Karlsruher Institut für Technologie

Module Handbook Economathematics M.Sc.

SPO 2016

Summer term 2019

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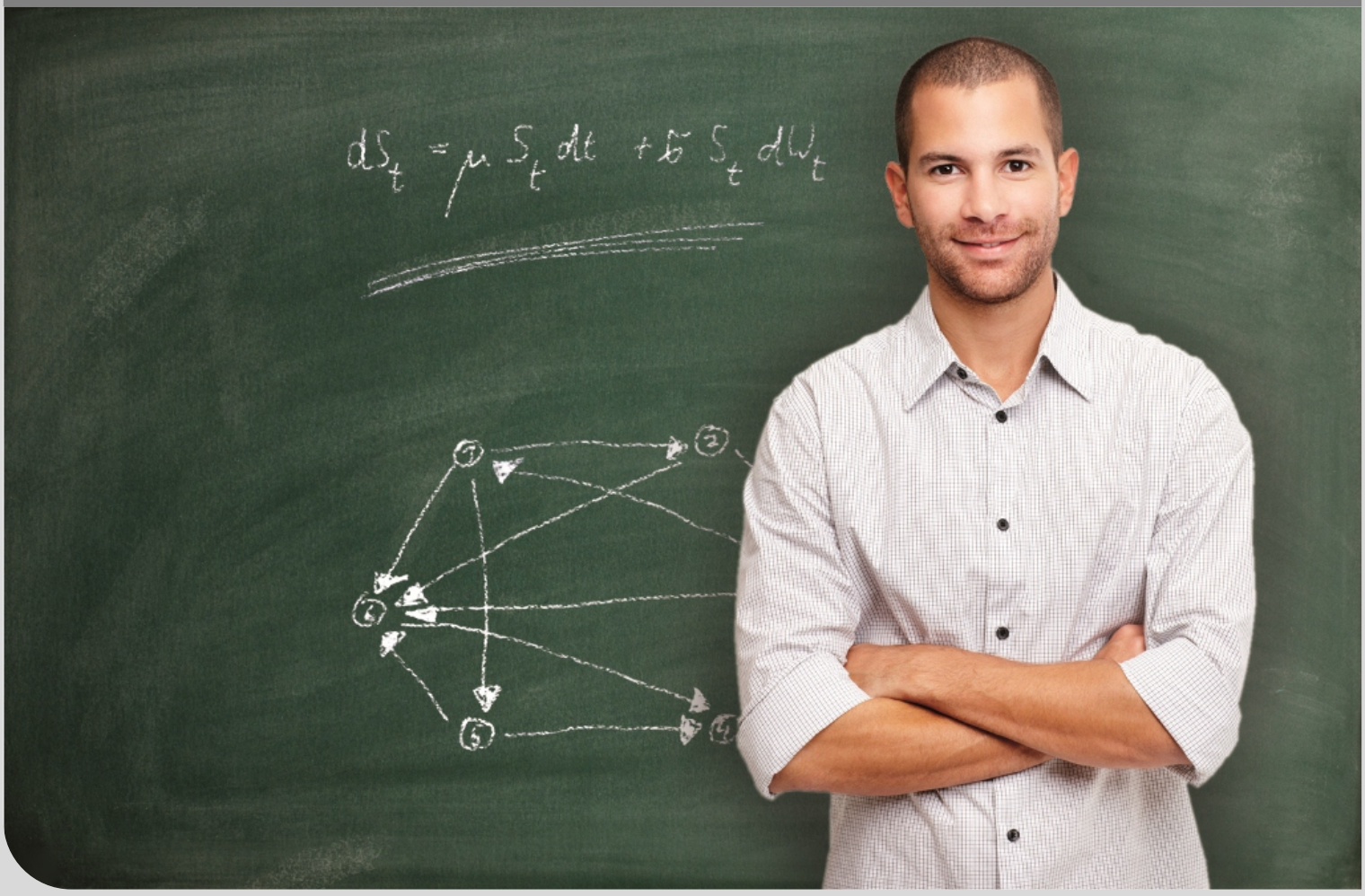
KIT DEPARTMENT OF ECONOMICS AND MANAGEMENT / KIT DEPARTMENT OF MATHEMATICS



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1 Welcome to the new module handbook of your study programme

We are delighted that you have decided to study at the KIT Department of Economics and Management and wish you a good start into the new semester!

The following contact persons are at your disposal for questions and problems at any time.

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Write to us!

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2 Field of study structure

Mandatory	
Master Thesis	30 CR
Mathematical Methods	36 CR
Finance - Risk Management - Managerial Economics	18 CR
Operations Management - Data Analysis - Informatics	18 CR
Seminar in Economics and Management	3 CR
Mathematical Seminar	3 CR
Elective Field	12 CR

2.1 Master Thesis

Credits
30

Mandatory		
M-MATH-102917	Master Thesis	30 CR

2.2 Mathematical Methods

Credits
36

Election block: Stochastik (at least 8 credits)		
M-MATH-102860	Continuous Time Finance	8 CR
M-MATH-102865	Stochastic Geometry	8 CR
M-MATH-102902	Asymptotic Stochastics	8 CR
M-MATH-102903	Spatial Stochastics	8 CR
M-MATH-102904	Brownian Motion	4 CR
M-MATH-102905	Percolation	6 CR
M-MATH-102906	Generalized Regression Models	4 CR
M-MATH-102907	Markov Decision Processes	5 CR
M-MATH-102908	Stochastic Control	4 CR
M-MATH-102909	Mathematical Statistics	4 CR
M-MATH-102910	Nonparametric Statistics	4 CR
M-MATH-102911	Time Series Analysis	4 CR
M-MATH-102919	Discrete Time Finance	8 CR
M-MATH-102922	Poisson Processes	5 CR
M-MATH-102939	Extreme Value Theory	4 CR
M-MATH-102942	Stochastic Evolution Equations	8 CR
M-MATH-102946	Stein's Method	5 CR
M-MATH-102947	Probability Theory and Combinatorial Optimization	8 CR
M-MATH-102951	Random Graphs	6 CR
M-MATH-102956	Forecasting: Theory and Practice	8 CR
M-MATH-104055	Ruin theory	4 CR
Election block: Analysis oder Angewandte und Numerische Mathematik, Optimierung (at least 8 credits)		
M-MATH-101320	Functional Analysis	8 CR
M-MATH-101335	Special Functions and Applications in Potential Theory	5 CR
M-MATH-101768	Spectral Theory	8 CR
M-MATH-102870	Classical Methods for Partial Differential Equations	8 CR
M-MATH-102871	Boundary and Eigenvalue Problems	8 CR
M-MATH-102872	Evolution Equations	8 CR
M-MATH-102873	Fourier Analysis	8 CR
M-MATH-102874	Integral Equations	8 CR
M-MATH-102878	Complex Analysis	8 CR
M-MATH-102879	Potential Theory	8 CR
M-MATH-102881	Stochastic Differential Equations	8 CR
M-MATH-102882	Calculus of Variations	8 CR
M-MATH-102883	Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems	8 CR
M-MATH-102885	Maxwell's Equations	8 CR
M-MATH-102890	Inverse Problems	8 CR
M-MATH-102924	Optimization in Banach Spaces	8 CR
M-MATH-102926	Sobolev Spaces	5 CR
M-MATH-102927	Traveling Waves	6 CR
M-MATH-102941	Control Theory	6 CR
M-MATH-102942	Stochastic Evolution Equations	8 CR
M-MATH-102952	L2-Invariants	5 CR
M-MATH-103080	Dynamical Systems	8 CR
M-MATH-103257	Nonlinear Maxwell Equations	3 CR
M-MATH-103259	Bifurcation Theory	5 CR

M-MATH-103539	Nonlinear Analysis	8 CR
M-MATH-103545	Harmonic Analysis for Dispersive Equations	8 CR
M-MATH-102884	Scattering Theory	8 CR
M-MATH-104059	Mathematical Topics in Kinetic Theory	4 CR
M-MATH-104425	Dispersive equations	6 CR
M-MATH-104435	Selected Topics in Harmonic Analysis	3 CR
M-MATH-101338	Parallel Computing	5 CR
M-MATH-102888	Numerical Methods for Differential Equations	8 CR
M-MATH-102889	Introduction to Scientific Computing	8 CR
M-MATH-102891	Finite Element Methods	8 CR
M-MATH-102892	Numerical Optimisation Methods	8 CR
M-MATH-102894	Numerical Methods in Computational Electrodynamics	6 CR
M-MATH-102895	Wavelets	8 CR
M-MATH-102896	Medical Imaging	8 CR
M-MATH-102897	Mathematical Methods in Signal and Image Processing	8 CR
M-MATH-102899	Optimisation and Optimal Control for Differential Equations	4 CR
M-MATH-102900	Adaptive Finite Elemente Methods	6 CR
M-MATH-102901	Numerical Methods in Mathematical Finance	8 CR
M-MATH-102914	Numerical Methods in Mathematical Finance II	8 CR
M-MATH-102915	Numerical Methods for Hyperbolic Equations	6 CR
M-MATH-102920	Special Topics of Numerical Linear Algebra	8 CR
M-MATH-102921	Geometric Numerical Integration	6 CR
M-MATH-102928	Numerical Methods for Time-Dependent Partial Differential Equations	8 CR
M-MATH-102929	Mathematical Modelling and Simulation in Practise	4 CR
M-MATH-102930	Numerical Methods for Integral Equations	8 CR
M-MATH-102931	Numerical Methods for Maxwell's Equations	6 CR
M-MATH-102932	Numerical Methods in Fluid Mechanics	4 CR
M-MATH-102935	Compressive Sensing	5 CR
M-MATH-102936	Functions of Operators	6 CR
M-MATH-102937	Functions of Matrices	8 CR
M-MATH-102938	Project Centered Software-Lab	4 CR
M-MATH-102943	Introduction into Particulate Flows	3 CR
M-MATH-102944	Numerical Continuation Methods	5 CR
M-MATH-102945	Introduction to Matlab and Numerical Algorithms	5 CR
M-MATH-102955	Advanced Inverse Problems: Nonlinearity and Banach Spaces	5 CR
M-MATH-103260	Mathematical Methods of Imaging	5 CR
M-MATH-103527	Foundations of continuum mechanics	3 CR
M-MATH-103700	Exponential Integrators	6 CR
M-MATH-103709	Numerical Linear Algebra for Scientific High Performance Computing	3 CR
M-MATH-103919	Introduction to Kinetic Theory	4 CR
M-MATH-104054	Uncertainty Quantification	4 CR
M-MATH-104058	Numerical Linear Algebra in Image Processing	6 CR
M-MATH-104426	Comparison of numerical integrators for nonlinear dispersive equations	4 CR
M-MATH-104827	Fourier analysis and its applications to PDEs neu	4 CR
M-MATH-103540	Boundary Element Methods neu	8 CR
M-MATH-102887	Monotonicity Methods in Analysis neu	3 CR
Election block: Algebra und Geometrie (at most 20 credits)		
M-MATH-101315	Algebra	8 CR
M-MATH-101317	Differential Geometry	8 CR
M-MATH-101336	Graph Theory	8 CR
M-MATH-101724	Algebraic Geometry	8 CR

M-MATH-101725	Algebraic Number Theory	8 CR
M-MATH-102864	Convex Geometry	8 CR
M-MATH-102867	Geometric Group Theory	8 CR
M-MATH-102948	Algebraic Topology	8 CR
M-MATH-102949	Introduction to Geometric Measure Theory	6 CR
M-MATH-102950	Combinatorics	8 CR
M-MATH-102952	L2-Invariants	5 CR
M-MATH-102957	Extremal Graph Theory	8 CR
M-MATH-102958	Spin Manifolds, Alpha Invariant and Positive Scalar Curvature	5 CR
M-MATH-102959	Homotopy Theory	8 CR
M-MATH-102960	The Riemann Zeta Function	4 CR
M-MATH-102865	Stochastic Geometry	8 CR
M-MATH-102866	Geometry of Schemes	8 CR
M-MATH-102912	Global Differential Geometry	8 CR
M-MATH-102940	Comparison Geometry	5 CR
M-MATH-102953	Algebraic Topology II	8 CR
M-MATH-102954	Group Actions in Riemannian Geometry	5 CR
M-MATH-103258	Finite group schemes	4 CR
M-MATH-104053	Commutative Algebra	8 CR
M-MATH-104057	Key Moments in Geometry	5 CR
M-MATH-104261	Lie groups and Lie algebras	8 CR
M-MATH-104349	Bott Periodicity	5 CR

2.3 Finance - Risk Management - Managerial Economics

Credits
18

Election block: Finance - Risk Management - Managerial Economics (at least 18 credits)		
M-WIWI-101478	Innovation and Growth	9 CR
M-WIWI-101480	Finance 3	9 CR
M-WIWI-101482	Finance 1	9 CR
M-WIWI-101483	Finance 2	9 CR
M-WIWI-101496	Growth and Agglomeration	9 CR
M-WIWI-101500	Microeconomic Theory	9 CR
M-WIWI-101502	Economic Theory and its Application in Finance	9 CR
M-WIWI-101504	Collective Decision Making	9 CR
M-WIWI-101505	Experimental Economics	9 CR
M-WIWI-101637	Analytics and Statistics	9 CR
M-WIWI-101638	Econometrics and Statistics I	9 CR
M-WIWI-101639	Econometrics and Statistics II	9 CR
M-WIWI-102970	Decision and Game Theory	9 CR
M-WIWI-103247	Intelligent Risk and Investment Advisory	9 CR
M-WIWI-103261	Disruptive FinTech Innovations	9 CR
M-WIWI-103119	Advanced Topics in Strategy and Management	9 CR
M-WIWI-103720	eEnergy: Markets, Services and Systems	9 CR
M-WIWI-104068	Information Systems in Organizations	9 CR

2.4 Operations Management - Data Analysis - Informatics

Credits
18

Election block: Operations Management - Datenanalyse - Informatik (at least 18 credits)		
M-WIWI-101413	Applications of Operations Research	9 CR
M-WIWI-101414	Methodical Foundations of OR	9 CR
M-WIWI-101452	Energy Economics and Technology	9 CR
M-WIWI-101472	Informatics	9 CR
M-WIWI-101473	Mathematical Programming	9 CR
M-WIWI-101490	Marketing Management	9 CR
M-WIWI-102832	Operations Research in Supply Chain Management	9 CR
M-WIWI-102805	Service Operations	9 CR
M-WIWI-103289	Stochastic Optimization	9 CR

2.5 Seminar in Economics and Management

Credits
3

Election block: Wirtschaftswissenschaftliches Seminar (at least 3 credits)		
M-WIWI-102971	Seminar	3 CR
M-WIWI-102973	Seminar	3 CR

2.6 Mathematical Seminar

Credits
3

Mandatory		
M-MATH-102730	Seminar	3 CR

2.7 Elective Field

Credits
12

Election block: Wahlpflichtfach (at least 12 credits)		
M-MATH-102864	Convex Geometry	8 CR
M-MATH-102866	Geometry of Schemes	8 CR
M-MATH-102872	Evolution Equations	8 CR
M-MATH-102879	Potential Theory	8 CR
M-MATH-102883	Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems	8 CR
M-MATH-102888	Numerical Methods for Differential Equations	8 CR
M-MATH-102890	Inverse Problems	8 CR
M-MATH-102891	Finite Element Methods	8 CR
M-MATH-102894	Numerical Methods in Computational Electrodynamics	6 CR
M-MATH-102904	Brownian Motion	4 CR
M-MATH-102906	Generalized Regression Models	4 CR
M-MATH-102909	Mathematical Statistics	4 CR
M-MATH-102910	Nonparametric Statistics	4 CR
M-MATH-102924	Optimization in Banach Spaces	8 CR
M-MATH-102927	Traveling Waves	6 CR
M-MATH-102931	Numerical Methods for Maxwell's Equations	6 CR
M-MATH-102936	Functions of Operators	6 CR
M-MATH-101315	Algebra	8 CR
M-MATH-101724	Algebraic Geometry	8 CR
M-MATH-101725	Algebraic Number Theory	8 CR
M-MATH-101768	Spectral Theory	8 CR
M-MATH-102867	Geometric Group Theory	8 CR
M-MATH-102874	Integral Equations	8 CR
M-MATH-102882	Calculus of Variations	8 CR
M-MATH-102899	Optimisation and Optimal Control for Differential Equations	4 CR
M-MATH-102905	Percolation	6 CR
M-MATH-102915	Numerical Methods for Hyperbolic Equations	6 CR
M-MATH-102947	Probability Theory and Combinatorial Optimization	8 CR
M-MATH-102951	Random Graphs	6 CR
M-MATH-102956	Forecasting: Theory and Practice	8 CR
M-MATH-101317	Differential Geometry	8 CR
M-MATH-101320	Functional Analysis	8 CR
M-MATH-101335	Special Functions and Applications in Potential Theory	5 CR
M-MATH-101336	Graph Theory	8 CR
M-MATH-101338	Parallel Computing	5 CR
M-MATH-102860	Continuous Time Finance	8 CR
M-MATH-102873	Fourier Analysis	8 CR
M-MATH-102878	Complex Analysis	8 CR
M-MATH-102885	Maxwell's Equations	8 CR
M-MATH-102889	Introduction to Scientific Computing	8 CR
M-MATH-102892	Numerical Optimisation Methods	8 CR
M-MATH-102930	Numerical Methods for Integral Equations	8 CR
M-MATH-102940	Comparison Geometry	5 CR
M-MATH-102941	Control Theory	6 CR
M-MATH-102942	Stochastic Evolution Equations	8 CR
M-MATH-102944	Numerical Continuation Methods	5 CR

M-MATH-102952	L2-Invariants	5 CR
M-MATH-102958	Spin Manifolds, Alpha Invariant and Positive Scalar Curvature	5 CR
M-MATH-102895	Wavelets	8 CR
M-MATH-102896	Medical Imaging	8 CR
M-MATH-102897	Mathematical Methods in Signal and Image Processing	8 CR
M-MATH-102901	Numerical Methods in Mathematical Finance	8 CR
M-MATH-102902	Asymptotic Stochastics	8 CR
M-MATH-102907	Markov Decision Processes	5 CR
M-MATH-102908	Stochastic Control	4 CR
M-MATH-102911	Time Series Analysis	4 CR
M-MATH-102912	Global Differential Geometry	8 CR
M-MATH-102914	Numerical Methods in Mathematical Finance II	8 CR
M-MATH-102919	Discrete Time Finance	8 CR
M-MATH-102920	Special Topics of Numerical Linear Algebra	8 CR
M-MATH-102922	Poisson Processes	5 CR
M-MATH-102926	Sobolev Spaces	5 CR
M-MATH-102928	Numerical Methods for Time-Dependent Partial Differential Equations	8 CR
M-MATH-102929	Mathematical Modelling and Simulation in Practise	4 CR
M-MATH-102932	Numerical Methods in Fluid Mechanics	4 CR
M-MATH-102935	Compressive Sensing	5 CR
M-MATH-102937	Functions of Matrices	8 CR
M-MATH-102939	Extreme Value Theory	4 CR
M-MATH-102943	Introduction into Particulate Flows	3 CR
M-MATH-102946	Stein's Method	5 CR
M-MATH-102948	Algebraic Topology	8 CR
M-MATH-102949	Introduction to Geometric Measure Theory	6 CR
M-MATH-102954	Group Actions in Riemannian Geometry	5 CR
M-MATH-102959	Homotopy Theory	8 CR
M-MATH-102960	The Riemann Zeta Function	4 CR
M-MATH-102865	Stochastic Geometry	8 CR
M-MATH-102870	Classical Methods for Partial Differential Equations	8 CR
M-MATH-102871	Boundary and Eigenvalue Problems	8 CR
M-MATH-102881	Stochastic Differential Equations	8 CR
M-MATH-102900	Adaptive Finite Elemente Methods	6 CR
M-MATH-102903	Spatial Stochastics	8 CR
M-MATH-102921	Geometric Numerical Integration	6 CR
M-MATH-102938	Project Centered Software-Lab	4 CR
M-MATH-102945	Introduction to Matlab and Numerical Algorithms	5 CR
M-MATH-102950	Combinatorics	8 CR
M-MATH-102953	Algebraic Topology II	8 CR
M-MATH-102955	Advanced Inverse Problems: Nonlinearity and Banach Spaces	5 CR
M-MATH-102957	Extremal Graph Theory	8 CR
M-WIWI-101413	Applications of Operations Research	9 CR
M-WIWI-101414	Methodical Foundations of OR	9 CR
M-WIWI-101452	Energy Economics and Technology	9 CR
M-WIWI-101472	Informatics	9 CR
M-WIWI-101473	Mathematical Programming	9 CR
M-WIWI-101478	Innovation and Growth	9 CR
M-WIWI-101480	Finance 3	9 CR
M-WIWI-101482	Finance 1	9 CR
M-WIWI-101483	Finance 2	9 CR

M-WIWI-101490	Marketing Management	9 CR
M-WIWI-101496	Growth and Agglomeration	9 CR
M-WIWI-101500	Microeconomic Theory	9 CR
M-WIWI-101502	Economic Theory and its Application in Finance	9 CR
M-WIWI-101504	Collective Decision Making	9 CR
M-WIWI-101505	Experimental Economics	9 CR
M-WIWI-101637	Analytics and Statistics	9 CR
M-WIWI-101638	Econometrics and Statistics I	9 CR
M-WIWI-101639	Econometrics and Statistics II	9 CR
M-WIWI-102832	Operations Research in Supply Chain Management	9 CR
M-WIWI-102970	Decision and Game Theory	9 CR
M-WIWI-102971	Seminar	3 CR
M-WIWI-102972	Seminar	3 CR
M-WIWI-102973	Seminar	3 CR
M-WIWI-102974	Seminar	3 CR
M-MATH-103080	Dynamical Systems	8 CR
M-MATH-103257	Nonlinear Maxwell Equations	3 CR
M-MATH-103259	Bifurcation Theory	5 CR
M-MATH-103260	Mathematical Methods of Imaging	5 CR
M-MATH-103258	Finite group schemes	4 CR
M-WIWI-103289	Stochastic Optimization	9 CR
M-WIWI-103247	Intelligent Risk and Investment Advisory	9 CR
M-WIWI-103261	Disruptive FinTech Innovations	9 CR
M-WIWI-103119	Advanced Topics in Strategy and Management	9 CR
M-WIWI-103720	eEnergy: Markets, Services and Systems	9 CR
M-MATH-103527	Foundations of continuum mechanics	3 CR
M-MATH-103539	Nonlinear Analysis	8 CR
M-MATH-103545	Harmonic Analysis for Dispersive Equations	8 CR
M-MATH-103700	Exponential Integrators	6 CR
M-MATH-103709	Numerical Linear Algebra for Scientific High Performance Computing	3 CR
M-MATH-103919	Introduction to Kinetic Theory	4 CR
M-WIWI-104068	Information Systems in Organizations	9 CR
M-MATH-104053	Commutative Algebra	8 CR
M-MATH-104054	Uncertainty Quantification	4 CR
M-MATH-104055	Ruin theory	4 CR
M-MATH-104057	Key Moments in Geometry	5 CR
M-MATH-104058	Numerical Linear Algebra in Image Processing	6 CR
M-MATH-104059	Mathematical Topics in Kinetic Theory	4 CR
M-MATH-102884	Scattering Theory	8 CR
M-MATH-104261	Lie groups and Lie algebras	8 CR
M-MATH-104349	Bott Periodicity	5 CR
M-MATH-104425	Dispersive equations	6 CR
M-MATH-104426	Comparison of numerical integrators for nonlinear dispersive equations	4 CR
M-MATH-104435	Selected Topics in Harmonic Analysis	3 CR
M-MATH-104827	Fourier analysis and its applications to PDEs neu	4 CR
M-MATH-103540	Boundary Element Methods neu	8 CR
M-MATH-102887	Monotonicity Methods in Analysis neu	3 CR

3 Modules

M 3.1 Module: The Riemann Zeta Function [M-MATH-102960]

Responsible: Dr. Fabian Januszewski
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Language	Level	Version
4	Irregular	Deutsch	4	1

Mandatory			
T-MATH-105934	The Riemann Zeta Function	4 CR	Januszewski

M 3.2 Module: Adaptive Finite Elemente Methods [M-MATH-102900]

Responsible: Prof. Dr. Willy Dörfler
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Irregular	1 semester	4	1

Mandatory			
T-MATH-105898	Adaptive Finite Element Methods	6 CR	Dörfler

Prerequisites
none

M 3.3 Module: Advanced Inverse Problems: Nonlinearity and Banach Spaces [M-MATH-102955]

Responsible: Prof. Dr. Andreas Rieder
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Irregular	2 term	5	1

Mandatory			
T-MATH-105927	Advanced Inverse Problems: Nonlinearity and Banach Spaces	5 CR	Rieder

Prerequisites
none

M 3.4 Module: Advanced Topics in Strategy and Management [M-WIWI-103119]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Language	Level	Version
9	Deutsch	4	1

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-106188	Workshop Current Topics in Strategy and Management	3 CR	Lindstädt
T-WIWI-106189	Workshop Business Wargaming – Analyzing Strategic Interactions	3 CR	Lindstädt
T-WIWI-106190	Strategy and Management Theory: Developments and "Classics"	3 CR	Lindstädt

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
Students

- are able to analyze business strategies and derive recommendations using appropriate frameworks
- learn to express their position through compelling reasoning in structured discussions
- are qualified to critically examine recent research topics in the field of strategic management
- can derive own conclusions from less structured information by using interdisciplinary knowledge

Prerequisites
None

Content
The module is divided into three main topics:

The students

- analyze and discuss a wide range of business strategies on the basis of collectively selected case studies.
- participate in a business wargaming workshop and analyze strategic interactions.
- write a paper about current topics in the field of strategic management theory.

Recommendation
None

Annotation
This course is admission restricted. After being admitted to one course of this module, the participation at the other courses will be guaranteed.

Every course of this module will be at least offered every second term. Thus, it will be possible to complete the module within two terms.

This module will be offered for the first time in the winter term 2017/18.

M 3.5 Module: Algebra [M-MATH-101315]

Responsible: Prof. Dr. Frank Herrlich
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-102253	Algebra	8 CR	Herrlich, Kühnlein

Prerequisites
None

M 3.6 Module: Algebraic Geometry [M-MATH-101724]

Responsible: Prof. Dr. Frank Herrlich
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-103340	Algebraic Geometry	8 CR	Herrlich, Kühnlein

M 3.7 Module: Algebraic Number Theory [M-MATH-101725]

Responsible: Dr. Stefan Kühnlein
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-103346	Algebraic Number Theory	8 CR	Kühnlein

M 3.8 Module: Algebraic Topology [M-MATH-102948]

Responsible: Prof. Dr Roman Sauer
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	2 term	4	1

Mandatory			
T-MATH-105915	Algebraic Topology	8 CR	Kammeyer, Sauer

Prerequisites
none

M 3.9 Module: Algebraic Topology II [M-MATH-102953]

Responsible: Prof. Dr Roman Sauer
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	2 term	5	1

Mandatory			
T-MATH-105926	Algebraic Topology II	8 CR	Sauer

Prerequisites
none

M 3.10 Module: Analytics and Statistics [M-WIWI-101637]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Language	Level	Version
9	Deutsch	4	2

Mandatory			
T-WIWI-103123	Advanced Statistics	4,5 CR	Grothe
Election block: Ergänzungsangebot (between 4,5 and 5 credits)			
T-WIWI-106341	Machine Learning 2 – Advanced Methods	5 CR	Zöllner
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module seperately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
A Student

- Deepens the knowledge of descriptive and inferential statistics.
- Deals with simulation methods.
- Learns basic and advanced methods of statistical analysis of multivariate and high-dimensional data.

Prerequisites
The course "*Advanced Statistics*" is compulsory.

Content

- Deriving estimates and testing hypotheses
- Stochastic processes
- Multivariate statistics, copulas
- Dependence measures
- Dimension reduction
- High-dimensional methods
- Prediction

Annotation
The planned lectures and courses for the next three years are announced online.

Workload
The total workload for this module is approximately 270 hours.

M 3.11 Module: Applications of Operations Research [M-WIWI-101413]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Operations Management - Data Analysis - Informatics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	8

Election block: Wahlpflichtangebot (between 1 and 2 items)			
T-WIWI-102704	Facility Location and Strategic Supply Chain Management	4,5 CR	Nickel
T-WIWI-102714	Tactical and Operational Supply Chain Management	4,5 CR	Nickel
Election block: Ergänzungsangebot (at most 1 item)			
T-WIWI-102726	Global Optimization I	4,5 CR	Stein
T-WIWI-106199	Modeling and OR-Software: Introduction	4,5 CR	Nickel
T-WIWI-106545	Optimization under Uncertainty	5 CR	Rebennack

Competence Certificate
The assessment is carried out as partial exams (according to § 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- is familiar with basic concepts and terms of Supply Chain Management,
- knows the different areas of Supply Chain Management and their respective optimization problems,
- is acquainted with classical location problem models (in the plane, on networks and discrete) as well as fundamental methods for distribution and transport planning, inventory planning and management,
- is able to model practical problems mathematically and estimate their complexity as well as choose and adapt appropriate solution methods.

Prerequisites
At least one of the courses *Facility Location and strategic Supply Chain Management* and *Tactical and operational Supply Chain Management* has to be taken.

Content
Supply Chain Management is concerned with the planning and optimization of the entire, inter-company procurement, production and distribution process for several products taking place between different business partners (suppliers, logistics service providers, dealers). The main goal is to minimize the overall costs while taking into account several constraints including the satisfaction of customer demands.

