COURSE OUTLINE

(1) GENERAL

SCHOOL	FOOD AND NUTRITIONAL SCIENCES		
ACADEMIC UNIT	FOOD SCIENCE AND HUMAN NUTRITION		
LEVEL OF STUDIES	BACHELOR OF SCIENCE		
COURSE CODE	**265**	**SEMESTER**	**6th**
COURSE TITLE	COMPUTER APPLICATIONS IN FOOD PROCESSING		
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 and computational practical's	3	3	
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*	Field of Science		
PREREQUISITE COURSES:	Mathematics, Computer Programming, Food Engineering, Unit Operations in Food Engineering, Food Preservation		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://w1.aua.gr/etda/en/courses/computer-applications-in-food-processing/		

(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 course introduces the principles and methodologies for modeling and optimizing food related processes through computational tools. The course material includes Introduction to modeling of food processes. Nonlinear algebraic equations. Systems of linear and non-linear algebraic equations. Simple and multiple linear and nonlinear regression. Systems of ordinary differential

equations - Initial Value Problems. Numerical integration. Introduction to optimization. Linear programming. Applications through EXCEL and MATLAB.
Upon successful completion of this course the student will become familiar with the use of mathematical equations to describe the basic phenomena observed in food processes. He will learn the basic numerical methods for solving various mathematical problems, and the use of the EXCEL and MATLAB software for modeling and optimization in food processing.

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
Teamwork
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…

Computational work
Analyze and synthesize data and information
Work autonomously

(3) SYLLABUS

1. Course Structure/Requirements. Introduction to **modeling** in food processing. Basic concepts in using EXCEL.
2. **EXCEL:** Learning basic commands, functions and graphs.
3. Solving food engineering and food biotechnology problems, expressed through **non - linear algebraic equations** or systems of nonlinear algebraic equations.
4. Numerical methods of "Successive substitutions", "Bisection", "Newton-Raphson" for solving **nonlinear algebraic equations**.
5. Curve fitting of experimental data (**regression analysis**, least squares method). Examples using EXCEL and MATLAB.
6. **Analytical solution** for temperature profile calculation for products heating by conduction. Calculation of the temperature at the geometric center of a slab using the EXCEL. Comparison with literature values from charts.
7. **Numerical integration**. Calculation of the F value of a thermal process using EXCEL.
8. Introduction to **process optimization**. Basic definitions of optimization problems.
9. **Simple and multiple, linear and nonlinear regression analysis**. Determination of parameter by of least squares method using EXCEL. Procedure "SOLVER". Simultaneous determination of D and z values by nonlinear regression analysis.
10. **Linear programming** problem solving.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Teaching in a computer laboratory (power point presentation and blackboard writing for theory).
On hands practice with EXCEL and MATLAB.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td></td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>39</td></tr>
<tr><td>Weekly homework</td><td>26</td></tr>
<tr><td>Autonomous study</td><td>10</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>75</td></tr>
</table>
</td></tr>
<tr><td>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.</td><td>I. Final examination (50% of the final course grade). Solving problems using EXCEL and MATLAB.

II. Weekly (computational) homework (50%)</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. Cleve B. Moler, Αριθμητικές Μέθοδοι Με Το MATLAB (Μετάφραση), Εκδόσεις Κλειδάριθμος Επε, Αθήνα, 2010.
2. Μουσας Βασίλειος Χ., Βασική Χρήση Και Προγραμματισμός MATLAB 7 (Περιέχει Cd), Εκδόσεις Ιων Στέλλα Παρικου & Σια Οε, Περιστέρι, 2009
3. Paul Cornell, Ανάλυση Δεδομένων Με Το Microsoft Excel (Μετάφραση), Εκδόσεις Κλειδάριθμος Επε, Αθήνα, 2004.

- Related academic journals:

1. Journal of Food Engineering (Elsevier)