Module description: Algebra and Statistics 2

Module Code	t.BA.XXM6.AS2.19HS
ECTS Credits	4
Language of Instruction/Examination	German
Organizational Unit	IAMP
Module Coordinator	Karl Reiner Lermer
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	This module covers linear transformations, eigenvectors and eigenvalues, continuous probability distributions, the Gaussian distribution, the central limit theorem, deductive statistics and also linear regression.
Module Content	• Linear transformations • Eigenvectors and eigenvalues • Continuous probability distributions • Gaussian distribution • Central limit theorem • Deductive statistics • Linear regression
Prerequisite Knowledge	Mathematics of the technical vocational baccalaureate

Learning Objectives (Competences)	Students...	Competencies	Taxonomies
	You are able to calculate linear regression lines.	F, M	K2, K3
	You are able to use the competencies listedabove to solve more complex problems.	M, F	K3
	You are able to- compute real eigenvalues and eigenvectors of linear transformations and matrices.	F, M	K2, K3
	You are able to- determine whether a transformation is linear.- derive the transformation matrix of a linear transformation.- calculate and apply the composition of linear transformations as a product of matrices- define and apply two and three dimensional compressions, rotations, projections and reflections.	M, F	K2, K3
	You are accustomed to basic terms of deductive statistics (point and interval estimate, bias and consistency)You are able to calculate confidence intervals and derive hypothesis tests.	F, M	K2, K3
	You are able to-distinguish discrete and continuous random variables-calculate the expected value, the variance and the standard deviation of continuous random variables.- apply the probability density function (PDF) and cumulative distribution function (CDF) of the Gaussian distribution in examples. -explain and apply the central limit theorem.	M, F	K2, K3

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Performance Assessment	End-of-module exam	Assessment	Length (min.)	Weighting	Form
	written exam	Grade	90	70	acc. to module agreement

	Performance assessment during the semester	Assessment	Length (min.)	Weighting	Form
	written exam	Grade	45	20	acc. to module agreement
	Regular Exams *for instance online tests*	Grade		10	acc. to module agreement

Classroom Attendance Requirement	None
Learning material	• depending on lecturer
Comments	Supplementary literature: Gramlich, G., Lineare Algebra – Eine Einführung (München: Carl Hanser Verlag, 4. Aufl. 2014), ISBN: 978-3446441408 Sachs, M., Wahrscheinlichkeitsrechnung und Statistik: für Ingenieurstudenten an Fachhochschulen (München: Carl Hanser Verlag, 4. Aufl. 2013), ISBN: 978-3446437975 Papula, L., Mathematische Formelsammlung: Für Ingenieure und Naturwissenschaftler (Wiesbaden: Springer Vieweg, 12. Aufl. 2017), ISBN 978-3658161941