MODULE OUTLINE

1. GENERAL INFORMATION

SCHOOL	SCHOOL OF SCIENCE AND TECHNOLOGY		
PROGRAM COURSE	Quality Management and Technology		
LEVEL OF STUDY	POSTGRADUATE		
MODULE CODE	DIP60	**YEAR OF STUDY**	2nd
MODULE TITLE	Advanced Tools and Methods for Quality Control		
INDEPENDENT TEACHING ACTIVITIES *in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits*		**WEEKLY HOURS**	**CREDIS**
Weekly teaching hours 18-19 * 30 weeks		560	20 ECTS
COURSE TYPE Compulsory, Optional, Optional mandatory	Compulsory		
PREREQUISITE MODULES:	DIP50		
LANGUAGE OF INSTRUCTION AND EXAMS	GREEK		
THE MODULE IS OFFERED TO ERASMUS STUDENTS	No (due to annual duration of the module)		
MODULE WEBSITE (URL)	https://www.eap.gr/en/quality-management-and-technology/topics/#d60 Each module has its own space in the Learning Management System of EAP (http://study.eap.gr), with controlled access (use of code) for students and teaching staff.		

2. LEARNING OUTCOMES

Learning Outcomes

- *The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:*

After completing this module, students are expected to be able to:

- distinguish between random (common or usual) and non-random (special) causes of variability in a production process.
- to understand how Statistical Process Control can be used in order to monitor and control a production process, with the ultimate goal of improving its performance.
- apply quality control tools (such as control charts for variables and properties and/or capability indicators) in a production process,

aiming to achieve optimal performance (minimization of variability, stability of mean level).

- understand and apply the six-sigma standard in order to strive for continuous process improvement.
- identify experiments with one factor or with multiple factors, as well as experiments grouped by context variables.
- use full or fractional factorial experiments to analyze experiments containing factors with two or three levels.
- apply Taguchi's loss function in order to produce products of the best possible quality.
- implement Taguchi's philosophy of off-line (out-of-process) quality control – selecting appropriate internal and external design tables in order to analyze quality-related measures

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,
Adapting to new situations
Decision-making
Individual/Independent work
Group/Team work
Working in an international environment
Working in an interdisciplinary environment
Introduction of innovative research
Project planning and management
Respect for diversity and multiculturalism
Environmental awareness
Social, professional and ethical responsibility and sensitivity to gender issues
Critical thinking
Development of free, creative and inductive thinking ……
(Other…….citizenship, spiritual freedom, social awareness, altruism etc.) …….

Adapting to new situations
Decision-making
Group/Team work
Working in an interdisciplinary environment
Environmental awareness
Critical thinking

3. MODULE CONTENT

The main objective of the module is for students to apply advanced statistical tools to real problems. Initially, students will learn the basic tools of Statistical Process Control, with special emphasis on control charts. In addition, experimental design is introduced and methodologies for analyzing one or more factors in randomized complete group and Latin square designs are studied. Finally, they are studied techniques for the out-of-order quality improvement of a process, giving particular importance to Taguchi methodologies. It should be noted that all of the above is implemented using an appropriate statistical package.

The key subjects of the module are Statistical Process Control Design and Analysis of Experiments Continuous Quality Improvement Processes and Techniques

4. TEACHING METHODS--ASSESSMENT

<table>
<tr><td>MODES OF DELIVERY
Face-to-face, in-class lecturing, distance teaching and distance learning etc.</td><td>Distance education with five Group Counseling Meetings (OSS) during the academic year on weekends.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY
Use of ICT in teaching, Laboratory Education, Communication with students</td><td>We use :
Remote meetings tools (cisco webex),
Presentation software (e.g. power point),
Specialized software in the subjects under study

Additionally, the students use office automation tools, web browsers and e-reader for digital books.</td></tr>
<tr><td>MODULE DESIGN
Description of teaching techniques, practices and methods: Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc

The study hours for each learning activity as well as the hours of selfdirected study are given following the principles of the ECTS.</td><td><table>
<tr><th>Activity</th><th>Annual Workload</th></tr>
<tr><td>5 OSS (* 4 hours)</td><td>20</td></tr>
<tr><td>Preparation of Assignments (5 assignments * 50 hours)</td><td>250</td></tr>
<tr><td>Examination</td><td>3</td></tr>
<tr><td>Individual study</td><td>287</td></tr>
<tr><td>Total module workload (hours)</td><td>560</td></tr>
</table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS
Detailed description of the evaluation procedures.</td><td>Elaboration of written assignments during the academic year, the average of the grades of which participates in the formation of the final grade of module by 30%, if there is a passable in the final or repetitive examinations. In the final written exams the</td></tr>
</table>

Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work, other……etc. *Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students*	grade of the written assignments participates in the formation of the final grade of module by 70%. All the criteria are posted, both in each written assignment (in the LMS http://study.eap.gr), as well as in the general regulation of HOU at: https://www.eap.gr/wp-content/uploads/2022/03/kanonismos-spoudwn-isxys-apo-to-didaktiko-etos-2022-2023.pdf

(6) SUGGESTED BIBLIOGRAPHY

- *Suggested bibliography:*

HOU Publications:

Volume A: *Statistical Process Control, HOU*, Patras 2002.

Volume A': *Special Issues on Statistical Process Control, HOU*, Patras 2008.

Volume B: *Design and Analysis of Experiments, HOU*, Patras 2002.

Volume B': *Στατιστικός Πειραματισμός: Σχεδιασμός και Ανάλυση, HOU*, Patras 2008.

Volume C: Continuous *Quality Improvement Processes and Techniques, HOU*, Patras 2001.

Volume C': *Taguchi's methods and methods for* Continuous *Quality Improvement Processes and Techniques, HOU*, Patras 2008.

-Related scientific Journals:

1) Journal of Applied Statistics
2) Quality Engineering
3) Quality Technology & Quantitative Management
4) Journal of Quality Technology
5) Quality and Reliability Engineering International
6) Communications in Statistics-Theory and Methods
7) Communications in Statistics-Simulation and Computation
8) Applied Stochastic Models in Business and Industry
9) International Journal of Production Research
10) Computers & Industrial Engineering