysis, and synthesis of data and information**, using appropriate technologies (*essential for chemical, microbiological, and sensory evaluation of meat and seafood*)
- **Decision-making** (*in critical areas such as safety, quality, and processing control systems like HACCP*)
- **Autonomous work** (*in conducting analytical procedures and preparing technical reports*)
- **Teamwork** (*through group-based laboratory activities, processing practices, and on-site visits*)
- **Working in an interdisciplinary environment** (*integrating food technology, anatomy, chemistry, microbiology, and food safety science*)
- **Adaptability to new situations** (*due to variations in raw material, evolving legislation, and novel technologies*)
- **Critical thinking and self-assessment** (*fostered through quality assessments, deviation analysis, and performance reflection*)
- **Promotion of free, creative, and inductive thinking** (*especially in the development of innovative products, process improvements, and waste valorization*)

CONTENT

LECTURES

1. Meat-Poultry

- Structure of striated muscle (muscle bundles, connective tissue, adipose tissue, vessels and nerves).
- Structure of the muscle fiber (sarcoplasm, muscle fibrils, sarcoplasm, nuclei, color of muscle fibers, white and red muscle fibers).
- Chemical and biochemical composition of the muscle (muscle fibril proteins, striated muscle function, proteins of connective tissue and organelles, lipids, carbohydrates, minerals, water, water holding capacity of muscle tissue).
- Conversion of muscle tissue to meat (ATP effect on post-mortem changes, post-mortem glycolysis, course of postmortem stiffness, postmortem changes of proteins and I.S.Y., meat maturation).
- Organoleptic characteristics and nutritional value of meat.
- Cooling and preservation of chilled meat (cooling of meat, methods of cooling carcasses and of meat, preservation of the frozen state, problems and changes of meat during cooling and



refrigerated storage).

- Abnormal meat quality deviations (PSE, DFD-meat, glycolysis, generation, control conditions, effects on meat and meat products).
- Technology of meat products.
- Pasteurized sausages (choice of raw material, sodium chloride, water, flavorings, additives and auxiliaries, binding of water and fat – formation of the pasteurized structure sausages, preparation of the meat paste, salting – formation – preservation of the color, storage, heat treatment, cooling – preservation – packaging).
- Quality of pasteurized sausages (Defects due to improper choice of the first matter, casings, NaCl, water, additives and auxiliary materials, preparation of meat paste, nitrites, color auxiliaries, meat paste filling, heat treatment and smoking, packaging, maintenance. Defects in texture, color, appearance, taste and smell).
- Cured products (microbiological stability of cured products, cured sausages, selection of raw material, sodium chloride – auxiliary – flavoring – additives, preparation of cream cheese, filling, ripening, factors and control parameters during the production of curing cured meats, the importance of microorganisms during production, defects due in micro-organisms, smoking of sausages, curing – dehydration, packaging, sale, maintenance. Preventive control measures.
- Quality of curing sausages (Defects due to inappropriate selection of raw material, cases, additives and auxiliary materials, potassium sorbate, preparation of cream mass, filling, ripening external, internal and control factors, dosing, packaging, maintenance. Defects texture, color, appearance, taste and smell).

2. FISH

- Systematic classification, anatomy and physiology of fish. The main catches (fish, molluscs, crustaceans).
- Chemical composition and nutritional value of fish.
- Organoleptic characteristics of catches
 - Qualitative characteristics (inspection) of catches. Postmortem changes (organoleptic, biochemical, microbiological). Catch sampling methods
- Catch preservation methods
 - Quality control (chemical/biochemical/physical, microbiological, organoleptic tests) of catches. Quality changes and shelf life of fishery products. Quality features and standards
- Assessment and management of catch safety and quality. Good hygiene practices and industrial practices (GHP/GMP). Hazard Analysis Critical Control Points (HACCP)
- Catch processing
- Preservation and packaging of catches
- Fish by-products (roe, fishmeal, liver oil, caviar, taramas, brik, surimi etc.).
- Legislation. Special health rules and official controls on fishery products. European legislative framework for the safety and quality of fish

LAB EXERCISES

1. Meat-Poultry

- Slaughter and operation of slaughterhouses
- Elements of anatomical and comparative anatomy of animals
- Cutting up animal carcasses
- Categorization and quality grading of carcasses
- Measurement of active acidity (pH) and total acidity of meat and its products- Freshness test – Measurement of water activity
- Differentiation between frozen and fresh meat – Meat tenderness measurement
- Color measurement of meat and its products
- Meat packaging
- Oxidative rancidity – Determination of thiobarbituric acid number
- Moisture determination
- Water holding capacity and water loss during cooking
- Defects in meat products
- Determination of starch in meat products
- Determination of nitrite content of meat preparations
- Determination of sodium chloride content of meat products
- Hygiene – Meat safety and implementation of the HACCP system in the meat industry

2. Fish

- Sampling.
- Systematic ranking. Anatomy of fish, molluscs, molluscs. Performance data.
- Chemical composition of the catch. Specific pathogenic flora of fresh fishery products.



