School of **Business**
Department of **Business Information Systems**

Mathematics II
(W3WI_602)

FORMAL INFORMATION ON THE MODULE

MODULE #	LOCATION IN THE COURSE OF STUDY	MODULE DURATION (SEMESTER)	SEMESTER	LANGUAGE
W3WI_602	2nd academic year	1	Fall Term	English

FORMS OF TEACHING USED

Lecture, exercise

FORMS OF EXAMINATION USED

EXAMINATION PERFORMANCE	EXAM DURATION (IN MINUTES)	GRADING
Written or oral exam	120	yes

WORKLOAD AND ECTS CREDITS

TOTAL WORKLOAD (IN H)	OF WHICH ATTENDANCE TIME (IN H)	OF WHICH SELF-STUDY (IN H)	ECTS CREDIT POINTS
150	55	95	5

QUALIFICATION OBJECTIVES AND COMPETENCIES

PROFESSIONAL COMPETENCE

Students know basic statistical methods for data analysis, their application principles and interpretation options and basic methods of operations research with optimization, graph theory and simulation.
The application of the methods to economic problems is just as much a focus as the associated interpretation of the results.

METHODOLOGICAL COMPETENCE

Students can assess the relevance and use of the methods in the professional context and in the professional field of application. They have gained initial experience in using the methods.

PERSONAL AND SOCIAL COMPETENCE

Students can justify their choice of methods in a professional context.

OVERARCHING COMPETENCE

Students can independently apply the methods they have learned to practical problems and develop solutions.

LEARNING UNITS AND CONTENT

TEACHING AND LEARNING UNITS	PRESENCE TIME	SELF-STUDY
Statistics	28	48

- Basics: data collection - characteristic - scale level
Descriptive statistics with one-dimensional data material: frequency distributions - position parameters, mean values -
Scattering parameters, variance and concentration measures
- Descriptive statistics with multidimensional data: ratio and index numbers - correlation - contingency table - regression - time series analysis
- Probability theory: permutations, combinations - probability - random variables,
Distributions - distribution parameters (expected value, variance) -
- Inductive statistics: basics of estimation methods and test theory

LEARNING UNITS AND CONTENT

TEACHING AND LEARNING UNITS	PRESENCE TIME	SELF-STUDY
Operations Research	27	47

- Linear optimization: problem definition - graphical solution - simplex method - duality
- Graph theory: Basics - Shortest paths in graphs - Minimally spanning trees - Network technology
- Simulation: Types of simulation - Techniques (Monte Carlo method, generation of random numbers) - Simulation languages - Areas of application

Optional additional content:
- Transportation problems: NWE rule, stepping stone method, MODI method, linear assignment problem
- Combinatorial and integer optimization: Branch-and-bound method - heuristic optimization Solution method
- Basics of nonlinear optimization

SPECIAL FEATURES

The examination duration only applies to the written examination. The duration of the oral examination is 20 minutes.

PREREQUISITES

Mathematics I

LITERATURE

- Bamberg, G. and Baur, F.: Statistics, Munich
- Domschke, W. and Drexl, A.: Introduction to Operations Research, Berlin
- Heinrich, G.: Operations Research, Munich