Statistics for Researchers in Engineering Sciences					AR-223

Rota	Duration	Semester	SWS	Credit Points	Workload
annually SS	1 Semester	2nd (Semester)	3 SWS	5	150 h

1	**Modul Structure**				
	Course (Abbreviation)	**Type/ SWS**	**Presence**	**Self Study**	**Credit Points**
	a) Statistics for Researchers in Engineering Sciences (STAT)	Lecture/ 2 SWS	25 h	65 h	3
	b) Statistics for Researchers in Engineering Sciences (STAT)	Tutorial/ 1 SWS	15 h	45 h	2

2	**Language** English
3	**Content** 1. Empirical distributions and explanatory data analysis: frequency tables, bar charts, histograms, distribution characteristics 2. Probability theory: conditional probability, independence 3. Random variables and their distributions: discrete distributions (Uniform, Bernoulli, Binomial,Poisson), continuous distributions (Uniform, Normal), expectation and variance, sampling distribution theory, joint distributions, covariance and correlation 4. Estimation: properties of estimators, confidence intervals 5. Test of statistical hypotheses: Binomial test, Gaussian test, t-test, power, p-value 6. Regression: simple / multiple regression, tests concerning regression 7. Time series analysis: stochastic processes, stationarity, autocorrelation, filtering **Literature:** • Slides
4	**Competencies** This course gives an introduction to statistical concepts that are useful for research projects in various fields of application and areas of science. Furthermore the students should get a good grasp of the application of these concepts to engineering problems like prediction, optimal testing and estimation.
5	**Examination Requirements** All students are requested to solve four take home problems. The final exam will be an oral or a written exam, depending on the number of participants (form will be announced second week of course).
6	**Formality of Examination** ☒ Module Finals ☐ Accumulated Grade
7	**Module Requirements (Prerequisites)**
8	**Allocation to Curriculum:** Program: Automation & Robotics, Field of study: Robotics, Process Automation, Cognitive Systems
9	**Responsibility/ Lecturer** *Dr. T. Mildenberger/* Dr. T. Mildenberger