



**TECHNOLOGY AND QUALITY
CONTROL OF MILK AND ITS
PRODUCTS
COURSE OUTLINE**

GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
DEPARTMENT	FOOD SCIENCE AND NUTRITION		
COURSE LEVEL	<i>Undergraduate</i>		
COURSE CODE	ME711	SEMESTER	7 th
COURSE TITLE	TECHNOLOGY AND QUALITY CONTROL OF MILK AND ITS PRODUCTS RESPONSIBLE: M. KAKAGIANNI		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	ECTS
	Lectures	3	6
	Lab Lectures-exercises	3	
COURSE TYPE <i>Background, General Knowledge, Scientific Area, Skill Development</i>	<i>Scientific Area, special background</i>		
PREREQUISITES:			
LANGUAGE OF TEACHING AND EXAMINATIONS:	GREEK		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES		
URL	https://eclass.uth.gr/poiotikos-elegxos-galatos/		

TEACHING RESULTS

Teaching Results
<p>TECHNOLOGY AND QUALITY CONTROL OF MILK AND ITS PRODUCTS is a core subject of specialist and scientific background on the biosynthesis and secretion of milk, composition, physicochemicals characteristic nutritional and microbiological characteristics, adulteration, quality management, of hygiene and safety of milk and its products, factors affecting the composition and the physicochemical characteristics of milk, microbiology of raw milk, growth micro-organisms, fermentations and mechanism of milk spoilage, hygiene of production, preservation and transportation of raw milk, technology, hygiene and quality control of pasteurized milk, of sterilized, condensed, powdered and chocolate milk, technology, hygiene and quality control of cheese, yogurt, cream, butter and ice cream, enzymes and microbial cultures used in the production of milk products, effect of processing methods in the composition and physicochemical characteristics of milk, its sampling milk and its products, hygiene of milk processing units, unit equipment milk processing, specifications, cleaning and disinfection, automation of processing units milk, utilization of by-products of milk processing units. Upon successful completion of the course, students should:</p> <ul style="list-style-type: none"> • understand the composition, the properties and the microbiology and health status of milk and its products, • have become familiar with the quality characteristics of raw milk and the controls to ensure it of its quality, • familiarize themselves with the technology and quality assurance of the main dairy products, know the basic categories of cheese,



- know the basic defects/diseases of milk products
- recognize and manage the factors that affect the quality of milk and its products,
- can make products of milk,
- know the methods of preservation and processing of milk and their effect on this,
- know the techniques and methods applied to control the quality of milk and dairy products both during production and during their storage,
- perform all laboratory quality checks performed on milk and products of

General Skills

- Application of knowledge in practice
- Search, analysis and synthesis of data and information, with use of necessary technologies
- Adaptation to new situations
- Decision making
- Work in an interdisciplinary environment
- Generation of new research ideas
- Exercise criticism and self-criticism
- Promotion of free, creative and inductive thinking

CONTENT

LECTURES

- Biosynthesis and secretion of milk
- Ingredients, physicochemical characteristics and nutritional value of milk.
- Effect of various factors (heating, cooling, homogenization, etc.) that affect the composition and the physicochemical characteristics of milk.
- Microbiology of raw milk. Growth of microorganisms, fermentations and mechanism of spoilage of milk.
- Hygiene of production, storage and transport of raw milk.
- Quality control of raw milk and relationship between quality of raw milk and products.
 - Technology, hygiene and quality control of pasteurized, sterilized, concentrated, powdered and chocolate milk.
 - Technology, hygiene and quality control of cheeses, yogurt, and other fermented products (sour milk, kefir), cream, butter, ice cream.
- Enzymes and microbial cultures used in the production of milk products.
- Effect of processing methods on the composition and physicochemical characteristics of milk.
- Shelf life of milk
 - Microbiology and spoilage of pasteurized milk and milk products. Unhealthy – unsuitable products.
 - Modern trends in milk technology
 - Cleaning and hygiene of milk processing facilities.
 - Equipment for milk processing units. Specifications, cleaning and disinfection.
 - Automation of milk processing units and modern trends in structure and organization
 - Utilization of by-products of milk processing units. Use of milk components in preparation of other foods.
 - Quality, safety assurance and critical control points, from raw material to final product, sampling of milk and its products and control methods at the various stages production and receipt of raw material, processing and finished products, quality characteristics, evaluation and standards of milk and milk products

LAB LECTURES-EXERCISES

1. Physicochemical characteristics of raw milk (pH, titratable acidity, indirect methods estimation of acidity, stability of raw milk, specific gravity).
2. Determination of main milk components (fat content, protein separation).
3. Checking the sanitary condition of raw milk (inhibitory factors, indirect and direct methods assessment of microbiological status, purity control).
4. Additional checks for the quality of raw milk (water adulteration control, detection of various types of milk in mixtures).
5. Familiarization of students with the basic equipment used by the milk industries (centrifugers, homogenizers, heat exchangers).
6. Problems of standardization and use of automated milk analyzer for the control of milk composition.
7. Control of the degree of heat treatment of milk (phosphatase, peroxidase) and special categories of microorganisms (heat-resistant, cold-tolerant).
8. Use of lactic acid cultures, production of fermented milk products (yoghurt), determination of yogurt acidity,



control of characteristic microorganisms of yogurt.

