

## Module Handbook

TUK MODHB Homepage

# Course MAT-12-28-K-3

Measure and Integration Theory (2V+1U, 4.5 LP)

## Course Type

SWS	Type	Course Form	CP (Effort)	Presence-Time / Self-Study
-	K	Lecture with exercise classes (V/U)	4.5 CP	93 h
2	V	Lecture		28 h
1	U	Exercise class (in small groups)		14 h
(2V+1U)			4.5 CP	42 h 93 h

## Basedata

SWS	2V+1U
CP, Effort	4.5 CP = 135 h
Position of the semester	1 Sem. in SuSe
Level	[3] Bachelor (Core)
Language	[DE] German
Lecturers	Grothaus, Martin, Prof. Dr. (PROF   DEPT: MAT) Hussein, Amru, Jun. Prof. Dr. (PROF   DEPT: MAT) Korn, Ralf, Prof. Dr. (PROF   DEPT: MAT) Redenbach, Claudia, Prof. Dr. (PROF   DEPT: MAT) Ritter, Klaus, Prof. Dr. (PROF   DEPT: MAT) Sass, Jörn, Prof. Dr. (PROF   DEPT: MAT) + further Lecturers of the department Mathematics
Area of study	[MAT-GRU] Mathematics (B.Sc. year 1 and 2)
Lifecycle-State	[NORM] Active

## Possible Study achievement

- Verification of study performance: **proof of successful participation in the exercise classes (ungraded)**
- Examination number (Study achievement): 83155 ("Exercise Class Measure and Integration Theory")
- Details of the examination (type, duration, criteria) will be announced at the beginning of the course.

### Contents

- systems of sets, Caratheodory theorem,
- d-dimensional Lebesgue measure,
- measurable functions, integral w.r.t. a measure, convergence theorems,
- $L^p$  spaces,
- product measures, Fubini's theorem,
- transformation theorem,
- theorem of Radon-Nikodym.

### Competencies / intended learning achievements

The students know the basic concepts, constructions, results and methods of proof of measure and integration theory. The content of the course is the basis for all advanced courses in stochastics and functional analysis.

### Literature

- J. Elstrodt: Maß- und Integrationstheorie,
- H. Bauer: Maß- und Integrationstheorie.

### Materials

Further literature will be announced in the lecture(s); exercise material is provided.

### Registration

Registration for the exercise classes via the online administration system URM (<https://urm.mathematik.uni-kl.de>).

### Requirements for attendance (informal)

#### Modules:

- [MAT-10-1-M-2] Fundamentals of Mathematics (M, 28.0 LP)

### Requirements for attendance (formal)

None

### References to Course [MAT-12-28-K-3]

<b>Module</b>	<b>Name</b>	<b>Context</b>	
[MAT-12-10P-M-3]	Build-Up Module Mathematics (for Students of Physics)	WP: Obligation to choose	2V+1U, 5.0 LP
[MAT-12-20L_ERW-M-3]	Topic Module A: Mathematics in the Interplay between Abstraction and Concretisation	WP: Obligation to choose	2V+1U, 4.5 LP
[MAT-12-20L-M-3]	Topic Module A: Mathematics in the Interplay between Abstraction and Concretisation	WP: Obligation to choose	2V+1U, 4.5 LP
[MAT-12-2-M-3]	Measure Theory and Differential Equations	P: Obligatory	2V+1U, 4.5 LP
<b>Course-Pool</b>		<b>Name</b>	
[MAT-10-KPOOL-3]	Pure Mathematics (B.Sc. Mathematics)		