DEPARTMENT OF MATERIALS SCIENCE AND TECHOLOGY
COURSE SYLLABUS

Course Details						
Code			**Academic Year**		**Semester**	
NWI302			3		5	
Title			**T**	**A**	**L**	**ECTS**
Statistical and Numerical Methods			2	2		6

Language	German					
Level	**Undergraduate**	X	**Graduate**		**Postgraduate**	
Department / Program	Materials Science and Technology					
Forms of Teaching and Learning	Face to face					
Course Type	**Compulsory**	X	**Elective**			
Objectives	The participants of the module will be able to plan and carry out data surveys in a technical working environment, taking into account statistical principles and to evaluate the collected data. Based on the data collection and analysis, applicable key methods for problem identification and sustainable solutions are taught in company practice. ? Competence: 10% ?Method competence: 20% ?System competence: 40% ?Social competence: 30%					
Content	The course consists of the weekly 3-hour seminars with 1-hour practice and 1-hour lab. The students also get homework each week, which is worked out together with the tutor during the exercise.					
Prerequisites						
Coordinator	None					
Lecturer(s)	Asist Prof.Dr. Yaşanur Kayıkcı					
Assistant(s)	None					
Work Placement	No					
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						

TÜRK-ALMAN ÜNİVERSİTESİ
TÜRKISCH-DEUTSCHE UNIVERSITÄT

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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%
Total		**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	6	84
Self-Study	10	10	100
Assignments			
Presentation / Seminar Preparation			
Midterm Exam			
Recitations	14	3	42
Laboratory	14	2	28
Projects			
Final Exam	1	15	15
Total Work Load			**184**
ECTS Points (Total Work Load / Hours)			**6**

Learning Outcomes

1	Basics of statistics, methods of data collection, data analysis
2	Analyzing data via Excel Spreadsheet, SPSS, and R

Weekly Content

DEPARTMENT OF MATERIALS SCIENCE AND TECHOLOGY
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1	What is statistics? Types of statistics, basic terms of statistics
2	Scale level, classification of data, typography of data graphics
3	Reference distributions, measures: mode, media, mean, quartiles, variance, standard deviation, skew, IQR, box plot
4	Random Sample and Parameters, Probability Distributions, Discrete and Continuous Distribution Models
5	Special distributions: binomial distribution, multinomial distribution, Poisson distribution, uniform distribution, normal distribution
6	Distributions of multiple variables, probability density, distribution function, boundary distribution, expectation values, correlations, correlation coefficient, boundary correlation coefficient
7	Linear functions of several random variables
8	Non-linear functions of random variables
9	Random Variables, Samples and Estimates Transformations: Paired Samples, Independent Samples
10	Statistical test methods: significance analysis distribution, t-distribution, Kolmogorov-Smirnov, F-distribution, Chi-square test
11	Confidence Intervals: Bayes Confidence Intervals, Classic Confidence Intervals
12	The maximum likelihood method, least squares method
13	Classification and statistical learning: decision trees; Monte Carlo methods
14	Review

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1	5	5	5	5	5	5	5
2							
3							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High

Compiled by:	
Date of Compilation:	