COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Food and Nutritional Sciences		
ACADEMIC UNIT	FOOD SCIENCE AND HUMAN NUTRITION		
LEVEL OF STUDIES	INTEGRATED MASTER		
COURSE CODE	**350**	**SEMESTER**	**5**
COURSE TITLE	**DAIRY SCIENCE**		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures (Theory) and Practical Lessons (Laboratory Exercises)	3L+2P	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialised general knowledge
PREREQUISITE COURSES:	Food Chemistry [3390] General Microbiology [1280]
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://mediasrv.aua.gr/eclass/courses/ETDA189/
INSTRUCTORS Lectures & Laboratory Exercises	**LECTURES** Golfo Moatsou, Professor **LABORATORY EXERCISES** Evangelia Zoidou, Teaching Assistant Golfo Moatsou, Professor Anastasios Aktypis, Lecturer Theodoros Paschos, Technical staff Dimitra Kytinou, Technical staff

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The lesson [350] is a basic prerequisite for the lessons Dairy Technology I [1620] and Dairy Technology II – Cheese Science [3401].

The aim of the lesson [350] is to provide current scientific knowledge about the components, the properties and the complex interactions that occur in milk.

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

- be aware of the composition, structure, microbiota and physical properties of raw milk, the effect of the typical processing on them.

- be aware of the analytical methodology for the evaluation of the quality of raw milk utilized as a raw material for the food manufacturing sector.
- have acquired critical thinking skills needed to solve problems related to raw milk either as biological or as raw material for the food industry.

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

- *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*
- *Handling analytical equipment*
- *Respect for the natural environment*

(3) SYLLABUS

LECTURES

- Composition, structure and variability of milk. Production and exploitation of milk.
- Biosynthesis and secretion of milk.
- Fat and structure of fat globule.
- Proteins. Structure and destabilization of casein micelles
- Lactose, physicochemical properties of particular importance for the Dairy
- Salts. Distribution in various phases of milk and equillibria changes.
- Minor lipids, vitamins, enzymes
- Microorganisms of raw milk. Sources of contamination.
- Growth and metabolic activity of microorganisms in milk. Mastitis / antibiotics.
- Properties of milk: organoleptic characteristics, acidity and buffering capacity, density and specific gravity, redox potential.
- Factors affecting milk yield and composition: genetic, physiological and environmental.
- Measures to improve the quality of raw milk. Adulteration of milk. Storage of raw milk.
- Effect of processing on the characteristics of raw milk.
- Small ruminants' milk.

LABORATORY EXERSICES

- Introduction. Legislation, regulations, sampling and treatment of raw milk samples. Organization of analysis scheme for raw milk before processing.
- Milk composition -I (fat and moisture, reference methods)
- Milk composition -II (ash and chloride, reference methods)
- Milk composition -III (lactose, reference method)
- Milk composition -IV (total protein, casein, serum proteins, reference methods)
- Physical properties of milk I (pH and titratable acidity)
- Physical properties of milk II (density and freezing point)
- Microbiological quality of raw milk I (total mesophilic counts and coliforms, reference methods)
- Microbiological quality of raw milk II (routine methods)
- Detection of mastitis and somatic cells counts.

- Detection of antibiotics
- Automated (routine methods) for raw milk analysis
- Problem solving

(4) 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*	Power point and blackboard presentations. Asynchronously by means of the platform e-class. Distance learning by means of MS Teams platform. Videos.
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*	
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.*	THEORY: Written final exam in Greek (100%) on the content of the Lectures that combines short-answer questions, open-ended questions, multiple choice questionnaires. LABORATORY: Written final exam in Greek (70%) and written reports (30%). The exam questions are derived from the textbook offered to the students, the material posted on e-class by the Instructor and the teaching procedure.

Activity	***Semester workload***
13 weekly lectures (3 h/ lecture + personal study)	39
Laboratory exercises on milk analysis in small groups of students	25
Personal study	42
Written reports on laboratory exercises	16
Exams	3
Course total	**125**

(5) ATTACHED BIBLIOGRAPHY

Selections of textbooks that are available through the online service "EVDOXOS"

- *Kaminarides S. and Moatsou G. [Dairy Science], Embryo Publications, Athens 2009. In Greek.*

Other suggestions

- Walstra, P., Wouters, J.T.M. & Geurts, T. J., Dairy Science and Technology. CRC- Taylor & Francis. 2006.
- Park Y.W.& Haenlein G.F.W., Milk and Dairy Products in Human Nutrition. Wiley-Blackwell, UK, 2013.

Scientific Journals

- *Journal of Dairy Science*
- *Journal of Dairy Research*
- *International Dairy Journal*
- *International Journal of Dairy Technology*
- *Food Chemistry*
- *LWT*
- *Foods*
- *Dairy*