COURSE OUTLINE

(1) GENERAL

SCHOOL	**UNIVERSITY OF THESSALY**		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**ΥΔ1240**	**SEMESTER**	9th
COURSE TITLE	Wave mechanics and Offshore Structures		

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**	**CREDITS**
	4	6
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, specialized general knowledge, skills development*	specialized general knowledge
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek unless there are ERASMUS students where teaching is in English. The exams are given in all 2 languages
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/CULT_U_165/

(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*

Knowledge

The student after the completion of the course

possess advanced knowledge involving a critical understanding of theories and principles

- in marine hydraulics and in particular
  - in the theory of nonlinear waves,
  - in real waves
  - in extreme and design waves
- in hydrodynamics,
- charging in marine projects with a focus on platforms and offshore construction,
- maritime renewable energy sources, i.e. offshore wind turbines and wave energy exploitation devices.

Skills

The student after the completion of the course

possess advanced skills in solving complex and unpredictable problems

- the calculation of loads in marine structures,
- the methodology for calculating the design quantities of maritime projects.

Abilities
The student after the completion of the course
They will manage complex work plans and be able to make decisions in unpredictable work environments or technical problems. They will also be able to work individually and collectively when designing such projects. In particular, students will be able to:

- assess and judge technical, environmental, social and economic factors when planning offshore projects
- synthesize and propose best or new solutions based on the above assessment.

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
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
thinking Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive
……
Others…
…….

- Search, analyse and synthesize data and information, using the necessary technologies
- Adapting to new situations
- Decision-making
- Autonomous work
- Teamwork
- Project planning
- Respect for the natural environment

(3) **SYLLABUS**

Week No.	Course contents	Hours	
		Course attendance	Preparation
1	Introduction and presentation of the course	**4**	**0**
2	Linear Wave Theory	**4**	**3**
3	Wave kinematics	**4**	**3**
4	Wave forces – Morison equations	**4**	**3**
5	Loads on structures	**4**	**3**

6	Loads on structures	4	3
7	Real waves and predictions – SBM method	4	3
8	Nonlinear wave theories	4	3
9	Nonlinear wave solutions	4	3
10	Unsteady Waves	4	3
11	Directional Waves	4	3
12	Unsteady and Nonlinear Waves	4	3
13	Nonlinear and fully nonlinear wave models	4	3
14	Revision	4	0

(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*	Power-Point Lectures, Lecture Notes, Class Tutorials, E-class announcements, projects and tutorials

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

Activity	*Semester workload*
Lectures - Tutorials	14*4=56 hours
Studying	13*4=52 hours
Projects	40 + 16 = 56 hours
Exam paper	-
Studying of for exam paper	-
Educational Visit	-
Course total	*164*

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.*	**Assessment Language** Greek or English **Evaluation methods** Up to 66% Project 1: Technical Report for the calculation of loads on an offshore structure. Mandatory. Oral examination. Up to 33% Project 2: Exercises for calculating wave characteristics in real waves. Mandatory. Oral examination. Up to 5% Tutorials: During the course. Not mandatory.

(5) **ATTACHED BIBLIOGRAPHY**

-Suggested bibliography:

- Κουτίτας, Κ., «Εισαγωγή στην Παράκτια Τεχνική και τα Λιμενικά Έργα», ISBN 960-431-289-8, Θεσσαλονίκη: Εκδόσεις Ζήτη, 1998
- Dean R.G. & Dalrymple R.A., "Water Wave Mechanics for Engineers and Scientistis", World Scientific
- Mei, C.C., "The applied Dynamics of Ocean Surface Waves", Advanced Series on Ocean Engineering - Volume 1, ISBN 9971-50-789-7, World Scientific, 1989

- Related academic journals:

- Coastal Engineering,
- Coastal Engineering Journal,
- Journal of Fluid Mechanics,
- Physics of Fluids,
- Applied Ocean Research,
- Wave Motion,
- Water Waves,
- Ocean Engineering,
- Journal of Waterway, Port, Coastal and Ocean Engineering
- Marine Structures