Valid from 2026.HS

Module description: Linear Algebra 1

Module Code	t.BA.XXM5.LA1.19HS
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	In this course, you learn the basic tools of linear algebra. These include vector and matrix calculus and the solution of linear equation systems. You also learn how to calculate with complex numbers and to use them in a number of applications.
Module Content	**Number sets: real numbers and field axioms** **Complex numbers and the complex plane** **Calculus with complex numbers (summation and multiplication)** **Polar form of complex numbers (polar coordinates, modulus and argument)** **Euler‘s formula and exponential form of complex numbers** **Powers and roots of complex numbers** **Vectors in R^n and C^n** **Norm of a vector, inner product and angle between vectors** **Orthogonal Projection** **Parametric representations of lines and planes in R^3** **Cross Product of vectors** **Matrices and matrix product** **Matrices and matrix product** **Solution of systems of linear equations, Gauss elimination and row echelon form** **Linear least squares method.** **Inverse Matrix** **Derminant**
Prerequisite Knowledge	Knowledge of mathematics of the "technische Berufsmaturität"

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Learning Objectives (Competencies)

Students...	Competencies	Taxonomies
You are able to recognize systems of linear equations and use suitable methods to solve them. In addition, you can apply the linear least square method to overdetermined systems of linear equations.	F, M	K2, K3
You know complex numbers and their arithmetic operations in their various representations.	F, M	K2, K3
You are familiar with the basic operations of matrix calculus.These include the calculation of matrix products, determinants, inverse matrices, etc.	F, M	K2, K3
You are familiar with geometric calculus. You areable to compute norm, inner products, orthogonalprojection, and cross product of vectors and usevectors to describe geometric objects.	M, F	K2, K3

Performance Assessment

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

	Assessment	Length (min.)	Weighting	Social Form	Scenario/Format
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Classroom Attendance Requirement

None