

## Module Handbook

TUK MODHB Homepage

# Course MAT-81-15-K-7

## Asymptotic Analysis (2V, 4.5 LP)

### Course Type

SWS	Type	Course Form	CP (Effort)	Presence-Time / Self-Study	
2	V	Lecture	4.5 CP	28 h	107 h
(2V)			4.5 CP	28 h	107 h

### Basedata

SWS	2V
CP, Effort	4.5 CP = 135 h
Position of the semester	1 Sem. irreg.
Level	[7] Master (Advanced)
Language	[EN] English
Lecturers	Klar, Axel, Prof. Dr. (PROF   DEPT: MAT) Pinnau, René, Prof. Dr. (PROF   DEPT: MAT) + further Lecturers of the department Mathematics
Area of study	[MAT-TEMA] Industrial Mathematics
Additional informations	<a href="#">Informations about the course</a>
Lifecycle-State	[NORM] Active

### Contents

The mathematical techniques for flow computation and the theory of asymptotic expansions for differential equations are provided and analysed. In particular, the following topics are covered:

- regular and singular disturbed problems,
- scaling,
- multi-scale expansions,
- boundary layers for differential equations.

## Literature

- G. I. Barenblatt: Scaling,
- N. G. De Bruijn: Asymptotic methods in analysis,
- M. H. Holmes: Introduction to perturbation methods,
- U. Hornung: Homogenization and porous media,
- J. K. Hunter: Asymptotic analysis and singular perturbation theory (Lecture Notes).

## 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)
- [MAT-80-11A-M-4] Numerics of ODE (M, 4.5 LP)
- [MAT-80-11B-M-4] Introduction to PDE (M, 4.5 LP)

## Requirements for attendance (formal)

None

## References to Course [MAT-81-15-K-7]

Module	Name	Context	
[MAT-81-15-M-7]	Asymptotic Analysis	P: Obligatory	2V, 4.5 LP