This module considers several areas of Supply Chain Management. On the one hand, the determination of optimal locations within a supply chain is addressed. Strategic decisions concerning the location of facilities like production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning tasks allow an efficient flow of materials and lead to lower costs and increased customer service. On the other hand, the planning of material transport in the context of Supply Chain Management represents another focus of this module. By linking transport connections and different facilities, the material source (production plant) is connected with the material sink (customer). For given material flows or shipments, it is considered how to choose the optimal (in terms of minimal costs) distribution and transportation chain from the set of possible logistics chains, which asserts the compliance of delivery times and further constraints.

Furthermore, this module offers the possibility to learn about different aspects of the tactical and operational planning level in Suppy Chain Management, including methods of scheduling as well as different approaches in procurement and distribution logistics. Finally, issues of warehousing and inventory management will be discussed.

Recommendation
The courses Introduction to Operations Research I and II are helpful.

Annotation
The planned lectures and courses for the next three years are announced online.

Workload
The total workload of the module is about 240 hours. The workload is proportional to the credit points of the individual courses.

M 3.12 Module: Asymptotic Stochastics [M-MATH-102902]

Responsible: Prof. Dr. Norbert Henze
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-105866	Asymptotic Stochastics	8 CR	Fasen-Hartmann, Henze, Klar

Prerequisites
none

M 3.13 Module: Bifurcation Theory [M-MATH-103259]

Responsible: Dr. Rainer Mandel
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Level	Version
5	Irregular	4	1

Mandatory			
T-MATH-106487	Bifurcation Theory	5 CR	Mandel

Prerequisites
None

Annotation
Course is held in English

M 3.14 Module: Bott Periodicity [M-MATH-104349]

Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Each winter term	1 semester	4	1

Mandatory			
T-MATH-108905	Bott Periodicity	5 CR	Tuschmann

Prerequisites
None

M 3.15 Module: Boundary and Eigenvalue Problems [M-MATH-102871]

Responsible: Prof. Dr. Wolfgang Reichel
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each summer term	1 semester	4	1

Mandatory			
T-MATH-105833	Boundary and Eigenvalue Problems	8 CR	Hundertmark, Lamm, Plum, Reichel, Rottmann-Matthes, Schnaubelt, Weis

M 3.16 Module: Boundary Element Methods [M-MATH-103540]

Responsible: PD Dr. Tilo Arens
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-109851	Boundary Element Methods neu	8 CR	Arens

Prerequisites
None

M 3.17 Module: Brownian Motion [M-MATH-102904]

Responsible: Prof. Dr. Nicole Bäuerle
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Irregular	1 semester	4	1

Mandatory			
T-MATH-105868	Brownian Motion	4 CR	Bäuerle, Fasen-Hartmann, Last

Prerequisites
none

M 3.18 Module: Calculus of Variations [M-MATH-102882]

Responsible: Prof. Dr. Wolfgang Reichel
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105853	Calculus of Variations	8 CR	Kirsch, Lamm, Plum, Reichel

M 3.19 Module: Classical Methods for Partial Differential Equations [M-MATH-102870]

Responsible: Prof. Dr. Michael Plum
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-105832	Classical Methods for Partial Differential Equations	8 CR	Hundertmark, Lamm, Plum, Reichel, Schnaubelt, Weis

M 3.20 Module: Collective Decision Making [M-WIWI-101504]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each term	2 semester	4	3

Election block: Wahlpflichtangebot ()			
T-WIWI-102740	Public Management	4,5 CR	Wigger
T-WIWI-102859	Social Choice Theory	4,5 CR	Puppe

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
Students

- are able to model practical problems of the public sector and to analyze them with respect to positive and normative questions,
- understand individual incentives and social outcomes of different institutional designs,
- are familiar with the functioning and design of democratic elections and can analyze them with respect to their individual incentives.

Prerequisites
None

Content
The focus of the module is on mechanisms of public decisions making, including voting and the aggregation of preferences and judgements.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.21 Module: Combinatorics [M-MATH-102950]

Responsible: Prof. Dr. Maria Aksenovich
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	2 term	4	1

Mandatory			
T-MATH-105916	Combinatorics	8 CR	Aksenovich

Competence Certificate
The final grade is given based on the written final exam (3h).

By successfully working on the problem sets, a bonus can be obtained. If the grade in the final written exam is between 4,0 and 1,3, then the bonus improves the grade by one step (0,3 or 0,4).

Competence Goal
The students understand, describe, and use fundamental notions and techniques in combinatorics. They can analyze, structure, and formally describe typical combinatorial questions. The students can use the results and methods such as inclusion-exclusion, generating functions, Young tableaux, as well as the developed proof ideas, in solving combinatorial problems. In particular, they can analyze the existence and the number of ordered and unordered arrangements of a given size. The students understand and critically use the combinatorial methods. Moreover, the students can communicate using English technical terminology.

Prerequisites
none

Content
The course is an introduction into combinatorics. Starting with counting problems and bijections, classical methods such as inclusion-exclusion principle and generating functions are discussed. Further topics include Catalan families, permutations, Young tableaux, partial orders, and combinatorial designs.

Annotation

- Regular cycle: every 2nd year, summer semester
- Course is held in English

M 3.22 Module: Commutative Algebra [M-MATH-104053]

Responsible: Prof. Dr. Frank Herrlich
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-108398	Commutative Algebra	8 CR	Herrlich

Prerequisites
None

M 3.23 Module: Comparison Geometry [M-MATH-102940]

Responsible: Prof. Dr. Wilderich Tuschmann
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Irregular	1 semester	5	1

Mandatory			
T-MATH-105917	Comparison Geometry	5 CR	Tuschmann

Prerequisites
none

M 3.24 Module: Comparison of numerical integrators for nonlinear dispersive equations [M-MATH-104426]

Responsible: Prof. Dr Katharina Schratz
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Each winter term	1 semester	4	1

Mandatory			
T-MATH-109040	Comparison of numerical integrators for nonlinear dispersive equations	4 CR	Schratz

Prerequisites
None

Content
We will compare numerical integrators (e.g., splitting methods, exponential integrators) for nonlinear dispersive equations such as the nonlinear Schrödinger equation and Kortweg-de Vries equation. We will analyze their convergence properties with regard to the regularity assumptions on the solution.

M 3.25 Module: Complex Analysis [M-MATH-102878]

Responsible: Dr. Christoph Schmoeger
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	5	1

Mandatory			
T-MATH-105849	Complex Analysis	8 CR	Herzog, Plum, Reichel, Schmoeger, Schnaubelt, Weis

Content

- infinite products
- Mittag-Leffler theorem
- Montel's theorem
- Riemann mapping theorem
- conformal mappings
- univalent (schlicht) functions
- automorphisms of some domains
- harmonic functions
- Schwarz reflection principle
- regular and singular points of power series

M 3.26 Module: Compressive Sensing [M-MATH-102935]

Responsible: Prof. Dr. Andreas Rieder
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Irregular	2 term	4	1

Mandatory			
T-MATH-105894	Compressive Sensing	5 CR	Rieder

M 3.27 Module: Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems [M-MATH-102883]

Responsible: Prof. Dr. Michael Plum
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung) Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105854	Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems	8 CR	Plum

M 3.28 Module: Continuous Time Finance [M-MATH-102860]

Responsible: Prof. Dr. Nicole Bäuerle
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each summer term	1 semester	4	1

Mandatory			
T-MATH-105930	Continuous Time Finance	8 CR	Bäuerle, Fasen-Hartmann

M 3.29 Module: Control Theory [M-MATH-102941]

Responsible: Prof. Dr. Roland Schnaubelt
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Irregular	2 term	4	1

Mandatory			
T-MATH-105909	Control Theory	6 CR	Schnaubelt, Weis

Prerequisites
none

M 3.30 Module: Convex Geometry [M-MATH-102864]

Responsible: Prof. Dr. Daniel Hug
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105831	Convex Geometry	8 CR	Hug

Competence Goal
The students

- know fundamental combinatorial, geometric and analytic properties of convex sets and convex functions and apply these to related problems,
- are familiar with fundamental geometric and analytic inequalities for functionals of convex sets and their applications to geometric extremal problems and can present central ideas and techniques of proofs,
- know selected integral formulas for convex sets and the required results on invariant measures.
- know how to work self-organized and self-reflexive.

Content
1. Convex Sets
1.1. Combinatorial Properties
1.2. Support and Separation Properties
1.3. Extremal Representations
2. Convex Functions
2.1. Basic Properties
2.2. Regularity
2.3. Support Function
3. Brunn-Minkowski Theory
3.1. Hausdorff Metric
3.2. Volume and Surface Area
3.3. Mixed Volumes
3.4. Geometric Inequalities
3.5. Surface Area Measures
3.6. Projection Functions
4. Integralgeometric Formulas
4.1. Invariant Measures
4.2. Projection and Section Formulas

M 3.31 Module: Decision and Game Theory [M-WIWI-102970]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Language	Level	Version
9	Deutsch	4	1

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-102613	Auction Theory	4,5 CR	Ehrhart
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt
T-WIWI-102861	Advanced Game Theory	4,5 CR	Ehrhart, Puppe, Reiß

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student learns the basics of individual and strategic decisions on an advanced and formal level.

He learns to analyze economic problems through abstract and method-based thinking and to design solution strategies. In the tutorials, the concepts and results of the lecture will be applied in case studies.

Prerequisites
None

Content
See German version.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.32 Module: Differential Geometry [M-MATH-101317]

Responsible: Prof. Dr. Wilderich Tuschmann
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-102275	Differential Geometry	8 CR	Grensing, Leuzinger, Tuschmann

Prerequisites
None

M 3.33 Module: Discrete Time Finance [M-MATH-102919]

Responsible: Prof. Dr. Nicole Bäuerle
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-105839	Discrete Time Finance	8 CR	Bäuerle, Fasen-Hartmann

Prerequisites
none

M 3.34 Module: Dispersive equations [M-MATH-104425]

Responsible: Prof. Dr. Wolfgang Reichel
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Each winter term	1 semester	4	1

Mandatory			
T-MATH-109001	Dispersive equations	6 CR	Reichel

Prerequisites
None

M 3.35 Module: Disruptive FinTech Innovations [M-WIWI-103261]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Language	Level	Version
9	Englisch	4	1

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-106193	Engineering FinTech Solutions	4,5 CR	Ulrich
T-WIWI-106496	Computational FinTech with Python and C++	1,5 CR	Ulrich
T-WIWI-106495	Automated Financial Advisory	3 CR	Ulrich

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
Students with a strong technological background and/or a strong interest for software development and investments will learn how to build a prototype that automates essential steps for a fully automated investment and risk management process. Students also learn to organize themselves efficiently in teams of several developers in order to complete a prototype in a limited amount of time. Moreover, students deepen their understanding of finance and technology and learn how to combine both in an effective way. Students will hence be well prepared to become leaders and pioneers for upcoming FinTech innovations (and beyond) to help society to better invest for the future and to better protect from adverse risks.

Prerequisites
None.

Content
Within the scope of the lecture "Engineering FinTech Solutions" students get the opportunity to solve a partial problem from a larger FinTech problem independently and at the same time with close mentoring - by employees and professor of the C-RAM research group. The student is introduced to the problem to be solved on the basis of his very own level of knowledge and equipped with the necessary aids. Students are given the opportunity to combine new research approaches from the field of risk and investment management with modern information technology in order to independently master a step towards prototype development. Depending on the topic, students work alone or in teams. As part of the close mentoring approach, teams will meet weekly to discuss their progress and open questions with course students and the professor.

In the course "Computational FinTech with Python and C++" students are given individually tailored programming tasks at the beginning of the semester.

The contents of the seminar "Automated Financial Advisory" will be discussed with the students at the beginning of the semester.

Recommendation
None

Annotation
See respective lecture

Workload
The total workload for this module is approximately 270 hours. For further information, see respective lecture.

M 3.36 Module: Dynamical Systems [M-MATH-103080]

Responsible: Prof. Dr. Jens Rottmann-Matthes
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Language	Level	Version
8	Deutsch	4	1

Mandatory			
T-MATH-106114	Dynamical Systems	8 CR	Rottmann-Matthes

Prerequisites
none

M 3.37 Module: Econometrics and Statistics I [M-WIWI-101638]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Recurrence	Language	Level	Version
9	Each term	Deutsch	4	3

Mandatory			
T-WIWI-103125	Applied Econometrics	4,5 CR	Schienle
Election block: Ergänzungsangebot (between 4,5 and 5 credits)			
T-WIWI-103066	Data Mining and Applications	4,5 CR	Nakhaeizadeh
T-WIWI-103064	Financial Econometrics	4,5 CR	Schienle
T-WIWI-103126	Non- and Semiparametrics	4,5 CR	Schienle
T-WIWI-103127	Panel Data	4,5 CR	Heller
T-WIWI-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module seperately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student shows an in depth understanding of advanced Econometric techniques suitable for different types of data.He/She is able to apply his/her theoretical knowledge to real world problems with the help of statistical software and to evaluate performance of different approaches based on statistical criteria.

Prerequisites
The course "*Advanced Statistics*" [2520020] is compulsory and must be examined.
The course Financial Econometrics [2520022] can only be passed if the course Time Series Analysis in the module Time Series Analysis and the course Generalized Regression Models in the module Generalized Regression Models have not be passed.

Content
The courses of this module offer students a broad range of advanced Econometric techniques for state-of-the art data analysis.

Workload
The total workload for this module is approximately 270 hours.

M 3.38 Module: Econometrics and Statistics II [M-WIWI-101639]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Recurrence	Language	Level	Version
9	Each term	Deutsch	4	2

Election block: Wahlplfichtangebot (between 9 and 10 credits)			
T-WIWI-103066	Data Mining and Applications	4,5 CR	Nakhaeizadeh
T-WIWI-103064	Financial Econometrics	4,5 CR	Schienle
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe
T-WIWI-103126	Non- and Semiparametrics	4,5 CR	Schienle
T-WIWI-103127	Panel Data	4,5 CR	Heller
T-WIWI-103128	Portfolio and Asset Liability Management	4,5 CR	Safarian
T-WIWI-103065	Statistical Modeling of Generalized Regression Models	4,5 CR	Heller
T-WIWI-103129	Stochastic Calculus and Finance	4,5 CR	Safarian

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module seperately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student shows an in depth understanding of advanced Econometric techniques suitable for different types of data. He/She is able to apply his/her theoretical knowledge to real world problems with the help of statistical software and to evaluate performance of different approaches based on statistical criteria.

Prerequisites
This module can only be passed if the module *"Econometrics and Statistics I"* has been finished successfully before.

The course Financial Econometrics [2520022] can only be passed if the course Time Series Analysis in the module Time Series Analysis and the course Generalized Regression Models in the module Generalized Regression Models have not be passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-WIWI-101638 - Econometrics and Statistics I must have been started.

Content
This modula builds on prerequisites acquired in Module*"Econometrics and Statistics I"*. The courses of this module offer students a broad range of advanced Econometric techniques for state-of-the art data analysis.

Workload
The total workload for this module is approximately 270 hours.

M 3.39 Module: Economic Theory and its Application in Finance [M-WIWI-101502]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Language	Level	Version
9	Deutsch	4	4

Election block: Ergänzungsangebot (1 item)			
T-WIWI-102647	Asset Pricing neu	4,5 CR	Ruckes, Uhrig-Homburg
T-WIWI-102622	Corporate Financial Policy neu	4,5 CR	Ruckes
T-WIWI-109050	Corporate Risk Management neu	4,5 CR	Ruckes
T-WIWI-102623	Financial Intermediation neu	4,5 CR	Ruckes
Election block: Wahlpflichtangebot (1 item)			
T-WIWI-102609	Advanced Topics in Economic Theory neu	4,5 CR	Mitusch
T-WIWI-102861	Advanced Game Theory neu	4,5 CR	Ehrhart, Puppe, Reiß

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately. The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The students

- have learnt the methods of formal economic modeling, particularly of General Equilibrium Theory and contract theory
- will be able to apply these methods to the topics in Finance, specifically the areas of financial markets and institutions and corporate finance
- have gained many useful insights into the relationship between firms and investors and the functioning of financial markets

Prerequisites
One of the courses T-WIWI-102861 "Advanced Game Theory" and T-WIWI-102609 "Advanced Topics in Economic Theory" is compulsary.

Content
The mandatory course "Advanced Topics in Economic Theory" is devoted in equal parts to General Equilibrium Theory and to contract theory. The course "Asset Pricing" will apply techniques of General Equilibrium Theory to valuation of financial assets. The courses "Corporate Financial Policy" and "Finanzintermediation" will apply the techniques of contract theory to issues of corporate finance and financial institutions.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.40 Module: eEnergy: Markets, Services and Systems [M-WIWI-103720]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Language	Level	Version
9	Deutsch	4	1

Election block: Wahlpflichtangebot (at least 9 credits)			
T-WIWI-107501	Energy Market Engineering	4,5 CR	Weinhardt
T-WIWI-107503	Energy Networks and Regulation	4,5 CR	Weinhardt
T-WIWI-107504	Smart Grid Applications	4,5 CR	Weinhardt

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- is aware of design options for energy and especially electricity markets and can derive implications for the market results from the market design,
- knows about current trends regarding the Smart Grid and understands affiliated modelling aproaches,
- can evaluate business models of electricity grids according to the regulation regime
- is prepared for scientific contributions in the field of energy system analysis.

Prerequisites
None.

Content
The module conveys scientific and practical knowledge to analyse energy markets and according business models. To do so the scientific discussion on energy market designs is evaluated and analysed. Different energy market models are presented and their design implications are evaluated. Furthermore, the electricity system is analysed with regards to being a network industry and resulting regulation and business models are discussed. Besides these traditional areas of energy economics we will look at methods and models of digitalisation in the energy sector.

Annotation
The lecture Smart Grid Applications will be available starting in the winter term 2018/19.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.41 Module: Energy Economics and Technology [M-WIWI-101452]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: Operations Management - Data Analysis - Informatics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	4

Election block: Wahlpflichtangebot (at least 9 credits)			
T-WIWI-102793	Efficient Energy Systems and Electric Mobility	3,5 CR	Jochem
T-WIWI-102650	Energy and Environment	4,5 CR	Karl
T-WIWI-102830	Energy Systems Analysis	3 CR	Ardone
T-WIWI-107464	Smart Energy Infrastructure	3 CR	Ardone, Pustisek
T-WIWI-102695	Heat Economy	3 CR	Fichtner

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The examinations take place every semester. Re-examinations are offered at every ordinary examination date.The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- gains detailed knowledge about present and future energy supply technologies (focus on final energy carriers electricity and heat),
- knows the techno-economic characteristics of plants for energy provision, for energy transport as well as for energy distribution and demand,
- is able to assess the environmental impact of these technologies.

Prerequisites
To integrate the module “Energy Economics and Technology” in the degree programme “Wirtschaftsmathematik” it is compulsory to choose the course „Energy Systems Analysis“.

Content
Heat Economy: district heating, heating technologies, reduction of heat demand, statutory provisions
Energy Systems Analysis: Interdependencies in energy economics, energy systems modelling approaches in energy economics
Energy and Environment: emission factors, emission reduction measures, environmental impact
Efficient Energy Systems and Electric Mobility: concepts and current trends in energy efficiency, Overview of and economical, ecological and social impacts through electric mobility

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.42 Module: Evolution Equations [M-MATH-102872]

Responsible: Prof. Dr. Roland Schnaubelt
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105844	Evolution Equations	8 CR	Schnaubelt, Weis

M 3.43 Module: Experimental Economics [M-WIWI-101505]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Language	Level	Version
9	Deutsch	4	5

Election block: Wahlpflichtangebot (2 items)			
T-WIWI-102862	Predictive Mechanism and Market Design	4,5 CR	Reiß
T-WIWI-102863	Topics in Experimental Economics	4,5 CR	Reiß
T-WIWI-105781	Incentives in Organizations	4,5 CR	Nieken
T-WIWI-102614	Experimental Economics	4,5 CR	Weinhardt

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
Students

- are acquainted with the methods of Experimental Economics along with its strengths and weaknesses;
- understand how theory-guided research in Experimental Economics interacts with the development of theory;
- are provided with foundations in data analysis;
- design an economic experiment and analyze its outcome.

Prerequisites
None.

Content
The module Experimental Economics offers an introduction into the methods and topics of Experimental Economics. It also fosters and extends knowledge in theory-guided experimental economics and its interaction with theory development. Throughout the module, readings of selected papers are required.

Recommendation
Basic knowledge in mathematics, statistics, and game theory is assumed.

Annotation
The course "Predictive Mechanism and Market Design" is offered every second winter semester, e.g. WS2013 / 14, WS2015 / 16, ...

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.44 Module: Exponential Integrators [M-MATH-103700]

Responsible: Prof. Dr. Marlis Hochbruck
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Each winter term	1 semester	4	1

Mandatory			
T-MATH-107475	Exponential Integrators	6 CR	Hochbruck

Competence Certificate
Oral exam of approximately 20 minutes

Prerequisites
None

Content
In this class we consider the construction, analysis, implementation and application of exponential integrators. The focus will be on two types of stiff problems.

The first one is characterized by a Jacobian that possesses eigenvalues with large negative real parts. Parabolic partial differential equations and their spatial discretization are typical examples. The second class consists of highly oscillatory problems with purely imaginary eigenvalues of large modulus.

Apart from motivating the construction of exponential integrators for various classes of problems, our main intention in this class is to present the mathematics behind these methods. We will derive error bounds that are independent of stiffness or highest frequencies in the system.

Since the implementation of exponential integrators requires the evaluation of the product of a matrix function with a vector, we will briefly discuss some possible approaches as well.

M 3.45 Module: Extremal Graph Theory [M-MATH-102957]

Responsible: Prof. Dr. Maria Aksenovich
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Language	Level	Version
8	Irregular	Englisch	4	1

Mandatory			
T-MATH-105931	Extremal Graph Theory	8 CR	Aksenovich

Competence Certificate
The final grade is given based on an oral exam (approx. 30 min.).

Competence Goal
The students understand, describe, and use fundamental notions and techniques in extremal graph theory. They can analyze, structure, and formally describe typical combinatorial questions. The students understand and use Szemeredi's regularity lemma and Szemeredi's theorem, can use probabilistic techniques, such as dependent random choice and multistep random colorings, know the best bounds for the extremal numbers of complete graphs, cycles, complete bipartite graphs, and bipartite graphs with bounded maximum degree. They understand and can use the Ramsey theorem for graphs and hypergraphs, as well as stepping-up techniques for bounding Ramsey numbers. Moreover, the students know and understand the behavior of Ramsey numbers for graphs with bounded maximum degree. The students can communicate using English technical terminology.

Content
The course is concerned with advanced topics in graph theory. It focuses on the areas of extremal functions, regularity, and Ramsey theory for graphs and hypergraphs. Further topics include Turán's theorem, Erdös-Stone theorem, Szemerédi's lemma, graph colorings and probabilistic techniques.

Recommendation
Basic knowledge of linear algebra, analysis and graph theory is recommended.

Annotation
Course is held in English

M 3.46 Module: Extreme Value Theory [M-MATH-102939]

Responsible: Prof. Dr. Vicky Fasen-Hartmann
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Irregular	1 term	4	2

Mandatory			
T-MATH-105908	Extreme Value Theory	4 CR	Fasen-Hartmann, Henze

Prerequisites
None

M 3.47 Module: Finance 1 [M-WIWI-101482]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	1

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-102643	Derivatives	4,5 CR	Uhrig-Homburg
T-WIWI-102621	Valuation	4,5 CR	Ruckes
T-WIWI-102647	Asset Pricing	4,5 CR	Ruckes, Uhrig-Homburg

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- has core skills in economics and methodology in the field of finance
- assesses corporate investment projects from a financial perspective
- is able to make appropriate investment decisions on financial markets

Prerequisites
None

Content
The courses of this module equip the students with core skills in economics and methodology in the field of modern finance. Securities which are traded on financial and derivative markets are presented, and frequently applied trading strategies are discussed. A further focus of this module is on the assessment of both profits and risks in security portfolios and corporate investment projects from a financial perspective.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.48 Module: Finance 2 [M-WIWI-101483]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	4

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-102647	Asset Pricing neu	4,5 CR	Ruckes, Uhrig-Homburg
T-WIWI-108880	Blockchains & Cryptofinance neu	4,5 CR	Schuster, Uhrig-Homburg
T-WIWI-102625	Exchanges neu	1,5 CR	Franke
T-WIWI-102622	Corporate Financial Policy neu	4,5 CR	Ruckes
T-WIWI-109050	Corporate Risk Management neu	4,5 CR	Ruckes
T-WIWI-102643	Derivatives neu	4,5 CR	Uhrig-Homburg
T-WIWI-109941	eFinance: Information Systems for Securities Trading neu	4,5 CR	Weinhardt
T-WIWI-102644	Fixed Income Securities neu	4,5 CR	Uhrig-Homburg
T-WIWI-102900	Financial Analysis neu	4,5 CR	Luedecke
T-WIWI-102623	Financial Intermediation neu	4,5 CR	Ruckes
T-WIWI-102626	Business Strategies of Banks neu	3 CR	Müller
T-WIWI-102646	International Finance neu	3 CR	Uhrig-Homburg
T-WIWI-102645	Credit Risk neu	4,5 CR	Uhrig-Homburg
T-WIWI-102621	Valuation neu	4,5 CR	Ruckes

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student is in a position to discuss, analyze and provide answers to advanced economic and methodological issues in the field of modern finance.

Prerequisites
It is only possible to choose this module in combination with the module *Finance 1*. The module is passed only after the final partial exam of *Finance 1* is additionally passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-WIWI-101482 - Finance 1 must have been started.

Content
The module Finance 2 is based on the module Finance 1. The courses of this module equip the students with advanced skills in economics and methodology in the field of modern finance on a broad basis.

Annotation
The courses *eFinance: Information Engineering and Management for Securities Trading* [2540454] and *Financial Analysis* [2530205] can be chosen from summer term 2015 on.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.49 Module: Finance 3 [M-WIWI-101480]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	4

Election block: Wahlpflichtangebot (at least 9 credits)			
T-WIWI-102647	Asset Pricing neu	4,5 CR	Ruckes, Uhrig-Homburg
T-WIWI-108880	Blockchains & Cryptofinance neu	4,5 CR	Schuster, Uhrig-Homburg
T-WIWI-102625	Exchanges neu	1,5 CR	Franke
T-WIWI-102622	Corporate Financial Policy neu	4,5 CR	Ruckes
T-WIWI-109050	Corporate Risk Management neu	4,5 CR	Ruckes
T-WIWI-102643	Derivatives neu	4,5 CR	Uhrig-Homburg
T-WIWI-109941	eFinance: Information Systems for Securities Trading neu	4,5 CR	Weinhardt
T-WIWI-102644	Fixed Income Securities neu	4,5 CR	Uhrig-Homburg
T-WIWI-102900	Financial Analysis neu	4,5 CR	Luedecke
T-WIWI-102623	Financial Intermediation neu	4,5 CR	Ruckes
T-WIWI-102626	Business Strategies of Banks neu	3 CR	Müller
T-WIWI-102646	International Finance neu	3 CR	Uhrig-Homburg
T-WIWI-102645	Credit Risk neu	4,5 CR	Uhrig-Homburg
T-WIWI-102621	Valuation neu	4,5 CR	Ruckes

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student is in a position to discuss, analyze and provide answers to advanced economic and methodological issues in the field of modern finance.

Prerequisites
It is only possible to choose this module in combination with the module *Finance 1*and *Finance 2*. The module is passed only after the final partial exams of *Finance 1 and Finance 2* are additionally passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-WIWI-101482 - Finance 1 must have been started.
2. The module M-WIWI-101483 - Finance 2 must have been started.

