COURSE OUTLINE

1. GENERAL

SCHOOL	AGRICULTURAL SCIENCE		
DEPARTMENT	FOOD SCIENCE AND TECNOLOGY		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	FST_E03	**SEMESTER OF STUDIES**	6 or 8
COURSE TITLE	STATISTIAL CONTROL OF PRODUCTION PROCESSES		

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**	**ECTS CREDITS**
Lectures, seminars	4	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*	Specialized general knowledge
PREREQUISITE COURSES:	Typically, there are not prerequisite course. Essentially, the students should possess knowledge provided through the previously taught courses “Mathematics” and “Statistics”.
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBPAGE (URL)	

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*

This course builds on the knowledge and skills acquired in the course “Statistics” and contribute to the acquisition of advanced and highly specialized knowledge in the scientific field of Statistics. It aims at presenting and understanding by students the concepts of dependence, correlation, design and analysis of experiments and time series analysis as well as their application to real data.

By the end of this course the student will be able to:

- understand the concepts of dependence, correlation, design and analysis of experiments and time series analysis
- apply the former concepts to real problems from the field of food and agricultural sciences, but also from their everyday life

- know in-depth the basic theoretical knowledge about the subject
- use knowledge and understanding acquired in a manner that indicates a professional approach to their work or profession
- have competences typically demonstrated by developing and supporting arguments and solving problems within their field of knowledge
- communicate information, ideas, problems and solutions to both specialist and non-specialist public
- develop knowledge acquisition skills needed to continue to post graduate studies with a high degree of autonomy
- gather and interpret relevant data (in their knowledge field) to form judgments that include reflection on relevant scientific issues

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	*Search for, analysis and synthesis of data and information, with the use of the necessary technology*
Adapting to new situations	*Adapting to new situations*
Decision-making	*Decision-making*
Working independently	*Working independently*
Team work	*Team work*
Working in an international environment	*Working in an international environment*
Working in an interdisciplinary environment	*Working in an interdisciplinary environment*
Production of new research ideas	*Production of new research ideas*

By the end of this course the student will, furthermore, have developed the following skills (general abilities):

- Searching, analysis and synthesis of facts and information, as well as using the necessary technologies
- Adaptation to new situations
- Decision making
- Autonomous (Independent) work
- Promotion of free, creative and inductive thinking

3. SYLLABUS

This course builds on the knowledge and skills acquired in the course "Statistics" and contribute to the acquisition of advanced and highly specialized knowledge in the scientific field of Statistics.

1. Correlation and Regression: the fundamental difference between correlation and regression, scatter diagram for investigating the relation between two variables, the Pearson's and Spearman's correlation coefficients for measuring linear and monotonic relation respectively and their interpretations, simple linear regression and model specification, interpretation of the regression coefficient, point estimation of the parameters using the method of Ordinary Least Squares (OLS), the standard errors of the estimators, the elasticity of the dependent variable with respect to the explanatory variable, the classical assumptions for "best" estimators using OLS, interval estimation and hypotheses testing, Analysis of Variance for the fit of the model, the coefficient of determination, point and interval estimation and prediction of the individual and mean value of the dependent variable for a given value of the independent variable, diagnostic checking for departures from the classical assumptions using graphical methods.
2. Design & Analysis of Experiments: the principles of experimentation (experimental units and error, repetition, randomization, blocking and experimental design), the Analysis of Variance and multiple comparisons of means (with the Bonferroni procedure and Tukey's HSD method) for the completely randomized design, the randomized complete block design, the latin square design, the factorial design, the factorial design in randomized blocks and the split-plot design.
3. Time Series Analysis: the components of the series (trend, seasonality, cycle and irregularities) and the multiplicative model, estimation of the components of the series, seasonal indices, forecasting with the method of Exponential Smoothing.

4. TEACHING AND LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Use of Information and Communication Technologies (ICTs) (e.g. powerpoint) in teaching. Communication with students: through e-mail, department's website and platform e-class. The lectures content of the course for each chapter are uploaded on the internet, in the form of a series of .pdf files, where students can freely download them from the platform e-class.upatras.gr Software that supports statistical processing of data.
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.*	Written examination after the end of the semester (100%) including: • Multiple-choice questions • Solving correlation and regression problems • Solving design & analysis of experiments problems • Solving time series analysis problems • Benchmarking theory elements Grading scale: 1 to 10. Minimum passing grade: 5. Examination time: 3 hours.

Activities	***Work Load per semester***
Lectures (3 hours per week x 13 weeks)	39
Seminars (1 hour per week x 13 weeks)	13
Final examination (3 hours)	3
Non-guided study	70
Total number of hours for the Course (25 hours of work-load per ECTS credit)	**125**

4. ATTACHED BIBLIOGRAPHY

1. Statistics for Management and Economics, Gerald Keller, Hardcover: 992 pages, Publisher: South-Western College Pub, 10th edition (Jan. 1 2014), Language: English, ISBN-10: 1285425456.
2. Analyzing Compositional Data with R, van den Boogaart, K. Gerald, Tolosana-Delgado, Raimon, Publisher: Springer-Verlag Berlin Heidelberg, 1st Edition, 2013, ISBN: 978-3-642-36808-0.
3. Statistics for Business and Financial Economics, Lee, Cheng-Few, Lee, John C., Lee, Alice C., Pubisher: Springer-Verlag New York, 3rd Edition, 2013, ISBN: 978-1-4614-5896-8.
4. Introduction to Statistics: Fundamental Concepts and Procedures of Data Analysis, Howard M.

Reid, Paperback: 632 pages, Publisher: SAGE Publications, Inc; 1 edition (August 28, 2013), Language: English, ISBN-10: 1452271968.
5. Introduction to Statistics and Data Analysis, Heumann, Christian, Schomaker, Michael, Shalabh, Publisher: Springer International Publishing, 1st Edition, ISBN: 978-3-319-46160-1.
6. Introduction to Statistics, Carmine DeSanto, Richard Moscatelli, Rachel Rojas, Mike Totoro, Paperback: 872 pages, Publisher: Pearson Learning Solutions; 10 edition (January 25, 2015), Language: English, ISBN-10: 1323056300.