COURSE OUTLINE

(1) OVERVIEW

SCHOOL	MARITIME & INDUSTRY		
DEPARTMENT	INDUSTRIAL MANAGEMENT & TECHNOLOGY		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ΤΕΠΑΡ40	SEMESTER	5
COURSE TITLE	INDUSTRY 4.0		

DISCRETE TEACHING ACTIVITIES *In cases where ECTS credits are awarded to distinct components of the course (e.g., Lectures, Laboratory Exercises, etc.), please indicate them separately. If the credits are awarded as a whole for the entire course, please state the weekly teaching hours and the total number of credits*	WEEKLY TEACHING HOURS	ECTS
Lectures, Project	4	5.5
Please add additional rows if needed. A detailed description of the teaching organization and instructional methods is provided in Section (4).		

COURSE TYPE *core (C), core elective (CE), elective (E) - background, specialization, skill development*	E - Specialization
PREREQUISITE COURSES:	None.
LANGUAGE OF TEACHING AND EXAMINATIONS:	Greek (English for ERASMUS students)
THIS COURSE IS AVAILABLE TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	

(2) LEARNING OUTCOMES

Learning Outcomes

The learning outcomes of the course are described, specifying the particular knowledge, skills, and competencies at the appropriate level that students will acquire upon successful completion of the course.

Please refer to Appendix A

- *Description of the Level of Learning Outcomes for each study cycle according to the Qualifications Framework of the European Higher Education Area.*
- *Descriptive Indicators of Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B.*
- *Concise Guide for Writing Learning Outcomes*

The course introduces students to the ecosystem of the Fourth Industrial Revolution. In this context, it explores the significance of the digital transformation taking place across the industrial sector, along with the wide range of physical and digital technologies being utilized—such as cloud computing, augmented reality, additive manufacturing, and the Internet of Things (IoT).

Beyond introducing the implementation aspects of the Fourth Industrial Revolution, the course also examines maturity and readiness models that companies can use to assess their current level of digitalization. Additionally, it addresses how to construct an optimized project portfolio for digital transformation by evaluating various project alternatives.

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

- Demonstrate knowledge of the design principles of Industry 4.0
- Demonstrate understanding of the key enabling technologies of Industry 4.0 and how they are integrated into production processes
- Demonstrate the ability to evaluate a company's digital maturity and readiness status
- Demonstrate the ability to select an optimal project portfolio for digital transformation from a range of project alternatives

General Competences

Taking into account the general competences that a graduate should have acquired (as listed in the Diploma Supplement and outlined below), which of these competences does the course aim to develop?

Searching, analyzing, and synthesizing data and information, using the necessary technologies

Project design and management

Respect for diversity and multiculturalism

Adaptation to new situations *Decision making* *Autonomous work* *Teamwork* *Working in an international environment* *Working in an interdisciplinary environment* *Generation of new research ideas*	*Respect for the natural environment* *Demonstration of social, professional, and ethical responsibility and sensitivity to gender issues* *Exercising critical and self-critical thinking* *Promotion of free, creative, and inductive thinking* *…* *Other competences: …*

- Searching, analyzing, and synthesizing data and information, using the necessary technologies
- Adaptation to new situations
- Decision making
- Autonomous work
- Teamwork
- Working in an international environment
- Respect for diversity and multiculturalism
- Demonstration of social, professional, and ethical responsibility and sensitivity to gender issues
- Exercising critical and self-critical thinking
- Promotion of free, creative, and inductive thinking

(3) COURSE CONTENT

The course covers the following topics:

- Introduction to the 4th Industrial Revolution
- The Industrial Internet of Things
- Big Data and Industrial analytics
- Smart factories, Smart Products and Cyber Physical Systems
- Additive manufacturing, CAD, Robots, Cobots, Blockchain etc
- Robotic Process Automation
- Computer Simulation and "Digital Twins"
- Digital Transformation
- Maturity and readiness models for Industry 4.0 Stategy
- Project Portfolio Selection for the Digital Transformation Era
- Industry 4.0: Impacts on Diverse Sectors

Furthermore, articles, audiovisual lecture material, web links to useful resources, exercises, and software are uploaded in electronic format on the eClass platform.

(4) TEACHING and LEARNING METHODS - ASSESSMENT

TEACHING MODE *Face-to-face, in-class lecturing, distance teaching and distance learning etc.*	• Face-to-face in a classroom • Distance teaching & learning (if required)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in Teaching, Laboratory Education, Communication with students*	**Teaching**: Lectures using modern audiovisual equipment, learning support through the eClass electronic platform, synchronous distance teaching via MS Teams. **Laboratory**: open-access software for laboratory exercises **Communication with students**: face-to-face during office hours, email, eClass platform, MS Teams tools
Organization of Teaching *A detailed description of the teaching methods and approach is provided.* *Lectures, seminars, laboratory exercises, fieldwork, study and analysis of literature, tutorials, internships (placements), clinical practice, artistic workshops, interactive teaching, educational visits, project work, writing assignments, artistic creation, etc.* *The student's study hours for each learning activity, as well as the hours of independent study, are specified in accordance with the principles of ECTS*	

Activity	Semester Workload
Lectures	52
Project	26
Self-study of lecture material and exercises	57
Consultation Support	0.5
Exams (written)	2
Course Total	**137.5**

STUDENT ASSESSMENT *Description of the assessment process* *Language of assessment, assessment methods, formative or summative evaluation, multiple-choice tests, short-answer questions, essay questions, problem-solving, written assignments, reports, oral examinations, public presentations, laboratory work, clinical patient examination, artistic interpretation, other(s)* *Explicitly state assessment criteria and information on whether and where these criteria are accessible to students are included.*	**Language of Assessment**: Greek (English for ERASMUS students) **Assessment Mode**: Face-to-face and/or distance learning (if required) **Assessment Methods**: The final grade for the course is determined as follows: • The course is assessed by a written examination (100%) taken during the examination period of the winter semester and, in case of failure, during the September resit period. • A bonus of up to 30% on the passing grade is awarded if the student undertakes an optional assignment. The written examination includes short-answer and multiple choice questions. It is a closed-book exam **Students with Learning Difficulties**: Students with certified learning difficulties in reading and writing (as recognized by the competent authority) are assessed according to the procedures established by the Department. **Disclosure of Assessment Criteria**: The assessment criteria are communicated during the first class and are clearly stated on the course website and the eClass platform. The exam syllabus is announced on eClass following the final lecture of the semester. The exam answers are posted on eClass after the examinations take place. Students have the right to review their graded exams and receive explanations regarding their grades. In cases of further requests, the procedures outlined in the current Study Regulations apply.

(5) SUGGESTED BIBLIOGRAPHY

- Books:

- Ustundag, A., Cevikcan, E. (2018). Industry 4.0: Managing the Digital Transformation, HEAL-Link Springer ebooks, ISBN: 9783319578705 [91680862]
- Dastbaz, M., Cochrane, P. (2019). Industry 4.0 and Engineering for a Sustainable Future, HEAL-Link Springer ebooks, ISBN: 9783030129538 [91690979]

- Other educational material:

- Lecture Notes and Supporting Material provided by the Instructor