

Module Handbook

TUK MODHB Homepage

Course MAT-12-24-K-3

Introduction to Complex Analysis (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 WiSe
Level	[3] Bachelor (Core)
Language	[DE] German
Lecturers	Gathmann, Andreas, Prof. Dr. (PROF DEPT: MAT) Lassueur, Caroline, Jun. Prof. Dr. (PROF DEPT: MAT) Malle, Gunter, Prof. Dr. (PROF DEPT: MAT) Schulze, Mathias, Prof. Dr. (PROF DEPT: MAT) Thiel, Ulrich, 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): 83140 ("Exercise Class Introduction to Complex Analysis")
- Details of the examination (type, duration, criteria) will be announced at the beginning of the course.

Contents

- complex differential calculus: holomorphic functions, Cauchy-Riemannian differential equations,
- complex integral calculus: curve integrals, Cauchy's integral theorem and applications,
- singularities of holomorphic functions: Laurent series, removable singularity theorem,
- residue theorem and applications.

Competencies / intended learning achievements

The students know the basic concepts, statements and methods of complex analysis. They know and understand how the concepts of real analysis can be transferred to analysis over the complex numbers. In particular, they have acquired a deeper understanding of elementary functions. They have learned that an elegant mathematical theory can produce results of great significance.

Literature

- W. Fischer, I. Lieb: Funktionentheorie -Komplexe Analysis in einer Veränderlichen,
- R. Remmert, Funktionentheorie 1.

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)

Basic knowledge in multidimensional analysis (in particular: partial derivatives), e.g. from the courses [MAT-10-12-K-2] or [MAT-10-12L-K-2].

Courses

- [MAT-10-11A-K-2] Fundamentals of Mathematics I: Analysis (4V+2U+2T, 9.0 LP)
- [MAT-10-11B-K-2] Fundamentals of Mathematics I: Linear Algebra (2V+2U, 6.0 LP)

Requirements for attendance (formal)

None

References to Course [MAT-12-24-K-3]

Module	Name	Context	
[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

Course-Pool

Name

[MAT-10-KPOOL-3]	Pure Mathematics (B.Sc. Mathematics)
[PHY-M2-KPOOL-3]	Höhere Analysis (für Studierende der Physik)