Content
The courses of this module equip the students with advanced skills in economics and methodology in the field of modern finance on a broad basis.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.50 Module: Finite Element Methods [M-MATH-102891]

Responsible: Prof. Dr. Willy Dörfler
Prof. Dr. Christian Wieners

Organisation: KIT Department of Mathematics

Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-105857	Finite Element Methods	8 CR	Dörfler, Hochbruck, Jahnke, Rieder, Wieners

M 3.51 Module: Finite group schemes [M-MATH-103258]

Responsible: Prof. Dr. Frank Herrlich
Dr. Fabian Januszewski

Organisation: KIT Department of Mathematics

Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Language	Level	Version
4	Irregular	Deutsch	4	1

Mandatory			
T-MATH-106486	Finite group schemes	4 CR	Januszewski

M 3.52 Module: Forecasting: Theory and Practice [M-MATH-102956]

Responsible: Prof. Dr. Tilmann Gneiting
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Language	Level	Version
8	Irregular	1 term	Englisch	4	2

Mandatory			
T-MATH-105928	Forecasting: Theory and Practice	8 CR	Gneiting

Prerequisites
None

Annotation

- Regular cycle: every 2nd year, starting winter semester 16/17
- Course is held in English

M 3.53 Module: Foundations of continuum mechanics [M-MATH-103527]

Responsible: Prof. Dr. Christian Wieners
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
3	Irregular	2 term	4	1

Mandatory			
T-MATH-107044	Foundations of continuum mechanics	3 CR	Wieners

Prerequisites
none

M 3.54 Module: Fourier Analysis [M-MATH-102873]

Responsible: Prof. Dr. Lutz Weis
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105845	Fourier Analysis	8 CR	Schnaubelt, Weis

Content

- Fourier series
- Fourier transform on L1 and L2
- Tempered distributions and their Fourier transform
- Explizit solutions of the Heat-, Schrödinger- and Wave equation in Rn
- the Hilbert transform
- the interpolation theorem of Marcinkiewicz
- Singular integral operators
- the Fourier multiplier theorem of Mihlin

M 3.55 Module: Fourier analysis and its applications to PDEs [M-MATH-104827]

Responsible: Prof. Dr. Xian Liao
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Each winter term	1 semester	4	1

Mandatory			
T-MATH-109850	Fourier analysis and its applications to PDEs neu	4 CR	Liao

Prerequisites
None

M 3.56 Module: Functional Analysis [M-MATH-101320]

Responsible: Prof. Dr. Roland Schnaubelt
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-102255	Functional Analysis	8 CR	Herzog, Hundertmark, Lamm, Plum, Reichel, Schmoeger, Schnaubelt, Weis

Prerequisites
None

M 3.57 Module: Functions of Matrices [M-MATH-102937]

Responsible: PD Dr. Volker Grimm
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	2 term	4	1

Mandatory			
T-MATH-105906	Functions of Matrices	8 CR	Grimm

Prerequisites
none

M 3.58 Module: Functions of Operators [M-MATH-102936]

Responsible: PD Dr. Volker Grimm
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Irregular	2 term	4	1

Mandatory			
T-MATH-105905	Functions of Operators	6 CR	

M 3.59 Module: Generalized Regression Models [M-MATH-102906]

Responsible: Dr. Bernhard Klar
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Each summer term	1 semester	4	2

Mandatory			
T-MATH-105870	Generalized Regression Models	4 CR	Henze, Klar

Prerequisites
None

M 3.60 Module: Geometric Group Theory [M-MATH-102867]

Responsible: Prof. Dr Roman Sauer
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each summer term	1 semester	4	1

Mandatory			
T-MATH-105842	Geometric Group Theory	8 CR	Herrlich, Leuzinger, Link, Sauer, Schwer, Tuschmann

M 3.61 Module: Geometric Numerical Integration [M-MATH-102921]

Responsible: Prof. Dr Tobias Jahnke
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Irregular	2 term	4	1

Mandatory			
T-MATH-105919	Geometric Numerical Integration	6 CR	Hochbruck, Jahnke

Prerequisites
none

M 3.62 Module: Geometry of Schemes [M-MATH-102866]

Responsible: Prof. Dr. Frank Herrlich
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	5	1

Mandatory			
T-MATH-105841	Geometry of Schemes	8 CR	Herrlich, Kühnlein

M 3.63 Module: Global Differential Geometry [M-MATH-102912]

Responsible: Prof. Dr. Wilderich Tuschmann
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	2 term	5	1

Mandatory			
T-MATH-105885	Global Differential Geometry	8 CR	Grensing, Tuschmann

Prerequisites
none

M 3.64 Module: Graph Theory [M-MATH-101336]

Responsible: Prof. Dr. Maria Aksenovich
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Language	Level	Version
8	Irregular	1 semester	Englisch	4	1

Mandatory			
T-MATH-102273	Graph Theory	8 CR	Aksenovich

Competence Certificate
The final grade is given based on the written final exam (3h).
By successfully working on the problem sets, a bonus can be obtained. If the grade in the final written exam is between 4,0 and 1,3, then the bonus improves the grade by one step (0,3 or 0,4).

Competence Goal
The students understand, describe and use fundamental notions and techniques in graph theory. They can represent the appropriate mathematical questions in terms of graphs and use the results such as Menger's theorem, Kuratowski's theorem, Turan's theorem, as well as the developed proof ideas, to solve these problems. The students can analyze graphs in terms of their characteristics such as connectivity, planarity, and chromatic number. They are well positioned to understand graph theoretic methods and use them critically. Moreover, the students can communicate using English technical terminology.

Prerequisites
None

Content
The course Graph Theory treats the fundamental properties of graphs, starting with basic ones introduced by Euler and including the modern results obtained in the last decade. The following topics are covered: structure of trees, paths, cycles and walks in graphs, minors, unavoidable subgraphs in dense graphs, planar graphs, graph coloring, Ramsey theory, and regularity in graphs.

Annotation

- Regular cycle: every 2nd year, winter semester
- Course is held in English

M 3.65 Module: Group Actions in Riemannian Geometry [M-MATH-102954]

Responsible: Prof. Dr. Wilderich Tuschmann
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Irregular	2 term	5	1

Mandatory			
T-MATH-105925	Group Actions in Riemannian Geometry	5 CR	Tuschmann

Prerequisites
none

M 3.66 Module: Growth and Agglomeration [M-WIWI-101496]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	3

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-109194	Dynamic Macroeconomics	4,5 CR	Brumm
T-WIWI-102785	Theory of Endogenous Growth	4,5 CR	Ott
T-WIWI-103107	Spatial Economics	4,5 CR	Ott

Competence Certificate
The assessment is carried out as partial written exams (see the lectures descriptions).

The overall grade for the module is the average of the grades for each course weighted by the credits.

Competence Goal
The student

- gains deepened knowledge of micro-based general equilibrium models
- understands how based on individual optimizing decisions aggregate phenomena like economic growth or agglomeration (cities / metropolises) result
- is able to understand and evaluate the contribution of these phenomena to the development of economic trends
- can derive policy recommendations based on theory

Prerequisites
None

Content
The module includes the contents of the lectures *Endogenous Growth Theory* [2561503], *Spatial Economics* [2561260] and *International Economic Policy* [2560254]. While the first two lectures have a more formal-analytic focus, the third lecture approaches fundamental ideas and problems from the field of international economic policy from a more verbal perspective.

The common underlying principle of all three lectures in this module is that, based on different theoretical models, economic policy recommendations are derived.

Recommendation
Attendance of the course *Introduction Economic Policy* [2560280] is recommended.

Successful completion of the courses*Economics I: Microeconomics*and*Economics II: Macroeconomics*is required.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.67 Module: Harmonic Analysis for Dispersive Equations [M-MATH-103545]

Responsible: Dr. Peer Kunstmann
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-107071	Harmonic Analysis for Dispersive Equations	8 CR	Kunstmann

Prerequisites
None

Content
Fourier transform, Fourier multipliers, interpolation, singular integral operators, Mihlin's Theorem, Littlewood-Paley decomposition, oscillating integrals, dispersive estimates, Strichartz estimates, nonlinear equations.

M 3.68 Module: Homotopy Theory [M-MATH-102959]

Responsible: Prof. Dr Roman Sauer
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Language	Level	Version
8	Irregular	Deutsch	4	1

Mandatory			
T-MATH-105933	Homotopy Theory	8 CR	Sauer

M 3.69 Module: Informatics [M-WIWI-101472]

Responsible: Prof. Dr. Andreas Oberweis
Prof. Dr. Harald Sack
Prof. Dr. Ali Sunyaev
Prof. Dr. York Sure-Vetter
Prof. Dr. Melanie Volkamer
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Economics and Management

Part of: Operations Management - Data Analysis - Informatics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	10

Election block: Wahlpflichtangebot ()			
T-WIWI-109445	Applied Informatics II - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services neu	5 CR	Sunyaev
T-WIWI-109248	Critical Information Infrastructures neu	5 CR	Sunyaev
T-WIWI-109246	Digital Health neu	4 CR	Sunyaev
T-WIWI-109270	Human Factors in Security and Privacy neu	5 CR	Volkamer
T-WIWI-102680	Computational Economics neu	5 CR	Shukla
T-WIWI-102661	Database Systems and XML neu	5 CR	Oberweis
T-WIWI-102668	Enterprise Architecture Management neu	5 CR	Wolf
T-WIWI-106423	Information Service Engineering neu	5 CR	Sack
T-WIWI-102666	Knowledge Discovery neu	5 CR	Sure-Vetter
T-WIWI-102667	Management of IT-Projects neu	5 CR	Schätzle
T-WIWI-106340	Machine Learning 1 - Basic Methods neu	5 CR	Zöllner
T-WIWI-106341	Machine Learning 2 – Advanced Methods neu	5 CR	Zöllner
T-WIWI-102697	Business Process Modelling neu	5 CR	Oberweis
T-WIWI-102679	Nature-Inspired Optimisation Methods neu	5 CR	Shukla
T-WIWI-109799	Process Mining neu	5 CR	Oberweis
T-WIWI-102874	Semantic Web Technologies neu	5 CR	Sure-Vetter
T-WIWI-105801	Service Oriented Computing neu	5 CR	Sure-Vetter
T-WIWI-102895	Software Quality Management neu	5 CR	Oberweis
T-WIWI-102676	Special Topics of Enterprise Information Systems neu	5 CR	Oberweis
T-WIWI-102669	Strategic Management of Information Technology neu	5 CR	Wolf
T-WIWI-103112	Web Science neu	5 CR	Sure-Vetter
Election block: Praktikum (between 0 and 1 items)			
T-WIWI-109250	Emerging Trends in Critical Information Infrastructures neu	4 CR	Sunyaev
T-WIWI-108439	Advanced Lab Security, Usability and Society neu	4 CR	Volkamer
T-WIWI-109786	Advanced Lab Security neu	4 CR	Volkamer
T-WIWI-109271	Advanced Lab User Studies in Security neu	4 CR	Volkamer
T-WIWI-109985	Project Lab Cognitive Automobiles and Robots neu	4 CR	Zöllner
T-WIWI-109983	Project Lab Machine Learning neu	4 CR	Zöllner
T-WIWI-109251	Selected Issues in Critical Information Infrastructures neu	4 CR	Sunyaev
T-WIWI-109249	Sociotechnical Information Systems Development neu	4 CR	Sunyaev
T-WIWI-103523	Advanced Lab Informatics neu	4 CR	Oberweis, Sack, Sunyaev, Sure-Vetter, Volkamer, Zöllner

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

The examinations are offered every semester. Re-examinations are offered at every ordinary examination date. The assessment procedures are described for each course of the module separately.

When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Please note the following information about the module component exams of Prof. Dr. H. Schmeck:

The examinations in Algorithms for Internet Applications [T-WIWI-102658], Efficient Algorithms [T-WIWI-102655], Organic Computing [T-WIWI-102659] and Smart Energy Distribution [T-WIWI-102845] are offered latest until summer term 2017 (repeaters only).

Competence Goal
The student

- has the ability to master methods and tools in a complex discipline and to demonstrate innovativeness regarding the methods used,
- knows the principles and methods in the context of their application in practice,
- is able to grasp and apply the rapid developments in the field of computer science, which are encountered in work life, quickly and correctly, based on a fundamental understanding of the concepts and methods of computer science,
- is capable of finding and defending arguments for solving problems.

Prerequisites
It is only allowed to choose one lab.

Content
The thematic focus will be based on the choice of courses in the areas of Effiziente Algorithmen, Betriebliche Informations- und Kommunikationssysteme, Wissensmanagement, Komplexitätsmanagement and Software- und Systems Engineering.

Annotation
Detailed information on the recognition of examinations in the field of Informatics can be found at http://www.aifb.kit.edu/web/Auslandsaufenthalt.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.70 Module: Information Systems in Organizations [M-WIWI-104068]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Language	Level	Version
9	Deutsch	4	2

Election block: Wahlpflichtangebot (at least 9 credits)			
T-WIWI-105777	Business Intelligence Systems	4,5 CR	Mädche, Nadj, Toreini
T-WIWI-106201	Digital Transformation of Organizations	4,5 CR	Mädche
T-WIWI-108461	Interactive Information Systems	4,5 CR	Mädche, Morana
T-WIWI-108437	Practical Seminar: Information Systems and Service Design	4,5 CR	Mädche

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO) of the core course and further single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately.
The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- has a comprehensive understanding of conceptual and theoretical foundations of informations systems in organizations
- is aware of the most important classes of information systems used in organizations:. process-centric, information-centric and people-centric information systems.
- knows the most important activities required to execute in the pre-implementation, implementation and post-implementation phase of information systems in organizations in order to create business value
- has a deep understanding of key capabilities of business intelligence systems and/or interactive information systems used in organizations

Prerequisites
None

Content
During the last decades we witnessed a growing importance of Information Technology (IT) in the business world along with faster and faster innovation cycles. IT has become core for businesses from an operational company-internal and external customer perspective. Today, companies have to rethink their way of doing business, from an internal as well as an external digitalization perspective.

This module focuses on the internal digitalization perspective. The contents of the module abstract from the technical implementation details and focus on foundational concepts, theories, practices and methods for information systems in organizations. The students get the necessary knowledge to guide the successful digitalization of organizations. Each lecture in the module is accompanied with a capstone project that is carried out in cooperation with an industry partner.

Annotation
New module starting summer term 2018.

Workload
The total workload for this module is approximately 270 hours.

M 3.71 Module: Innovation and Growth [M-WIWI-101478]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	3

Election block: Wahlpflichtangebot (between 9 and 10 credits)			
T-WIWI-109194	Dynamic Macroeconomics	4,5 CR	Brumm
T-WIWI-102785	Theory of Endogenous Growth	4,5 CR	Ott
T-WIWI-102840	Innovationtheory and -Policy	4,5 CR	Ott

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The exams are offered at the beginning of the recess period about the subject matter of the latest held lecture. Re-examinations are offerd at every ordinary examination date. The assessment procedures are described for each course of the module seperately.

The overall grade for the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
Students shall be given the ability to

- know the basic techniques for analyzing static and dynamic optimization models that are applied in the context of micro-and macroeconomic theories
- understand the important role of innovation to the overall economic growth and welfare
- identify the importance of alternative incentive mechanisms for the emergence and dissemination of innovations
- explain, in which situations market interventions by the state, for example taxes and subsidies, can be legitimized, and evaluate them in the light of economic welfare

Prerequisites
None

Content
The module includes courses that deal with issues of innovation and growth in the context of micro-and macroeconomic theories. The dynamic analysis makes it possible to analyze the consequences of individual decisions over time, and sheds light on the tension between static and dynamic efficiency in particular. In this context is also analyzed, which policy is appropriate to carry out corrective interventions in the market and thus increase welfare in the presence of market failure.

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Workload
Total expenditure of time for 9 credits: 270 hours

Attendance time per lecture: 3x14h

Preparation and wrap-up time per lecture: 3x14h

Rest: Exam Preparation

The exact distribution is subject to the credits of the courses of the module.

M 3.72 Module: Integral Equations [M-MATH-102874]

Responsible: PD Dr. Frank Hettlich
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105834	Integral Equations	8 CR	Arens, Hettlich, Kirsch

M 3.73 Module: Intelligent Risk and Investment Advisory [M-WIWI-103247]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Language	Level	Version
9	Englisch	4	3

Election block: Wahlpflichtangebot (9 credits)			
T-WIWI-106442	Building Intelligent and Robo-Adviced Portfolios	9 CR	Ulrich
T-WIWI-107032	Computational Risk and Asset Management I	4,5 CR	Ulrich
T-WIWI-106494	Computational Risk and Asset Management II	4,5 CR	Ulrich
T-WIWI-106193	Engineering FinTech Solutions	4,5 CR	Ulrich

Competence Certificate
In winter semester 2018/2019 no exam for the courses "Building Intelligent and Robo-Adviced Portfolios" and "Computational Risk and Asset Management I / II" will be offered.

The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
Students obtain a practical and yet research oriented introduction into the field of quantitative and computational risk and investment management. Students learn how to use concepts from computer science, statistics, OR and economics to build intelligent risk and investment systems. Based on personal preferences, students can specialize within the module on either more practical programming and statistical learning points or more on the economic and mathematical insights and intuition.

After successful completion of the module, students know the industry intuition as well as state-of-the-art academic ‘financial engineering’ methods necessary to successfully contribute to sustainable and value oriented innovations in the field of intelligent risk and investment advisory.

Prerequisites
None.

Content
The lecture "Building Intelligent and Robo-Adviced Portfolios" offers an application-oriented introduction to intelligent and automated portfolio management.

The lectures "Computational Risk and Asset Management" offer an application-oriented introduction to financial market modeling with modern statistical concepts. The acquired knowledge is helpful for quantitative industry internships and jobs, as well as for further quantitative and/or data analysis oriented lectures/seminars/final papers at FBV and other KIT institutes. In terms of content, the student learns to analyse fundamental problems of financial market modelling, such as the prediction of returns, risk distributions and risk premiums, using probabilistic concepts and to solve them independently using modern software. The intuitive and at the same time rigorous interaction of statistical modelling on the one hand and the application to new financial market problems on the other hand characterizes the teaching philosophy of the course. All necessary statistical and financial specific concepts are discussed in the lectures. The students are given numerous possibilities to solve current financial problems independently with modern software. The learning of the programming language Python is part of the teaching program.

Within the scope of the lecture "Engineering FinTech Solutions" students get the opportunity to solve a subproblem from a larger FinTech problem independently and at the same time with close mentoring - by employee and professor of the C-RAM research group. The student is introduced to the problem to be solved on the basis of his very own level of knowledge and equipped with the necessary aids. Students are given the opportunity to combine new research approaches from the field of risk and investment management with modern information technology in order to independently master a step towards prototype development. Depending on the topic, students work alone or in teams. As part of the close mentoring approach, teams will meet weekly to discuss their progress and open questions with course students and the professor.

Recommendation
None

Annotation
See respective lecture

Workload
The total workload for this module is approximately 270 hours. For further information, see respective lecture.

M 3.74 Module: Introduction into Particulate Flows [M-MATH-102943]

Responsible: Prof. Dr. Willy Dörfler
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
3	Once	2 term	4	1

Mandatory			
T-MATH-105911	Introduction into Particulate Flows	3 CR	Dörfler

Prerequisites
none

M 3.75 Module: Introduction to Geometric Measure Theory [M-MATH-102949]

Responsible: PD Dr. Steffen Winter
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Irregular	2 term	4	1

Mandatory			
T-MATH-105918	Introduction to Geometric Measure Theory	6 CR	Winter

Prerequisites
none

M 3.76 Module: Introduction to Kinetic Theory [M-MATH-103919]

Responsible: Prof. Dr. Martin Frank
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Language	Level	Version
4	Each winter term	1 semester	Englisch	4	1

Mandatory			
T-MATH-108013	Introduction to Kinetic Theory	4 CR	Frank

Competence Goal
After successfully taking part in the module's classes and exams, students have gained knowledge and abilities as described in the "Inhalt" section. Specifically, Students know common means of mesoscopic and macroscopic description of particle systems. Furthermore, students are able to describe the basics of multiscale methods, such as the asypmtotic analysis and the method of moments. Students are able to apply numerical methods to solve engineering problems related to particle systems. They can name the assumptions that are needed to be made in the process. Students can judge whether specific models are applicable to the specific problem and discuss their results with specialists and colleagues.

Prerequisites
None

Content

- From Newton's equations to Boltzmann's equation
- Rigorous derivation of the linear Boltzmann equation
- Properties of kinetic equations (existence & uniqueness, H theorem)
- The diffusion limit
- From Boltzmann to Euler & Navier-Stokes
- Method of Moments
- Closure techniques
- Selected numerical methods

Recommendation
Partial Differential Equations, Functional Analysis

M 3.77 Module: Introduction to Matlab and Numerical Algorithms [M-MATH-102945]

Responsible: Dr. Daniel Weiß
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Irregular	2 term	4	1

Mandatory			
T-MATH-105913	Introduction to Matlab and Numerical Algorithms	5 CR	Weiß, Wieners

Prerequisites
none

M 3.78 Module: Introduction to Scientific Computing [M-MATH-102889]

Responsible: Prof. Dr. Willy Dörfler
Prof. Dr Tobias Jahnke

Organisation: KIT Department of Mathematics

Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each summer term	1 semester	4	2

Mandatory			
T-MATH-105837	Introduction to Scientific Computing	8 CR	Dörfler, Hochbruck, Jahnke, Rieder, Wieners

Prerequisites
None

M 3.79 Module: Inverse Problems [M-MATH-102890]

Responsible: Prof. Dr. Andreas Kirsch
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-105835	Inverse Problems	8 CR	Arens, Hettlich, Kirsch, Rieder

M 3.80 Module: Key Moments in Geometry [M-MATH-104057]

Responsible: Prof. Dr. Wilderich Tuschmann
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Each winter term	1 semester	4	1

Mandatory			
T-MATH-108401	Key Moments in Geometry	5 CR	Tuschmann

Prerequisites
None

M 3.81 Module: L2-Invariants [M-MATH-102952]

Responsible: Dr. Holger Kammeyer
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Irregular	2 term	4	1

Mandatory			
T-MATH-105924	L2-Invariants	5 CR	Kammeyer, Sauer

Prerequisites
none

M 3.82 Module: Lie groups and Lie algebras [M-MATH-104261]

Responsible: Prof. Dr. Enrico Leuzinger
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Language	Level	Version
8	Deutsch	4	1

Mandatory			
T-MATH-108799	Lie groups and Lie algebras	8 CR	Leuzinger

M 3.83 Module: Marketing Management [M-WIWI-101490]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: Operations Management - Data Analysis - Informatics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each summer term	1 semester	4	11

Election block: Wahlpflichtangebot (at least 1 item)			
T-WIWI-107720	Market Research neu	4,5 CR	Klarmann
T-WIWI-102883	Pricing neu	4,5 CR	Feurer
T-WIWI-109864	Product and Innovation Management neu	3 CR	Klarmann
Election block: Ergänzungsangebot (at most 1 item)			
T-WIWI-106137	Country Manager Simulation neu	1,5 CR	Feurer
T-WIWI-102835	Marketing Strategy Business Game neu	1,5 CR	Klarmann

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2) of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. For passing the module exam in every singled partial exam the respective minimum requirements has to be achieved.

When every singled examination is passed, the overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
Students
- have an advanced knowledge about central marketing contents
- have a fundamental understanding of the marketing instruments
- know and understand several strategic concepts and how to implement them
- are able to implement their extensive marketing knowledge in a practical context
- know several qualitative and quantitative approaches to prepare decisions in Marketing
- have the theoretical knowledge to write a master thesis in Marketing
- have the theoretical knowledge to work in/together with the Marketing department

Prerequisites
The course "Market Research" is obligatory.

Content
The aim of this module is to deepen central marketing contents in different areas. Therefore the students can choose between the following marketing courses:

- Product and Innovation Marketing
- Market Research – this course has to be completed successfully by students interested in seminar or master thesis positions at the chair of marketing
- Marketing Strategy Business Game
- Strategic Brand Management

Annotation
Please note that only one of the listed 1,5-ECTS courses can be chosen in the Marketing Management module.

Workload
The total workload for this module is approximately 270 hours.

M 3.84 Module: Markov Decision Processes [M-MATH-102907]

Responsible: Prof. Dr. Nicole Bäuerle
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Irregular	1 semester	4	1

Mandatory			
T-MATH-105921	Markov Decision Processes	5 CR	Bäuerle

Prerequisites
none

M 3.85 Module: Master Thesis [M-MATH-102917]

Responsible: Dr. Sebastian Grensing
Organisation: KIT Department of Mathematics
Part of: Master Thesis

Credits	Recurrence	Duration	Level	Version
30	Each term	1 term	4	1

Mandatory			
T-MATH-105878	Master Thesis	30 CR	Grensing

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to earn at least 70 credits in the following fields:
   - Finance - Risk Management - Managerial Economics
   - Mathematical Methods
   - Mathematical Seminar
   - Operations Management - Data Analysis - Informatics
   - Elective Field
   - Seminar in Economics and Management

M 3.86 Module: Mathematical Methods in Signal and Image Processing [M-MATH-102897]

Responsible: Prof. Dr. Andreas Rieder
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105862	Mathematical Methods in Signal and Image Processing	8 CR	Rieder

Prerequisites
none

M 3.87 Module: Mathematical Methods of Imaging [M-MATH-103260]

Responsible: Prof. Dr. Andreas Rieder
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Level	Version
5	Irregular	4	1

Mandatory			
T-MATH-106488	Mathematical Methods of Imaging	5 CR	Rieder

Prerequisites
None

M 3.88 Module: Mathematical Modelling and Simulation in Practise [M-MATH-102929]

Responsible: PD Dr. Gudrun Thäter
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Language	Level	Version
4	Irregular	2 term	Englisch	4	2

Mandatory			
T-MATH-105889	Mathematical Modelling and Simulation in Practise	4 CR	Thäter

Prerequisites
None

M 3.89 Module: Mathematical Programming [M-WIWI-101473]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: Operations Management - Data Analysis - Informatics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	5

Election block: Wahlpflichtangebot (at most 2 items)			
T-WIWI-102719	Mixed Integer Programming I	4,5 CR	Stein
T-WIWI-102726	Global Optimization I	4,5 CR	Stein
T-WIWI-103638	Global Optimization I and II	9 CR	Stein
T-WIWI-102856	Convex Analysis	4,5 CR	Stein
T-WIWI-102724	Nonlinear Optimization I	4,5 CR	Stein
T-WIWI-103637	Nonlinear Optimization I and II	9 CR	Stein
T-WIWI-102855	Parametric Optimization	4,5 CR	Stein
Election block: Ergänzungsangebot (at most 2 items)			
T-WIWI-106548	Advanced Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-102720	Mixed Integer Programming II	4,5 CR	Stein
T-WIWI-102727	Global Optimization II	4,5 CR	Stein
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CR	Nickel
T-WIWI-106549	Large-scale Optimization	4,5 CR	Rebennack
T-WIWI-103124	Multivariate Statistical Methods	4,5 CR	Grothe
T-WIWI-102725	Nonlinear Optimization II	4,5 CR	Stein
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- names and describes basic notions for advanced optimization methods, in particular from continuous and mixed integer programming,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve also challenging optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Prerequisites
At least one of the courses "Mixed Integer Programming I", "Parametric Optimization", "Convex Analysis", "Nonlinear Optimization I" and "Global Optimization I" has to be taken.

Content
The modul focuses on theoretical foundations as well as solution algorithms for optimization problems with continuous and mixed integer decision variables.

Annotation
The lectures are partly offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

For the lectures of Prof. Stein a grade of 30 % of the exercise course has to be fulfilled. The description of the particular lectures is more detailed.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.90 Module: Mathematical Statistics [M-MATH-102909]

Responsible: Dr. Bernhard Klar
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Irregular	1 semester	4	1

Mandatory			
T-MATH-105872	Mathematical Statistics	4 CR	Henze, Klar

Prerequisites
none

M 3.91 Module: Mathematical Topics in Kinetic Theory [M-MATH-104059]

Responsible: Prof. Dr. Dirk Hundertmark
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Each winter term	1 semester	4	1

Mandatory			
T-MATH-108403	Mathematical Topics in Kinetic Theory	4 CR	Hundertmark

Competence Goal
The students are familiar with the basic questions in kinetic theory and methodical approaches to their solutions. With the acquired knowledge they are able to understand the required analytical methods and are able to apply them to the basic equations in kinetic theory.

Prerequisites
None

Content

- Boltzmann equation: Cauchy problem and properties of solutions
- entropy and H theorem
- equilibrium and convergence to equilibrium
- other models of kinetic theory

M 3.92 Module: Maxwell's Equations [M-MATH-102885]

Responsible: Prof. Dr. Andreas Kirsch
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105856	Maxwell's Equations	8 CR	Arens, Hettlich, Kirsch

M 3.93 Module: Medical Imaging [M-MATH-102896]

Responsible: Prof. Dr. Andreas Rieder
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105861	Medical Imaging	8 CR	Rieder

Prerequisites
None

M 3.94 Module: Methodical Foundations of OR [M-WIWI-101414]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: Operations Management - Data Analysis - Informatics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	8

Election block: Wahlpflichtangebot (at least 1 item as well as between 4,5 and 9 credits)			
T-WIWI-102726	Global Optimization I	4,5 CR	Stein
T-WIWI-103638	Global Optimization I and II	9 CR	Stein
T-WIWI-102724	Nonlinear Optimization I	4,5 CR	Stein
T-WIWI-103637	Nonlinear Optimization I and II	9 CR	Stein
Election block: Ergänzungsangebot ()			
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-102727	Global Optimization II	4,5 CR	Stein
T-WIWI-102725	Nonlinear Optimization II	4,5 CR	Stein
T-WIWI-102704	Facility Location and Strategic Supply Chain Management	4,5 CR	Nickel

Competence Certificate
The assessment is carried out as partial written exams (according to Section 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- names and describes basic notions for optimization methods, in particular from nonlinear and from global optimization,
- knows the indispensable methods and models for quantitative analysis,
- models and classifies optimization problems and chooses the appropriate solution methods to solve also challenging optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions.

Prerequisites
At least one of the courses *Nonlinear Optimization I* and *Global Optimization I* has to be examined.

Content
The modul focuses on theoretical foundations as well as solution algorithms for optimization problems with continuous decision variables. The lectures on nonlinear programming deal with local solution concepts, whereas the lectures on global optimization treat approaches for global solutions.

Recommendation
The courses Introduction to Operations Research I and II are helpful.

Annotation
The planned lectures and courses for the next three years are announced online (http://www.ior.kit.edu).

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.95 Module: Microeconomic Theory [M-WIWI-101500]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: Finance - Risk Management - Managerial Economics
Elective Field

Credits	Language	Level	Version
9	Deutsch	4	3

Election block: Wahlpflichtangebot (at least 9 credits)			
T-WIWI-102609	Advanced Topics in Economic Theory neu	4,5 CR	Mitusch
T-WIWI-102861	Advanced Game Theory neu	4,5 CR	Ehrhart, Puppe, Reiß
T-WIWI-102859	Social Choice Theory neu	4,5 CR	Puppe
T-WIWI-102613	Auction Theory neu	4,5 CR	Ehrhart
T-WIWI-105781	Incentives in Organizations neu	4,5 CR	Nieken

Competence Certificate
The assessment is carried out as partial exams (according to Section 4(2), 1 or 2 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module seperately.

The overall grade of the the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
Students

- are able to model practical microoeconomic problems mathematically and to analyze them with respect to positive and normative questions,
- understand individual incentives and social outcomes of different institutional designs.

An example of a positive question is: which regulation policy results in which firm decistions under imperfect competition? An example of a normative question is: which voting rule has appealing properties?

Prerequisites
None

Content
The student should gain an understanding of advanced topics in economic theory, game theory and welfare economics. Core topics are, among others, strategic interactions in markets, cooperative and non-cooperative bargaining (Advanced Game Theory), allocation under asymmetric information and general equilibrium over time (Advanced Topics in Economic Theory), voting and the aggregation of preferences and judgements (Social Choice Theory).

