DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGIES
COURSE SYLLABUS

Course Details

Code	Academic Year			Semester
EBT305	3			5
Title	**T**	**A**	**L**	**ECTS**
Statistics	2	2	0	6

Language	German					
Level	**Undergraduate**	**X**	**Graduate**		**Postgraduate**	
Department / Program	Energy Science and Technology					
Forms of Teaching and Learning	Face-to-face					
Course Type	**Compulsory**		**Elective**	**X**		
Objectives	The objective of this course is to teach students the fundamental concepts of statistics, as well as methods for data collection, analysis, and interpretation. Students will develop the ability to derive meaningful conclusions from data using statistical methods and accurately interpret these results.					
Content	This course covers fundamental statistical concepts, data collection and analysis methods, and probability theory.					
Prerequisites	None					
Coordinator	Assoc. Prof. Dr. Merja Helena Tölle					
Lecturer(s)	Assoc. Prof. Dr. Merja Helena Tölle					
Assistant(s)						
Work Placement	None					

Recommended or Required Reading

Books / Lecture Notes	Statistische Methoden der Datenanalyse https://www-zeuthen.desy.de/~kolanosk/smd_ss08/skripte/skript.pdf 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.
Other Sources	

Additional Course Material

Documents	
Assignments	
Exams	

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Course Composition		
Mathematics and 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
	Total	**100**

ECTS Points and Work Load			
Activity	**Count**	**Duration**	**Work Load (Hours)**
Lectures	14	2	28
Self-Study	12	9	108
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	2	28
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**168**
		ECTS Points (Total Work Load / Hour)	**6**

Learning Outcomes	
1	Students can draw meaningful conclusions from data by using statistical data collection, organization, and analysis methods.
2	Students understand probability theory and statistical distributions and apply these concepts in the problem-solving process.

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3	Students evaluate the significance of data using hypothesis testing and statistical inference methods.
4	Students analyze relationships between variables using regression and correlation techniques.
5	Students interpret statistical findings and utilize them in decision-making processes.
Weekly Content	
1	Fundamental Concepts and Applications of Statistics
2	Data Collection Methods and Sampling Theory
3	Data Summarization and Visualization Techniques
4	Measures of Central Tendency and Dispersion
5	Probability Theory and Basic Probability Rules
6	Probability Distributions
7	Normal Distribution and Z-Tables
8	Midterm Exam
9	Estimation Theory and Confidence Intervals
10	Hypothesis Testing I: One-Sample Tests
11	Hypothesis Testing II: Two-Sample Tests
12	Chi-Square Tests and Applications
13	Regression and Correlation Analysis
14	Analysis of Variance (ANOVA)
15	Applications of Statistics and Ethics
16	Final Exam

Contribution of Learning Outcomes to Program Objectives (1-5)									
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**
1	5	5	5	5	5	5	5	5	5
2	5	5	5	5	5	5	5	5	5
3	5	5	5	5	5	5	5	5	5
4	5	5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5	5	5
Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High									

Compiled by:	
Date of Compilation:	