TECHNISCHE UNIVERSITÄT KAISERSLAUTERN

Module Handbook

TUK MODHB Homepage

Module MAT-12-10A-M-2

Pure Mathematics A (M, 10.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
MAT-12-10A-M-2	*Pure Mathematics A*	10.0 CP (300 h)

Basedata

CP, Effort	10.0 CP = 300 h
Position of the semester	2 Sem. from WiSe/SuSe
Level	[2] Bachelor (Fundamentals)
Language	[DE] German
Module Manager	Lossen, Christoph, Dr. habil. (WMA | DEPT: MAT)
Lecturers	The Lecturers of the department Mathematics
Area of study	[MAT-GRU] Mathematics (B.Sc. year 1 and 2)
Reference course of study	[MAT-82.105-SG] B.Sc. Mathematics
Livecycle-State	[NORM] Active

Notice

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

Module Part #A "*Algebraic Structures*" (Obligatory, 5.5 LP)

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V+2U	MAT-12-11-K-2	P	qU-Schein	PL1	5.5	WiSe/SuSe

- About **[MAT-12-11-K-2]**: Title: "Algebraic Structures"; Presence-Time: 56 h; Self-Study: 109 h

- About **[MAT-12-11-K-2]**: The study achievement **"[qU-Schein] proof of successful participation in the exercise classes (incl. written examination)"** must be obtained.
  - It is a prerequisite for the examination for PL1.

Module Part #B "*Pure Mathematics A1*" (Obligatory, 4.5 LP)

Type/SWS	Course Number	Choice in Module-Part	Choice in Course-Pool	SL	PL	CP	Sem.
KPOOL	**MAT-10-KPOOL-3**	P	WP-1	U-Schein	PL1	[4.5]	*

- About **[MAT-10-KPOOL-3]**: Title: "Pure Mathematics (B.Sc. Mathematics)";
- About **[MAT-10-KPOOL-3]**: A course from the course pool must be selected.
- About **[MAT-10-KPOOL-3]**: The study achievement **"[U-Schein] proof of successful participation in the exercise classes (ungraded)"** must be obtained.

Examination achievement PL1

- Form of examination: **oral examination (20-30 Min.)**
- Examination Frequency: each semester
- Examination number: 82027 ("Module Exam Pure Mathematics A")

> As far as the module part #B is concerned, it is generally possible to give the module examination PL1 to another courses than the required study achievement (proof of successful participation in the exercise classes). This requires that none of the courses involved has already been included in another module.

Evaluation of grades

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

Contents

A. Algebraic structures:

- Basic algebraic structures: groups, rings, fields (in particular: symmetric group);
- Substructures and factor structures (in particular: normal subgroups, isomorphism theorems);
- principal ideal domains: $\mathbb{Z}$, polynomial ring K[t] (in particular: Euclidean algorithm).

B. Pure Mathematics A1:

Introduction to an area of pure mathematics of choice from: Algebra, Differential Equations, Elementary Number Theory, Functional Analysis, Complex Analysis, Measure and Integration Theory, Topology, Vector Analysis or any other area of pure mathematics.

Competencies / intended learning achievements

Upon successful completion of this module, the students know and understand the axiomatic methodology of mathematics and the basic structures and methods of algebra. In addition, they have acquired basic knowledge in an area of pure mathematics, building on the knowledge they acquired in the first semester. They have learned to recognise general mathematical structures and to formulate statements about them precisely. Their creativity in dealing with abstract structures was promoted. They have learned to understand mathematical proofs and to independently prove or disprove mathematical statements in simple examples.

In the exercise classes they have acquired a confident, precise and independent handling of the terms, propositions and methods from the lectures. Special attention has been paid to learning a logically correct, complete argumentation.

Literature

see course descriptions

Registration

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

Requirements for attendance of the module (informal)

see course descriptions

Requirements for attendance of the module (formal)

None

References to Module / Module Number [MAT-12-10A-M-2]

Course of Study	Section	Choice/Obligation
[MAT-82.105-SG] B.Sc. Mathematics	[Core Modules (non specialised)] Pure Mathematics	[P] Compulsory
[MAT-82.276-SG] B.Sc. Business Mathematics	[Core Modules (non specialised)] General Mathematics	[WP] Compulsory Elective