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.96 Module: Monotonicity Methods in Analysis [M-MATH-102887]

Responsible: PD Dr. Gerd Herzog
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
3	Irregular	2 term	4	1

Mandatory			
T-MATH-105877	Monotonicity Methods in Analysis	3 CR	Herzog

M 3.97 Module: Nonlinear Analysis [M-MATH-103539]

Responsible: Prof. Dr. Tobias Lamm
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-107065	Nonlinear Analysis	8 CR	Lamm

Prerequisites
None

M 3.98 Module: Nonlinear Maxwell Equations [M-MATH-103257]

Responsible: Prof. Dr. Roland Schnaubelt
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
3	Irregular	1 semester	4	1

Mandatory			
T-MATH-106484	Nonlinear Maxwell Equations	3 CR	Schnaubelt

Prerequisites
none

Content

- Short introduction to nonlinear contraction semigroups in Hilbert spaces and to the spaces H(curl) and H(div).
- Semilinear case:
  Maxwell's equations with linear material laws and nonlinear conductivity. Wellposedness by means of maximal monotone operators. Long-term behavior.
- Quasilinear case:
  Maxwell's equations with nonlinear instantaneous material laws. Local wellposedness on the whole space via linearisation, apriori estimates and regularization. Blow-up examples. Outlook to results on domains.

M 3.99 Module: Nonparametric Statistics [M-MATH-102910]

Responsible: Prof. Dr. Norbert Henze
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Irregular	1 semester	4	2

Mandatory			
T-MATH-105873	Nonparametric Statistics	4 CR	Henze, Klar

Prerequisites
None

M 3.100 Module: Numerical Continuation Methods [M-MATH-102944]

Responsible: Prof. Dr. Jens Rottmann-Matthes
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Irregular	2 term	4	1

Mandatory			
T-MATH-105912	Numerical Continuation Methods	5 CR	Rottmann-Matthes

Prerequisites
none

M 3.101 Module: Numerical Linear Algebra for Scientific High Performance Computing [M-MATH-103709]

Responsible: Dr. Hartwig Anzt
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Language	Level	Version
3	Each winter term	1 semester	Englisch	4	1

Mandatory			
T-MATH-107497	Numerical Linear Algebra for Scientific High Performance Computing	3 CR	Anzt

Prerequisites
None

M 3.102 Module: Numerical Linear Algebra in Image Processing [M-MATH-104058]

Responsible: PD Dr. Volker Grimm
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Each winter term	1 semester	4	1

Mandatory			
T-MATH-108402	Numerical Linear Algebra in Image Processing	6 CR	Grimm

Prerequisites
None

M 3.103 Module: Numerical Methods for Differential Equations [M-MATH-102888]

Responsible: Prof. Dr. Willy Dörfler
Prof. Dr Tobias Jahnke

Organisation: KIT Department of Mathematics

Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-105836	Numerical Methods for Differential Equations	8 CR	Dörfler, Hochbruck, Jahnke, Rieder, Wieners

M 3.104 Module: Numerical Methods for Hyperbolic Equations [M-MATH-102915]

Responsible: Prof. Dr. Willy Dörfler
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Irregular	2 term	4	1

Mandatory			
T-MATH-105900	Numerical Methods for Hyperbolic Equations	6 CR	Dörfler

Competence Goal

.

Prerequisites
none

M 3.105 Module: Numerical Methods for Integral Equations [M-MATH-102930]

Responsible: PD Dr. Tilo Arens
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	2 term	5	1

Mandatory			
T-MATH-105901	Numerical Methods for Integral Equations	8 CR	Arens, Hettlich, Kirsch

M 3.106 Module: Numerical Methods for Maxwell's Equations [M-MATH-102931]

Responsible: Prof. Dr. Marlis Hochbruck
Prof. Dr Tobias Jahnke

Organisation: KIT Department of Mathematics

Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Irregular	2 term	4	1

Mandatory			
T-MATH-105920	Numerical Methods for Maxwell's Equations	6 CR	Hochbruck, Jahnke

M 3.107 Module: Numerical Methods for Time-Dependent Partial Differential Equations [M-MATH-102928]

Responsible: Prof. Dr. Marlis Hochbruck
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung) Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	5	1

Mandatory			
T-MATH-105899	Numerical Methods for Time-Dependent Partial Differential Equations	8 CR	Hochbruck, Jahnke

M 3.108 Module: Numerical Methods in Computational Electrodynamics [M-MATH-102894]

Responsible: Prof. Dr. Willy Dörfler
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung) Elective Field

Credits	Recurrence	Duration	Level	Version
6	Irregular	1 semester	4	1

Mandatory			
T-MATH-105860	Numerical Methods in Computational Electrodynamics	6 CR	Dörfler, Hochbruck, Jahnke, Rieder, Wieners

Prerequisites
none

M 3.109 Module: Numerical Methods in Fluid Mechanics [M-MATH-102932]

Responsible: Prof. Dr. Willy Dörfler
PD Dr. Gudrun Thäter

Organisation: KIT Department of Mathematics

Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Irregular	2 term	4	1

Mandatory			
T-MATH-105902	Numerical Methods in Fluid Mechanics	4 CR	Dörfler, Thäter

M 3.110 Module: Numerical Methods in Mathematical Finance [M-MATH-102901]

Responsible: Prof. Dr Tobias Jahnke
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105865	Numerical Methods in Mathematical Finance	8 CR	Jahnke

Prerequisites
none

M 3.111 Module: Numerical Methods in Mathematical Finance II [M-MATH-102914]

Responsible: Prof. Dr Tobias Jahnke
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	2 term	5	1

Mandatory			
T-MATH-105880	Numerical Methods in Mathematical Finance II	8 CR	Jahnke

Prerequisites
none

M 3.112 Module: Numerical Optimisation Methods [M-MATH-102892]

Responsible: Prof. Dr. Christian Wieners
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105858	Numerical Optimisation Methods	8 CR	Dörfler, Hochbruck, Jahnke, Rieder, Wieners

M 3.113 Module: Operations Research in Supply Chain Management [M-WIWI-102832]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Operations Management - Data Analysis - Informatics
Elective Field

Credits	Language	Level	Version
9	Deutsch	4	5

Election block: Wahlpflichtangebot (at most 2 items)			
T-WIWI-102723	Graph Theory and Advanced Location Models	4,5 CR	Nickel
T-WIWI-106200	Modeling and OR-Software: Advanced Topics	4,5 CR	Nickel
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
Election block: Ergänzungsangebot (at most 2 items)			
T-WIWI-106546	Introduction to Stochastic Optimization	4,5 CR	Rebennack
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	4,5 CR	Nickel
T-WIWI-102719	Mixed Integer Programming I	4,5 CR	Stein
T-WIWI-102720	Mixed Integer Programming II	4,5 CR	Stein
T-WIWI-106549	Large-scale Optimization	4,5 CR	Rebennack
T-WIWI-102704	Facility Location and Strategic Supply Chain Management	4,5 CR	Nickel
T-WIWI-102714	Tactical and Operational Supply Chain Management	4,5 CR	Nickel

Competence Certificate
The assessment is carried out as partial exams (according to § 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- is familiar with basic concepts and terms of Supply Chain Management,
- knows the different areas of SCM and their respective optimization problems,
- is acquainted with classical location problem models (in planes, in networks and discrete) as well as fundamental methods for distribution and transport planning, inventory planning and management,
- is able to model practical problems mathematically and estimate their complexity as well as choose and adapt appropriate solution methods.

Prerequisites
At least one of the courses "Operations Research in Supply Chain Management", "Graph Theory and Advanced Location Models", "Modeling and OR-Software: Advanced Topics" and"Special Topics of Stochastic Optimization (elective)" has to be taken.

Content
Supply Chain Management is concerned with the planning and optimization of the entire, inter-company procurement, production and distribution process for several products taking place between different business partners (suppliers, logistics service providers, dealers). The main goal is to minimize the overall costs while taking into account several constraints including the satisfaction of customer demands.
This module considers several areas of SCM. On the one hand, the determination of optimal locations within a supply chain is addressed. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of Supply Chains. Thoroughly carried out, location planning tasks allow an efficient flow of materials and lead to lower costs and increased customer service. On the other hand, the planning of material transport in the context of supply chain management represents another focus of this module. By linking transport connections and different facilities, the material source (production plant) is connected with the material sink (customer). For given material flows or shipments, it is considered how to choose the optimal (in terms of minimal costs) distribution and transportation chain from the set of possible logistics chains, which asserts the compliance of delivery times and further constraints. Furthermore, this module offers the possibility to learn about different aspects of the tactical and operational planning level in Suppy Chain Mangement, including methods of scheduling as well as different approaches in procurement and distribution logistics. Finally, issues of warehousing and inventory management will be discussed.

Recommendation
Basic knowledge as conveyed in the module*Introduction toOperations Research*[WI1OR] is assumed.

Annotation
Some lectures and courses are offered irregularly.
The planned lectures and courses for the next three years are announced online.

Workload
Total effort for 9 credits: ca. 270 hours

- Presence time: 84 hours
- Preparation/Wrap-up: 112 hours
- Examination and examination preparation: 74 hours

M 3.114 Module: Optimisation and Optimal Control for Differential Equations [M-MATH-102899]

Responsible: Prof. Dr. Christian Wieners
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Irregular	1 semester	4	1

Mandatory			
T-MATH-105864	Optimisation and Optimal Control for Differential Equations	4 CR	

Prerequisites
none

M 3.115 Module: Optimization in Banach Spaces [M-MATH-102924]

Responsible: Prof. Dr. Andreas Kirsch
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105893	Optimization in Banach Spaces	8 CR	Kirsch

Prerequisites
none

M 3.116 Module: Parallel Computing [M-MATH-101338]

Responsible: Dr. rer. nat. Mathias Krause
Prof. Dr. Christian Wieners

Organisation: KIT Department of Mathematics

Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Level	Version
5	Irregular	4	1

Mandatory			
T-MATH-102271	Parallel Computing	5 CR	Krause, Wieners

Prerequisites
None

M 3.117 Module: Percolation [M-MATH-102905]

Responsible: Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Irregular	1 semester	4	1

Mandatory			
T-MATH-105869	Percolation	6 CR	Last

Competence Goal
The students

- are acquainted with basic models of discrete and continuum percolation,
- acquire the skills needed to use specific probabilistic and graph-theoretical methods for the analysis of these models,
- know how to work self-organised and self-reflexive.

Prerequisites
none

M 3.118 Module: Poisson Processes [M-MATH-102922]

Responsible: Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Irregular	1 term	4	1

Mandatory			
T-MATH-105922	Poisson Processes	5 CR	Fasen-Hartmann, Hug, Last

Competence Certificate
oral exam

Competence Goal
The students know about important properties of the Poisson process. The focus is on probabilistic methods and results which are independent of the specific phase space. The students understand the central role of the Poisson process as a specific point process and as a random measure.

Module grade calculation
Marking: grade of exam

Prerequisites
none

Content

- Distributional properties of Poisson processes
- The Poisson process as a particular point process
- stationary Poisson and point processes
- Random measures and Cox processes
- Poisson cluster processes and compound Poisson processes
- The spatial Gale-Shapley algorithm

M 3.119 Module: Potential Theory [M-MATH-102879]

Responsible: Prof. Dr. Andreas Kirsch
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105850	Potential Theory	8 CR	Arens, Hettlich, Kirsch, Reichel

M 3.120 Module: Probability Theory and Combinatorial Optimization [M-MATH-102947]

Responsible: Prof. Dr. Daniel Hug
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 term	4	1

Mandatory			
T-MATH-105923	Probability Theory and Combinatorial Optimization	8 CR	Hug, Last

Prerequisites
none

M 3.121 Module: Project Centered Software-Lab [M-MATH-102938]

Responsible: PD Dr. Gudrun Thäter
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Irregular	2 term	4	1

Mandatory			
T-MATH-105907	Project Centered Software-Lab	4 CR	Thäter

Prerequisites
none

M 3.122 Module: Random Graphs [M-MATH-102951]

Responsible: Dr. Matthias Schulte
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Irregular	1 term	4	1

Mandatory			
T-MATH-105929	Random Graphs	6 CR	Schulte

Prerequisites
none

M 3.123 Module: Ruin theory [M-MATH-104055]

Responsible: Prof. Dr. Vicky Fasen-Hartmann
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Each winter term	1 semester	4	1

Mandatory			
T-MATH-108400	Ruin theory	4 CR	Fasen-Hartmann

Prerequisites
None

M 3.124 Module: Scattering Theory [M-MATH-102884]

Responsible: PD Dr. Frank Hettlich
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105855	Scattering Theory	8 CR	Arens, Hettlich, Kirsch

M 3.125 Module: Selected Topics in Harmonic Analysis [M-MATH-104435]

Responsible: Prof. Dr. Dirk Hundertmark
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
3	Each winter term	1 semester	4	1

Mandatory			
T-MATH-109065	Selected Topics in Harmonic Analysis	3 CR	Hundertmark

Competence Goal
The students are familiar with the concepts of singular integral operators and weighted estimates in Harmonic Analysis. They know the relations between the BMO space and the Muckenhoupt weights and also how to use dyadic analysis operators to obtain estimates for Calderon-Zygmund operators.

Prerequisites
None

Content
- Calderon-Zygmund and Singular Integral operators
- BMO space and Muckenhoupt weights
- Reverse Holder Inequality and Factorisation of Ap weights
- Extrapolation Theory and weighted norm inequalities for singular integral operators

M 3.126 Module: Seminar [M-MATH-102730]

Responsible: Dr. Stefan Kühnlein
Organisation: KIT Department of Mathematics
Part of: Mathematical Seminar

Credits	Recurrence	Language	Level	Version
3	Each term	Deutsch	4	2

Mandatory			
T-MATH-105686	Seminar Mathematics neu	3 CR	

M 3.127 Module: Seminar [M-WIWI-102973]

Responsible: Prof. Dr. Hagen Lindstädt
Prof. Dr. Oliver Stein

Organisation: KIT Department of Economics and Management

Part of: Seminar in Economics and Management
Elective Field

Credits	Language	Level	Version
3	Deutsch	4	1

Election block: Wahlpflichtangebot (3 credits)			
T-WIWI-103479	Seminar in Informatics A (Master)	3 CR	Professorenschaft des Fachbereichs Informatik
T-WIWI-103481	Seminar in Operations Research A (Master)	3 CR	Nickel, Rebennack, Stein

Competence Certificate
The modul examination consists of one seminar (according to §4 (3), 3 of the examintaion regulation). A detailed description of the assessment is given in the specific course characerization.

The final mark for the module is the mark of the seminar.

Competence Goal
The students are in a position to independently handle current, research-based tasks according to scientific criteria.

• They are able to research, analyze, abstract and critically review the information.

• They can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.

• They can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Prerequisites
None.

Content
Competences which are gained in the seminar module especially prepare the student for composing the final thesis. Within the term paper and the presentation the student exercises himself in scientific working techniques supported by the supervisor.

Beside advancing skills in techniques of scientific working there are gained integrative key qualifications as well. A detailled description o these qualifications is given in the section “Key Qualifications” of the module handbook.

Furthermore, the module also includes additional key qualifications provided by the KQ-courses.

Recommendation
None.

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required. The available places are listed on the internet: https://portal.wiwi.kit.edu.

M 3.128 Module: Seminar [M-WIWI-102971]

Responsible: Prof. Dr. Hagen Lindstädt
Prof. Dr. Oliver Stein

Organisation: KIT Department of Economics and Management

Part of: Seminar in Economics and Management
Elective Field

Credits	Language	Level	Version
3	Deutsch	4	1

Election block: Wahlpflichtangebot (3 credits)			
T-WIWI-103474	Seminar in Business Administration A (Master)	3 CR	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
T-WIWI-103478	Seminar in Economics A (Master)	3 CR	Professorenschaft des Fachbereichs Volkswirtschaftslehre
T-WIWI-103483	Seminar in Statistics A (Master)	3 CR	Grothe, Schienle

Competence Certificate
The modul examination consists of one seminar (according to §4 (3), 3 of the examintaion regulation). A detailed description of the assessment is given in the specific course characerization.
The final mark for the module is the mark of the seminar.

Competence Goal
The students are in a position to independently handle current, research-based tasks according to scientific criteria.

• They are able to research, analyze, abstract and critically review the information.

• They can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.

• They can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Prerequisites
None.

Content
Competences which are gained in the seminar module especially prepare the student for composing the final thesis. Within the term paper and the presentation the student exercises himself in scientific working techniques supported by the supervisor.

Beside advancing skills in techniques of scientific working there are gained integrative key qualifications as well. A detailled description o these qualifications is given in the section “Key Qualifications” of the module handbook.

Furthermore, the module also includes additional key qualifications provided by the KQ-courses.

Recommendation
None.

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required. The available places are listed on the internet: https://portal.wiwi.kit.edu.

M 3.129 Module: Seminar [M-WIWI-102972]

Responsible: Prof. Dr. Hagen Lindstädt
Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: Elective Field

Credits	Recurrence	Language	Level	Version
3	Each term	Deutsch/Englisch	4	1

Election block: Wahlplfichtangebot (1 item)			
T-WIWI-103476	Seminar in Business Administration B (Master)	3 CR	Professorenschaft des Fachbereichs Betriebswirtschaftslehre
T-WIWI-103477	Seminar in Economics B (Master)	3 CR	Professorenschaft des Fachbereichs Volkswirtschaftslehre
T-WIWI-103484	Seminar in Statistics B (Master)	3 CR	Grothe, Schienle

Competence Certificate
The modul examination consists of one seminar (according to §4 (3), 3 of the examintaion regulation). A detailed description of the assessment is given in the specific course characerization.

The final mark for the module is the mark of the seminar

Competence Goal

- The students are in a position to independently handle current, research-based tasks according to scientific criteria.
- They are able to research, analyze, abstract and critically review the information.
- They can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- They can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Prerequisites
None.

Content
Competences which are gained in the seminar module especially prepare the student for composing the final thesis. Within the term paper and the presentation the student exercises himself in scientific working techniques supported by the supervisor.

Beside advancing skills in techniques of scientific working there are gained integrative key qualifications as well.

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
he total workload for this module is approximately 90 hours.

M 3.130 Module: Seminar [M-WIWI-102974]

Responsible: Prof. Dr. Hagen Lindstädt
Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: Elective Field

Credits	Recurrence	Language	Level	Version
3	Each term	Deutsch/Englisch	4	1

Election block: Wahlplfichtangebot (1 item)			
T-WIWI-103480	Seminar in Informatics B (Master)	3 CR	Professorenschaft des Fachbereichs Informatik
T-WIWI-103482	Seminar in Operations Research B (Master)	3 CR	Nickel, Rebennack, Stein

Competence Certificate
The modul examination consists of one seminar (according to §4 (3), 3 of the examintaion regulation). A detailed description of the assessment is given in the specific course characerization.

The final mark for the module is the mark of the seminar

Competence Goal

- The students are in a position to independently handle current, research-based tasks according to scientific criteria.
- They are able to research, analyze, abstract and critically review the information.
- They can draw own conclusions using their interdisciplinary knowledge from the less structured information and selectively develop current research results.
- They can logically and systematically present the obtained results both orally and in written form in accordance with scientific guidelines (structuring, technical terminology, referencing). They can argue and defend the results professionally in the discussion.

Prerequisites
None.

Content
Competences which are gained in the seminar module especially prepare the student for composing the final thesis. Within the term paper and the presentation the student exercises himself in scientific working techniques supported by the supervisor.

Beside advancing skills in techniques of scientific working there are gained integrative key qualifications as well.

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Workload
he total workload for this module is approximately 90 hours.

M 3.131 Module: Service Operations [M-WIWI-102805]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: Operations Management - Data Analysis - Informatics

Credits	Language	Level	Version
9	Deutsch	4	5

Election block: Wahlpflichtangebot (at most 2 items)			
T-WIWI-102718	Discrete-Event Simulation in Production and Logistics	4,5 CR	Nickel
T-WIWI-102884	Operations Research in Health Care Management	4,5 CR	Nickel
T-WIWI-102715	Operations Research in Supply Chain Management	4,5 CR	Nickel
T-WIWI-102716	Practical Seminar: Health Care Management (with Case Studies)	4,5 CR	Nickel
Election block: Ergänzungsangebot (at most 2 items)			
T-WIWI-102860	Supply Chain Management in the Process Industry	4,5 CR	Nickel
T-WIWI-102872	Challenges in Supply Chain Management	4,5 CR	Mohr

Competence Certificate
The assessment is carried out as partial exams (according to Section 4 (2), 1-3 SPO), whose sum of credits must meet the minimum requirement of credits of this module. The assessment procedures are described for each course of the module separately. The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
Students

- knows the theoretical bases and the key components of Business Intelligence systems,
- acquires the basic skills to make use of business intelligence and analytics software in the service context
- are introduced into various application scenarios of analytics in the service context
- are able to distinguish different analytics methods and apply them in context
- learn how to apply analytics software in the service context
- are trained for the structured compilation and solution of practice relevant problems with the help of commercial business intelligence software packages as well as analytics methods and tools

Prerequisites
At least one of the fourcourses Operations Research in Supply Chain Management, Operations Research in Health Care Management, Practical seminar: Health Care Management orDiscrete-Event Simulation in Production and Logistics has to be assigned.

Content
The importance of services in modern economies is most evident – nearly 70% of gross value added are achieved in the tertiary sector and a growing number of industrial enterprises add customer specific services to their material goods or transform their business models fundamentally. The growing availability of data “Big Data” and their intelligent processing by applying analytic methods and business intelligence systems plays a key role.

It is the goal of the module to give students a comprehensive overview on the subject Business Intelligence & Analytics focusing on service issues. Various scenarios illustrate how the methods and systems introduced help to improve existing services or create innovative data-based services.

Recommendation
The course Practical Seminar Health Care should be combined with the course OR in Health Care Management.

Annotation
This module is part of the KSRI teaching profile “Digital Service Systems”. Further information on a service-specific profiling is available under www.ksri.kit.edu/teaching.

Workload
The total workload for this module is approximately 270 hours. For further information see German version.

M 3.132 Module: Sobolev Spaces [M-MATH-102926]

Responsible: Prof. Dr. Andreas Kirsch
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Irregular	1 term	4	1

Mandatory			
T-MATH-105896	Sobolev Spaces	5 CR	Kirsch

M 3.133 Module: Spatial Stochastics [M-MATH-102903]

Responsible: Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each winter term	1 semester	4	1

Mandatory			
T-MATH-105867	Spatial Stochastics	8 CR	Hug, Last

Competence Goal
The students are familiar with some basic spatial stochastic processes. They do not only understand how to deal with general properties of distributions, but also know how to describe and apply specific models (Poisson process, Gaussian random fields). They know how to work self-organised and self-reflexive.

Prerequisites
none

Content

- Point processes
- Random measures
- Poisson processes
- Gibbs point processes
- Ralm distributions
- Spatial ergodic theorem
- Spectral Theory of random fields
- Gaussian fields

Recommendation
It is recommended to attend the following modules previously: Probability Theory

M 3.134 Module: Special Functions and Applications in Potential Theory [M-MATH-101335]

Responsible: Prof. Dr. Andreas Kirsch
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Level	Version
5	Irregular	4	1

Mandatory			
T-MATH-102274	Special Functions and Applications in Potential Theory	5 CR	Kirsch

Prerequisites
None

M 3.135 Module: Special Topics of Numerical Linear Algebra [M-MATH-102920]

Responsible: Prof. Dr. Marlis Hochbruck
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	2 term	4	1

Mandatory			
T-MATH-105891	Special Topics of Numerical Linear Algebra	8 CR	Hochbruck

Prerequisites
none

M 3.136 Module: Spectral Theory [M-MATH-101768]

Responsible: Prof. Dr. Lutz Weis
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Language	Level	Version
8	Each summer term	Deutsch	5	1

Mandatory			
T-MATH-103414	Spectral Theory - Exam	8 CR	Herzog, Kunstmann, Schmoeger, Schnaubelt, Weis

Recommendation
It is recommended to attend the module 'Functional Analysis' previously.

M 3.137 Module: Spin Manifolds, Alpha Invariant and Positive Scalar Curvature [M-MATH-102958]

Responsible: Prof. Dr. Wilderich Tuschmann
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Language	Level	Version
5	Irregular	Deutsch	4	1

Mandatory			
T-MATH-105932	Spin Manifolds, Alpha Invariant and Positive Scalar Curvature	5 CR	Klaus, Tuschmann

M 3.138 Module: Stein's Method [M-MATH-102946]

Responsible: Dr. Matthias Schulte
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
5	Irregular	1 term	4	1

Mandatory			
T-MATH-105914	Stein's Method	5 CR	Schulte

Prerequisites
none

M 3.139 Module: Stochastic Control [M-MATH-102908]

Responsible: Prof. Dr. Nicole Bäuerle
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Irregular	1 semester	4	1

Mandatory			
T-MATH-105871	Stochastic Control	4 CR	Bäuerle

Prerequisites
none

M 3.140 Module: Stochastic Differential Equations [M-MATH-102881]

Responsible: Prof. Dr. Lutz Weis
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	5	1

Mandatory			
T-MATH-105852	Stochastic Differential Equations	8 CR	Schnaubelt, Weis

Content

- Brownian motion
- Martingales and Martingal inequalities
- Stochastic integrals and Ito's formula
- Existence and uniqueness of solutions for systems of stochastic differential equations
- Perturbation and stability results
- Application to equations in financial mathematics, physics and engineering
- Connection with diffusion equations and potential theory

M 3.141 Module: Stochastic Evolution Equations [M-MATH-102942]

Responsible: Prof. Dr. Lutz Weis
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 term	5	1

Mandatory			
T-MATH-105910	Stochastic Evolution Equations	8 CR	Weis

Prerequisites
none

M 3.142 Module: Stochastic Geometry [M-MATH-102865]

Responsible: Prof. Dr. Daniel Hug
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Mathematical Methods (Algebra und Geometrie)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Each summer term	1 semester	5	1

Mandatory			
T-MATH-105840	Stochastic Geometry	8 CR	Hug, Last

Competence Goal
The students

- know the fundamental geometric models and characteristics in stochastic geometry,
- are familiar with properties of Poisson processes of geometric objects,
- know examples of applications of models of stochastic geometry,
- know how to work self-organised and self-reflexive.

Content

- Random Sets
- Geometric Point Processes
- Stationarity and Isotropy
- Germ Grain Models
- Boolean Models
- Foundations of Integral Geometry
- Geometric densities and characteristics
- Random Tessellations

Recommendation
It is recommended to attend the module 'Spatial Stochastics' previously.

M 3.143 Module: Stochastic Optimization [M-WIWI-103289]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: Operations Management - Data Analysis - Informatics
Elective Field

Credits	Recurrence	Duration	Level	Version
9	Each term	1 semester	4	6

Election block: Wahlpflichtangebot (at most 2 items)			
T-WIWI-106546	Introduction to Stochastic Optimization neu	4,5 CR	Rebennack
T-WIWI-106548	Advanced Stochastic Optimization neu	4,5 CR	Rebennack
T-WIWI-106549	Large-scale Optimization neu	4,5 CR	Rebennack
Election block: Ergänzungsangebot (at most 2 items)			
T-WIWI-102723	Graph Theory and Advanced Location Models neu	4,5 CR	Nickel
T-WIWI-102719	Mixed Integer Programming I neu	4,5 CR	Stein
T-WIWI-102720	Mixed Integer Programming II neu	4,5 CR	Stein
T-WIWI-103124	Multivariate Statistical Methods neu	4,5 CR	Grothe
T-WIWI-102715	Operations Research in Supply Chain Management neu	4,5 CR	Nickel
T-WIWI-106545	Optimization under Uncertainty neu	5 CR	Rebennack
T-WIWI-106552	Simulation of Stochastic Systems neu	4,5 CR	Grothe, Rebennack

Competence Certificate
The assessment is carried out as partial exams (according to § 4(2), 1 of the examination regulation) of the single courses of this module, whose sum of credits must meet the minimum requirement of credits of this module.

The assessment procedures are described for each course of the module seperately.

The overall grade of the module is the average of the grades for each course weighted by the credits and truncated after the first decimal.

Competence Goal
The student

- names and describes basic notions for advanced stochastic optimization methods, in particular, ways to algorithmically exploit the special model structures,
- knows the indispensable methods and models for quantitative analysis of stochastic optimization problems,
- models and classifies stochastic optimization problems and chooses the appropriate solution methods to solve also challenging stochastic optimization problems independently and, if necessary, with the aid of a computer,
- validates, illustrates and interprets the obtained solutions,
- identifies drawbacks of the solution methods and, if necessary, is able to makes suggestions to adapt them to practical problems.

Prerequisites
At least one of the courses "Advanced Stochastic Optimization" and"Large-scale Optimization" has to be taken.

Content
The module focuses on the modeling as well as the imparting of theoretical principles and solution methods for optimization problems with special structure, which occur for example in the stochastic optimization.

Recommendation
It is recommended to listen to the lecture "Introduction to Stochastic Optimization" before the lecture "Advanced Stochastic Optimization" is visited.

Annotation
The course "Introduction to Stochastic Optimization" will be offered until the summer semester 2019 as an additional option in the elective offer of the module. Thereafter, the course can only be selected in the supplementary offer.

The courses are sometimes offered irregularly. The curriculum, planned for three years in advance, can be found on the Internet at http://sop.ior.kit.edu/28.php.

Workload
The total workload for this module is approximately 270 hours (9 credits). The allocation is made according to the credit points of the courses of the module. The total number of hours per course is determined by the amount of time spent attending the lectures and exercises, as well as the exam times and the time required to achieve the module's learning objectives for an average student for an average performance.

