

## COURSE DESCRIPTION FORM

<b>Course Code and Title</b>	CE225 STATISTICS FOR CIVIL ENGINEERS
<b>Semester</b>	3
<b>Catalog description</b>	The Importance of Statistics for Civil Engineering, Events and Set Theory, Basic Concepts of Probability, Conditional Probability, Total Probability, Bayes Theorem, Random Variables, Random Variables, Probability Distributions, Problems with multiple random variables, Choice and Test of Distribution Models, Monte Carlo Simulation, Estimation of parameters from observational data, Hypothesis testing, Regression and Correlation Analysis
<b>Required reading</b>	
<b>Recommended reading</b>	<p>1. Nathabandu T. Kottegoda, Renzo Rosso, "Statistics, Probability and Reliability for Civil and Environmental Engineers", McGraw Hill International Editions, 1998.</p> <p>2. A.H.S. Tang and W.H. Tang, 1975, Probability Concepts in Engineering Planning and Design, Vol:1, John Wiley and Sons, USA.</p>
<b>ECTS</b>	4
<b>Prerequisites and co-requisites</b>	No prerequisite Required attendance to lectures is at least 70%
<b>Compulsory/Elective</b>	Compulsory
<b>Language of instruction</b>	English
<b>Aim of course</b>	To equip the students with a working knowledge of probability, statistics, and modeling in the presence of uncertainties and to help the students to develop an intuition and an interest for random phenomena, and to introduce both theoretical issues and applications that may be useful in real life.
<b>Learning outcomes of the course unit</b>	<ol style="list-style-type: none"> <li>1. Communicate using the language of probability and statistics</li> <li>2. Choose appropriate probabilistic models for a given problem, using information from observed data and knowledge of the physical system being studied</li> <li>3. Use probability tools to perform civil engineering calculations</li> <li>4. Identify topics where probability and statistics have been or should be applied in civil engineering</li> </ol>
<b>Mode of delivery</b>	The mode of delivery of this course is face to face.
<b>Course content</b>	<ol style="list-style-type: none"> <li>1. The importance of statistics for civil engineering</li> <li>2. Events and Set Theory</li> <li>3. Basic Concepts of Probability</li> <li>4. Conditional Probability, Total Probability, Bayes Theorem</li> <li>5. Random Variables</li> <li>6. Random Variables</li> <li>7. Probability Distribution Functions and Midterm I</li> <li>8. Probability Distribution Functions</li> <li>9. Problems with Multiple Random Variables</li> <li>10. Choice and Test of Distribution Models</li> <li>11. Monte Carlo Simulation</li> </ol>

	12. Midterm II						
	13. Estimation of Parameters from Observational Data						
	14. Hypothesis Testing						
	15. Regression and Correlation Analysis						
<b>Planned learning activities and teaching methods</b>	3 hours of theoretical lectures per week(3+0) Quizzes Report preparation Midterm exam and required works Final exam and required works						
<b>Assessment methods and criteria</b>		Quantity	Percentage (%)				
	Mid-terms	2	40				
	Assignment	2	5				
	Exercises	-					
	Projects	-					
	Practice	-					
	Quiz	4	15				
	Contribution of In-term Studies to Overall Grade %		60				
	Contribution of Final Examination to Overall Grade (%)		40				
Attendance							
<b>Workload</b>	<b>Efficiency</b>	<b>Total Week Count</b>	<b>Weekly Duration (in hour)</b>	<b>Total Workload in Semester</b>			
	Theoretical Study Hours of Course Per Week	14	3	42			
	Practicing Hours of Course Per Week	0	0	0			
	Reading	14	1	14			
	Searching in Internet and Library	14	1	14			
	Designing and Applying Materials	0	0	0			
	Preparing Reports	14	1	14			
	Preparing Presentation	0	0	0			
	Presentation	0	0	0			
	Mid-Term and Studying for Mid-Term	2	5	10			
	Final and Studying for Final	1	5	5			
	Other	0	0	0			
	Total Workload:			99			
	Total Workload / 25:			3.96			
	ECTS:			4			
<b>Course's contribution to program</b>	No	Program Learning Outcomes	1	2	3	4	5
	1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied knowledge in these areas in complex engineering problems.					X
	2	Ability to identify, formulate, and solve complex civil engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.					X
	3	Ability to design a complex system, process, device or product under realistic constraints					

	and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.						
4	Ability to devise, select, and use modern techniques and tools needed for analyzing and solving complex problems encountered in civil engineering practice; ability to employ information technologies and to use at least one computer programming language effectively.					X	
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex civil engineering problems or discipline specific research questions.						
6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.						X
7	Ability to work individually.		X				
8	Ability to communicate effectively in Turkish, both orally and in writing; ability to write effective reports and comprehend written reports.		X				
9	Knowledge of English of B1 level according to <u>Common European Framework of Reference</u> .						
10	Prepare design and production reports, make effective presentations, and give and receive clear and intelligible instructions.						
11	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.						X
12	Consciousness to behave according to ethical principles and professional and ethical responsibility.						
13	Knowledge on standards used in civil engineering practice.						
14	Knowledge about business life practices such as project management, risk management, and change management.						
15	Awareness in entrepreneurship, innovation; knowledge about sustainable development.						
16	Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering.						
17	Awareness of the legal consequences of engineering solutions.						
<b>Name of lecturer(s) and contact information</b>		Prof. Dr. Can E. Balas, <a href="mailto:cbalas@gazi.edu.tr">cbalas@gazi.edu.tr</a> , Inst. Dr. Erhan Tekinetekin@ <a href="mailto:gazi.edu.tr">gazi.edu.tr</a>					