FOOD ENGINEERING
COURSE OUTLINE

GENERAL

SCHOOL	AGRICULTURAL SCIENCES
DEPARTMENT	FOOD SCIENCE AND NUTRITION
EDUCATION LEVEL	*Undergraduate*
COURSE CODE	**MK514** **SEMESTER** E´
COURSE TITLE	FOOD ENGINEERING RESPONSIBLE: I. Giovanoudis

SELF-ENDED TEACHING ACTIVITIES *in case the credits are awarded in separate parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniquely for the entire course, enter the weekly teaching hours and total credits*	WEEKLY TEACHING HOURS	CREDIT UNITS (ECTS)
Lectures	3	6
Laboratory / Application Exercises	3	

COURSE TYPE ***Background, General Knowledge, Scientific Area, Development Skills***	Scientific Area of Food Engineering
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning Outcomes

The aim of the course is for students to acquire basic engineering knowledge in order to have the knowledge and resources to determine basic physicochemical characteristics as well as quantitative elements in food processing processes. The course is implemented in lectures (10), tutorials (3) and laboratory (6) exercises around the fields:

- Physicochemical properties of foods
- Heat transfer phenomena during food processing
- Calculation of heat and mass transfer coefficients, diffusion coefficients
- Mass and energy balances in food processes
- Interpretation of changes in physicochemical characteristics of foods during and after food processing
- Selection of food processing parameters

After completing the course, students will gain knowledge to solve problems related to basic food processes: pasteurization, sterilization, freezing, drying, condensation and their effect on basic food properties. In addition, students will be able to analyze and design processing processes as well as relate process parameters to food properties, quality, physicochemical and organoleptic characteristics.

General Skills

- Data search, analysis and synthesis
- Promotion of critical thinking
- Promotion of teamwork

COURSE CONTENT

1st Week: Introduction to Food Engineering
2nd Week: Thermophysical properties of foods
3rd Week-Tutorial (students may have a personal computer with them)

Use of PC (excel) to process primary experimental data
4th Week-Tutorial (students may have a personal computer with them)
Use of PC (excel) for the mathematical description of experimental data and the development of
mathematical models in food processes
5th Week: Heat transfer phenomena: Heating and cooling food
6th Week: Drying processes
7th Week: Food thermal processes: Boiling, pasteurization, sterilization
8th Week: Freezing food
9th Week: Equilibrium and Diffusion Processes
10th Week: Mechanical separations
Week 11: Challenges and New Trends in Food Engineering
12th Week-Tutorial exercises: Solving exercises using a computer
13th Week: Review and solve exercises

Laboratory exercises
#1: Water Sorption Isotherms in Foods: Curve Construction and Mathematical Modeling
#2: Heat Exchangers: A Study of Design Parameters for Pasteurization Processes
#3: Kinetic study of air drying
#4: Study of rheological characteristics in foods
#5: Kinetic study of osmotic dehydration
#6: Mass balances in condensation processes

TEACHING and LEARNING METHODS - EVALUATION

TEACHING METHOD	Face-to-face lectures in a classroom and Laboratory / Application Exercises in suitable Laboratory/ Classroom.
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	Solution of tutorial exercises using PC Computer use during lectures

TEACHING ORGANISATION	Activity	Semester's Workload
	Lectures	39
	Tutorial exercises	9
	Laboratory exercises	30
	Study	20
	Processing results of laboratory exercises and writing a report	30
	Preparation for written exam	22
	Total (25 workload hours per Credit unit)	*150*

STUDENT EVALUATION	**1. Written exam (70 to 100 %):** - Multiple choice and TRUE/FALSE questions - Questions of crisis and short development - Solving computational problems **2. Lab grade (0 to 30%):** - Participation and performance during the laboratory exercise - Written report of laboratory results - Oral examination on written reports *A prerequisite for the final written exam is the successful attendance of the laboratory part of the course. For the recognition of the course, students must secure a passable grade in both individual scores.*

RECOMMENDED BIBLIOGRAPHY

- **- Suggested Bibliography:**
- Introduction to Food Engineering, R. Paul Singh, Dennis R. Heldman
- FOOD ENGINEERING, GOULA ATHANASIA, LAZARIDIS CHARALAMPOS
- Basic Chemical Engineering Processes, 7th Edition, McCabe-Smith-Harriott
- Fundamentals of Food Process Engineering, Food Science Text Series. Edited by R. T. Toledo, R. K. Singh and F. Kong
- Handbook of Food Processing Equipment (Food Engineering Series) 2nd ed. 2016 Edition, by George Saravacos, Athanasios E. Kostaropoulos
- Food Engineering Handbook, Food Engineering Fundamentals, Edited By Theodoros Varzakas, Constantina Tzia
- **- Related scientific journals:**
- Journal of Food Engineering, Official scientific journal of the International Society of Food Engineering
- Journal of Food Process Engineering
- Food Engineering Reviews