Course information in English

General course information:

Course title:	Probability and Statistics	**Course code:**	ΓΚ0800
Credits:	5	**Work load (hours):**	125
Course level:	Undergraduate ☒	Graduate ☐	
Course type:	Mandatory ☒	Selective ☐	
Course category:	Basic ☒	Orientation ☐	
Semester:	1th	**Hours per week:**	4
Course objectives (capabilities pursued and learning results):			
• Have a good notion about / understand the basic elements of probability and statistics. • Be able to use the concepts in practical applications (practical sessions). • Be able to generalize material to a broader variety of practical problems.			
Prerequisites:			
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Instructor's data:

Name:	Dr Marios Spiliotopoulos
Level:	Laboratory Teaching Staff
Office:	
Tel. – email:	24210 74177– spilioto@uth.gr
Other tutors:	

Specific course information:

Week No.	Course contents	Hours	
		Course attendance	Preparation
1	The concept of probability in technical works. Making decisions under conditions of risk and uncertainty.	**4**	**2**
2	Probability Theory (Events & Probabilities, Conditional Probability, Total Probability Theorem, Bayes' Theorem). Applications.	**4**	**2**
3	Conditional probability, random variables, probability distributions, continuous univariate distributions. Applications.	**4**	**2**
4	Analytical models of random events (random, variables, univariate continuous uniform distributions). Applications.	**4**	**3**
5	Multivariate Distributions. Related functions (probability distributions). Applications.	**4**	**3**
6	Statistics and data classification. Frequency distribution. Applications.	**4**	**3**
7	Parameter estimation from observed data. The role of statistical inference in the works of engineering, Random sampling. Applications.	**4**	**3**
8	Estimation of parameters from observed data (confidence interval calculation, average, standard deviation). Quantitative Problems. Applications.	**4**	**3**
9	Distributions theory. Map probability, normal distribution and lognormal distribution. Applications.	**4**	**3**
10	Frequency distributions, X2 test, Kolmogorov test, Smirnov test. Applications.	**4**	**3**
11	Regression analysis - Basic formulation. Multivariate linear regression, nonlinear regression. Applications.	**4**	**3**
12	Regression analysis applications in engineering problems. Correlation analysis and estimation of correlation coefficients. Applications.	**4**	**3**
13	Bayes' methodology for estimation techniques and sampling. Basic concepts. Applications.	**4**	**3**
14	More Bayesian sampling concepts. Quality control. Applications.	**4**	**3**

Additional hours for:

Class project	Examinations	Preparation for examinations	Educational visit
		30	-

Suggested literature:

- ALFREDO, H., ANG, S., WILSON, H. TANG "Εφαρμογές Πιθανοτήτων και Στατιστικής στη μελέτη και προγραμματισμό τεχνικών έργων" Εκδ. Κυριακίδη Θεσ/νικη 1993.(Μετάφραση: Καθ. Δημ. Παν.Θ Δ. Παναγιωτακόπουλος).
- BROWNLEE, K.A. "Statistical Theory and Methodology in Science and Engineering" J. Wiley & Sons, New York 1960.
- LIPSON, C., SHETH, N.J, "Statistical Design and Analysis of Engineering Expirements" McGraw - Hill Book Company, New York 1973.
- HALD, A., "Statistical Theory with Engineering Applications" J Willey & Sons, New York, 1952.
- ΠΑΠΑΙΩΑΝΝΟΥ, Τ., ΛΟΥΚΑΣ, Σ., "Θεωρία Πιθανοτήτων και Στατιστικής", Εκδόσεις Σταμούλη, Αθήνα, 1997.
- HOWITT, D., GRAMMER, D., "Στατιστική με το SPSS 13", Εκδόσεις Κλειδάριθμος, Αθήνα, 2006.
- NORUSIS, M., J., "Οδηγός Ανάλυσης Δεδομένων με το SPSS 12.0", Εκδόσεις Κλειδάριθμος, Αθήνα, 2005.

Teaching method *(select and describe if necessary -* **weight***):*		
Teaching	☒	60 %
Seminars	☐	
Demonstrations	☐	
Laboratory	☐	
Exercises	☒	40 %
Visits at facilities	☐	
Other *(describe):* …….	☐	
Total		100%

Evaluation method *(select)*- **weight:**				
	written	*%*	*Oral*	*%*
Homework	☐		☐	
Class project	☐		☐	

Interim examination	☐		☐	
Final examinations	☒	100%	☐	
Other *(describe):* ……	☐		☐	