M 3.144 Module: Time Series Analysis [M-MATH-102911]

Responsible: Dr. Bernhard Klar
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Stochastik)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Each summer term	1 semester	4	2

Mandatory			
T-MATH-105874	Time Series Analysis	4 CR	Henze, Klar

Prerequisites
None

M 3.145 Module: Traveling Waves [M-MATH-102927]

Responsible: Prof. Dr. Jens Rottmann-Matthes
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
6	Irregular	1 term	4	1

Mandatory			
T-MATH-105897	Traveling Waves	6 CR	Rottmann-Matthes

M 3.146 Module: Uncertainty Quantification [M-MATH-104054]

Responsible: Prof. Dr. Martin Frank
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
4	Each winter term	1 semester	4	1

Mandatory			
T-MATH-108399	Uncertainty Quantification	4 CR	Frank

Competence Goal
After successfully taking part in the module's classes and exams, students have gained knowledge and abilities as described in the "Inhalt" section.

Specifically, students know several parametrization methods for uncertainties. Furthermore, students are able to describe the basics of several solution methods (stochastic collocation, stochastic Galerkin, Monte-Carlo). Students can explain the so-called curse of dimensionality.

Students are able to apply numerical methods to solve engineering problems formulated as algebraic or differential equations with uncertainties. They can name the advantages and disadvantages of each method. Students can judge whether specific methods are applicable to the specific problem and discuss their results with specialists and colleagues. Finally, students are able to implement the above methods in computer codes.

Prerequisites
None

Content
In this class, we learn to propagate uncertain input parameters through differential equation models, a field called Uncertainty Quantification (UQ). Given uncertain input (parameter values, initial or boundary conditions), how uncertain is the output? The first part of the course ("how to do it") gives an overview on techniques that are used. Among these are:

- Sensitivity analysis
- Monte-Carlo methods
- Spectral expansions
- Stochastic Galerkin method
- Collocation methods, sparse grids

The second part of the course ("why to do it like this") deals with the theoretical foundations of these methods. The so-called "curse of dimensionality" leads us to questions from approximation theory. We look back at the very standard numerical algorithms of interpolation and quadrature, and ask how they perform in many dimensions.

Recommendation
Numerical methods for differential equations

M 3.147 Module: Wavelets [M-MATH-102895]

Responsible: Prof. Dr. Andreas Rieder
Organisation: KIT Department of Mathematics
Part of: Mathematical Methods (Analysis oder Angewandte und Numerische Mathematik, Optimierung)
Elective Field

Credits	Recurrence	Duration	Level	Version
8	Irregular	1 semester	4	1

Mandatory			
T-MATH-105838	Wavelets	8 CR	Rieder

Prerequisites
none

4 Courses

T 4.1 Course: Spin Manifolds, Alpha Invariant and Positive Scalar Curvature [T-MATH-105932]

Responsible: Stephan Klaus
Prof. Dr. Wilderich Tuschmann

Organisation: KIT Department of Mathematics

Part of: M-MATH-102958 - Spin-Mannigfaltigkeiten, alpha-Invariante und positive Skalarkrümmung

Type	Credits	Version
Prüfungsleistung mündlich	5	1

T 4.2 Course: Adaptive Finite Element Methods [T-MATH-105898]

Responsible: Prof. Dr. Willy Dörfler
Organisation: KIT Department of Mathematics
Part of: M-MATH-102900 - Adaptive Finite Elemente Methoden

Type	Credits	Version
Prüfungsleistung mündlich	6	1

Prerequisites
none

T 4.3 Course: Advanced Game Theory [T-WIWI-102861]

Responsible: Prof. Dr. Karl-Martin Ehrhart
Prof. Dr. Clemens Puppe
Prof. Dr. Johannes Philipp Reiß

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101500 - Microeconomic Theory
M-WIWI-101502 - Ökonomische Theorie und ihre Anwendung in Finance
M-WIWI-102970 - Entscheidungs- und Spieltheorie

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2521533	Advanced Game Theory	2 SWS	Lecture (V)	Puppe, Ehrhart, Müller
WS 18/19	2521534	Übung zu Advanced Game Theory	1 SWS	Practice (Ü)	Müller, Puppe
Exams					
WS 18/19	7900232	Advanced Game Theory		Prüfung (PR)	Puppe

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Recommendation
Basic knowledge of mathematics and statistics is assumed.

Below you will find excerpts from events related to this course:

V Advanced Game Theory

2521533, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
This course offers an advanced and rigorous treatment of game theory.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

T 4.4 Course: Advanced Inverse Problems: Nonlinearity and Banach Spaces [T-MATH-105927]

Responsible: Prof. Dr. Andreas Rieder
Organisation: KIT Department of Mathematics
Part of: M-MATH-102955 - Advanced Inverse Problems: Nonlinearity and Banach Spaces

Type	Credits	Version
Prüfungsleistung mündlich	5	1

Events					
WS 18/19	0123000	Nichtlineare inverse Probleme in Banachräumen	2 SWS	Lecture (V)	Rieder
WS 18/19	0123010	Übungen zu 0123000 (Nichtlineare inverse Probleme in Banachräumen)	2 SWS	Practice (Ü)	Rieder
Exams					
WS 18/19	7700061	Advanced Inverse Problems: Nonlinearity and Banach Spaces		Prüfung (PR)	Rieder

Prerequisites
none

T 4.5 Course: Advanced Lab Informatics [T-WIWI-103523]

Responsible: Prof. Dr. Andreas Oberweis
Prof. Dr. Harald Sack
Prof. Dr. Ali Sunyaev
Prof. Dr. York Sure-Vetter
Prof. Dr. Melanie Volkamer
Prof. Dr.-Ing. Johann Marius Zöllner

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4	Each term	1

Events					
WS 18/19	2512100	Security	4 SWS	Practical course (P)	Baumgart, Volkamer, Mayer
WS 18/19	2512301	Linked Data and the Semantic Web	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Acosta Deibe, Käfer, Heling, Weller
WS 18/19	2512311	Real-World Challenges in Data Science and Analytics	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Nickel, Weinhardt, Zehnder, Brandt
WS 18/19	2512312	Cooperation seminar: Innovative applications on single board computers as well as their economic relevance	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Ott, Weller, Bälz
WS 18/19	2512400	Entwicklung Soziotechnischer Informationssysteme	SWS	Practical course (P)	Sunyaev, Kromat
WS 18/19	2512501	Projektpraktikum Kognitive Automobile und Roboter	3 SWS	Practical course (P)	Zöllner
WS 18/19	2512600	Projektpraktikum Information Service Engineering	2 SWS	Practical course (P)	Sack
SS 2019	2512101	Praktikum Betriebliche Informationssysteme: Realisierung innovativer Dienste für Studierende	3 SWS	Practical course (P)	Oberweis, Toussaint, Ullrich
SS 2019	2512300	Knowledge Discovery and Data Mining	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Färber, Nguyen, Weller
SS 2019	2513306	Data Science & Real-time Big Data Analytics	2 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Riemer, Zehnder
Exams					
WS 18/19	7900038	Linked Data and the Semantic Web		Prüfung (PR)	Sure-Vetter
WS 18/19	7900046	Sicherheit		Prüfung (PR)	Volkamer
WS 18/19	7900094	Selected Topics in Text Mining - Cooperation Seminar AIFB and ECON		Prüfung (PR)	Sure-Vetter, Ott
WS 18/19	7900102	Advanced Lab Information Service Engineering		Prüfung (PR)	Sack
WS 18/19	7900107	Advanced Lab Cognitive Automobile and Robots		Prüfung (PR)	Zöllner
WS 18/19	7900115	Development of Sociotechnical Information Systems		Prüfung (PR)	Sunyaev
WS 18/19	7900192	Data Science with Open Data		Prüfung (PR)	Sure-Vetter
SS 2019	7900085	Advanced Lab in Information Systems: Realization of innovative services for students		Prüfung (PR)	Oberweis

SS 2019	7900094	Knowledge Discovery and Data Mining	Prüfung (PR)	Sure-Vetter

Competence Certificate
Advanced Lab "Privacy Friendly Apps":

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of of a practical work in which a software functionality must be implemented and three interim submissions of the software to be developed. The weighting of the individual components will be announced during the first meeting.

All other courses of the Institute AIFB:

The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

- a practical work
- a presentation and
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

Annotation
The title of this course is a generic one. Specific titles and the topics of offered seminars will be announced before the start of a semester in the internet at https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Security**
2512100, WS 18/19, 4 SWS, Open in study portal — **Practical course (P)**

Notes
More information on https://ilias.studium.kit.edu/goto.php?target=crs_719271&client_id=produktiv

V **Linked Data and the Semantic Web**
2512301, WS 18/19, 3 SWS, Open in study portal — **Seminar / Practical course (S/P)**

Description
The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this practical seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

V Real-World Challenges in Data Science and Analytics

2512311, WS 18/19, 3 SWS, Open in study portal

Seminar / Practical course (S/P)

Notes
The exact dates and information for registration will be announced at the event page.

V Cooperation seminar: Innovative applications on single board computers as well as their economic relevance

2512312, WS 18/19, 3 SWS, Open in study portal

Seminar / Practical course (S/P)

Description
This seminar is offered cooperatively by the Chair of Web Science (AIFB) and the Chair of Economic Policy (ECON).

The cooperation seminar deals with the technical realization of innovative applications using single board computers such as Arduino (https://www.arduino.cc) or Raspberry Pi (https://www.raspberrypi.org). These single board computers can be extended by various sensors and modules, thus fulfilling a wide range of tasks. Thus, the addition of a camera allows for example gesture and face detection, or the equipment with different sensors enables the measurement of temperature and perception of moving objects.

At the same time, the implications of cost-effective availability of these basic technologies are analyzed from an economic-scientific perspective. The spread and use of these single-board computers, as well as the concepts associated with their success, can have a decisive impact on innovation processes. The reasons and obstacles as well as their relevance to innovation are therefore also addressed from an economic perspective.

Microcomputers such as the Raspberry Pi, for example, are increasingly being used and expanded in the private environment, with numerous applications being possible in the household sector. They can be used as a monitoring system, as a home server or as an electronic func- tion opener. Likewise, due to their low cost, size and ease of use, they can also significantly support the development of innovative processes, for example in the development of prototypes.

Within the scope of this seminar, the possibilities of a single board computer are investigated using the Raspberry Pi. The students are to conceive, realize and present innovative applications in two-teams. Each team is provided with a Raspberry Pi. In addition to the realization of an innovative application, each team has to deal with and discuss an economic science issue. The use of the Raspberry Pi or the underlying concepts from an innovation-economic perspective are to be analyzed.

In addition to the Raspberry Pis, various sensors and expansion modules are also provided and can be purchased after consultation with the supervisors. Furthermore, it may be necessary to develop extensions in Python during the seminar. Previous knowledge in Python and Semantic Web technologies are therefore an advantage but not an imperative requirement.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

V Entwicklung Soziotechnischer Informationssysteme

2512400, WS 18/19, SWS, Open in study portal

Practical course (P)

Description
The aim of this course is to provide a practical introduction into developing socio-technical information systems, such as web platforms, mobile apps, or desktop applications. Course participants will create (individually or in groups) software solutions for specific problems from various practical domains. The course tasks comprise requirements assessment, system design, and software implementation. Furthermore, course participants will gain insights into software quality assurance methods and software documentation.

Workload
4 ECTS = approx. 120 h

V Projektpraktikum Information Service Engineering

2512600, WS 18/19, 2 SWS, Open in study portal

Practical course (P)

Description
The project will be worked on in teams of 3-4 students each, guided by a tutor from the teaching staff. In the winter semester 2018/19 we intend to participate in the "Cod1ng Da V1nc1" Initiative .

The ISEproject course is based on the summer semester lecture "Information Service Engineering". Goal of the course is to work on a research problem in small groups (3-4 students) related to the ISE lecture topics, i.e. Natural Language Processing, Linked Data engineering, and Knowledge Mining. The solution of the given research problemrequires the development of a software implementation.

Required coursework includes:

- Mid term presentation (5-10 min)
- Final presentation (10-15 min)
- Course report (c. 20 pages)
- Participation and contribution of the students during the course
- Software development and delivery

Notes
The ISEproject course can also be credited as a **seminar**.

The project will be worked on in teams of 3-4 students each, guided by a tutor from the teaching staff. In the winter semester 2018/19 we intend to participate in the "Cod1ng Da V1nc1" Initiative .

V Knowledge Discovery and Data Mining

2512300, SS 2019, 3 SWS, Open in study portal

Seminar / Practical course (S/P)

Description
The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

Literature
Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V Data Science & Real-time Big Data Analytics

2513306, SS 2019, 2 SWS, Open in study portal

Seminar / Practical course (S/P)

Description
Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

T 4.6 Course: Advanced Lab Security [T-WIWI-109786]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4	Each winter term	1

Events					
WS 18/19	2512100	Security	4 SWS	Practical course (P)	Baumgart, Volkamer, Mayer

Competence Certificate
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

- a practical work
- a presentation and possibly
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

Recommendation
Knowledge from the lecture "Information Security" is recommended.

Below you will find excerpts from events related to this course:

V Security **Practical course (P)**
2512100, WS 18/19, 4 SWS, Open in study portal

Notes
More information on https://ilias.studium.kit.edu/goto.php?target=crs_719271&client_id=produktiv

T 4.7 Course: Advanced Lab Security, Usability and Society [T-WIWI-108439]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4	Each summer term	1

Events					
WS 18/19	2512551	Praktikum Security, Usability and Society	3 SWS	Practical course (P)	Volkamer, Mayer
Exams					
WS 18/19	7900116	Advanced Lab Security, Usability and Society		Prüfung (PR)	Volkamer

Competence Certificate
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

- a practical work
- a presentation and possibly
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

Recommendation
Knowledge from the lecture "Information Security" is recommended.

Annotation
The course is expected to be offered from winter term 2018/2019.

Contents:

In the course of the programming lab, changing topics from the field of Human Factors in Security und Privacy will be worked on.

Learning goals:

The student

- can apply the basics of information security
- is able to implement appropriate measures to achieve different protection goals
- can structure a software project in the field of information security
- can use the Human Centred Security and Privacy by Design technique to develop user-friendly software
- can explain and present technical facts and the results of the programming lab in oral and written form

Below you will find excerpts from events related to this course:

V Praktikum Security, Usability and Society

2512551, WS 18/19, 3 SWS, Open in study portal — **Practical course (P)**

Notes
Kick-off Meeting (compulsory attendance) 19.10.2018

T 4.8 Course: Advanced Lab User Studies in Security [T-WIWI-109271]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4	Each summer term	1

Events					
SS 2019	2512552	Praktikum User Studies in Security and Privacy	3 SWS	Practical course (P)	Volkamer, Gerber, Mayer
Exams					
WS 18/19	7900129	Advanced Lab User Studies in Security		Prüfung (PR)	Volkamer
SS 2019	7900129	Advanced Lab User Studies in Security		Prüfung (PR)	Volkamer

Competence Certificate
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

- a practical work
- a presentation and possibly
- a written seminar thesis

Practical work, presentation and written thesis are weighted according to the course.

Prerequisites
None

T 4.9 Course: Advanced Statistics [T-WIWI-103123]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101637 - Analytics und Statistik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2550552	Statistik für Fortgeschrittene	2 SWS	Lecture (V)	Grothe
WS 18/19	2550553	Übung zu Statistik für Fortgeschrittene	2 SWS	Practice (Ü)	Grothe, Kaplan, Coblenz
Exams					
WS 18/19	7900219	Advanced Statistics		Prüfung (PR)	Grothe

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4). The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites
None

Annotation
New course starting winter term 2015/2016

Below you will find excerpts from events related to this course:

V Statistik für Fortgeschrittene

2550552, WS 18/19, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
Basic principles
Types of convergence and limit theorems
Multivariate Distributions
Copulas
Simulation techniques, Bootstrap
Statistical Estimation
Statistical Testing
Simulation studies

Literature
Comprehensive lecture notes

T 4.10 Course: Advanced Stochastic Optimization [T-WIWI-106548]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematische Optimierung
M-WIWI-103289 - Stochastische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	1

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Prerequisites
None.

T 4.11 Course: Advanced Topics in Economic Theory [T-WIWI-102609]

Responsible: Prof. Dr. Kay Mitusch
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101500 - Microeconomic Theory
M-WIWI-101502 - Ökonomische Theorie und ihre Anwendung in Finance

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	1

Events					
SS 2019	2520527	Advanced Topics in Economic Theory	2 SWS	Lecture (V)	Mitusch, Scheffel
SS 2019	2520528	Übung zu Advanced Topics in Economic Theory	1 SWS	Practice (Ü)	Pegorari

Competence Certificate
The course T-WIWI-102609 "Advanced Topics in Economic Theory" restarts in summer term 2019.

The assessment consists of a written exam (60min) (following §4(2), 1 of the examination regulation) at the end of the lecture period or at the beginning of the following semester.

Prerequisites
None

Recommendation
This course is designed for advanced Master students with a strong interest in economic theory and mathematical models. Bachelor students who would like to participate are free to do so, but should be aware that the level is much more advanced than in other courses of their curriculum.

Below you will find excerpts from events related to this course:

V Advanced Topics in Economic Theory

2520527, SS 2019, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
The course deals with basic elements of modern economic theory. It is divided into two parts. The first part introduces the microeconomic foundations of general equilibrium á la Debreu ("The Theory of Value", 1959) and Hildenbrand/Kirman ("Equilibrium Analysis",1988). The second part deals with asymmetric information and introduces the basic techniques of contract theory.
The course is largely based on the textbook "Microeconomic Theory" (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
The course is based on the excellent textbook "Microeconomic Theory" (Chapters 1-5, 10, 13-20) by A.Mas-Colell, M.D.Whinston, and J.R.Green.

T 4.12 Course: Algebra [T-MATH-102253]

Responsible: Prof. Dr. Frank Herrlich
Dr. Stefan Kühnlein
Organisation: KIT Department of Mathematics
Part of: M-MATH-101315 - Algebra

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
WS 18/19	0102200	Algebra	4 SWS	Lecture (V)	Kühnlein
WS 18/19	0102210	Übungen zu 0102200 (Algebra)	2 SWS	Practice (Ü)	Kühnlein
Exams					
WS 18/19	7700044	Algebra		Prüfung (PR)	Kühnlein

T 4.13 Course: Algebraic Geometry [T-MATH-103340]

Responsible: Prof. Dr. Frank Herrlich
Dr. Stefan Kühnlein

Organisation: KIT Department of Mathematics

Part of: M-MATH-101724 - Algebraische Geometrie

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
SS 2019	0152000	Algebraische Geometrie	4 SWS	Lecture (V)	Januszewski
SS 2019	0152100	Übungen zu 0152000 (Algebraische Geometrie)	2 SWS	Practice (Ü)	Januszewski

T 4.14 Course: Algebraic Number Theory [T-MATH-103346]

Responsible: Dr. Stefan Kühnlein
Organisation: KIT Department of Mathematics
Part of: M-MATH-101725 - Algebraische Zahlentheorie

Type	Credits	Version
Prüfungsleistung mündlich	8	1

T 4.15 Course: Algebraic Topology [T-MATH-105915]

Responsible: Dr. Holger Kammeyer
Prof. Dr Roman Sauer

Organisation: KIT Department of Mathematics

Part of: M-MATH-102948 - Algebraische Topologie

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	8	Irregular	1

Events					
SS 2019	0157400	Algebraic Topology	4 SWS	Lecture (V)	Campagnolo
SS 2019	0157410	Tutorial for 0157400 (Algebraic Topology)	2 SWS	Practice (Ü)	Campagnolo

Prerequisites
none

T 4.16 Course: Algebraic Topology II [T-MATH-105926]

Responsible: Prof. Dr Roman Sauer
Organisation: KIT Department of Mathematics
Part of: M-MATH-102953 - Algebraische Topologie II

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	8	Irregular	1

Prerequisites
none

T 4.17 Course: Applied Econometrics [T-WIWI-103125]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Ökonometrie und Statistik I

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Exams				
WS 18/19	7900251	Applied Econometrics	Prüfung (PR)	Schienle
WS 18/19	7900280	Applied Econometrics	Prüfung (PR)	Schienle

Competence Certificate
The assessment of this course is a written examination (90 min) according to §4(2), 1 of the examination regulation.

Prerequisites
None

Annotation
The course is not offered regularly.

T 4.18 Course: Applied Informatics II - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services [T-WIWI-109445]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each summer term	2

Events					
SS 2019	2511032	Applied Informatics II - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services	2 SWS	Lecture (V)	Sunyaev
SS 2019	2511033	Übungen zu Angewandte Informatik II – Internet Computing	1 SWS	Practice (Ü)	Sunyaev
Exams					
SS 2019	7900025	Applied Informatics II - Internet Computing		Prüfung (PR)	Sunyaev

Competence Certificate
The assessment consists of a written exam (120 min) according to Section 4(2), 1 of the examination regulation. The successful completion of the exercises is recommended for the written exam, which is offered at the end of the winter semester and at the end of the summer semester.

By successful processing the exercises a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Applied Informatics II - Principles of Internet Computing: Foundations for Emerging Technologies and Future Services — Lecture (V)

2511032, SS 2019, 2 SWS, Open in study portal

Learning Content
The lecture Applied Computer Science II provides insights into fundamental concepts and future technologies of distributed systems and Internet computing. Students should be able to select, design and apply the presented concepts and technologies. The course first introduces basic concepts of distributed systems (e.g. design of architectures for distributed systems, internet architectures, web services, middleware).

In the second part of the course, emerging technologies of Internet computing will be examined in depth. These include, among others:

- Cloud Computing
- Edge & Fog Computing
- Internet of Things
- Blockchain
- Artificial Intelligence

Workload
The total workload for this course is approximately 150 hours. For further information see German version.

Literature
Tba in the lecture.

T 4.19 Course: Asset Pricing [T-WIWI-102647]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Ökonomische Theorie und ihre Anwendung in Finance

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	2

Events					
SS 2019	2530555	Asset Pricing	2 SWS	Lecture (V)	Uhrig-Homburg
SS 2019	2530556	Übung zu Asset Pricing	1 SWS	Practice (Ü)	Uhrig-Homburg, Reichenbacher
Exams					
WS 18/19	7900056	Asset Pricing		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The success control takes place in form of a written examination (75 min) during the semester break (according to §4(2), 1 SPO).

The examination is offered every semester and can be repeated at any regular examination date.

A bonus can be acquired through successful participation in the practice. If the grade of the written examination is between 4.0 and 1.3, the bonus improves the grade by one grade level (0.3 or 0.4). The exact criteria for awarding a bonus will be announced at the beginning of the course.

Prerequisites
None

Recommendation
We strongly recommend knowledge of the basic topics in investments (bachelor course), which will be necessary to be able to follow the course.

Below you will find excerpts from events related to this course:

V Asset Pricing
2530555, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Description
The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed

Learning Content
This lecture deals with the valuation of risky cash flows. A stochastic discount model and a central equation will be introduced, which form the basis of nearly every valuation model in finance. That includes the valuation of stocks, bonds and derivatives. The first part of the lecture will present the theory, the second part covers empirical questions related to this approach.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Basic literature

- Asset pricing / Cochrane, J.H. - Rev. ed., Princeton Univ. Press, 2005.

Elective literature

- Investments and Portfolio Management / Bodie, Z., Kane, A., Marcus, A.J. - 9. ed., McGraw-Hill, 2011.
- The econometrics of financial markets / Campbell, J.Y., Lo, A.W., MacKinlay, A.C. - 2. printing, with corrections, Princeton Univ. Press, 1997.

T 4.20 Course: Asymptotic Stochastics [T-MATH-105866]

Responsible: Prof. Dr. Vicky Fasen-Hartmann
Prof. Dr. Norbert Henze
Dr. Bernhard Klar

Organisation: KIT Department of Mathematics

Part of: M-MATH-102902 - Asymptotische Stochastik

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
WS 18/19	0118000	Asymptotische Stochastik	4 SWS	Lecture (V)	Henze
WS 18/19	0118100	Übungen zu 0118000	2 SWS	Practice (Ü)	Henze
Exams					
WS 18/19	7700059	Asymptotic Stochastics		Prüfung (PR)	Henze

Prerequisites
none

T 4.21 Course: Auction Theory [T-WIWI-102613]

Responsible: Prof. Dr. Karl-Martin Ehrhart
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101500 - Microeconomic Theory
M-WIWI-102970 - Entscheidungs- und Spieltheorie

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2520408	Auktionstheorie	2 SWS	Lecture (V)	Ehrhart
WS 18/19	2520409	Übungen zu Auktionstheorie	1 SWS	Practice (Ü)	Ehrhart
Exams					
WS 18/19	7900222	Auction Theory		Prüfung (PR)	Ehrhart

Competence Certificate
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.
The exam is offered each semester.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Auktionstheorie

2520408, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
This course deals with the analysis and modeling of auction which are based on game theory. This also includes aspects of applying and designing auctions as well as experiences with auctions. Main topics are:

- Single- and multi-unit auctions
- Selling and procurement auctions
- Electronic auctions (e.g. eBay, C2C, B2B)
- Multi-attributive auctions.

Annotation
We suggest to attend either Game Theory I or Decision Theory beforehand.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Ehrhart , K.-M. und S. Seifert: Auktionstheorie, Skript zur Vorlesung, KIT, 2011
- Krishna, V.: Auction Theory, Academic Press, Second Edition, 2010
- Milgrom, P.: Putting Auction Theory to Work, Cambridge University Press, 2004
- Ausubel, L.M. und P. Cramton: Demand Reduction and Inefficiency in Multi-Unit Auctions, University of Maryland, 1999

T 4.22 Course: Automated Financial Advisory [T-WIWI-106495]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103261 - Disruptive Finanz-technologische Innovationen

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Each summer term	1

Events					
WS 18/19	2500002	Automated Financial Advisory	2 SWS	Seminar (S)	Ulrich
SS 2019	2530372	Automated Financial Advisory	2 SWS	Seminar (S)	Ulrich
Exams					
WS 18/19	7900290	Automated Financial Advisory		Prüfung (PR)	Ulrich
SS 2019	7900124	Automated Financial Advisory		Prüfung (PR)	Ulrich

Competence Certificate
The grade consists of a written thesis and an oral presentation.

Prerequisites
There are two conditions for taking this course:

1. This course is only open for registered students of the module “Disruptive FinTech Innovations”.
2. Registered students do also attend in the same semester the lecture “Engineering FinTech Solutions” and the programming internship “Computational FinTech with Python and C++”.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-106193 - Engineering FinTech Solutions must have been started.
2. The course T-WIWI-106496 - Computational FinTech with Python and C++ must have been started.

Below you will find excerpts from events related to this course:

V Automated Financial Advisory
2500002, WS 18/19, 2 SWS, Open in study portal — **Seminar (S)**

Learning Content
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

Workload
The total workload for this course is approximately 90 hours.

Literature
Literature will be distributed during the first lecture.

V Automated Financial Advisory
2530372, SS 2019, 2 SWS, Open in study portal — **Seminar (S)**

Learning Content
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

Workload
The total workload for this course is approximately 90 hours.

Literature
Literature will be distributed during the first lecture.

T 4.23 Course: Bifurcation Theory [T-MATH-106487]

Responsible: Dr. Rainer Mandel
Organisation: KIT Department of Mathematics
Part of: M-MATH-103259 - Verzweigungstheorie

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	5	Irregular	1

Prerequisites
None

T 4.24 Course: Blockchains & Cryptofinance [T-WIWI-108880]

Responsible: Dr. Philipp Schuster
Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2530567	Blockchains & Cryptofinance	2 SWS	Lecture (V)	Schuster, Uhrig-Homburg
WS 18/19	2530568	Übung zu Blockchains & Cryptofinance	1 SWS	Practice (Ü)	Müller
Exams					
WS 18/19	7900028	Blockchains & Cryptofinance		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The assessment consists of a written exam (75 min) (§4(2), 1 of the examination regulations).

Prerequisites
None

Recommendation
None

Annotation
New course starting winter term 2018/2019.

Below you will find excerpts from events related to this course:

V Blockchains & Cryptofinance

2530567, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Workload
Gesamtaufwand bei 4,5 Leistungspunkten: ca. 135.0 Stunden

Präsenzzeit: 30 Stunden

Vor – und Nachbereitung der LV: 45.0 Stunden

Prüfung und Prüfungsvorbereitung: 60.0 Stunden

T 4.25 Course: Bott Periodicity [T-MATH-108905]

Responsible: Prof. Dr. Wilderich Tuschmann
Organisation: KIT Department of Mathematics
Part of: M-MATH-104349 - Bott-Periodizität

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	5	Irregular	1

Events					
WS 18/19	0106400	Bott-Periodizität	2 SWS	Lecture (V)	Klaus
WS 18/19	0106410	Übungen zu 0106400 (Bott-Periodizität)	2 SWS	Practice (Ü)	Klaus

Prerequisites
none

T 4.26 Course: Boundary and Eigenvalue Problems [T-MATH-105833]

Responsible: Prof. Dr. Dirk Hundertmark
Prof. Dr. Tobias Lamm
Prof. Dr. Michael Plum
Prof. Dr. Wolfgang Reichel
Prof. Dr. Jens Rottmann-Matthes
Prof. Dr. Roland Schnaubelt
Prof. Dr. Lutz Weis

Organisation: KIT Department of Mathematics

Part of: M-MATH-102871 - Rand- und Eigenwertprobleme

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
SS 2019	0157500	Rand- und Eigenwertprobleme	4 SWS	Lecture (V)	Reichel
SS 2019	0157510	Übungen zu 0157500	2 SWS	Practice (Ü)	Reichel

T 4.27 Course: Boundary Element Methods [T-MATH-109851]

Responsible: PD Dr. Tilo Arens
Organisation: KIT Department of Mathematics
Part of: M-MATH-103540 - Randelementmethoden

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	8	Irregular	1

Prerequisites
none

T 4.28 Course: Brownian Motion [T-MATH-105868]

Responsible: Prof. Dr. Nicole Bäuerle
Prof. Dr. Vicky Fasen-Hartmann
Prof. Dr. Günter Last

Organisation: KIT Department of Mathematics

Part of: M-MATH-102904 - Brownsche Bewegung

Type	Credits	Version
Prüfungsleistung mündlich	4	1

Events					
SS 2019	0155700	Brownsche Bewegung	2 SWS	Lecture (V)	Bäuerle
SS 2019	0155710	Übungen zu 0155700 (Brownsche Bewegung)	1 SWS	Practice (Ü)	Bäuerle

Prerequisites
none

T 4.29 Course: Building Intelligent and Robo-Adviced Portfolios [T-WIWI-106442]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103247 - Intelligente Risiko- und Investitionsberatung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	9	Each summer term	1

Competence Certificate
No exam in winter semester 2018/2019.

