

Module Handbook (<https://modhb.uni-kl.de/>)

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## Course MAT-52-16-K-7

Robust Optimization (4V+2U, 9.0 LP)

### Course Type

SWS	Type	Course Form	CP (Effort)	Presence-Time / Self-Study
-	K	Lecture with exercise classes (V/U)	9.0 CP	186 h
4	V	Lecture		56 h
2	U	Exercise class (in small groups)		28 h
(4V+2U)			9.0 CP	84 h
				186 h

### Basedata

SWS	4V+2U
CP, Effort	9.0 CP = 270 h
Position of the semester	1 Sem. irreg.
Level	[7] Master (Advanced)
Language	[EN] English
Lecturers	Krumke, Sven Oliver, Prof. Dr. (PROF   DEPT: MAT) (/staff/20/) Ruzika, Stefan, Prof. Dr. (PROF   DEPT: MAT) (/staff/30/) Schöbel, Anita, Prof. Dr. (PROF   DEPT: MAT) (/staff/32/) + further Lecturers of the department Mathematics
Area of study	[MAT-OPT] Optimisation
Additional informations	<a href="https://www.mathematik.uni-kl.de/opt/lehre/">Informations about the course</a> ( <a href="https://www.mathematik.uni-kl.de/opt/lehre/">https://www.mathematik.uni-kl.de/opt/lehre/</a> )
Lifecycle-State	[NORM] Active

### Contents

- modelling with robust optimization,
- modelling and concepts of uncertainty set,
- model reformulations in solvable problems.

- problem complexities,
- linear, non-linear and integer optimization in robust optimization,
- application to combinatorial problems,
- approaches from robust optimization: Soyster approach for uncertain problems; strict robustness; robust regularization; minimax regret approach; adjustable robustness; approach by Bertsimas and Sim; recoverable robustness.

## Literature

- A. Ben-Tal, L. El Ghaoui, A. Nemirovski: Robust Optimization,
- P. Kouvelis, G. Yu: Robust Discrete Optimization and Its Applications.

## Materials

Further literature will be announced in the lecture.

## Requirements for attendance (informal)

### Modules:

- [MAT-10-1-M-2] Fundamentals of Mathematics (M, 28.0 LP) (/mhb/modules/MAT-10-1-M-2/)
- [MAT-14-13-M-3] Linear and Network Programming (M, 9.0 LP) (/mhb/modules/MAT-14-13-M-3/)
- [MAT-50-11-M-4] Integer Programming: Polyhedral Theory and Algorithms (M, 9.0 LP) (/mhb/modules/MAT-50-11-M-4/)

## Requirements for attendance (formal)

None

## References to Course [MAT-52-16-K-7]

Module	Name	Context
[MAT-52-16-M-7 (/mhb/modules/MAT-52-16-M-7/)]	Robust Optimization	P: Obligatory 4V+2U, 9.0 LP