DEPARTMENT OF CIVIL ENGINEERING
COURSE SYLLABUS

Course Details				
Code	**Academic Year**			**Semester**
BAU305	3			Spring
Title	**T**	**A**	**L**	**ECTS**
Stochastic Systems	3	2		6

Language	German					
Level	**Undergraduate**	✓	**Graduate**		**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**	✓	**Elective**			
Objectives	This course provides statistics, the probability theory that students need, and the basics of random processes. The goal of this course is to use a strict theoretical approach to address probability problems. Random variables, moments, joint distributions, multivariate random variables, conditional expectation and variance, posterior distributions, probability generation function, moment generation function, characteristic function, random sum, types of convergence and Poisson processes are highlighted.					
Content	This course focuses on probability sets, random variables and higher-order statistics (limit value sets) as well as on stochastic processes at the graduate level. It offers the introduction of stochastic processes and limit value sets. Definition of stochastic processes, statistics of stochastic processes, narrow and largely stationary stochastic processes, ergodic processes, discrete and continuous time processes, autocorrelation and cross-correlation functions, Wiener-Khinchin theorem, power spectrum density, spectral cross-power density, linear time with stochastic inputs unchanged systems, Wiener-Lee relationship, white noise, system identification and matched filter completed.					
Prerequisites						
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	A. Papoulis and S. Pillai, Probability, Random Variables and Stochastic Processes; 4th edition, McGraw-Hill Europe, 2002 R. D. Yates and D. J. Goodman, Probability and Stochastic Processes, Wiley, 1999. A. Leon-Garcia, Probability, Statistics, and Random Processes for Electrical Engineering; 3rd Edition, Prentice-Hall, 2008.
Other Sources	

Additional Course Material	
Documents	

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Assignments		
Exams		
Course Composition		
Mathematics und Basic Sciences		%
Engineering		%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment		
Activity	**Count**	**Percentage (%)**
Midterm Exam		
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam		
	Total	**100**

ECTS Points and Work Load			
Activity	**Count**	**Duration**	**Work Load (Hours)**
Lectures	14	5	70
Self-Study	14	3	42
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	2	10
Recitations			
Laboratory			
Projects			
Final Exam	1	2	15
		Total Work Load	**137**
		ECTS Points(Total Work Load / Hour)	**6**

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Learning Outcomes	
1	Students understand moment generation and characteristic functions.
2	Students will understand the approximation in the distribution of the random variable sequence.
3	Students understand and apply the filtering and prediction concepts of a random process.
4	The students acquire basic knowledge of continuous Markov chains.
5	Students understand moment generation and characteristic functions.
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Weekly Content	
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Contribution of Learning Outcomes to Program Objectives(1-5)

	P1	P2	P3	P4	P5	P6	P7
1							

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12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	
Date of Compilation:	