COURSE OUTLINE

(1) GENERAL

SCHOOL	Maritime and Industrial Studies		
ACADEMIC UNIT	Department of Maritime Studies		
LEVEL OF STUDIES	Postgraduate		
COURSE CODE	NAS-SHM112	**SEMESTER**	B
COURSE TITLE	Maritime Information Systems		

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
	3	5
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, specialised general knowledge, skills development*	General Background
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	English
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://eclass.unipi.gr/modules/contact/index.php?course_id=1194

(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*
By the end of this module, students should be able to: • Evaluate a system for maritime monitoring • Evaluate a maritime data processing system • Develop database queries for maritime data analytics.

To introduce the state-of-the-art maritime monitoring systems.
▪ To present the keys concepts of database systems.
▪ To equip students with skills and tools for maritime data analytics.

(3) SYLLABUS

Week 1
MARITIME MONITORING SYSTEMS
• Passive systems (satellite systems)
• Active systems (COSPAS-SARSAT, NAVTEXT, AIS, LRIT, etc)
• Hybrid systems

Week 2
MARITIME DATA ANALYSIS
• Maritime pattern detection
• Maritime Data Visualisation
• Origin-Destination Matrices
• Complex event recognition

Week 3
INTRODUCTION TO RELATIONAL ALGREBRA
• Relational schemas
• Super Key, Candidate Key, Primary Key, Foreign Key
• Integrity Constraints

Week 4
RELATIONAL ALGREBRA: MARITIME DATABASE QUERYING & MODIFICATION
• Selection, projection, renaming, union, set difference
• Cartesian product, inner join, outer join
• Maritime database querying

Week 5
INTRODUCTION TO SQL
• Basic query structure
• Set operations
• Null values

Week 6
SQL: AGGREGATION AND COMPLEX QUERY EXECUTION
• Aggregate functions
• Query execution order
• Nested subqueries

Week 7
DATABASE MANAGEMENT SYSTEMS AND VISUAL ANALYTICS SYSTEMS
• PostgreSQL
• QGIS
• Maritime information extraction and visualisation

Week 8
SQL: JOIN AND MARITIME DATABASE MODIFICATION
• Join of relations
• Database Modification
• Maritime database querying and modification: demonstration

(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*	e-class		

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	24
	Self-study	101
	Course total	*125*

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.*	The module will be assessed on the basis of two components: A) Individual performance (20%): class participation, assignments, cases, exercises, tests B) Written exams (80%): A 2-hour written exam test.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

Silberschatz, Korth, and Sudarshan (2010, 6th e): Database Systems Concepts, McGraw-Hill.
Molina, Ulman and Widom (2001, 3rd e): Database Systems: The Complete Book, Prentice Hall.

- Related academic journals:

- Lectures Outline
- Course Slides
- Maritime data (AIS position signals)

- Selected Problems Review
- Academic Papers