

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY  
COURSE SYLLABUS

Course Details					
<b>Code</b>				<b>Academic Year</b>	<b>Semester</b>
MAT204				2	4
<b>Title</b>	<b>T</b>	<b>A</b>	<b>L</b>	<b>ECTS</b>	
Statistical Methods of Data Analysis	2	2	1	6	
<b>Language</b>	German				
<b>Level</b>	<b>Undergraduate</b>	<b>X</b>	<b>Graduate</b>		<b>Postgraduate</b>
<b>Department / Program</b>	Energy Science and Technology				
<b>Forms of Teaching and Learning</b>	Face-to-face				
<b>Course Type</b>	<b>Compulsory</b>		<b>Elective</b>	<b>X</b>	
<b>Objectives</b>	Module participants can plan and conduct data surveys in a technical work environment by considering statistical principles and evaluating the collected data. Based on data collection and analysis, key applicable methods for problem identification and sustainable solutions are taught in company practices.				
<b>Content</b>	The course consists of weekly 3-hour seminars, including a 1-hour practice session and a 1-hour laboratory. Additionally, students receive weekly assignments prepared together with the instructor during the exercise sessions.				
<b>Prerequisites</b>	None				
<b>Coordinator</b>	None				
<b>Lecturer(s)</b>	Assist. Prof. Dr. Yaşanur Kayıkcı				
<b>Assistant(s)</b>	None				
<b>Work Placement</b>	None				
Recommended or Required Reading					
<b>Books / Lecture Notes</b>	-				
<b>Other Sources</b>	Statistische Methoden der Datenanalyse <a href="https://www-zeuthen.desy.de/~kolanosk/smd_ss08/skripte/skript.pdf">https://www-zeuthen.desy.de/~kolanosk/smd_ss08/skripte/skript.pdf</a> Sachs, L. (2004): Angewandte Statistik, 11.Auflage, Springer, Berlin. Sachs L., Hedderich J. (2006): Angewandte Statistik. Methodensammlung mit R., Springer Hatzinger, R., Hornik, K., Nagel, H. Maier, M.J. (2014): R: Einführung durch angewandte Statistik, 2. Auflage, Pearson. Fahrmeir, L., Künstler, R., Pigeot I., Tutz, G. (2016): Statistik: Der Weg zur Datenanalyse, 8. Auflage, Springer Feindt, M. Kerzel, U. (2015): Prognosen bewerten: Statistische Grundlagen und praktische Tipps, Springer Gabler Und viele online Quellen dazu.				
Additional Course Material					
<b>Documents</b>	-				
<b>Assignments</b>	-				

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Exams	1 Midterm, 1 Final	
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**Course Composition**

Mathematics und Basic Sciences	60	%
Engineering	40	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

**Assessment**

Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz		
Assignments		
Attendance		
Recitations		
Projects		
Final Exam	1	60
<b>Total</b>		<b>100</b>

**ECTS Points and Work Load**

Activity	Count	Duration	Work Load (Hours)
Lectures	14	6	84
Self-Study	1	8	8
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations	14	3	42
Laboratory	14	2	28
Projects			
Final Exam	1	3	3
<b>Total Work Load</b>			<b>168</b>
<b>ECTS Points (Total Work Load / Hour)</b>			<b>6</b>

**Learning Outcomes**

1	Fundamentals of Statistics, Data Collection Methods, Data Analysis
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2	Data Analysis Using Excel Spreadsheet, SPSS, and R						
<b>Weekly Content</b>							
1	What is Statistics? Types of Statistics, Fundamental Conditions of Statistics						
2	Scale Levels, Data Classification, Data Graph Typography						
3	Reference Distributions, Measures: Mode, Median, Mean, Quartiles, Variance, Standard Deviation, Skewness, IQR, Box-Plot						
4	Random Sampling and Parameters, Probability Distributions, Discrete and Continuous Distribution Models						
5	Special Distributions: Binomial Distribution, Multinomial Distribution, Poisson Distribution, Uniform Distribution, Normal Distribution						
6	Multivariate Distributions, Probability Density, Distribution Function, Marginal Distribution, Expected Values, Correlations, Correlation Coefficient, Marginal Correlation Coefficient						
7	Linear Functions of Various Random Variables						
8	Midterm Exam						
9	Nonlinear Functions of Random Variables						
10	Random Variables, Samples, and Estimation Transformations: Paired Samples, Independent Samples						
11	Statistical Test Methods: Significance Analysis Distribution, t-Distribution, Kolmogorov-Smirnov Test, F-Distribution, Chi-Square Test						
12	Confidence Intervals: Bayesian Confidence Intervals, Classical Confidence Intervals						
13	Maximum Likelihood Method, Least Squares Method						
14	Classification and Statistical Learning: Decision Trees; Monte Carlo Methods						
15	Exam Preparation						
16	End-of-Semester Exam						
<b>Contribution of Learning Outcomes to Program Objectives (1-5)</b>							
	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>	<b>P5</b>	<b>P6</b>	<b>P7</b>
1							
<b>Contribution Level</b>	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High						
<b>Compiled by:</b>	Res. Asisst. Kevser Celep						
<b>Date of Compilation:</b>	11.02.2025						