

COURSE OUTLINE

(1) General information

FACULTY/SCHOOL	Maritime and Industrial Studies		
DEPARTMENT	Maritime Studies		
LEVEL OF STUDY	Undergraduate		
COURSE UNIT CODE	NA84	SEMESTER	Winter semester elective
COURSE TITLE	Zero Carbon Shipping		
INSTRUCTOR'S NAME	Professor Ernestos Spyridon Tzannatos		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>	WEEKLY TEACHING HOURS	CREDITS	
	4	6	
<i>Add rows if necessary. The organization of teaching and the teaching methods used are described in detail under section 4</i>			
COURSE TYPE <i>Background knowledge, Scientific expertise, General Knowledge, Skills Development</i>	Scientific expertise		
PREREQUISITE COURSES:	Compulsory: Ship Technology (1 st semester) Recommended: Ship Systems (3 rd semester)		
LANGUAGE OF INSTRUCTION:	English		
LANGUAGE OF EXAMINATION/ASSESSMENT:			
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes		
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 level of study, in accordance with the European Higher Education Qualifications' Framework.
- Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and

APPENDIX B

- Guidelines for writing Learning Outcomes

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

(3) COURSE CONTENT

<p>Description & techno-economic assessment of:</p> <ul style="list-style-type: none"> - zero carbon or carbon neutral marine fuels: <ul style="list-style-type: none"> o hydrogen & ammonia o bio-fuels (with or without CCS) o synthetic carbon fuels (with or without CCS) - all electric ship (battery storage) - onboard renewable energy systems <ul style="list-style-type: none"> o solar (PV) o wind (direct propulsion & electric generation)

(4) TEACHING METHODS--ASSESSMENT

<p>MODES OF DELIVERY <i>Face-to-face, in-class lecturing, distance teaching and distance learning etc.</i></p>	In-class lecturing or Online	
<p>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY <i>Use of ICT in teaching, Laboratory Education, Communication with students</i></p>	Yes	
<p>COURSE DESIGN <i>Description of teaching techniques, practices and methods: Lectures, seminars, laboratory practice, fieldwork, study and analysis</i></p>	<p>Activity/Method</p>	<p>Semester workload</p>
	<p>Lectures & Interactive teaching</p>	<p>13 lect. x 4 hrs = 52 hrs</p>

<p><i>of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.</i></p> <p><i>The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.</i></p>		
	Self-directed study	98 hrs
	Total	150 hours
<p>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS</p> <p><i>Detailed description of the evaluation procedures:</i></p> <p><i>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.</i></p> <p><i>Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students.</i></p>	<p>Multiple choice tests</p> <p>Problem solving</p>	

(5) SUGGESTED BIBLIOGRAPHY:

<p><i>-Suggested bibliography:</i></p> <p>- Lecturer's notes</p> <p>https://openknowledge.worldbank.org/handle/10986/35436</p>	--
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