İzmir Institute of Technology
Institute of Engineering and Science (M.S.)
Civil Engineering

CE 577		Statistical Analysis in Coastal Engineering			
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
1	CE 577	STATISTICAL ANALYSIS IN COASTAL ENG.	3+0	3	5

Instructor:
Dr. Doğan Kısacık, e-mail: dogankisacik@iyte.edu.tr, Office phone: 7506817

Assistants:
Nisa Bahadıroğlu and Binhan Arık, e-mail: nisabahadiroglu@iyte.edu.tr, binhanarik@iyte.edu.tr

The objective of the Course:
The objective of this course is to broaden the horizon in the field of Coastal Engineering with the description of the random nature of sea waves, and the introduction of statistical and spectral tools used in coastal engineering problems. Within the course, the ability to apply knowledge of statistics and computer programming to coastal engineering problems will be increased. The ability to implement theoretical knowledge for the engineering application of random sea waves will be improved.

Content of the Course:
Statistical theory of waves, harmonic analysis, energy density spectrum, the probability distribution of waves, Measurement and analysis of waves, measurement techniques, definitions of height and period of irregular waves, spectral analysis, Examples of statistical analysis of coastal engineering problems.

Prerequisites and co-requisites:
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Course Lecturers:
Asst. Prof. Dr. Doğan Kısacık

Recommended or Required Reading
1. Goda, Yoshimi. (2010), Random Seas and Design of Maritime Structures, Advanced Series of Ocean Engineering, Vol. 33, World Scientific
2. Holthuijsen, L. H. (2007), Waves in Oceanic and Coastal Waters, Cambridge University Press.
3. Kamphius, J.W. (2000), Introduction to Coastal Engineering and Management, Advanced Series on Ocean Engineering, Vol.16, World Scientific

4. Newland, D.E. (2005), An Introduction to Random Vibrations, Spectral and Wavelet Analysis, Dover Publications.

Weekly Detailed Course Contents

1	Waves in the sea The concept of a simple sinusoidal wave Random sea wave proles
2	Measurement of sea waves Statistical quantities of digital wave data
3	Definition of representative waves Distributions of individual wave heights and periods
4	Wave grouping Relationship between wave spectra and characteristic wave dimensions
5	Parameters derived from the wave spectra Common parametric expressions for wave spectra
6	Theory of spectral analysis
7	Theory of spectral analysis
8	Directional spectra of random sea waves
9	Wave transformation
10	Wave transformation
11	Wave climate statistics: Definitions Long-term wave statistics Long-term distribution of individual wave heights Extreme wave statistics
12	Wave climate statistics: Definitions Long-term wave statistics Long-term distribution of individual wave heights Extreme wave statistics
13	Extreme wave statistics Distribution functions for extreme waves Return period and return value Estimation of best-fitting distribution function
14	Estimation of return value and its confidence interval Encounter probability Selection of design wave height

Assessment Method and Criteria

In-Term Studies	Quantity	Percentage
Midterm exams	2	% 25
Projects	0	% 20
Final examination	1	% 30
Total		% 100