

Pflichtfach in den Bachelorstudiengängen (Bachelor of Arts)

Matrix Algebra and Decision Analysis

	Part 1: Matrix Algebra	Part 2: Decision Analysis
Teaching load	2 hours per week	2 hours per week
ECTS Credit points	5 = 150 hours	
	2.5 = 75 hours	2.5 = 75 hours
	Lecture: 30 hours = 15 x 2 hours per week	Lecture: 30 hours = 15 x 2 hours per week
	Self-study: 45 hours <ul style="list-style-type: none"> ➤ 30 h: preparation before and after lectures, reading of handouts and textbooks, PC exercises ➤ 15 h: Preparation for final exam 	Self-study: 45 hours <ul style="list-style-type: none"> ➤ 30 h: preparation before and after lectures, reading of handouts and textbooks ➤ 15 h: Preparation for final exam
Lecturer	Prof. Dr. Karsten Schmidt	Prof. Dr. Hildegard Breig
Course objectives and Learning Outcomes	Students will learn fundamental methods of matrix algebra, disregarding the abstract theory of linear algebra. They should be able to apply matrix algebra methods in different areas (e.g. management science, economics, statistics).	Students are expected to learn concepts, rules and methods of rational decision making. structure decision problems; identify conflicting objectives and trade-offs between alternatives; explain value functions; represent a decision's situation's inherent uncertainty; define risk aversion; describe advantages and disadvantages of group decision making

Topics	<ul style="list-style-type: none"> • Matrix operations • Special matrices • Trace, rank, determinant • Eigenvalues, quadratic forms • Moore-Penrose-Inverse • Solving systems of linear equations • Introduction to the Computer Algebra System DERIVE 	<ul style="list-style-type: none"> • Elements of Decision Problems • Structuring Decisions • Decision Making Under Certainty • Modeling Uncertainty • Modeling Preferences • Group Decision Making
Textbooks	<ul style="list-style-type: none"> ➤ Schmidt, K., Trenkler, G.: Einführung in die Moderne Matrix-Algebra - mit Anwendungen in der Statistik, 2. Aufl. Heidelberg (Springer) 2006 [<i>abbreviated version in English</i>] 	<ul style="list-style-type: none"> ➤ Clemen, R.T., Making Hard Decisions. An Introduction to Decision Analysis, 2nd ed. Duxbury Press 1995 ➤ Brown, R., Rational Choice and Judgment. Decision Analysis for the Decider, Wiley 2005
Teaching methods	Lectures & Exercises in PC lab	<ul style="list-style-type: none"> • Lectures • Exercises
Grading	Final exam (Mathematics II)	Final exam (Mathematics II)
Teaching language	English	English