9. Mechanism of coagulation of milk with rennet and study of factors affecting coagulation ability and subtraction.

10. Organoleptic control of cheeses, determination of fat content and determination of acidity in cheese.

11. Ice cream preparation and quality control.

12. Determination of milk contaminants: detection of aflatoxin M1, antimicrobial agents.

13. Monitoring in a cheese factory, as part of an educational visit, the manufacturing process of traditional Greek cheeses (Feta, Graviera, whey cheeses) and pH measurements during during cheese making

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	<ul style="list-style-type: none"> • 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 <p>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.</p>		
TEACHING STRUCTURE	Activity Semester	Workload	
	Lectures	39	
	Lab Lectures	39	
	Elaboration of a study (project)	45	
	Independent Study	27	
	Course Total: (25 hours of workload per credit unit)	150	
EVALUATION OF STUDENTS	<p>1. Written exam (70 %):</p> <ul style="list-style-type: none"> - Multiple choice questions (Formative, conclusion) - Short development questions (Formative, conclusion) - Questions of crisis and development (Formative, conclusion) - Extended development questions (Formative, conclusion) <p>2. Lab grade (30%):</p> <ul style="list-style-type: none"> - Multiple choice questions - Short answer questions - Evaluation of laboratory work 		



BIBLIOGRAPHY

-Suggested Bibliography:

- Hygiene and technology of milk and its products, MANTIS I. ANTONIOS, PAPAGEORGIU K. DIMITRIOS, FLETOURIS I. DIMITRIOS, ANGELIDIS S. APOSTOLOS, 2nd Edition, 2018, Publications: AFOI KYRIAKIDI EDITIONS S.A.
- Technology of Dairy Products - Cheesemaking, Zerfyridis G. 2001, Yahoudis Publications
- Science and Technology of Milk and Dairy Products, Kehagias Chr., Tsakali Efstathia, 2nd Edition 2020, Publications: NEW TECHNOLOGIES Publications PRIVATE CAPITAL COMPANY
- Laboratory examination of milk and dairy products, MANTIS ANTONIOS, PAPAGEORGIU DIMITRIOS, FLETOURIS DIMITRIOS, 2nd Edition, 2015, AFOI KYRIAKIDI EDITIONS S.A.
- Science and Technology of Milk and Dairy Products, Walstra, Pieter Walstra, Jan T. M. Wouters, Tom J. Geurts, 1st Edition, 2023, BROKEN HILL PUBLISHERS LTD
- Zerfyridis G. (2001), "Milk products technology - Fermented products, ice cream, cream, butter", Ed. Yahoudi – Yapouli
- Cheesemaking, Anifantakis Emmanuel M., 2004, STAMOULI Publications
- Milk, Science, Technology and Quality Assurance Controls, Kehagias Chr. Edition 1, 2011, Publishers: MARIA PARIKOU & SIA EPE
 - Kaminaridis S., Moatsou G. (2009), "Dairy", Ed. EMBRYO - STYLIANOS VASSILIADIS
 - Bintsis, Th. and Papadimas F. (2009), "Cheese - milk technology - cheesemaking - presentation of cheeses", Ed. Cool guy.
- Milk and Milk Products, Varnam Alan H., Sutherland Jane P., 1st Edition, 2008, Publishers: STELLA PARIKOU & SIA OE
- Kehagias X. and Koulouris S. (2005), "Elements of Technology and milk quality controls and of dairy products" Ed. ION

-Related bibliography:

- Anil Kumar Puniya (2015). Fermented Milk and Dairy Products. 1st Edition, CRC Press [ISBN 9781466577978]
- Britz T.J. and Robinson R. K. (2008), "Advanced dairy science and technology", Blackwell Pub. Professional. [ISBN: 978-1-4051-3618-1]
- Mattila-Sandholm T and Saarela M. (2007), "Functional Dairy Products", Vol.2., CRC Press; Cambridge, England. [ISBN-13: 9781845693107]
- Tamime A.Y. and Robinson R.K. (2007), "Tamime and Robinson's yoghurt: science and technology", Elsevier Science. [ISBN: 9781845692612]
- Dairy science and Technology, P. Walstra, J.T.M. Wouters, T.J. Geurts, 2nd Edition, 2005, CRC Press Taylor & Francis Group [ISBN 9780824727635]
- Cheese chemistry, Physics and microbiology, Vol1&2, Edited by P.F. Fox, P.L.H. McSweeney, T.M. Cogan and T. P. Guinee, 3rd Edition, 2004, Elsevier academic press [ISBN: 9780080500935]
- Varnam A. H. and Sutherland J.P. (2001), "Milk and milk products: technology, chemistry and microbiology", Springer US. [ISBN: 978-0-8342-1955-7]
- Horwitz W. (2000), "Official methods of analysis of AOAC International", 17th edition, Vol. II, Association Of Analytical Communities International. [ISBN-10: 0935584781]
- International Dairy Journal
- Journal of Dairy Science
- International Journal of Dairy Technology