The exam tests the material of the current semester and takes place during the lecture-free period. Students who don't pass the exam are allowed to re-take the exam.

Details of the grade formation will be announced at the beginning of the event.

Prerequisites
None.

Recommendation
Good skills in applied math modeling (differential equations).

Annotation
The course is not offered regularly.

T 4.30 Course: Business Intelligence Systems [T-WIWI-105777]

Responsible: Prof. Dr. Alexander Mädche
Mario Nadj
Peyman Toreini

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-104068 - Information Systems in Organizations

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2540422	Business Intelligence Systems	2 + 1 SWS	Lecture (V)	Mädche, Nadj
Exams					
WS 18/19	7900224	Business Intelligence Systems		Prüfung (PR)	Mädche

Competence Certificate
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.
Students receive one aggregated grade consisting of a written exam (60%) and the Business Intelligence System challenge (40%). The exam and the Business Intelligence System challenge need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the Business Intelligence System challenge.

Prerequisites
None

Recommendation
Basic knowledge on database systems is helpful.

Below you will find excerpts from events related to this course:

V Business Intelligence Systems

2540422, WS 18/19, 2 + 1 SWS, Open in study portal — **Lecture (V)**

Description
In most modern enterprises, Business Intelligence Systems represent a core enabler of managerial decision making in that they are supplying up-to-date and accurate information about all relevant aspects of a company's planning and operations: from stock levels to sales volumes, from process cycle times to key indicators of corporate performance.

The aim of this course is to introduce theoretical foundations, concepts, tools, and current practice of Business Intelligence Systems from a managerial and technical perspective. The lecture is complemented with a Business Intelligence System challenge, where students work with real-world data and enable system-based decision making using commercial Business Intelligence software packages.

Learning Content
· Conceptual Foundations
· Provisioning: ETL Process, Metadata, Data Warehouse & Data Marts and Big Data Technologies
· Consumption: Reporting, Dashboards and its relation to (Big Data) Analytics
· BI Strategy & Governance
· BI Implementation & Post-Implementation Management
· Business Intelligence System Challenge (in cooperation with industry partner)

Literature

Turban, E., Aronson, J., Liang T.-P., Sharda, R. 2008. “Decision Support and Business Intelligence Systems”. Pearson.

Watson, H. J. 2014. “Tutorial: Big Data Analytics: Concepts, Technologies, and Applications,” Communications of the Association for Information Systems (34), p. 24.

Arnott, D., and Pervan, G. 2014. “A critical analysis of decision support systems research revisited: The rise of design science,” Journal of Information Technology (29:4), Nature Publishing Group, pp. 269–293 (doi: 10.1057/jit.2014.16).

Carlo, V. (2009). “Business intelligence: data mining and optimization for decision making”. Editorial John Wiley and Sons, 308-317.

Chen, H., Chiang, R. H. L, and Storey, V. C. 2012. „Business Intelligence and Analytics: From Big Data to Big Impact,“ MIS Quarterly (36:4), pp. 1165-1188.

Davenport, T. 2014. Big Data @ Work, Boston, MA: Harvard Business Review.

Economist Intelligence Unit. 2015 “Big data evolution: Forging new corporate capabilities for the long term”

Power, D. J. 2008. “Decision Support Systems: A Historical Overview,” Handbook on Decision Support Systems, pp. 121–140 (doi: 10.1007/978-3-540-48713-5_7).

Sharma, R., Mithras, S., and Kankanhalli, A. 2014. „Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organisations,“ European Journal of Information Systems (23:4), pp. 433-441.

Silver, M. S. 1991. “Decisional Guidance for Computer-Based Decision Support,” MIS Quarterly (15:1), pp. 105-122.

T 4.31 Course: Business Process Modelling [T-WIWI-102697]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each winter term	1

Events					
WS 18/19	2511210	Business Process Modelling	2 SWS	Lecture (V)	Drescher, Oberweis
WS 18/19	2511211	Übung zu Modellierung von Geschäftsprozessen	1 SWS	Practice (Ü)	Drescher, Koschmider
Exams					
WS 18/19	7900015	Business Process Modelling		Prüfung (PR)	Oberweis
SS 2019	7900047	Business Process Modelling		Prüfung (PR)	Oberweis

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Business Process Modelling

2511210, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
The proper modeling of relevant aspects of business processes is essential for an efficient and effective design and implementation of processes. This lecture presents different classes of modeling languages and discusses the respective advantages and disadvantages of using actual application scenarios. For that simulative and analytical methods for process analysis are introduced. In the accompanying exercise the use of process modeling tools is practiced.

Workload
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

Literature

- M. Weske: Business Process Management: Concepts, Languages, Architectures. Springer 2012.
- F. Schönthaler, G.Vossen, A. Oberweis, T. Karl: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer 2012.

Further Literature will be given in the lecture.

T 4.32 Course: Business Strategies of Banks [T-WIWI-102626]

Responsible: Prof. Dr. Wolfgang Müller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	3	Each winter term	1

Events					
WS 18/19	2530299	Business Strategies of Banks	2 SWS	Lecture (V)	Müller
Exams					
WS 18/19	7900064	Business Strategies of Banks		Prüfung (PR)	Müller, Ruckes
SS 2019	7900079	Business Strategies of Banks		Prüfung (PR)	Müller

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Business Strategies of Banks

2530299, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Description
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management's perspective.
The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank's corporate policy.

Learning Content
The management of a bank is in charge of the determination and implementation of business policy - taking into account all relevant endogenous and exogenous factors - that assures the bank's success in the long run. In this context, there exists a large body of banking models and theories which are helpful in describing the success and risk of a bank. This course is meant to be the bridging of banking theory and practical implementation. In the course of the lectures students will learn to take on the bank management's perspective.
The first chapter deals with the development of the banking sector. Making use of appropriate assumptions, a banking policy is developed in the second chapter. The design of bank services (ch. 3) and the adequate marketing plan (ch. 4) are then built on this framework. The operational business of banks must be guided by appropriate risk and earnings management (ch. 5 and 6), which are part of the overall (global) bank management (ch. 7). Chapter eight, at last, deals with the requirements and demands of bank supervision as they have significant impact on a bank's corporate policy.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Elective literature:

- A script is disseminated chapter by chapter during the course of the lecture.
- Hartmann-Wendels, Thomas; Pfingsten, Andreas; Weber, Martin; 2000, Bankbetriebslehre, 6th edition, Springer

T 4.33 Course: Calculus of Variations [T-MATH-105853]

Responsible: Prof. Dr. Andreas Kirsch
Prof. Dr. Tobias Lamm
Prof. Dr. Michael Plum
Prof. Dr. Wolfgang Reichel

Organisation: KIT Department of Mathematics

Part of: M-MATH-102882 - Variationsrechnung

Type	Credits	Version
Prüfungsleistung mündlich	8	1

T 4.34 Course: Challenges in Supply Chain Management [T-WIWI-102872]

Responsible: Esther Mohr
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2550494	Challenges in Supply Chain Management	3 SWS	Lecture (V)	Mohr

Competence Certificate
The assessment consists of a written paper and an oral exam of ca. 30-40 min (non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)).

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
The number of course participants is limited to 12 participants due to joint work in BASF project teams. Due to these capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The course is offered irregularly. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Challenges in Supply Chain Management

2550494, SS 2019, 3 SWS, Open in study portal — **Lecture (V)**

Learning Content
The course consists of case studies of BASF which cover future challenges of supply chain management. Thus, the course aims at a case-study based presentation, critical evaluation and exemplary discussion of recent questions in supply chain management. The focus lies on future challenges and trends, also with regard to their applicability in practical cases (especially in the chemical industry).

The main part of the course is working on a project together with BASF in Ludwigshafen. The students get in touch with scientific working: The in-depth work with a special scientific topic makes the students familiar with scientific literature research and argumentation methods. As a further aspect of scientific work, especially for Master students the emphasis is put on a critical discussion of the project topic.

This course will include working on cutting edge supply chain topics like Industry 4.0 / “Internet of Everything in production”, supply chain analytics, risk management, procurement and production in SCM. The team essays / project reports will be linked to industry-related challenges as well as to upcoming theoretical concepts. The topics of the seminar will be announced at the beginning of the term in a preliminary meeting.

Annotation
The number of course participants is limited to 12 participants due to joint work in BASF project teams. Due to these capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The course is offered irregularly. The planned lectures and courses for the next three years are announced online.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
To be defined depending on the topic.

T 4.35 Course: Classical Methods for Partial Differential Equations [T-MATH-105832]

Responsible: Prof. Dr. Dirk Hundertmark
Prof. Dr. Tobias Lamm
Prof. Dr. Michael Plum
Prof. Dr. Wolfgang Reichel
Prof. Dr. Roland Schnaubelt
Prof. Dr. Lutz Weis

Organisation: KIT Department of Mathematics

Part of: M-MATH-102870 - Klassische Methoden für partielle Differentialgleichungen

Type	Credits	Version
Prüfungsleistung schriftlich	8	1

Events					
WS 18/19	0105300	Classical Methods for Partial Differential Equations	4 SWS	Lecture (V)	Reichel
WS 18/19	0105310	Classical Methods for Partial Differential Equations - Pass	2 SWS	Practice (Ü)	Reichel
Exams					
WS 18/19	7700045	Classical Methods for Partial Differential Equations		Prüfung (PR)	Reichel, Anapolitanos

T 4.36 Course: Combinatorics [T-MATH-105916]

Responsible: Prof. Dr. Maria Aksenovich
Organisation: KIT Department of Mathematics
Part of: M-MATH-102950 - Kombinatorik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	8	Irregular	1

Prerequisites
none

T 4.37 Course: Commutative Algebra [T-MATH-108398]

Responsible: Prof. Dr. Frank Herrlich
Organisation: KIT Department of Mathematics
Part of: M-MATH-104053 - Kommutative Algebra

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	8	Irregular	1

Prerequisites
none

T 4.38 Course: Comparison Geometry [T-MATH-105917]

Responsible: Prof. Dr. Wilderich Tuschmann
Organisation: KIT Department of Mathematics
Part of: M-MATH-102940 - Vergleichsgeometrie

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	5	Irregular	1

Prerequisites
Keine

T 4.39 Course: Comparison of numerical integrators for nonlinear dispersive equations [T-MATH-109040]

Responsible: Prof. Dr Katharina Schratz
Organisation: KIT Department of Mathematics
Part of: M-MATH-104426 - Vergleich numerischer Integratoren für nicht-lineare dispersive Gleichungen

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	4	Irregular	1

Prerequisites
none

T 4.40 Course: Complex Analysis [T-MATH-105849]

Responsible: PD Dr. Gerd Herzog
Prof. Dr. Michael Plum
Prof. Dr. Wolfgang Reichel
Dr. Christoph Schmoeger
Prof. Dr. Roland Schnaubelt
Prof. Dr. Lutz Weis

Organisation: KIT Department of Mathematics

Part of: M-MATH-102878 - Komplexe Analysis

Type	Credits	Version
Prüfungsleistung mündlich	8	1

T 4.41 Course: Compressive Sensing [T-MATH-105894]

Responsible: Prof. Dr. Andreas Rieder
Organisation: KIT Department of Mathematics
Part of: M-MATH-102935 - Compressive Sensing

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	5	Irregular	1

T 4.42 Course: Computational Economics [T-WIWI-102680]

Responsible: Dr. rer. nat. Pradyumn Kumar Shukla
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each winter term	2

Events					
WS 18/19	2590458	Computational Economics	2 SWS	Lecture (V)	Shukla
WS 18/19	2590459	Übungen zu Computational Economics	1 SWS	Practice (Ü)	Shukla
Exams					
WS 18/19	7900005	Computational Economics		Prüfung (PR)	Shukla
SS 2019	7900030	Computational Economics		Prüfung (PR)	Shukla

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulation). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4). The bonus only applies to the first and second exam of the semester in which it was obtained.

Prerequisites
None

Annotation
The credits have been changed to 5 starting summer term 2016.

Below you will find excerpts from events related to this course:

V Computational Economics

2590458, WS 18/19, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
Examining complex economic problems with classic analytical methods usually requires making numerous simplifying assumptions, for example that agents behave rationally or homogeneously. Recently, widespread availability of computing power gave rise to a new field in economic research that allows the modeling of heterogeneity and forms of bounded rationality: Computational Economics. Within this new discipline, computer based simulation models are used for analyzing complex economic systems. In short, an artificial world is created which captures all relevant aspects of the problem under consideration. Given all exogenous and endogenous factors, the modelled economy evolves over time and different scenarios can be analyzed. Thus, the model can serve as a virtual testbed for hypothesis verification and falsification.

Literature

- R. Axelrod: "Advancing the art of simulation in social sciences". R. Conte u.a., Simulating Social Phenomena, Springer, S. 21-40, 1997.
- R. Axtel: "Why agents? On the varied motivations for agent computing in the social sciences". CSED Working Paper No. 17, The Brookings Institution, 2000.
- K. Judd: "Numerical Methods in Economics". MIT Press, 1998, Kapitel 6-7.
- A. M. Law and W. D. Kelton: "Simulation Modeling and Analysis", McGraw-Hill, 2000.
- R. Sargent: "Simulation model verification and validation". Winter Simulation Conference, 1991.
- L. Tesfation: "Notes on Learning", Technical Report, 2004.
- L. Tesfatsion: "Agent-based computational economics". ISU Technical Report, 2003.

Elective literature:

- Amman, H., Kendrick, D., Rust, J.: "Handbook of Computational Economics". Volume 1, Elsevier North-Holland, 1996.
- Tesfatsion, L., Judd, K.L.: "Handbook of Computational Economics". Volume 2: Agent-Based Computational Economics, Elsevier North-Holland, 2006.
- Marimon, R., Scott, A.: "Computational Methods for the Study of Dynamic Economies". Oxford University Press, 1999.
- Gilbert, N., Troitzsch, K.: "Simulation for the Social Scientist". Open University Press, 1999.

T 4.43 Course: Computational FinTech with Python and C++ [T-WIWI-106496]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103261 - Disruptive Finanz-technologische Innovationen

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	1,5	Each summer term	1

Events					
WS 18/19	2500003	Computational FinTech with Python and C++	1,5 SWS	Practical course (P)	Ulrich
SS 2019	2530373	Computational FinTech with Python and C++	1 SWS	Practical course (P)	Ulrich
Exams					
WS 18/19	7900289	Computational FinTech with Python and C++		Prüfung (PR)	Ulrich
SS 2019	7900123	Computational FinTech with Python and C++		Prüfung (PR)	Ulrich

Competence Certificate
The grade is based on a larger or several smaller programming exercises.

Prerequisites
There are two conditions for taking this course:

1. This course is only open for registered students of the module “Disruptive FinTech Innovations”.
2. Registered students do also attend in the same semester the lecture “Engineering FinTech Solutions” and the seminar “Automated Financial Advisory”.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-106193 - Engineering FinTech Solutions must have been started.
2. The course T-WIWI-106495 - Automated Financial Advisory must have been started.

Below you will find excerpts from events related to this course:

V Computational FinTech with Python and C++

2500003, WS 18/19, 1,5 SWS, Open in study portal — **Practical course (P)**

Learning Content
At the beginning of the semester, each student receives a personalized set of programming tasks .

Workload
Roughly 45 hours.

V Computational FinTech with Python and C++

2530373, SS 2019, 1 SWS, Open in study portal — **Practical course (P)**

Learning Content
At the beginning of the semester, each student receives a personalized set of programming tasks .

Workload
Roughly 45 hours.

T 4.44 Course: Computational Risk and Asset Management I [T-WIWI-107032]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103247 - Intelligente Risiko- und Investitionsberatung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Competence Certificate
No exam in winter semester 2018/2019.

The grade consists of an exam and seven problem sets, which are distributed throughout the semester. All problem sets count equally and make up in total 25% of the final grade. The exam accounts for the remaining 75%. The exam is based on all the material that is taught in the current semester. The exam takes place in the last week of the lecture period. Students who fail the exam are allowed to retake the exam.

Prerequisites
None.

Recommendation
None

T 4.45 Course: Computational Risk and Asset Management II [T-WIWI-106494]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103247 - Intelligente Risiko- und Investitionsberatung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Competence Certificate
No exam in winter term 2018/2019.

The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and 6 problem sets, which are distributed throughout the semester. All problem sets count equally and make up in total 25% of the final grade. The exam accounts for the remaining 75%. The exam is based on all the material that is taught in the current semester. The exam takes place in the last week of the lecture period. Students who fail the exam are allowed to retake the exam.

Prerequisites
None.

Recommendation
It is recommend that students have studied the material of „Computational Risk and Asset Management I“.

Annotation
New course starting winter term 2017/2018.

T 4.46 Course: Computer-Assisted Analytical Methods for Boundary and Eigenvalue Problems [T-MATH-105854]

Responsible: Prof. Dr. Michael Plum
Organisation: KIT Department of Mathematics
Part of: M-MATH-102883 - Computerunterstützte analytische Methoden für Rand- und Eigenwertprobleme

Type	Credits	Version
Prüfungsleistung mündlich	8	1

T 4.47 Course: Continuous Time Finance [T-MATH-105930]

Responsible: Prof. Dr. Nicole Bäuerle
Prof. Dr. Vicky Fasen-Hartmann
Organisation: KIT Department of Mathematics
Part of: M-MATH-102860 - Finanzmathematik in stetiger Zeit

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
SS 2019	0159400	Finanzmathematik in stetiger Zeit	4 SWS	Lecture (V)	Bäuerle
SS 2019	0159500	Übungen zu 0159400	2 SWS	Practice (Ü)	Bäuerle

T 4.48 Course: Control Theory [T-MATH-105909]

Responsible: Prof. Dr. Roland Schnaubelt
Prof. Dr. Lutz Weis

Organisation: KIT Department of Mathematics

Part of: M-MATH-102941 - Steuerungstheorie

Type	Credits	Version
Prüfungsleistung mündlich	6	1

Prerequisites
none

T 4.49 Course: Convex Analysis [T-WIWI-102856]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	1

Events					
SS 2019	2550120	Konvexe Analysis	SWS	Lecture (V)	Stein

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.

The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

Below you will find excerpts from events related to this course:

V Konvexe Analysis

2550120, SS 2019, SWS, Open in study portal **Lecture (V)**

Learning Content
Convex Analysis deals with properties of convex functions and convex sets, in particular with respect to the minimization of convex functions over convex sets. That the involved functions are not necessarily assumed to be differentiable allows a number a applications which are not covered by techniques from smooth optimization, e.g. approximation problems with respect to the Manhattan or maximum norms, classification problems or the theory of statistical estimates. The lecture develops along another, geometrically simple example, where a nonsmooth obstacle set is to be described by a single smooth convex constraint such that minimal and maximal distances to the obstacle can be computed. The lecture is structured as follows:

- Introductory examples and terminology
- Convex subdifferential, Lipschitz continuity and the safety margin
- Normal cones, error bounds and the maximal distance

Literature
Elective literature:

- J. Borwein, A. Lewis, Convex Analysis and Nonlinear Optimization: Theory and Examples (2 ed.), Springer, 2006.
- S. Boyd, L. Vandenberghe, Convex Optimization, Cambridge University Press, 2004.
- O. Güler, Foundations of Optimization, Springer, 2010.
- J.-B. Hiriart-Urruty, C. Lemarechal, Fundamentals of Convex Analysis, Springer, 2001.
- R.T. Rockafellar, Convex Analysis, Princeton University Press, 1970.
- R.T. Rockafellar, R.J.B. Wets, Variational Analysis, Springer, Berlin, 1998.

T 4.50 Course: Convex Geometry [T-MATH-105831]

Responsible: Prof. Dr. Daniel Hug
Organisation: KIT Department of Mathematics
Part of: M-MATH-102864 - Konvexe Geometrie

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
WS 18/19	0104400	Konvexe Geometrie	4 SWS	Lecture (V)	Hug
WS 18/19	0104410	Übungen zu 0104400	2 SWS	Practice (Ü)	Hug
Exams					
WS 18/19	7700065	Convex Geometry		Prüfung (PR)	Hug

T 4.51 Course: Corporate Financial Policy [T-WIWI-102622]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Ökonomische Theorie und ihre Anwendung in Finance

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Exams				
WS 18/19	7900058	Corporate Financial Policy	Prüfung (PR)	Ruckes
SS 2019	7900073	Corporate Financial Policy	Prüfung (PR)	Ruckes

Competence Certificate
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.

The exam is offered each semester.

Prerequisites
None

Annotation
The course will not be offered in summer term 2019. However, the exam can be written on the regular date at the end of the semester.

T 4.52 Course: Corporate Risk Management [T-WIWI-109050]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Ökonomische Theorie und ihre Anwendung in Finance

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	2

Events					
SS 2019	2530218	Corporate Risk Management	SWS	Lecture (V)	Ruckes, Hoang
SS 2019	2530219	Übung zu Corporate Risk Management	SWS	Practice (Ü)	Silbereis, Ruckes, Hoang
Exams					
WS 18/19	7900136	Corporate Risk Management		Prüfung (PR)	Ruckes

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation. The exam is offered each semester. If there are only a small number of participants registered for the exam, we reserve the right to hold an oral examination instead of a written one.

Prerequisites
None

Recommendation
None

Annotation
The course is offered as a block course in the summer term.

Below you will find excerpts from events related to this course:

V Corporate Risk Management

2530218, SS 2019, SWS, Open in study portal **Lecture (V)**

Learning Content

- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

Workload
The total workload of this course is approximately 135.0 hours. For further information, see German version.

Literature

- Friberg, Richard. *Managing Risk and Uncertainity: A Strategic Approach*. Cambridge, MA: Managing RIsk and Uncertainity, 2015.
- Stulz, René M. *Risk Management & Derivatives*. Mason, Ohio: Cengage Learning, Inc, 2002.
- Jorion, Philippe. *Value at Risk, 3rd Ed: The new Benchmark for Managing Financial Risk*. 3 ed. New York: General Finance & Investing, 2006.

V Übung zu Corporate Risk Management

2530219, SS 2019, SWS, Open in study portal

Practice (Ü)

Learning Content

- Stochastic basics
- Firm decisions under risk - expected utility theory
- The value motive for corporate risk management
- Common risk measures from practice (e.g. Cash-flow at Risk)
- Operational and financial risk management instruments
- The risk management organization (central vs. decentral)
- External risk reporting (e.g. obligations and incentives)

Workload

The total workload of this course is approximately 135.0 hours. For further information, see German version.

Literature

- Friberg, Richard. *Managing Risk and Uncertainity: A Strategic Approach.* Cambridge, MA: Managing RIsk and Uncertainity, 2015.
- Stulz, René M. *Risk Management & Derivatives.* Mason, Ohio: Cengage Learning, Inc, 2002.
- Jorion, Philippe. *Value at Risk, 3rd Ed: The new Benchmark for Managing Financial Risk.* 3 ed. New York: General Finance & Investing, 2006.

T 4.53 Course: Country Manager Simulation [T-WIWI-106137]

Responsible: Dr. Sven Feurer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101490 - Marketing Management

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	1,5	Each winter term	1

Events					
WS 18/19	2572172	Country Manager Simulation	SWS	Block (B)	Feurer
Exams					
WS 18/19	7900154	Country Manager Simulation		Prüfung (PR)	Klarmann

Competence Certificate
Alternative exam assessment (30 minutes presentation) according to § 4 paragraph 2 Nr. 3 of the examination regulation SPO 2015.

Annotation
The course language is English. In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
Please note that only one of the 1.5-ECTS courses can be chosen in this Module.
Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1,5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

Below you will find excerpts from events related to this course:

V Country Manager Simulation

2572172, WS 18/19, SWS, Open in study portal **Block (B)**

Learning Content
Understanding Culture
Understanding International Buyer Behavior
Market Entry Decisions
International Marketing and Sales Management (adaptation vs. differentiation)

Annotation

- The course language is English.
- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in winter term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in winter term starts.
- Please note that only one of the following courses can be chosen in the Sales Management Module: Country Manager Simulation, Case Studies in Sales and Pricing or Preisverhandlungen und Verkaufspräsentationen.
- Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1,5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

Workload
Total workload for 1.5 ECTS: ca. 45 hours

Literature
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

T 4.54 Course: Credit Risk [T-WIWI-102645]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2530565	Credit Risk	3 SWS	Lecture / Practice (VÜ)	Uhrig-Homburg, Hofmann
Exams					
WS 18/19	7900055	Credit Risk		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation and may be supplemented by a non exam assessment according to § 4 paragraph 2 Nr. 3. The examination is offered every semester and can be repeated at every regular examination date.

Prerequisites
None

Recommendation
See German version.

Annotation
See German version.

Below you will find excerpts from events related to this course:

V Credit Risk

2530565, WS 18/19, 3 SWS, Open in study portal **Lecture / Practice (VÜ)**

Description
The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed

Learning Content
The lecture deals with the diverse issues arising in the context of measuring and controlling credit risk. At first, the theoretical and empirical relations between ratings, probabilities of default, and credit spreads are analysed. After that, the focus is on the valuation of credit risk. Finally, the management of credit risk, e.g. using credit derivatives and credit portfolio analysis, is examined, and the legal framework and its implications are discussed

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Lando, D., Credit risk modeling: Theory and Applications, Princeton Univ. Press, (2004).
- Uhrig-Homburg, M., Fremdkapitalkosten, Bonitätsrisiken und optimale Kapitalstruktur, Beiträge zur betriebswirtschaftlichen Forschung 92, Gabler Verlag, (2001).

Elective literature:

- Bluhm, C., Overbeck, L., Wagner, C. , Introduction to Credit Risk Modelling, 2nd Edition, Chapman & Hall, CRC Financial Mathematics Series, (2010).
- Duffie, D., Singleton, K.J., Credit Risk: Pricing, Measurement and Management, Princeton Series of Finance, Prentice Hall, (2003).

T 4.55 Course: Critical Information Infrastructures [T-WIWI-109248]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	5	Each winter term	3

Events					
WS 18/19	2511400	Critical Information Infrastructures	2 SWS	Lecture (V)	Sunyaev
WS 18/19	2511401	Übungen zu Critical Information Infrastructures	1 SWS	Practice (Ü)	Sunyaev
Exams					
WS 18/19	7900067	Critical Information Infrastructures		Prüfung (PR)	Sunyaev
SS 2019	7900061	Critical Information Infrastructures		Prüfung (PR)	Sunyaev

Competence Certificate
The alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- the preparation of a written elaboration as well as
- an oral examination as part of a presentation of the work.

Details of the grades will be announced at the beginning of the course.

Prerequisites
None.

Annotation
New lecture from winter semester 2018/2019.

Below you will find excerpts from events related to this course:

V Critical Information Infrastructures

2511400, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Description
The lecture critical information infrastructures introduces students to the world of these complex sociotechnical systems that permeate societies on a global scale. Students will learn to handle the complexities involved in the design, development, operation and evaluation of critical information infrastructures. In the beginning of the lecture, critical information infrastructures will be introduced on a general level. The following sessions will focus on an in-depth exploration of selected cases that represent current challenges in research and practice. For example, students will learn how to continuously monitor and audit critical information infrastructures to ensure reliability and security. Likewise, students will get to know how to deal with cascading failures in interconnected infrastructures.

T 4.56 Course: Data Mining and Applications [T-WIWI-103066]

Responsible: Rheza Nakhaeizadeh
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Ökonometrie und Statistik I
M-WIWI-101639 - Ökonometrie und Statistik II

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	4,5	Each summer term	2

Events					
SS 2019	2520375	Data Mining and Applications	2/4 SWS	Lecture (V)	Nakhaeizadeh

Competence Certificate

- Conduction of a larger emprical study in groups
- reporting of milestones
- final presentation (app. 45 minutes)

Prerequisites
None

Below you will find excerpts from events related to this course:

V Data Mining and Applications

2520375, SS 2019, 2/4 SWS, Open in study portal **Lecture (V)**

Learning Content
Part one: Data Mining

Why Data Mining?

- What is Data Mining?
- History of Data Mining
- Conferences and Journals on Data Mining
- Potential Applications
- Data Mining Process:
- Business Understanding
- Data Understanding
- Data Preparation
- Modeling
- Evaluation
- Deployment
- Interdisciplinary aspects of Data Mining
- Data Mining tasks
- Data Mining Algorithms (Decision Trees, Association Rules,
- Regression, Clustering, Neural Networks)
- Fuzzy Mining
- OLAP and Data Warehouse
- Data Mining Tools
- Trends in Data Mining

Part two: Examples of application of Data Mining

- Success parameters of Data Mining Projects
- Application in industry
- Application in Commerce

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature
U. Fayyad, G. Piatetsky-Shapiro, P. Smyth, R. Uthurusamy, editors, Advances in Knowledge Discovery and Data Mining, AAAI/ MIT Press, 1996 (order on-line from Amazon.com or from MIT Press).

- Jiawei Han, Micheline Kamber, Data Mining : Concepts and Techniques, 2nd edition, Morgan Kaufmann, ISBN 1558609016, 2006.
- David J. Hand, Heikki Mannila and Padhraic Smyth, Principles of Data Mining , MIT Press, Fall 2000
- Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Springer Verlag, 2001.
- Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Addison wesley (May, 2005). Hardcover: 769 pages. ISBN: 0321321367
- Ripley, B.D. (1996) Pattern Recognition and Neural Networks, Cambridge: Cambridge University Press.
- Ian witten and Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, 2nd Edition, Morgan Kaufmann, ISBN 0120884070, 2005.

