COURSE OUTLINE

1. GENERAL INFORMATION

SCHOOL	MARITIME AND INDUSTRIAL STUDIES		
DEPARTMENT	INDUSTRIAL MANAGEMENT AND TECHNOLOGY		
LEVEL OF STUDY	UNDERGRADUATE		
COURSE UNIT CODE	ΤΕΟΔΕ13	**SEMESTER OF STUDY**	8th
COURSE TITLE	COMPUTATIONAL METHODS / TOOLS IN INDUSTRIAL MANAGEMENT		

INDEPENDENT TEACHING ACTIVITIES *in case in which credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures and Project		5.5
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at section 4.		

COURSE TYPE *general background, special background, specialized general knowledge, skills development*	Special background
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATION/ASSESSMENT:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

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:

APPENDIX A

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

The course involves the study and practical training in Project Management, through the unified study of projects from their conception to their completion. It examines cognitive areas, methodologies, tools and approaches to Project Management. The stages of initial project evaluation and selection are presented at first, as well as the need to align projects with the business strategy. Then, the complete project management plan is presented step-by-step, including statutes, management plans of the physical object, time and cost, and risk management. Throughout the course, specialized techniques complementing the cognitive domains are presented, while the techniques are applied to indicative projects supported by appropriate software (MS Project). The course has a practical orientation as it studies real cases and is centrally located in the curriculum.

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

- Demonstrate knowledge on the necessary basic concepts, methodologies and techniques of modern project management so that they would have no problem when dealing with a project
- Understand the need to harmonize project management with the strategy, values and goals of an organization as well as the multidimensional impact that projects have on

the overall environment
- Be familiar with the most widely and globally accepted techniques and standards that facilitate project management and are the common international language of understanding on these issues
- Present the methodological framework for the selection, development, execution and monitoring of projects
- Demonstrate sufficient training in PM processes and be able to deepen in their study
- Demonstrate an incentive for professional PM certification

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 aims

Search for, analysis and synthesis of data and information, by the use of technologies that are necessary according the case
Adapting to new situations
Decision-making
Independent work
Team work
Working in an international environment
Working in an interdisciplinary environment
Introduction of innovative research
Project planning and management
Respect for difference and multiculturalism
Environmental awareness
Social, professional and ethical responsibility and sensitivity to gender issues
Critical consciousness, criticism and self-criticism
Development of free, creative and inductive thinking

- Search for, analysis and synthesis of data and information, by the use of technologies that are necessary according the case
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- Environmental awareness
- Social, professional and ethical responsibility and sensitivity to gender issues
- Critical consciousness, criticism and self-criticism
- Development of free, creative and inductive thinking

2. COURSE CONTENT

The course covers the following topics:

- Week 1: Introductory lecture, lesson objective - Programming language categories, compiler / interpreter differences, familiarity with the Python environment and the programming tool (IDE).
- Week 2: Code Flow Execution Mapping, Debugger - Input-Output Processing, Variable Types
- Week 3: Libraries and the Python virtual environment - Basic data structures (tables, lists)
- Week 4: Basic data structures (stack, queue), read / write from / to files - Special categories of Python data structures (data-frames, pandas)
- Week 5: Industrial case study 1 (Food Manufacture) using optimization tools, modeling, introduction to the Pyomo library - implementation, solution.
- Week 6: Industrial case study 2 (Production Planning) using optimization tools, modeling - analysis of computational method architecture, implementation, solution.
- Week 7: Industrial case study 3 (Manpower Planning) using optimization tools, modeling - analysis of computational architecture, implementation, solution.
- Week 8: Industrial case study 4 (Asset Management) using optimization tools, modeling - analysis of computational architecture, implementation, solution.
- Week 9: Industrial Case Study 2 (Production Planning) using optimization and simulation tools, introduction to the SimPy library - analysis of computational method architecture, implementation, solution.

- Week 10: Industrial case study 1 (Food Manufacture) using optimization tools and quality control charts, introduction to the matplotlib library - analysis of computational architecture, implementation, explanation.
- Week 11: Industrial case study 4 (Asset Management) using optimization and linear regression tools, introduction to the scikit-learn library - analysis of architectural computational method implementation, solution.

Students also participate in an individual project. Case studies in lectures are given in English and explained in Greek, while the terminology is also given in English. The work is given in Greek and if there is a need in English.
In addition, articles, audiovisual lecture materials, web addresses, useful information as well as exercises and / or software for the practice of students are posted in eclass.

3. TEACHING METHODS - ASSESSMENT

TEACHING MODE *Face-to-face, in-class lecturing, on distance teaching and distance learning etc.*	In-class lecturing
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in Teaching, Laboratory Education, Communication with students*	**Teaching:** Lectures with audiovisual media, support of the learning process through the eclass platform **Communication with students:** face-to-face at office hours, email, eclass
COURSE DESIGN *Description of teaching techniques, practices and methods:* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, clinical practice, Art Workshop, Interactive teaching, Educational visits, project, Essay writing, Artistic creativity, etc.* *The study hours for each learning activity as well as the hours of non- directed study are given according to the principles of the ECTS*	

Activity / Method	***Semester Workload***
Lectures	52
Mini projects	26
Self-study of lecture material and case studies	57
Counselling	0.5
Exams (written)	2
Course Total	***137.5***

STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS *Detailed description of the evaluation procedures:* *Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice questionnaires, short- answer questions, open-ended questions, problem solving, written work, Essay/report, oral exam, public presentation, laboratory work, art interpretation, other……etc* *Evaluation criteria are specifically defined and given as well as if and where they are reported and accessible to students.*	**Language of exams:** Greek **Assessment Methods:** The exam material of the course is announced in eclass after the last course of the semester. The final grade of the course is as follows: • 50% from the project. • 50% of the written exams in the spring semester exam period and, in case of failure, in the September re-examination period. The written examination includes mathematical modeling questions of a case study. In addition, the selection of appropriate tools for the synthesis of a computational method and the analysis of its architecture using simple diagrams are required. It is conducted with closed books. The evaluation of students with special learning difficulties in writing and reading (as certified and qualified by a competent institution) is performed according to the relevant procedure decided by the Department Assembly. **Notification of the Assessment Criteria:** The evaluation criteria are made known during the first lecture and are

	clearly stated on the course website and e-class. The answers to the exam questions are posted at eclass after the exam date. Students have the opportunity to discuss their exam paper with the course instructor (at the posted office hours) after the announcement of the course grades.

4. SUGGESTED BIBLIOGRAPHY

-Suggested Bibliography :

- Book: Model Building in Mathematical Programming, 5th Edition, H.P. Williams

-Scientific Journals: not applicable

-Lecture Notes