COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Naval Architecture		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	NAOME1130	**SEMESTER**	5
COURSE TITLE	**PROBABILITY AND STATISTICS**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS (ECTS)**
Lectures	3	3

COURSE TYPE *general background, specialbackground, specialised general knowledge, skills development*	General background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/NA193/

(2) COURSE GOALS / LEARNING OUTCOMES

Over the last decades the use of probability models and statistical methods has become common practice among the engineers. With reference to naval and marine technology it should be noted that ships and marine structures are exposed to the sea environment which may be best represented by a stochastic point of view. Furthermore, there is a trend in integrating the probabilistic approach into marine safety regulations, while there is an increasing use of risk-based design for ships and naval systems in maritime industry.

In view of the above, the purpose of this course is to introduce students in probability theory and in basic statistical methodology that will assist them to gain an in-depth understanding of various topics in marine engineering.

Learning outcomes:

On completion of this course the student should be able to:

- understand the basic concepts of probability and random variables,
- compute and interpret descriptive statistics,
- compute confidence intervals associated with sample means and handle statistical hypothesis tests,
- apply statistical techniques and methodology in engineering problem-solving processes,
- understand the basic concepts of stochastic processes which are used for the representation of wind waves environment (normal stochastic processes, ocean waves spectra, spectral parameters).

(3) COURSE CONTENT / SYLLABUS

Probability

Events and their probability, Probability laws. Total probability theorem, Independence, Bayes' theorem. Random variables, discrete and continuous probability distributions. Moments of variables. The central limit theorem.

Statistics

Descriptive statistics, Confidence intervals, Statistical hypothesis testing, Linear regression analysis.

Applications in Marine Technology

Introduction to stochastic processes. Stochastic character of wind waves. Wave spectra and spectral moments. Normal stochastic processes. Ocean waves as a normal stochastic field.

(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	• Use of ICT in teaching. • Use of mathematical software. • Support learning through the electronic e-class platform.
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	*Workload (hours)*
Lectures	39
Study of Lectures	51
Course total	**90**

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*	Final written examination: 100%

(5) ATTACHED BIBLIOGRAPHY

1. D.P. Bertsekas, J.N. Tsitsiklis, Introduction to Probability, 2nd Edition, Athena Scientific, 2008.
2. S. Ross, A First Course in Probability, 8th Edition, Prentice Hall, 2010.
3. S. Ross, Introductory Statistics, 4th Edition, Academic Press, 2017.
4. R.E. Walpole, R.H. Myers, S.L. Myers, K.E. Ye, Probability & Statistics for Engineers & Scientists, MyLab Statistics Update, 9th Edition, Pearson, 2017.