T 4.57 Course: Database Systems and XML [T-WIWI-102661]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each winter term	1

Events					
WS 18/19	2511202	Database Systems and XML	2 SWS	Lecture (V)	Oberweis, Schiefer
WS 18/19	2511203	Übungen zu Datenbanksysteme und XML	1 SWS	Practice (Ü)	Oberweis, Schiefer, Fritsch
Exams					
WS 18/19	7900007	Database Systems and XML		Prüfung (PR)	Oberweis
SS 2019	7900046	Database Systems and XML		Prüfung (PR)	Oberweis

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Database Systems and XML

2511202, WS 18/19, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
Databases are a proven technology for managing large amounts of data. The oldest database model, the hierarchical model, was replaced by different models such as the relational or the object-oriented data model. The hierarchical model became particularly more important with the emergence of the extensible Markup Language XML. XML is a data format for structured, semi-structured, and unstructured data. In order to store XML documents consistently and reliably, databases or extensions of existing data base systems are required. Among other things, this lecture covers the data model of XML, concepts of XML query languages, aspects of storage of XML documents, and XML-oriented database systems.

Workload
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

Literature

- M. Klettke, H. Meyer: XML & Datenbanken: Konzepte, Sprachen und Systeme. dpunkt.verlag 2003
- H. Schöning: XML und Datenbanken: Konzepte und Systeme. Carl Hanser Verlag 2003
- W. Kazakos, A. Schmidt, P. Tomchyk: Datenbanken und XML. Springer-Verlag 2002
- R. Elmasri, S. B. Navathe: Grundlagen der Datenbanksysteme. 2009
- G. Vossen: Datenbankmodelle, Datenbanksprachen und Datenbankmanagementsysteme. Oldenbourg 2008

Further literature will be given individually.

T 4.58 Course: Derivatives [T-WIWI-102643]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2530550	Derivatives	2 SWS	Lecture (V)	Uhrig-Homburg
SS 2019	2530551	Übungen zu Derivate	1 SWS	Practice (Ü)	Uhrig-Homburg, Eska
Exams					
WS 18/19	7900051	Derivatives		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Derivatives

2530550, SS 2019, 2 SWS, Open in study portal **Lecture (V)**

Description
The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

Learning Content
The lecture deals with the application areas and valuation of financial derivatives. After an overview of the most important derivatives and their relevance, forwards and futures are analysed. Then, an introduction to the Option Pricing Theory follows. The main emphasis is on option valuation in discrete and continuous time models. Finally, construction and usage of derivatives are discussed, e.g. in the context of risk management.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Hull (2012): Options, Futures, & Other Derivatives, Prentice Hall, 8th Edition

Elective literature:

Cox/Rubinstein (1985): Option Markets, Prentice Hall

T 4.59 Course: Differential Geometry [T-MATH-102275]

Responsible: Dr. Sebastian Grensing
Prof. Dr. Enrico Leuzinger
Prof. Dr. Wilderich Tuschmann

Organisation: KIT Department of Mathematics

Part of: M-MATH-101317 - Differentialgeometrie

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	8	Each summer term	1

Events					
SS 2019	0100300	Differential Geometry	4 SWS	Lecture (V)	Tuschmann
SS 2019	0100310	Tutorial for 0100300 (Differential Geometry)	2 SWS	Practice (Ü)	Tuschmann
Exams					
WS 18/19	7700033	Differential Geometry - Exam		Prüfung (PR)	Leuzinger

T 4.60 Course: Digital Health [T-WIWI-109246]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4	Each winter term	1

Events					
WS 18/19	2511402	Digital Health	2 SWS	Lecture (V)	Sunyaev, Kromat
Exams					
WS 18/19	7900068	Digital Health		Prüfung (PR)	Sunyaev
SS 2019	7900062	Digital Health		Prüfung (PR)	Sunyaev

Competence Certificate
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Prerequisites
None.

Annotation
New lecture from winter semester 2018/2019.

Below you will find excerpts from events related to this course:

V Digital Health

2511402, WS 18/19, 2 SWS, Open in study portal — **Lecture (V)**

Description
The lecture "Digital Health" has a twofold purpose: first, to introduce theoretical foundations of various topics in digital health (they include, for instance, eHealth, health information systems, ambient assisted living, and smart homes in health care); and second, to introduce current topics in research on digital health (this includes for example genomics, gamification in health care, mobile health, and information privacy) by presenting papers and research projects the research group is working on. In addition, students are given the opportunity to combine the theoretical knowledge with real problems through a practical lecture.

Workload
4 ECTS = approx. 120 h.

T 4.61 Course: Digital Transformation of Organizations [T-WIWI-106201]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104068 - Information Systems in Organizations

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2540556	Digital Transformation and Organizations	3 SWS	Lecture (V)	Mädche
Exams					
WS 18/19	7900230	Digital Transformation of Organizations		Prüfung (PR)	Mädche

Competence Certificate
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.
Students receive one aggregated grade consisting of a written exam (60%) and case study deliverable (40%). The exam and the case study need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the case study.

Prerequisites
None

Annotation
The course will be held in English.

Below you will find excerpts from events related to this course:

V Digital Transformation and Organizations

2540556, SS 2019, 3 SWS, Open in study portal **Lecture (V)**

Description
During the last decades we witnessed a growing importance of Information Technology (IT) in the business world along with faster and faster innovation cycles. IT has become core for businesses from an operational company-internal and external customer perspective. Today, IT is considered as key enabler of operational excellence ranging from the enrichment of routine working tasks (e.g., enterprise resource planning systems) to e-enabled integration of entire business eco-systems (e.g., e-supply chains). Complementing this primarily company-internal perspective on IT, we have recently have seen a massive growth of digital extensions of existing products and services across all industries. The disruptive potential of IT has already transformed selected key industries, e.g. media or retail, and its impact is continuously growing in all areas of business and society.
Large-scale information systems (IS) in organizations strongly interplay with work practices of individual employees as well as organizational structures shaping and being shaped by individuals' behavior. Thus, successful implementation of IS requires dealing with transformation beyond technology. The ability to implement and use IS in a way supporting its overall value proposition has become a central success determinant. Accordingly, the course “Management of Information Systems” course is designed to provide a comprehensive insight into theoretical foundations, concepts, tools, and current practice of IS. The lecture is complemented with a case study. Students get the opportunity to analyze and propose solutions for a selected real-world IS implementation.

Learning Content

- Definition and key concepts of Information Systems
- Introduction of different types of application systems (organizational process & information-centric systems, customer-centric systems, supplier-centric systems and people-centric systems) and their characteristics
- The digital transformation process: The pre-implementation, implementation and post-implementation phase covering facets such as business/IT alignment, packaged software selection, IS implementation projects, as well as adoption & use of IS
- Practice-oriented case study focusing on real-world IS scenarios

Literature

Daft, R. L. (2009). Organization theory and design. Cengage learning.

Laudon, K. C. and Laudon, J. P. (2014). Management Information Systems: Managing the Digital Firm, 13th Edition, Pearson.

Sambamurthy, V and Zmud, R. Z. (2012). Guiding the Digital Transformation of Organizations. Legerity Digital Press, ISBN 978-0-9857955-0-4.

T 4.62 Course: Discrete Time Finance [T-MATH-105839]

Responsible: Prof. Dr. Nicole Bäuerle
Prof. Dr. Vicky Fasen-Hartmann
Organisation: KIT Department of Mathematics
Part of: M-MATH-102919 - Finanzmathematik in diskreter Zeit

Type	Credits	Version
Prüfungsleistung schriftlich	8	1

Events					
WS 18/19	0108400	Finanzmathematik in diskreter Zeit	4 SWS	Lecture (V)	Bäuerle
WS 18/19	0108500	Übungen zu 0108400	2 SWS	Practice (Ü)	Bäuerle
Exams					
WS 18/19	0100025	Discrete Time Finance		Prüfung (PR)	Bäuerle
WS 18/19	6700054	Discrete Time Finance		Prüfung (PR)	Bäuerle

Prerequisites
none

T 4.63 Course: Discrete-Event Simulation in Production and Logistics [T-WIWI-102718]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations
M-WIWI-102832 - Operations Research im Supply Chain Management

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2550488	Ereignisdiskrete Simulation in Produktion und Logistik	3 SWS	Lecture (V)	Spieckermann

Competence Certificate
The assessment consists of a written paper and an oral exam of about 30-40 min (non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015)).

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The course is planned to be held every summer term.

The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Ereignisdiskrete Simulation in Produktion und Logistik

2550488, SS 2019, 3 SWS, Open in study portal **Lecture (V)**

Learning Content
Simulation of production and logistics systems is an interdisciplinary subject connecting expert knowledge from production management and operations research with mathematics/statistics as well as computer science and software engineering. With completion of this course, students know statistical foundations of discrete simulation, are able to classify and apply related software applications, and know the relation between simulation and optimization as well as a number of application examples. Furthermore, students are enabled to structure simulation studies and are aware of specific project scheduling issues.

Annotation
Basic knowledge as conveyed in the module "Introduction toOperations Research" is assumed.

Besides knowledge of Operations Research students are assumed to be familiar with the following topics:

- Introduction in Statistics
- Programming basics (algorithms and data structures)
- Basic knowledge in production and logistics

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Banks J., Carson II J. S., Nelson B. L., Nicol D. M. (2010) Discrete-event system simulation, 5.Aufl., Pearson, Upper Saddle River.
- Eley, M. (2012): Simulation in der Logistik - Einführung in die Erstellung ereignisdiskreter Modelle unter Verwendung des Werkzeuges "Plant Simulation“, Springer, Berlin und Heidelberg
- Kosturiak, J. und M. Gregor (1995): Simulation von Produktionssystemen. Springer, Wien und New York.
- Law, A. M. (2015): Simulation Modeling and Analysis. 5th Edition, McGraw-Hill, New York usw.
- Liebl, F. (1995): Simulation. 2. Auflage, Oldenbourg, München.
- Noche, B. und S. Wenzel (1991): Marktspiegel Simulationstechnik. In: Produktion und Logistik. TÜV Rheinland, Köln.
- Pidd, M. (2004): Computer Simulation in Management Science. 5th Edition, Wiley, Chichester.
- Robinson S (2004) Simulation: the practice of model development and use. John Wiley & Sons, Chichester
- VDI (2014): Simulation von Logistik-, Materialfluß- und Produktionssystemen. VDI Richtlinie 3633, Blatt 1, VDI-Verlag, Düsseldorf.

T 4.64 Course: Dispersive equations [T-MATH-109001]

Responsible: Prof. Dr. Wolfgang Reichel
Organisation: KIT Department of Mathematics
Part of: M-MATH-104425 - Dispersive Gleichungen

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	6	Irregular	1

Prerequisites
none

T 4.65 Course: Dynamic Macroeconomics [T-WIWI-109194]

Responsible: Prof. Dr. Johannes Brumm
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101478 - Innovation und Wachstum
M-WIWI-101496 - Wachstum und Agglomeration

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2560402	Dynamic Macroeconomics	2 SWS	Lecture (V)	Brumm
WS 18/19	2560403	Übung zu Dynamic Macroeconomics	1 SWS	Practice (Ü)	Krause
Exams					
WS 18/19	7900261	Dynamic Macroeconomics		Prüfung (PR)	Scheffel

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Dynamic Macroeconomics

2560402, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Description
The course Dynamic Macroeconomics addresses macroeconomic questions on an advanced level. The main focus of this course is on dynamic programming and its fundamental role in modern macroeconomics. After starting with the necessary mathematical tools, several applications in labor economics, economic growth, and asset pricing are introduced. The course pursues a hands-on approach so that students not only gain theoretical insights but also learn numerical tools to solve dynamic economic models using the modern programming language Python.

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature and lecture notes are provided during the course.

T 4.66 Course: Dynamical Systems [T-MATH-106114]

Responsible: Prof. Dr. Jens Rottmann-Matthes
Organisation: KIT Department of Mathematics
Part of: M-MATH-103080 - Dynamische Systeme

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	8	Irregular	1

Prerequisites
none

T 4.67 Course: Efficient Energy Systems and Electric Mobility [T-WIWI-102793]

Responsible: PD Dr. Patrick Jochem
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energiewirtschaft und Technologie

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	3,5	Each summer term	1

Events					
SS 2019	2581006	Efficient Energy Systems and Electric Mobility	2 SWS	Lecture (V)	Jochem, McKenna
Exams					
WS 18/19	7981006	Efficient Energy Systems and Electric Mobility		Prüfung (PR)	Fichtner

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Efficient Energy Systems and Electric Mobility

2581006, SS 2019, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
This lecture series combines two of the most central topics in the field of energy economics at present, namely energy efficiency and electric mobility. The objective of the lecture is to provide an introduction and overview to these two subject areas, including theoretical as well as practical aspects, such as the technologies, political framework conditions and broader implications of these for national and international energy systems.

The energy efficiency part of the lecture provides an introduction to the concept of energy efficiency, the means of affecting it and the relevant framework conditions. Further insights into economy-wide measurements of energy efficiency, and associated difficulties, are given with recourse to several practical examples. The problems associated with market failures in this area are also highlighted, including the Rebound Effect. Finally and by way of an outlook, perspectives for energy efficiency in diverse economic sectors are examined.

The electric mobility part of the lecture examines all relevant issues associated with an increased penetration of electric vehicles including their technology, their impact on the electricity system (power plants and grid), their environmental impact as well as their optimal integration in the future private electricity demand (i.e. smart grids and V2G). Besides technical aspects the user acceptance and behavioral aspects are also discussed.

Workload
The total workload for this course is approximately 105.0 hours. For further information see German version.

Literature
Will be anounced in the lecture.

T 4.68 Course: eFinance: Information Systems for Securities Trading [T-WIWI-109941]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2540454	eFinance: Information Systems for Securities Trading	2 SWS	Lecture (V)	Weinhardt, Notheisen, Glaser
WS 18/19	2540455	Übungen zu eFinance: Wirtschaftsinformatik für den Wertpapierhandel	1 SWS	Practice (Ü)	Notheisen, Glaser

Competence Certificate
The assessment consists of a written exam (60 min) (§4(2), 1 of the examination regulations) and by submitting written essays as part of the exercise (§4(2), 3 SPO 2007 respectively §4(3) SPO 2015). 70% of the final grade is based on the written exam and 30% is based on assignments from the exercises. The points obtained in the exercises only apply to the first and second exam of the semester in which they were obtained.

Prerequisites
see below

Recommendation
None

Below you will find excerpts from events related to this course:

V eFinance: Information Systems for Securities Trading

2540454, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Description
The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market micro structure, several key parameters and factors of electronic trading are examined. These insights gained along a structured securities trading process are complemented and verified by the analysis of prototypical trading systems developed at the institute as well as selected trading systems used by leading exchanges in the world. In the more practical-oriented second part of the lecture, speakers from practice will give talks about financial trading systems and link the theoretical findings to real-world systems and applications.

Learning Content
The theoretical part of the course examines the New Institutions Economics which provides a theoretically found explanation for the existence of markets and intermediaries. Building upon the foundations of the market micro structure, several key parameters and factors of electronic trading are examined. These insights gained along a structured securities trading process are complemented and verified by the analysis of prototypical trading systems developed at the institute as well as selected trading systems used by leading exchanges in the world. In the more practical-oriented second part of the lecture, speakers from practice will give talks about financial trading systems and link the theoretical findings to real-world systems and applications.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Picot, Arnold, Christine Bortenlänger, Heiner Röhrl (1996): "Börsen im Wandel". Knapp, Frankfurt
- Harris, Larry (2003): "Trading and Exchanges - Market Microstructure for Practitioners"". Oxford University Press, New York

Elective literature:

- Gomber, Peter (2000): "Elektronische Handelssysteme - Innovative Konzepte und Technologien". Physika Verlag, Heidelberg
- Schwartz, Robert A., Reto Francioni (2004): "Equity Markets in Action - The Fundamentals of Liquidity, Market Structure and Trading". Wiley, Hoboken, NJ

T 4.69 Course: Emerging Trends in Critical Information Infrastructures [T-WIWI-109250]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4	Each term	1

Events					
WS 18/19	2513400	Emerging Trends in Critical Information Infrastructures	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
Exams					
WS 18/19	7900114	Emerging Trends in Critical Information Infrastructures		Prüfung (PR)	Sunyaev
SS 2019	7900187	Emerging Trends in Critical Information Infrastructures		Prüfung (PR)	Sunyaev

Competence Certificate
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of a final thesis.

Prerequisites
None.

Annotation
The course is usually held as a block course.

Below you will find excerpts from events related to this course:

V Emerging Trends in Critical Information Infrastructures

2513400, WS 18/19, 2 SWS, Open in study portal **Seminar (S)**

Description
The block seminar Emerging Trends in Critical Information Infrastructures aims to provide insights into emerging topics in the field of information systems and to offer students an opportunity to write their first academic paper alone or in a group of students. Each semester, different topics are offered around the lectures and research domains of Prof. Sunyaev's chair, especially Trusted Engineering, Digital Health, Internet Technologies as well as Auditing and Certifications. Students can also submit their own topic suggestions within the framework of the main topics specified in the respective semester.

T 4.70 Course: Energy and Environment [T-WIWI-102650]

Responsible: Ute Karl
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energiewirtschaft und Technologie

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2581003	Energy and Environment	2 SWS	Lecture (V)	Karl
SS 2019	2581004	Übungen zu Energie und Umwelt	1 SWS	Practice (Ü)	Seddig, Keles
Exams					
WS 18/19	7981003	Energy and Environment		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Energy and Environment

2581003, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
The focus of the lecture is put on environmental impacts of fossil fuel conversion and related assessment methods. The list of topics is given below.

- Fundamentals of energy conversion
- Air pollutant formation from fossil fuel combustion
- Control of air pollutant emissions from fossil-fuelled power plants.
- Measures to improve conversion efficiency of fossil fuelled power plants.
- External effects of energy supply (Life Cycle Assessment of selected energy systems)
- Integrated Assessment models supporting the European Thematic Strategy on Air
- Cost-effectiveness analyses and cost-benefit analyses of air pollution control measures
- Monetary evaluation of external effects of energy supply (external costs)

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Thr references for further reading are included in the lecture documents (see ILIAS)

T 4.71 Course: Energy Market Engineering [T-WIWI-107501]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2540464	Energy Market Engineering	2 SWS	Lecture (V)	Weinhardt, Staudt
SS 2019	2540465	Übung zu Energy Market Engineering	1 SWS	Practice (Ü)	Staudt, vom Scheidt

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Recommendation
None

Annotation
Former course title until summer term 2017: T-WIWI-102794 "eEnergy: Markets, Services, Systems".

The lecture has also been added in the IIP Module *Basics of Liberalised Energy Markets*.

Below you will find excerpts from events related to this course:

V Energy Market Engineering
2540464, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
This lecture discusses different design options for electricity markets. We will focus on different approaches of nodal and zonal pricing as well as single price mechanisms and capacity markets. After a short recap of German and European market designs, the different design options will be discussed scientifically and with the help of examples. Furthermore, we will evaluate alternative market design options like microgrids. Besides the fundamental functioning of those markets, we will introduce and discuss methodological knowledge to evaluate market design options.

Annotation
The lecture has also been added in the IIP Module *Basics of Liberalised Energy Markets*.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Erdmann G, Zweifel P. *Energieökonomik, Theorie und Anwendungen*. Berlin Heidelberg: Springer; 2007.
- Grimm V, Ockenfels A, Zoettl G. Strommarktdesign: Zur Ausgestaltung der Auktionsregeln an der EEX *. *Zeitschrift für Energiewirtschaft*. 2008:147-161.
- Stoft S. *Power System Economics: Designing Markets for Electricity*. IEEE; 2002.,
- Ströbele W, Pfaffenberger W, Heuterkes M. *Energiewirtschaft: Einführung in Theorie und Politik*. 2nd ed. München: Oldenbourg Verlag; 2010:349.

T 4.72 Course: Energy Networks and Regulation [T-WIWI-107503]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2540494	Energy Networks and Regulation	2 SWS	Lecture (V)	Rogat
WS 18/19	2540495	Übung zu Energy Networks and Regulation	1 SWS	Practice (Ü)	Rogat
Exams					
WS 18/19	7900198	Energy Networks and Regulation		Prüfung (PR)	Weinhardt
WS 18/19	7900236	Energy Networks and Regulation		Prüfung (PR)	Weinhardt

Competence Certificate
The assessment consists of a written exam according to Section 4 (2), 1 of the examination regulation.
The exam is offered every semester. Re-examinations are offered on every ordinary examination date.

Prerequisites
None

Recommendation
None

Annotation
Former course title until summer term 2017: T-WIWI-103131 "Regulatory Management and Grid Management - Economic Efficiency of Network Operation"

Below you will find excerpts from events related to this course:

V Energy Networks and Regulation

2540494, WS 18/19, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
The lecture “Energy Networks and Regulation” provides insights into the regulatory framework of electricity and gas. It touches upon the way the grids are operated and how regulation affects almost all grid activities. The lecture also addresses approaches of grid companies to cope with regulation on a managerial level. We analyze how the system influences managerial decisions and strategies such as investment or maintenance. Furthermore, we discuss how the system affects the operator’s abilities to deal with the massive challenges lying ahead (“Energiewende”, redispatch, European grid integration, electric vehicles etc.). Finally, we look at current developments and major upcoming challenges, e.g., the smart meter rollout. Covered topics include:

- Grid operation as a heterogeneous landscape: big vs. small, urban vs. rural, TSO vs. DSO.
- Objectives of regulation: Fair price calculation and high standard access conditions.
- The functioning of incentive regulation
- Amendment to the incentive regulation: its merits, its flaws
- The revenue cap and how it is adjusted according to certain exogenous factors
- Grid tariffs: How are they calculated, what is the underlying rationale, do we need a reform (and which)?
- Exogenous costs shifted (arbitrarily) into the grid, e.g. feed-in tariffs for renewable energy or decentralized supply.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

Averch, H.; Johnson, L.L (1962). Behavior of the firm under regulatory constraint, in: American Economic Review, 52 (5), S. 1052 – 1069.

Bundesnetzagentur (2006): Bericht der Bundesnetzagentur nach § 112a EnWG zur Einführung der Anreizregulierung nach § 21a EnWG, http://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen_Institutionen/Netzentgelte/Anreizregulierung/BerichtEinfuehrgAnreizregulierung.pdf?__blob=publicationFile&v=3.

Bundesnetzagentur (2015): Evaluierungsbericht nach § 33 Anreizregulierungsverordnung, https://www.bmwi.de/Redaktion/DE/Downloads/A/anreizregulierungsverordnung-evaluierungsbericht.pdf?__blob=publicationFile&v=1.

Filippini, M.; Wild, J.; Luchsinger, C. (2001) : Regulierung der Verteilnetzpreise zu Beginn der Marktöffnung. Erfahrungen in Norwegen und Schweden, Bundesamt für Energie, Bern, http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/34/066/34066585.pdf.

Gómez, T. (2013): Monopoly Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 151 – 198, Springer-Verlag, London.

Gómez, T. (2013): Electricity Distribution, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 199 – 250, Springer-Verlag, London.

Pérez-Arriaga, I.J. (2013): Challenges in Power Sector Regulation, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 647 – 678, Springer-Verlag, London.

Rivier, M.; Pérez-Arriaga, I.J.; Olmos, L. (2013): Electricity Transmission, in: Pérez-Arriaga, I.J. (Hg.): Regulation of the Power Sector, S. 251 – 340, Springer-Verlag, London.

T 4.73 Course: Energy Systems Analysis [T-WIWI-102830]

Responsible: Dr. Armin Ardone
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energiewirtschaft und Technologie

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	3	Each winter term	1

Events					
WS 18/19	2581002	Energy Systems Analysis	2 SWS	Lecture (V)	Ardone
Exams					
WS 18/19	7981002	Energy Systems Analysis		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam according to Section 4(2), 1 of the examination regulation.

Prerequisites
None

Recommendation
None

Annotation
Since 2011 the lecture is offered in winter term. Exams can still be taken in summer term.

Below you will find excerpts from events related to this course:

V Energy Systems Analysis
2581002, WS 18/19, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
1. Overview and classification of energy systems modelling approaches
2. Usage of scenario techniques for energy systems analysis
3. Unit commitment of power plants
4. Interdependencies in energy economics
5. Scenario-based decision making in the energy sector
6. Visualisation and GIS techniques for decision support in the energy sector

Annotation
Since 2011 the lecture is offered in winter term. Exams can still be taken in summer term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

T 4.74 Course: Engineering FinTech Solutions [T-WIWI-106193]

Responsible: Prof. Dr Maxim Ulrich
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103247 - Intelligente Risiko- und Investitionsberatung
M-WIWI-103261 - Disruptive Finanz-technologische Innovationen

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4,5	Each summer term	2

Events					
WS 18/19	2530357	Engineering FinTech Solutions	2 SWS	Lecture (V)	Ulrich
SS 2019	2530357	Engineering FinTech Solutions	3 SWS	Lecture (V)	Ulrich
Exams					
WS 18/19	7900287	Engineering FinTech Solutions		Prüfung (PR)	Ulrich
SS 2019	7900125	Engineering FinTech Solutions		Prüfung (PR)	Ulrich

Competence Certificate
Alternative exam assessment (§ 4(2), 3 SPO 2015). Details of the grade formation will be announced at the beginning of the course.

Prerequisites
This course is only open for registered students of the module “Intelligent Risk and Investment Advisory” and “Disruptive FinTech Solutions”.

Recommendation
None

Annotation
The course will be held in English language.

Below you will find excerpts from events related to this course:

V Engineering FinTech Solutions
2530357, WS 18/19, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
This project-oriented lecture invites students to work independently and yet, under close monitoring of researchers and the professor of the C-RAM research group, on a sub-problem of a larger FinTech research question. Students will in a personalized manner be introduced to the necessary concepts, tools and methods that are necessary to solve the question at hand. Students obtain the opportunity to connect newest research insights with modern information technology to move a step closer towards their own development of a prototype. Depending on the topic, students work alone or in groups. An essential part of the guided research mentoring is that students take part in weekly meetings to discuss open issues, to present their progress and to learn from their fellow students

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature will be distributed during the first lecture.

V Engineering FinTech Solutions
2530357, SS 2019, 3 SWS, Open in study portal — **Lecture (V)**

Notes
New course starting summer term 2019.

Learning Content
This project-oriented lecture invites students to work independently and yet, under close monitoring of researchers and the professor of the C-RAM research group, on a sub-problem of a larger FinTech research question. Students will in a personalized manner be introduced to the necessary concepts, tools and methods that are necessary to solve the question at hand. Students obtain the opportunity to connect newest research insights with modern information technology to move a step closer towards their own development of a prototype. Depending on the topic, students work alone or in groups. An essential part of the guided research mentoring is that students take part in weekly meetings to discuss open issues, to present their progress and to learn from their fellow students

Workload
The total workload for this course is approximately 135 hours. For further information see German version.

Literature
Literature will be distributed during the first lecture.

T 4.75 Course: Enterprise Architecture Management [T-WIWI-102668]

Responsible: Thomas Wolf
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each winter term	1

Events					
WS 18/19	2511600	Enterprise Architecture Management	2 SWS	Lecture (V)	Wolf
WS 18/19	2511601	Übungen zu Enterprise Architecture Management	1 SWS	Practice (Ü)	Wolf
Exams					
WS 18/19	7900010	Enterprise Architecture Management		Prüfung (PR)	Oberweis
SS 2019	7900043	Enterprise Architecture Management		Prüfung (PR)	Wolf

Competence Certificate
The assessment of this course is a written (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Enterprise Architecture Management

2511600, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
The following topics will be covered: components of enterprise architecture, enterprise strategy including methods to develop strategies, business process (re)engineering, methods to implement changes within enterprises (management of change)

Literature

- Nolan, R., Croson, D.: Creative Destruction: A Six-Stage Process for Transforming the Organization. Harvard Business School Press, Boston Mass. 1995
- Doppler, K., Lauterburg, Ch.: Change Management. Campus Verlag 1997
- Jacobson, I.: The Object Advantage, Business Process Reengineering with Object Technology. Addison-Wesley Publishing Company, Wokingham England 1994
- Keller, G., Teufel, Th.: SAP R/3 prozessorientiert anwenden. Addison Wesley 1998
- Österle, H.: Business Engineering Bd. 1 und 2. Springer Verlag, Berlin 1995

T 4.76 Course: Evolution Equations [T-MATH-105844]

Responsible: Prof. Dr. Roland Schnaubelt
Prof. Dr. Lutz Weis

Organisation: KIT Department of Mathematics

Part of: M-MATH-102872 - Evolutionsgleichungen

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
WS 18/19	0105900	Evolutionsgleichungen	4 SWS	Lecture (V)	Schnaubelt
WS 18/19	0105910	Übungen zu 0105900	2 SWS	Practice (Ü)	Schnaubelt
Exams					
WS 18/19	7700051	Evolution Equations		Prüfung (PR)	Schnaubelt

T 4.77 Course: Exchanges [T-WIWI-102625]

Responsible: Dr. Jörg Franke
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	1,5	Each summer term	1

Exams				
WS 18/19	7900062	Exchanges	Prüfung (PR)	Franke, Ruckes

Competence Certificate
The examination will be offered latest until winter term 2018/2019 (repeaters only).

