

COURSE OUTLINE

(1) OVERVIEW

SCHOOL	MARITIME & INDUSTRY		
DEPARTMENT	INDUSTRIAL MANAGEMENT & TECHNOLOGY		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	TEΠAP29-1	SEMESTER	8
COURSE TITLE	PRODUCT DEVELOPMENT & INNOVATION		
DISCRETE TEACHING ACTIVITIES <i>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</i>		WEEKLY TEACHING HOURS	ECTS
Lectures & Project		4	5.5
<i>Please add additional rows if needed. A detailed description of the teaching organization and instructional methods is provided in Section (4).</i>			
COURSE TYPE <i>core (C), core elective (CE), elective (E) - background, specialization, skill development</i>	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 <i>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.</i> <i>Please refer to Appendix A</i> • 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	
This course is an introduction to modern product design and development processes. The course covers the major aspects of product development: Product Planning, Customer Needs, Product Specifications, Concept Generation, Concept Selection, Concept Testing, Product Architecture, Industrial Design, Prototyping, Design for Safety, Design for Environment, and Intellectual Properties. Most of the principles that are presented concern mainly products but can also be applied to services or software products. Particular emphasis is given to capturing customer needs and converting them into product design and development specifications. During the weekly lectures, relevant case studies are presented and analyzed, while students are asked to complete a project related to the study of the development of a product based on the topics covered in the course. Using up to date bibliography, case studies and relevant audiovisual material, students will develop skills regarding: • Their capabilities in designing and developing new innovative products. • The coordination of numerous projects and interdisciplinary teams for achieving the common purpose called “final product”.	
General Competences <i>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?</i>	
<i>Searching, analyzing, and synthesizing data and information, using the necessary technologies</i> <i>Adaptation to new situations</i> <i>Decision making</i> <i>Autonomous work</i> <i>Teamwork</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i>	<i>Project design and management</i> <i>Respect for diversity and multiculturalism</i> <i>Respect for the natural environment</i> <i>Demonstration of social, professional, and ethical responsibility and sensitivity to gender issues</i> <i>Exercising critical and self-critical thinking</i> <i>Promotion of free, creative, and inductive thinking</i> <i>...</i>

Generation of new research ideas	Other competences: ...
• Searching, analyzing, and synthesizing data and information, using the necessary technologies • Adaptation to new situations • Decision making • Autonomous work • Teamwork • Generation of new research ideas • Project design and management • Working in an interdisciplinary 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 main stages of product development, such as: production planning, determination of user needs, product concepts generation, selection of the best concept for development, economic analysis, concept testing, industrial design, design for the environment, prototype manufacturing. Specifically,

Week	Topics
1	Basic concepts of Research & Development of products
2	Basic concepts of technological innovation
3	Introduction to product design and development
4	Organizations and processes
5	Product development planning
6	Determination of customer needs, product specifications
7	Product concept generation, product concept selection
8	Product concept testing
9	Product architecture, industrial design
10	Design for production, principles of standards
11	Design for reliability, design for the environment
12	Patents and Intellectual Properties, Project presentation
13	Project presentation

Also, students participate in discussions at the end of the presentation of each topic with the use of examples of real products. Case studies are presented from papers and related books, such as, for example, Product Design and Development, 5th Edition, by Karl T. Ulrich and Steven D. Eppinger, McGraw Hill, International Edition, 2012. Students are organized into small project teams to study the development of a product based on the principles and methodologies presented in the lectures. 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 <i>Face-to-face, in-class lecturing, distance teaching and distance learning etc.</i>	• Face-to-face in a classroom • Distance teaching & learning (if required)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	Teaching: Lectures using modern audiovisual equipment, learning support through the eClass electronic platform, synchronous distance teaching via MS Teams.

<i>Use of ICT in Teaching, Laboratory Education, Communication with students</i>	Communication with students: face-to-face during office hours, email, eClass platform, MS Teams tools	
Organization of Teaching <i>A detailed description of the teaching methods and approach is provided.</i> <i>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.</i> <i>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</i>	Activity	Semester Workload
	Lectures	52
	Project	40
	Self-study of lecture material and case studies	43
	Consultation Support	0.5
	Exams (written)	2
	Course Total	137.5
STUDENT ASSESSMENT <i>Description of the assessment process</i> <i>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)</i> <i>Explicitly state assessment criteria and information on whether and where these criteria are accessible to students are included.</i>	Language of Assessment: Greek (English for ERASMUS students) Assessment Mode: Face-to-face and/or distance learning (if required) Assessment Methods: The final course grade is formed as follows: • 40% by the project: 30% from the quality of the methodology and presentation and 10% from the analysis of case studies • 60% by the written exams taken in the examination period of the spring semester and, in case of failure, in the September resits The written examination includes short-answer and essay questions. It is conducted with closed books. 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: • Tsourveloudis, N., Nicolos, I. (2014). Production Technologies, Technical University of Crete Publications, ISBN: 9786188153707 [41995733] – in Greek - Journals: - Other educational material: • Lecture Notes and Supporting Material provided by the Instructor • Ulrich, K.T., Eppinger, S.D. (2012). Product Design and Development, 5th Edition, McGraw Hill, International Edition.
