

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

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Module MAT-10-11-M-2

Fundamentals of Mathematics A: Linear Algebra I and Analysis I (M, 15.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
MAT-10-11-M-2	<i>Fundamentals of Mathematics A: Linear Algebra I and Analysis I</i>	15.0 CP (450 h)

Basedata

CP, Effort	15.0 CP = 450 h
Position of the semester	1 Sem. in WiSe/SuSe
Level	[2] Bachelor (Fundamentals)
Language	[DE] German
Module Manager	Lossen, Christoph, Dr. habil. (WMA DEPT: MAT) (/staff/24/)
Lecturers	Lecturers of the department Mathematics
Area of study	[MAT-EDU] Mathematics (B.Ed./M.Ed.)
Reference course of study	[MAT-31.105-SG] B.Ed. LaGR Mathematics (/mhb/FB-MAT/cos-588/)
Lifecycle-State	[NORM] Active

Notice

To prepare for the course, it is recommended to participate in the Online Mathematics Bridge Course (OMB+), see <https://www.mathematik.uni-kl.de/omb/> (<https://www.mathematik.uni-kl.de/omb/>)

The course is also offered as distance learning course as part of the early entrance programme FiMS, see <https://fims.mathematik.uni-kl.de> (<https://fims.mathematik.uni-kl.de>)

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V+2U	MAT-10-11B-K-2 (/mhb/courses/MAT-10-11B-K-2/)	P	SL1	PL1	6.0	WiSe/SuSe
4V+2U+2T	MAT-10-11A-K-2 (/mhb/courses/MAT-10-11A-K-2/)	P	SL1	PL1	9.0	WiSe/SuSe

- About [**MAT-10-11B-K-2**]: Title: "Fundamentals of Mathematics I: Linear Algebra"; Presence-Time: 56 h; Self-Study: 124 h
- About [**MAT-10-11B-K-2**]: The study achievement must be obtained. It is a prerequisite for the examination for PL1 .
- About [**MAT-10-11A-K-2**]: Title: "Fundamentals of Mathematics I: Analysis"; Presence-Time: 112 h; Self-Study: 158 h
- About [**MAT-10-11A-K-2**]: The study achievement must be obtained. It is a prerequisite for the examination for PL1 .

Study achievement SL1

- Verification of study performance: **proof of successful participation in the exercise classes (incl. written examination)**
- Study achievement is a prerequisite for the examination.
- Examination number (Study achievement): 82015 ("Exercise Class Fundamentals of Mathematics I")

Der qualifizierte Übungsschein kann in Form von zwei Teilleistungen (qualifizierter Übungsschein zu „Grundlagen der Mathematik I: Lineare Algebra“ und qualifizierter Übungsschein zu „Grundlagen der Mathematik I: Analysis“) erbracht werden.

Examination achievement PL1

- Form of examination: **oral examination (30-45 Min.)**
- Examination Frequency: each semester
- Examination number: 80105 ("Fundamentals of mathematics I: Linear Algebra & Analysis")

Evaluation of grades

The grade of the module examination is also the module grade.

Contents

Fundamentals of Mathematics I: Linear Algebra:

- vector spaces,
- linear mappings,
- linear systems of equations,
- matrices,
- determinants.

Fundamentals of Mathematics I: Analysis:

- real and complex numbers,
- sequences, limit values and series; power series,
- elementary functions; continuity,
- differentiation (in the one-dimensional case),
- integration (in the one-dimensional case).

Competencies / intended learning achievements

Upon successful completion of this module, the students

- have mastered the basic concepts of Linear Algebra and one-dimensional Analysis as a foundation for further scientific studies; through the exercises and the tutorials they have acquired a confident, precise and independent handling of the

terms, statements and methods dealt with in the lectures;

- are trained in analytical thinking; they are able to recognise abstract structures and to work on mathematical problems imaginatively;
- are able to convey elementary mathematical facts; their teamwork and communication skills have been trained through exercises and tutorials.

Literature

- G. Fischer: Lineare Algebra,
- K. Jänich: Lineare Algebra,
- H.-J. Kowalsky, G.O. Michler: Lineare Algebra,
- S. Bosch: Lineare Algebra,
- O. Forster: Analysis 1,
- H. Heuser: Lehrbuch der Analysis, Teil 1,
- M. Barner, F. Flohr: Analysis I,
- K. Königsberger: Analysis 1.

Registration

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

Requirements for attendance (informal)

None

Requirements for attendance (formal)

None

References to Module / Module Number [MAT-10-11-M-2]

Course of Study	Section	Choice/Obligation
[MAT-31.105-SG] B.Ed. LaGR Mathematics (/mhb/FB-MAT/cos-588/)	Compulsory Modules	[P] Compulsory
[MAT-47.105-SG] B.Ed. LaBBS Mathematics (/mhb/FB-MAT/cos-598/)	Compulsory Modules	[P] Compulsory
[MAT-B4.105-SG] ZEP LaG Mathematics (/mhb/FB-MAT/cos-645/)	Compulsory Elective Modules	[WP] Compulsory Elective
[MAT-B2.105-SG] ZEP LaRSP Mathematics (/mhb/FB-MAT/cos-652/)	Compulsory Elective Modules	[WP] Compulsory Elective
[MAT-B5.105-SG] ZEP LaBBS Mathematics (/mhb/FB-MAT/cos-660/)	Compulsory Elective Modules	[WP] Compulsory Elective