### Module title

**Linear Algebra**

**Abbreviation**

10-M-LNA-072-m01

### Module coordinator

Dean of Studies Mathematik (Mathematics)

### Module offered by

Institute of Mathematics

### ECTS

18

### Method of grading

numerical grade

### Only after succ. compl. of module(s)

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### Duration

2 semester

### Module level

undergraduate

### Other prerequisites

By way of exception, additional prerequisites are listed in the section on assessments.

### Contents

Sets, relations and maps; notions of groups, rings and fields (in particular, polynomial rings); vector spaces (subspaces, quotient spaces, linear independency, basis, dimension); linear maps (isomorphism theorem, image, kernel, rank); matrix calculus; systems of linear equations, determinants, eigenvalues, eigenvectors and eigenspaces, diagonalisability (including characteristic polynomial, minimal polynomial), normal forms, bilinear forms; Euclidean and unitary vector spaces (orthonormal bases, isometries, principal axis transformation).

### Intended learning outcomes

The student knows and masters the basic notions and essential methods of linear algebra. He/She is able to perform easy mathematical arguments independently, and can present them adequately in written and oral form. He/She is able to apply the central proof methods and concepts of linear algebra and knows about their algebraic and geometric background.

### Courses

This module comprises 3 module components. Information on courses will be listed separately for each module component.

- **10-M-LNA-1-072: V + Ü** (no information on SWS (weekly contact hours) and course language available)
- **10-M-LNA-2-072: V + Ü** (no information on SWS (weekly contact hours) and course language available)
- **10-M-LNA-P-072: M** (no information on SWS (weekly contact hours) and course language available)

### Method of assessment

#### Assessment in module component 10-M-LNA-1-072: Linear Algebra 1

- **8 ECTS, Method of grading:** (not) successfully completed
- **Language of assessment:** German, English if agreed upon with the examiner

**Other prerequisites:** Module 10-M-VKM is recommended.

#### Assessment in module component 10-M-LNA-2-072: Linear Algebra 2

- **8 ECTS, Method of grading:** (not) successfully completed
- **Language of assessment:** German, English if agreed upon with the examiner

**Other prerequisites:** Module 10-M-VKM is recommended; in addition, module component 10-M-LNA-1 is recommended for module component 10-M-LNA-2.

#### Assessment in module component 10-M-LNA-P-072: Examination in Linear Algebra

- **2 ECTS, Method of grading:** numerical grade
- **Language of assessment:** German, English if agreed upon with the examiner

**Other prerequisites:** Module 10-M-VKM is recommended.
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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<td>Bachelor' degree (1 major) Mathematics (2007)</td>
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