Valid from 2024.HS

Module description: Linear Algebra 2

Module Code	t.BA.XXM5.LA2.19HS
ECTS Credits	4
Language of Instruction/Examination	German
Organizational Unit	ICP
Module Coordinator	Matthias Schmid
Legal Framework	The module description is part of the legal basis in addition to the general academic regulations. It is binding. During the first week of the semester a written and communicated supplement can specify the module description in more detail.
Module Characteristic	Type 2b 2 times 2 lecture lessons (not necessarily consecutive) per semester week and class
Module Description	Students are familiarized with vector spaces, linear mappings, eigenvalues and eigenvectors. They learn how to mathematically describe linear mappings on vector spaces, using vectors and matrices, and apply these concepts to Fourier analysis and to the solution of linear differential equations.
Module Content	**Vector spaces and vector space axioms** **Subspaces** **Linear independence of vectors** **Basis and dimension of vector spaces** **Inner product, norm and orthonormal bases of vector spaces** **Fourier series** **Linear Mappings** **Examples of linear mappings (reflections, scalings, rotations and projections)** **Fundamental spaces of a matrix (null space and column space)** **Invertible linear mappings (isomorphisms)** **Change of basis of a vector space** **Calculation of eigenvalues and eigenvectors** **Basis of eigenvectors and diagonalization of matrices** **Applications of diagonalization (e.g. linear ordinary differential equations)**
Prerequisite Knowledge	• Knowledge of mathematics of the „technische Berufsmaturität“ • Knowledge of linear algebra 1 for ET/ST

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Learning Objectives (Competences)

Students...	Competencies	Taxonomies
You are familiar with linear mappings between vector spaces and you are able to describe them with respect to arbitrary bases using matrices and vectors.	M, F	K2, K3
You can calculate eigenvalues and eigenvectors of linear mappingsand examine matrices for their diagonalizability. You are able to apply thediagonalization of matrices as an important practical insight from linear algebrato technical contexts.	M, F	K2, K3
You are familiar with the abstract notion of a vector space and its subspaces. You can describe vectors as coordinate vectors with respect to some basis. In particular, you know the Fourier series as an application of this concept.	M, F	K2, K3
You are able to identify and to solve linear ordinary differential equations with constant coefficients using linear algebraic methods.	F, M	K2, K3

Performance Assessment

End-of-module exam	Assessment	Length (min.)	Weighting	Form
written exam	Grade	120	100	acc. to module agreement

Performance assessment during the semester	Assessment	Length (min.)	Weighting	Form
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Classroom Attendance Requirement

None

Learning material

Comments