COURSE OUTLINE

(1) General information

FACULTY/SCHOOL	School of Maritime and Industrial Studies		
DEPARTMENT	Department of Maritime Studies		
LEVEL OF STUDY	Undergraduate Studies		
COURSE UNIT CODE	NA57		7th
COURSE TITLE	Marine Pollution Laboratory and Applications		
INDEPENDENT TEACHING ACTIVITIES *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*		**WEEKLY TEACHNG HOURS**	**CREDITS**
Laboratory		4	6
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail under section 4			
COURSE TYPE *Background knowledge, Scientific expertise, General Knowledge, Skills Development*	Elective Course		
PREREQUISITE COURSES:	none		
LANGUAGE OF INSTRUCTION:	Greek		
LANGUAGE OF EXAMINATION/ASSESSMENT:	Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes, in English		
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* ***DIX B*** • *Guidelines for writing Learning Outcomes*
The aim of the course "Marine Pollution Laboratory and Applications" is to provide theoretical knowledge and practical application of the marine pollution, sources of marine pollution, ways of introducing pollutants into the marine ecosystem, identification of pollutants and different options

which aim to limit pollution in various marine ecosystems. The course develops the students' capabilities to design and perform a small-scale marine geochemical research.
Successful completion of the course, with field and laboratory work, will enable students to:
• familiarize with field work and different sampling methods (*knowledge*),
• familiarize with the operation of the laboratory, rules and working methods at all stages of τηε research, from preparation to chemical analysis of marine samples (*understanding*)
• design a detailed protocol to quantify the presence of pollutants in a marine ecosystem (*analysis*)
• use in practice theoretical approaches (*application*)
• prepare a comprehensive report on marine geochemical research, from designing (research goal) to critical review of results (*analysis*)
• judge their results (*composition*)
• make judgments about complex environmental problems (*evaluation*)

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 aim?

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

- *Individual/Independent work*
- *Group/Team work*
- *Decision-making*
- *Search for, analysis and synthesis of data and information by the use of appropriate technologies*
- *Adapting to new situations*
- *Environmental awareness*
- *Working in an interdisciplinary environment*
- *Critical thinking*
- *Development of free, creative and inductive thinking*

(3) COURSE CONTENT

THEORETICAL PART

- Marine pollution
- Sources of marine pollution and ways of introducing pollutants into the marine ecosystem
- Assessment of the environmental health of a marine ecosystem
- Quantification of pollutants
- Modeling the diffusion of marine pollution

LABORATORY PART

- Design of sampling map
- Sampling of seawater and sediment samples
- Field work with the determination of environmental parameters
- Laboratory quantification of selected pollutants in a marine ecosystem - case study
- Editing results - Statistical analysis

(4) TEACHING METHODS--ASSESSMENT

<table>
<tr><td>MODES OF DELIVERY
Face-to-face, in-class lecturing, distance teaching and distance learning etc.</td><td>Face-to-face, class lecturing, field and laboratory work</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY
Use of ICT in teaching, Laboratory Education, Communication with students</td><td>Support the learning process through the e-class platform</td></tr>
<tr><td>COURSE DESIGN
Description of teaching techniques, practices and methods:
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.

The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.</td><td>
<table>
<tr><th>Activity/Method</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>fieldwork</td><td>30</td></tr>
<tr><td>Laboratory practice</td><td>30</td></tr>
<tr><td>Essay writing</td><td>16</td></tr>
<tr><td>No guided study</td><td>22</td></tr>
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<tr><td>Total</td><td>150</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS
Detailed description of the evaluation procedures:

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.

Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students.</td><td>Written project and presentation in class</td></tr>
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(5) SUGGESTED BIBLIOGRAPHY:

-Suggested bibliography:

Chester, R. and Jickells, T. (2012), Marine Geochemistry, Wiley Library.

EPA, Environmental Protection Agency (2001) Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analyses, Office of Water (4305), EPA-823-B-01-002, United States.
Fifield, F.W. and Haines, P.J. (eds) (1995) Environmental Analytical Chemistry, Blackie Academic & Professional, London.
Nollet, L.M.L. and De Gelder, L.S.P. (2014) Handbook of Water Analysis, CRC Press, Third Edition, London.
Prichard, E., MacKay, G. M. and Points, J. (eds) (1996) Trace Analysis: a structured approach to obtaining reliable results, Royal Society of Chemistry, Cambridge
Rose, A.W., Hawkes, H.E. and Webb, J.S. (1979) Geochemistry in Mineral Exploration, Academic Press, London.
Weis, J.S. (2015) Marine Pollution what everyone needs to know, Oxford University Press, USA.
Related Scientific Magazines
Geochemistry: Exploration, Environment, Analysis
Environmental Geochemistry
Marine Geochemistry