- Biochemical and biological functions and quality of fresh catches (organoleptic control,
- Biochemical spoilage indicators, physical methods, bacteriological methods, safety and hygiene).
- The role of the various components of the catch in determining the quality and possibility for processing (fat, proteins, carbohydrates, pigments in catches, minerals, vitamins, nitrogenous components).
- Handling of fresh catch (maintaining the quality of fresh catch in relation to the species, fishing season and area, spoilage, causes of spoilage, manipulations on the fishing vessel, hygiene of fishing vessels and containers and hazard critical point assessment (HACCP)).
- Preservation of catches by various treatments (drying, salting, smoking) (salting of catch, water content and storability, water activity and microbial spoilage, smoking of catch, basic components of tobacco).
- Laboratory control of quality characteristics and hygiene and safety parameters of fresh, frozen and processed fishery products

TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD.	Face to face lectures in the auditorium/classroom and face to face laboratory exercises in an appropriate laboratory.																
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	• Use of I.C.T. in Teaching, in Laboratory Education, in Communication with the students • Use of ICT in Teaching • Use of ICT in Laboratory Education (Usage software for statistical control of the quality of food) • Use of ICT in Communication with students The course material (theory and exercises) is posted in the e-class of the DFSN of UT. Communication with the students is done through announcements on the e- class. From this platform, students can communicate by email with the teacher.																
TEACHING STRUCTURE	<table><tr><th>Activity Semester</th><th>Workload</th></tr><tr><td>Lectures</td><td>39</td></tr><tr><td>Lab exercises</td><td>39</td></tr><tr><td>Study and analysis bibliography</td><td>10</td></tr><tr><td>Writing assignment/assignments</td><td>12</td></tr><tr><td>Independent study</td><td>25</td></tr><tr><td>Course Total: (25 hours of workload per credit unit)</td><td>125</td></tr></table>	Activity Semester	Workload	Lectures	39	Lab exercises	39	Study and analysis bibliography	10	Writing assignment/assignments	12	Independent study	25	Course Total: (25 hours of workload per credit unit)	125		
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EVALUATION OF STUDENTS	1. Written exam (70 %): - Multiple choice questions (Formative, conclusion) - Short development questions (Formative, conclusion) - Extended development questions (Formative, conclusion) - Problem Solving (Formative, Deductive) 2. Lab grade (30%): - Short answer questions - Development questions - Solving problems (exercises) - Evaluation of laboratory reports - assignments																

BIBLIOGRAPHY



- *Suggested Bibliography:*

- TECHNOLOGY OF MEAT AND ITS PRODUCTS, SPYRIDON V. RAMANTANIS, 3rd Edition, 2020, Publishers: Christina and Vasiliki Kordali OE
- Meat technology, Bloukas Ioannis G., 1st Edition, 2017, UNIBOOKS IKE Publications
- TO KREAS AND ITS PRODUCTS, S.A. GEORGAKIS (collective work), 1st Edition, 2005, Publishers: Christina and Vassiliki Kordali O.E.
- FOOD TECHNOLOGY OF ANIMAL ORIGIN, S.A. GEORGAKIS, K.P. VARELTZIS, I.A. AMBROSIADIS, 2nd Edition, 2002, Publishers: Christina and Vasiliki Kordali O.E.
- Karaioannoglou, P. (2015) Hygiene of Mammalian Meat. Second Edition. Kyriakidis Brothers Publications, Thessaloniki.
- Science and Technology of Fishery Products, Lougovois Vladimiro, 1st Edition, 2023, Publishers: A. TZIOLA & SONS SA.
- Technology and quality control of fish, PAPAGIANNI MARIA, 1st Edition, 2022, Publishers: AFOI KYRIAKIDI PUBLISHERS S.A.
- QUALITY CONTROL AND FISH TECHNOLOGY, K.P. VARELTZIS, Edition 1st, 1999, Publications: Christina and Vasiliki Kordali O.E.
- Technology and quality control of fish - Volume I, Papanastasiou Dimitrios P., 1st Edition, 1990, Publications: STELLA PARIKOU & SIA OE

- *Related bibliography::*

- Meat Science
- Handbook of Meat and Meat Processing, Second Edition, Y. H. Hui, CRC press, 2012. [ISBN 9781439836835]
- Handbook of Poultry Science and Technology, Secondary Processing, Isabel Guerrero-Legarreta, Y. Hui, Alma
- Delia Alarcón-Rojo, Wiley, 2010 [ISBN: 978-0-470-18553-7]
- Nollet, L.M.L. and Toldrà, F. (editors) (2009). Handbook of Processed Meats and Poultry Analysis. CRC Press New York. [ISBN 9781420045314]
- Lawrie, R.A. and Ledward, D.A. (2006). Lawrie's Meat Science, 7th Edition. Woodhead Publishing Limited, Cambridge, UK. [ISBN: 1-84569-159-8]
- Varnam A. και Sutherland J. (2001). Κρέας και Προϊόντα κρέατος. Εκδόσεις Ίων, Αθήνα. [Varnam A. and Sutherland J. (2001). Meat and Meat Products. Publications Ion, Athens] [ISBN: 960-405-40-8]
- Lawless, H.T. and Heymann, H. (1999). Sensory Evaluation in Food. Principles and Practices. Springer, USA. [ISBN 0-8342-1752-X]
- Pearson, A.M. and Gillett, T.A. (1996). Processed meat. 3rd Edition. Chapman & Hall, New York, USA. [ISBN: 0-412-06441-3]
- Boziaris, I.S. (editor) (2014). Novel Food Preservation and Microbial Assessment Techniques. Taylor & Francis, CRC Press [ISBN 9781466580756]
- Boziaris, I. S. (editor) (2013). Seafood Processing: Technology, Quality and Safety. FST Advances in Food Science Series Wiley- Blackwell [ISBN: 978-1-118-34620-4]
- Bremmer, H. A. (editor) (2002). Safety and quality issues in fish processing. Woodhead publishing, [ISBN: 978-1855735521]
- Kestin, S.C. & Warriss, P.D. (2001). Farmed Fish Quality. Oxford: Blackwell Science. [ISBN: 978- 0852382608]