Prerequisites
None

Recommendation
None

T 4.78 Course: Experimental Economics [T-WIWI-102614]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101505 - Experimentelle Wirtschaftsforschung
M-WIWI-102970 - Entscheidungs- und Spieltheorie

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2540489	Experimental Economics	2 SWS	Lecture (V)	Pfeiffer, Peukert, Dorner, Knierim
WS 18/19	2540493	Übung zu Experimentelle Wirtschaftsforschung	1 SWS	Practice (Ü)	Knierim
Exams					
WS 18/19	7900178	Experimental Economics		Prüfung (PR)	Weinhardt
WS 18/19	7900194	Experimental Economics		Prüfung (PR)	Weinhardt

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Experimental Economics

2540489, WS 18/19, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
Experimental Economics have become a separate field in Economics. Nearly all fields of the economic discipline use economic experiments to verify theoretical results. Besides being used for empricial validation, this method is applied in political and strategic consulting. The lecture gives an introduction to experimental methods in economics and shows differences to experiments in natural sciences. Scientific studies are used to show exemplary applications.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Strategische Spiele; S. Berninghaus, K.-M. Ehrhart, W. Güth; Springer Verlag, 2nd ed., 2006.
- Handbook of Experimental Economics; J. Kagel, A. Roth; Princeton University Press, 1995.
- Experiments in Economics; J.D. Hey; Blackwell Publishers, 1991.
- Experimental Economics; D.D. Davis, C.A. Holt; Princeton University Press, 1993.
- Experimental Methods: A Primer for Economists; D. Friedman, S. Sunder; Cambridge University Press, 1994.

T 4.79 Course: Exponential Integrators [T-MATH-107475]

Responsible: Prof. Dr. Marlis Hochbruck
Organisation: KIT Department of Mathematics
Part of: M-MATH-103700 - Exponentielle Integratoren

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	6	Irregular	1

Prerequisites
none

T 4.80 Course: Extremal Graph Theory [T-MATH-105931]

Responsible: Prof. Dr. Maria Aksenovich
Organisation: KIT Department of Mathematics
Part of: M-MATH-102957 - Extremale Graphentheorie

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	8	Each term	1

T 4.81 Course: Extreme Value Theory [T-MATH-105908]

Responsible: Prof. Dr. Vicky Fasen-Hartmann
Prof. Dr. Norbert Henze

Organisation: KIT Department of Mathematics

Part of: M-MATH-102939 - Extremwerttheorie

Type	Credits	Version
Prüfungsleistung mündlich	4	2

T 4.82 Course: Facility Location and Strategic Supply Chain Management [T-WIWI-102704]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Anwendungen des Operations Research
M-WIWI-101414 - Methodische Grundlagen des OR
M-WIWI-102832 - Operations Research im Supply Chain Management

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	4

Events					
WS 18/19	2550486	Facility Location and Strategic Supply Chain Management	2 SWS	Lecture (V)	Nickel
WS 18/19	2550487	Übungen zu Standortplanung und strategisches SCM	1 SWS	Practice (Ü)	Bakker
Exams					
WS 18/19	7900221	Facility Location and Strategic Supply Chain Management		Prüfung (PR)	Nickel

Competence Certificate
Due to a research semester of Professor Nickel in WS 19/20, the course "Facility Location and Strategic Supply Chain Management" does NOT take place in WS 19/20. In particular, neither WS 19/20 nor SS 20 will offer an exam for the lecture. The follow-up exam to the lecture in WS 18/19 takes place in SS 19 and is exclusively for students in the second examination.

The assessment consists of a written exam (60 min) according to Section 4 (2), 1 of the examination regulation.

The exam takes place in every semester.

Prerequisite for admission to examination is the succesful completion of the online assessments.

Prerequisites
Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendation
None

Annotation
The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Facility Location and Strategic Supply Chain Management

2550486, WS 18/19, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
Since the classical work "Theory of the Location of Industries" of Weber from 1909, the determination of an optimal location of a new facility with respect to existing customers is strongly connected to strategical logistics planning. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning allows an efficient flow of materials and leads to lower costs and increased customer service.

Subject of the course is an introduction to the most important terms and definitions in location planning as well as the presentation of basic quantitative location planning models. Furthermore, specialized location planning models for Supply Chain Management will be addressed as they are part in many commercial SCM tools for strategic planning tasks.

Annotation
The lecture is held in every winter term. The planned lectures and courses for the next three years are announced online.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Elective literature:

- Daskin: Network and Discrete Location: Models, Algorithms, and Applications, Wiley, 1995
- Domschke, Drexl: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
- Francis, McGinnis, White: Facility Layout and Location: An Analytical Approach, 2nd Edition, Prentice Hall, 1992
- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
- Thonemann: Operations Management - Konzepte, Methoden und Anwendungen, Pearson Studium, 2005

T 4.83 Course: Financial Analysis [T-WIWI-102900]

Responsible: Dr. Torsten Luedecke
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2530205	Financial Analysis	2 SWS	Lecture (V)	Luedecke
SS 2019	2530206	Übungen zu Financial Analysis	2 SWS	Practice (Ü)	Luedecke
Exams					
WS 18/19	7900059	Financial Analysis		Prüfung (PR)	Luedecke, Ruckes
SS 2019	7900075	Financial Analysis		Prüfung (PR)	Luedecke

Competence Certificate
See German version.

Prerequisites
None

Recommendation
Basic knowledge in corporate finance, accounting, and valuation is required.

Below you will find excerpts from events related to this course:

V Financial Analysis

2530205, SS 2019, 2 SWS, Open in study portal **Lecture (V)**

Description
This lecture reviews the key financial statements according to international financial reporting standards and provides analytical tools to evaluate the income statement, the balance sheet, and the cash flow statement in order to measure a firm's liquidity, operational efficiency, and profitability.

Learning Content
Topics:

- Introduction to Financial Analysis
- Financial Reporting Standards
- Major Financial Statements and Other Information
- Recognition and Measurement Issues
- Analysis of Financial Statements
- Financial Reporting Quality

Literature

- Alexander, D. and C. Nobes (2017): Financial Accounting – An International Introduction, 6th ed., Pearson.
- Penman, S.H. (2013): Financial Statement Analysis and Security Valuation, 5th ed., McGraw Hill.

T 4.84 Course: Financial Econometrics [T-WIWI-103064]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Ökonometrie und Statistik I
M-WIWI-101639 - Ökonometrie und Statistik II

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	1

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MATH-105874 - Time Series Analysis must not have been started.

Recommendation
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics"[2520016]

Annotation
The course takes place each second summer term: 2018/2020....

T 4.85 Course: Financial Intermediation [T-WIWI-102623]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2
M-WIWI-101502 - Ökonomische Theorie und ihre Anwendung in Finance

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2530232	Financial Intermediation	2 SWS	Lecture (V)	Ruckes
WS 18/19	2530233	Übung zu Finanzintermediation	1 SWS	Practice (Ü)	Ruckes, Hoang, Benz
Exams					
WS 18/19	7900063	Financial Intermediation		Prüfung (PR)	Ruckes
SS 2019	7900078	Financial Intermediation		Prüfung (PR)	Ruckes

Competence Certificate
The assessment of this course is a written examination (following §4(2), 1 SPO) of 60 mins.
The exam is offered each semester.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Financial Intermediation

2530232, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Description

- Arguments for the existence of financial intermediaries
- Bank loan analysis, relationship lending
- Competition in the banking sector
- Stability of the financial system
- The macroeconomic role of financial intermediation

Learning Content

- Arguments for the existence of financial intermediaries
- Bank loan analysis, relationship lending
- Stability of the financial system
- The macroeconomic role of financial intermediation
- Principles of the prudential regulation of banks

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Elective literature:

- Hartmann-Wendels/Pfingsten/Weber (2014): Bankbetriebslehre, 6th edition, Springer Verlag.
- Freixas/Rochet (2008): Microeconomics of Banking, 2nd edition, MIT Press.

T 4.86 Course: Finite Element Methods [T-MATH-105857]

Responsible: Prof. Dr. Willy Dörfler
Prof. Dr. Marlis Hochbruck
Prof Dr Tobias Jahnke
Prof. Dr. Andreas Rieder
Prof. Dr. Christian Wieners

Organisation: KIT Department of Mathematics

Part of: M-MATH-102891 - Finite Elemente Methoden

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
WS 18/19	0110300	Finite Elemente Methoden	4 SWS	Lecture (V)	Rieder
WS 18/19	0110310	Übungen zu 0110300	2 SWS	Practice (Ü)	Rieder
Exams					
WS 18/19	7700062	Finite Element Methods		Prüfung (PR)	Rieder

T 4.87 Course: Finite group schemes [T-MATH-106486]

Responsible: Dr. Fabian Januszewski
Organisation: KIT Department of Mathematics
Part of: M-MATH-103258 - Endliche Gruppenschemata

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	4	Once	1

T 4.88 Course: Fixed Income Securities [T-WIWI-102644]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Exams				
WS 18/19	7900053	Fixed Income Securities	Prüfung (PR)	Uhrig-Homburg

Competence Certificate
Please note that the lecture is not held in winter semester 18/19.

The assessment consists of a written exam (75 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation SPO2015 and may be supplemented by a non exam assessment according to § 4 paragraph 2 Nr. 3.The examination is offered every semester and can be repeated at every regular examination date.

Prerequisites
None

Recommendation
Knowledge from the course "Derivatives" is very helpful.

Annotation
See German version.

T 4.89 Course: Forecasting: Theory and Practice [T-MATH-105928]

Responsible: Prof. Dr. Tilmann Gneiting
Organisation: KIT Department of Mathematics
Part of: M-MATH-102956 - Vorhersagen: Theorie und Praxis

Type	Credits	Version
Prüfungsleistung mündlich	8	2

Events					
WS 18/19	0123100	Forecasting: Theory and Praxis	2 SWS	Lecture (V)	Gneiting
WS 18/19	0123110	Tutorial for 0123100 (Forecasting: Theory and Praxis)	2 SWS	Practice (Ü)	Gneiting
SS 2019	0178000	Forecasting: Theory and Practice II	2 SWS	Lecture (V)	Gneiting
SS 2019	0178010	Tutorial for 0178010 (Forecasting: Theory and Practice II)	1 SWS	Practice (Ü)	Gneiting
Exams					
WS 18/19	7700085	Forecasting: Theory and Practice		Prüfung (PR)	Gneiting
SS 2019	7700010	Forecasting: Theory and Practice		Prüfung (PR)	Gneiting

T 4.90 Course: Foundations of continuum mechanics [T-MATH-107044]

Responsible: Prof. Dr. Christian Wieners
Organisation: KIT Department of Mathematics
Part of: M-MATH-103527 - Grundlagen der Kontinuumsmechanik

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	3	Once	1

Prerequisites
none

T 4.91 Course: Fourier Analysis [T-MATH-105845]

Responsible: Prof. Dr. Roland Schnaubelt
Prof. Dr. Lutz Weis

Organisation: KIT Department of Mathematics

Part of: M-MATH-102873 - Fourieranalysis

Type	Credits	Version
Prüfungsleistung schriftlich	8	1

Events					
SS 2019	0157600	Fourier analysis and its applications to PDEs	3 SWS	Lecture (V)	Liao
SS 2019	0157610	Tutorial for 0157600 (Fourier analysis and its applications to PDEs)	1 SWS	Practice (Ü)	Liao

T 4.92 Course: Fourier analysis and its applications to PDEs [T-MATH-109850]

Responsible: Prof. Dr. Xian Liao
Organisation: KIT Department of Mathematics
Part of: M-MATH-104827 - Fourier-Analyse und ihre Anwendungen auf PDG

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	4	Irregular	1

Prerequisites
none

T 4.93 Course: Functional Analysis [T-MATH-102255]

Responsible: PD Dr. Gerd Herzog
Prof. Dr. Dirk Hundertmark
Prof. Dr. Tobias Lamm
Prof. Dr. Michael Plum
Prof. Dr. Wolfgang Reichel
Dr. Christoph Schmoeger
Prof. Dr. Roland Schnaubelt
Prof. Dr. Lutz Weis

Organisation: KIT Department of Mathematics

Part of: M-MATH-101320 - Funktionalanalysis

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	8	Each winter term	2

Events					
WS 18/19	0104800	Functional Analysis	4 SWS	Lecture (V)	Kunstmann
WS 18/19	0104810	Tutorial for 0104800 (Functional Analysis)	2 SWS	Practice (Ü)	Kunstmann
Exams					
WS 18/19	0100047	Functional Analysis		Prüfung (PR)	Lamm, Hundertmark, Kunstmann

T 4.94 Course: Functions of Matrices [T-MATH-105906]

Responsible: PD Dr. Volker Grimm
Organisation: KIT Department of Mathematics
Part of: M-MATH-102937 - Matrixfunktionen

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Prerequisites
none

T 4.95 Course: Functions of Operators [T-MATH-105905]

Organisation: KIT Department of Mathematics
Part of: M-MATH-102936 - Operatorfunktionen

Type	Credits	Version
Prüfungsleistung mündlich	6	1

T 4.96 Course: Generalized Regression Models [T-MATH-105870]

Responsible: Prof. Dr. Norbert Henze
Dr. Bernhard Klar
Organisation: KIT Department of Mathematics
Part of: M-MATH-102906 - Generalisierte Regressionsmodelle

Type	Credits	Version
Prüfungsleistung mündlich	4	2

Events					
SS 2019	0161400	Generalisierte Regressionsmodelle	2 SWS	Lecture (V)	Ebner
SS 2019	0161410	Übungen zu 0161400	1 SWS	Practice (Ü)	Ebner

T 4.97 Course: Geometric Group Theory [T-MATH-105842]

Responsible: Prof. Dr. Frank Herrlich
Prof. Dr. Enrico Leuzinger
Dr. Gabriele Link
Prof. Dr Roman Sauer
Prof. Dr. Petra Schwer
Prof. Dr. Wilderich Tuschmann

Organisation: KIT Department of Mathematics

Part of: M-MATH-102867 - Geometrische Gruppentheorie

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	8	Irregular	1

Events					
SS 2019	0153300	Geometric Group Theory	4 SWS	Lecture (V)	Leuzinger
SS 2019	0153310	Tutorial for 0153300 (Geometric Group Theory)	2 SWS	Practice (Ü)	Leuzinger

T 4.98 Course: Geometric Numerical Integration [T-MATH-105919]

Responsible: Prof. Dr. Marlis Hochbruck
Prof. Dr Tobias Jahnke

Organisation: KIT Department of Mathematics

Part of: M-MATH-102921 - Geometrische numerische Integration

Type	Credits	Version
Prüfungsleistung mündlich	6	1

Prerequisites
none

T 4.99 Course: Geometry of Schemes [T-MATH-105841]

Responsible: Prof. Dr. Frank Herrlich
Dr. Stefan Kühnlein
Organisation: KIT Department of Mathematics
Part of: M-MATH-102866 - Geometrie der Schemata

Type	Credits	Version
Prüfungsleistung mündlich	8	1

T 4.100 Course: Global Differential Geometry [T-MATH-105885]

Responsible: Dr. Sebastian Grensing
Prof. Dr. Wilderich Tuschmann
Organisation: KIT Department of Mathematics
Part of: M-MATH-102912 - Globale Differentialgeometrie

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
WS 18/19	0100300	Globale Differentialgeometrie	4 SWS	Lecture (V)	Tuschmann
WS 18/19	0100310	Übungen zu 0100300 (Globale Differentialgeometrie)	2 SWS	Practice (Ü)	Tuschmann
Exams					
WS 18/19	7700001	Global Differential Geometry		Prüfung (PR)	Tuschmann

Prerequisites
none

T 4.101 Course: Global Optimization I [T-WIWI-102726]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Anwendungen des Operations Research
M-WIWI-101414 - Methodische Grundlagen des OR
M-WIWI-101473 - Mathematische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2550134	Globale Optimierung I	2 SWS	Lecture (V)	Stein
SS 2019	2550135	Übungen zu Globale Optimierung I+II	1 SWS	Practice (Ü)	Stein
Exams					
WS 18/19	7900007_NK_WS1819	Global Optimization I		Prüfung (PR)	Stein

Competence Certificate
Success is in the form of a written examination (60 min.) (according to § 4(2), 1 SPO) and possibly of a compulsory prerequisite.

The exam is offered in the lecture of semester and the following semester.

The success check can be done also with the success control for "Global optimization II". In this case, the duration of the written exam is 120 min.

Prerequisites
None

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-103638 - Global Optimization I and II must not have been started.

Recommendation
None

Annotation
Part I and II of the lecture are held consecutively in the *same*semester.

Below you will find excerpts from events related to this course:

V Globale Optimierung I

2550134, SS 2019, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

T 4.102 Course: Global Optimization I and II [T-WIWI-103638]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodische Grundlagen des OR
M-WIWI-101473 - Mathematische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	9	Each summer term	1

Events					
SS 2019	2550134	Globale Optimierung I	2 SWS	Lecture (V)	Stein
SS 2019	2550136	Globale Optimierung II	2 SWS	Lecture (V)	Stein
Exams					
WS 18/19	7900001_NK_WS1819	Global optimization I and II		Prüfung (PR)	Stein

Competence Certificate
The assessment of the lecture is a written examination (120 minutes) according to §4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

The examination is held in the semester of the lecture and in the following semester.

Prerequisites
None

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-102726 - Global Optimization I must not have been started.
2. The course T-WIWI-102727 - Global Optimization II must not have been started.

Recommendation
None

Annotation
Part I and II of the lecture are held consecutively in the *same* semester.

Below you will find excerpts from events related to this course:

V Globale Optimierung I

2550134, SS 2019, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

Part I of the lecture treats methods for global optimization of convex functions under convex constraints. It is structured as follows:

- Introduction, examples, and terminology
- Existence results
- Optimality in convex optimization
- Duality, bounds, and constraint qualifications
- Numerical methods

Nonconvex optimization problems are treated in part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

V Globale Optimierung II

2550136, SS 2019, 2 SWS, Open in study portal

Lecture (V)

Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The global solution of convex optimization problems is subject of part I of the lecture.

Part II of the lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via aBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

T 4.103 Course: Global Optimization II [T-WIWI-102727]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodische Grundlagen des OR
M-WIWI-101473 - Mathematische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	2

Events					
SS 2019	2550135	Übungen zu Globale Optimierung I+II	1 SWS	Practice (Ü)	Stein
SS 2019	2550136	Globale Optimierung II	2 SWS	Lecture (V)	Stein
Exams					
WS 18/19	7900152_NK_WS1819	Global Optimization II		Prüfung (PR)	Stein

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

The examination is held in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of "Global optimization I". In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-WIWI-103638 - Global Optimization I and II must not have been started.

Annotation
Part I and II of the lecture are held consecutively in the *same*semester.

Below you will find excerpts from events related to this course:

V Globale Optimierung II

2550136, SS 2019, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
In many optimization problems from economics, engineering and natural sciences, numerical solution methods are only able to efficiently identify *local* optimizers, while it is much harder to find *globally* optimal points. This corresponds to the fact that by local search it is easy to find the summit of the closest mountain, but that the search for the summit of Mount Everest is rather elaborate.

The global solution of convex optimization problems is subject of part I of the lecture.

Part II of the lecture treats methods for global optimization of nonconvex functions under nonconvex constraints. It is structured as follows:

- Introduction and examples
- Convex relaxation
- Interval arithmetic
- Convex relaxation via aBB method
- Branch and bound methods
- Lipschitz optimization

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Literature

- W. Alt *Numerische Verfahren der konvexen, nichtglatten Optimierung* Teubner 2004
- C.A. Floudas *Deterministic Global Optimization* Kluwer 2000
- R. Horst, H. Tuy *Global Optimization* Springer 1996
- A. Neumaier *Interval Methods for Systems of Equations* Cambridge University Press 1990

T 4.104 Course: Graph Theory [T-MATH-102273]

Responsible: Prof. Dr. Maria Aksenovich
Organisation: KIT Department of Mathematics
Part of: M-MATH-101336 - Graphentheorie

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	8	Irregular	1

Prerequisites
None

T 4.105 Course: Graph Theory and Advanced Location Models [T-WIWI-102723]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematische Optimierung
M-WIWI-102832 - Operations Research im Supply Chain Management
M-WIWI-103289 - Stochastische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	2

Exams				
WS 18/19	7900276	Graph Theory and Advanced Location Models	Prüfung (PR)	Nickel

Competence Certificate
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the lecture and the following lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T 4.106 Course: Group Actions in Riemannian Geometry [T-MATH-105925]

Responsible: Prof. Dr. Wilderich Tuschmann
Organisation: KIT Department of Mathematics
Part of: M-MATH-102954 - Gruppenwirkungen in der Riemannschen Geometrie

Type	Credits	Version
Prüfungsleistung mündlich	5	1

Prerequisites
none

T 4.107 Course: Harmonic Analysis for Dispersive Equations [T-MATH-107071]

Responsible: Dr. Peer Kunstmann
Organisation: KIT Department of Mathematics
Part of: M-MATH-103545 - Harmonische Analysis für dispersive Gleichungen

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	8	Irregular	1

Events					
WS 18/19	01053410	Tutorial for Dispersive Equations	1 SWS	Practice (Ü)	Liao

Prerequisites
none

T 4.108 Course: Heat Economy [T-WIWI-102695]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energiewirtschaft und Technologie

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	3	Each summer term	1

Exams				
WS 18/19	7981001	Heat Economy	Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Recommendation
None

Annotation
See German version.

T 4.109 Course: Homotopy Theory [T-MATH-105933]

Responsible: Prof. Dr Roman Sauer
Organisation: KIT Department of Mathematics
Part of: M-MATH-102959 - Homotopietheorie

Type	Credits	Version
Prüfungsleistung mündlich	8	1

T 4.110 Course: Human Factors in Security and Privacy [T-WIWI-109270]

Responsible: Prof. Dr. Melanie Volkamer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each winter term	1

Events					
WS 18/19	2511554	Human Factors in Security and Privacy	2 SWS	Lecture (V)	Volkamer
WS 18/19	2511555	Übungen zu Human Factors in Security and Privacy	1 SWS	Practice (Ü)	Volkamer
Exams					
WS 18/19	7900113	Human Factors in Security and Privacy		Prüfung (PR)	Volkamer
SS 2019	7900084	Human Factors in Security and Privacy		Prüfung (PR)	Volkamer

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (30 min) following §4, Abs. 2, 2 of the examination regulation.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
Successful participation in the exercises.

Below you will find excerpts from events related to this course:

V Human Factors in Security and Privacy

2511554, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Description
The history of information security and privacy has taught us that it takes more than technological innovation to develop effective security and privacy mechanisms: Many aspects of information security and privacy actually depend on both technical and human factors. As a result of focusing on the technical factors, we are seeing a persistent gap between theoretical security and actual security in real world which becomes an increasing problem in the age of digitalization. The gap is mainly caused by strong and actually unrealistic assumptions regarding the users' knowledge and behavior.

Human factors in security and privacy research addresses several types of security and privacy mechanisms, e.g., authentication mechanisms including text and graphical passwords, security and privacy indicators (such as the icons in the address bar of nowadays web browsers) and security and privacy interventions like warning messages, permission dialogs and security and privacy policies as well as corresponding configuration interfaces. Besides security and privacy mechanisms, human factors in security and privacy researchers deal with security and privacy awareness, education, and training approaches.

'Human factors in security & privacy' research areas are:

- identifying users' mental models using techniques such as (semi-)structured interviews or focus groups,
- evaluating existing approaches regarding their effectiveness in supporting their users in making secure decisions / informed decisions in the context of privacy using techniques such as cognitive walkthroughs, lab user studies or even field studies,
- proposing improved / new approaches and evaluating their effectiveness using the so called human-centered security / privacy by design approach.

This lecture and the corresponding exercises discuss the various problems of existing security and privacy mechanisms and security and privacy awareness/education/training approaches. The lecture addresses relevant psychological and sociological aspects which are important to know and to consider when developing more usable security/privacy mechanisms and more effective awareness/education/training approaches. The human centered security and privacy by design approach is introduced. Furthermore, some of the methodologies used in this area are explained and a subset of them is applied. Finally, positive examples, such as graphical passwords, are introduced and discussed. Note,the main part of the exercise is replicating an interview based study.

Learning Content
This lecture and the corresponding exercises discuss the various problems of existing security and privacy mechanisms and security and privacy awareness/education/training approaches. The lecture addresses relevant psychological and sociological aspects which are important to know and to consider when developing more usable security/privacy mechanisms and more effective awareness/education/training approaches. This includes the importance of mental models. The human centered security and privacy by design approach is introduced. Furthermore, some of the methodologies used in this area are explained and a subset of them is also applied. Finally, positive examples, such as graphical passwords, are introduced and discussed. Note, the main part of the exercise is replicating an interview based study.

Literature

- Usable Security: History, Themes, and Challenges (Synthesis Lectures on Information Security, Privacy, and Trust): Simson Garfinkel und Heather Richter Lipford. 2014
- Security and Usability: Designing Secure Systems that People Can Use von Lorrie Faith Cranor und Simson Garfinkel. 2005
- Melanie Volkamer, Karen Renaud: Mental Models - General Introduction and Review of Their Application to Human-Centred Security. In Number Theory and Cryptography (2013): 255-280: https://link.springer.com/chapter/10.1007/978-3-642-42001-6_18
- Paul Gerber, Marco Ghiglierie, Birgit Henhapl, Oksana Kulyk, Karola Marky, Peter Mayer, Benjamin Reinheimer, Melanie Volkamer: Human Factors in Security. In: Reuter C. (eds) Sicherheitskritische Mensch-Computer-Interaktion. Springer (2018) https://link.springer.com/chapter/10.1007/978-3-658-19523-6_5
- Bruce Schneier: Psychology of Security (2018): https://www.schneier.com/essays/archives/2008/01/the_psychology_of_se.html
- Ross Anderson: security /usability and psychology. In Security Engineering. http://www.cl.cam.ac.uk/~rja14/Papers/SEv2-c02.pdf
- Andrew Odlyzko: Economics, Psychology and Sociology of Security: http://www.dtc.umn.edu/~odlyzko/doc/econ.psych.security.pdf

T 4.111 Course: Incentives in Organizations [T-WIWI-105781]

Responsible: Prof. Dr. Petra Nieken
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101500 - Microeconomic Theory
M-WIWI-101505 - Experimentelle Wirtschaftsforschung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2573003	Incentives in Organizations	2 SWS	Lecture (V)	Nieken
SS 2019	2573004	Übung zu Incentives in Organizations	1 SWS	Practice (Ü)	Nieken, Mitarbeiter
Exams					
WS 18/19	7900201	Incentives in Organizations		Prüfung (PR)	Nieken

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

In case of a small number of registrations, we might offer an oral exam instead of a written exam.

Prerequisites
None

Recommendation
Knowledge of microeconomics, game theory, and statistics is assumed.

Annotation
The course is carried out routinely in summer.

Below you will find excerpts from events related to this course:

V Incentives in Organizations
2573003, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
The students acquire profound knowledge about the design and the impact of different incentive and compensation systems. Topics covered are, for instance, performance based compensation, team work, intrinsic motivation, multitasking, and subjective performance evaluations. We will use microeconomic or behavioral models as well as empirical data to analyze incentive systems. We will investigate several widely used compensation schemes and their relationship with corporate strategy. Students will learn to develop practical implications which are based on the acquired knowledge of this course.

Annotation
is carried out routinely in summer.

Workload
The total workload for this course is approximately 135 hours.

Lecture 32h

Preparation of lecture 52h

Exam preparation 51h

Literature

Literature (mandatory): Slides, case studies, and selected research papers annolunced in the lecture

Literature (additional):

Brickley / Smith / Zimmerman: Managerial Economics and Organizantional Architecture

Camerer: Behavioral Game Theory

Lazear / Gibbs: Personnel Economics in Practice

Wooldridge: Introduction to Econometrics

Wooldridge: Econometric Analysis of Cross Section and Panel Data

T 4.112 Course: Information Service Engineering [T-WIWI-106423]

Responsible: Prof. Dr. Harald Sack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each summer term	1

Events					
SS 2019	2511606	Information Service Engineering	2 SWS	Lecture (V)	Sack
SS 2019	2511607	Übungen zu Information Service Engineering	1 SWS	Practice (Ü)	Sack
Exams					
WS 18/19	7900071	Information Service Engineering		Prüfung (PR)	Sack
SS 2019	7900070	Information Service Engineering		Prüfung (PR)	Sack

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None

Annotation
New course starting summer term 2017.

Below you will find excerpts from events related to this course:

V Information Service Engineering

2511606, SS 2019, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
- Information, Natural Language and the Web

- Natural Language Processing

  - NLP and Basic Linguistic Knowledge
  - NLP Applications, Techniques & Challenges
  - Evaluation, Precision and Recall
  - Regular Expressions and Automata
  - Tokenization
  - Language Model and N-Grams
  - Part-of-Speech Tagging

- Linked Data Engineering

  - Knowledge Representations and Ontologies
  - What's in an URI?
  - Resource Description Framework (RDF)
  - Creating new Models with RDFS
  - Querying RDF(S) with SPARQL
  - More Expressivity with Web Ontology Language (OWL)
  - The Web of Data
  - Vocabularies and Ontologies in the Web of Data
  - Wikipedia, DBpedia, and Wikidata

- Information Retrieval

  - Information Retrieval Models
  - Retrieval Evaluation
  - Web Information Retrieval
  - Document Crawling, Text Processing, and Indexing
  - Query Processing and Result Representation
  - Question Answering

- Knowledge Mining

  - From Data to Knowledge
  - Data Mining
  - Machine Learning Basics for Knowledge Mining
  - Mining Knowledge from Wikipedia
  - Named Entity Resolution

- Exploratory Search and Recommender Systems

  - Semantic Search and Entity Centric Search
  - Collaborative Filtering and Content Based Recommendations
  - From Search to Intelligent Browsing
  - Linked Data Based Exploratory Search
  - Fact Ranking

Annotation
New lecture, since summer semester 2017

Literature

- D. Jurafsky, J.H. Martin, Speech and Language Processing, 2nd ed. Pearson Int., 2009.
- S. Hitzler, S. Rudolph, Foundations of Semantic Web Technologies, Chapman / Hall, 2009.
- R. Baeza-Yates, B. Ribeiro-Neto, Modern Information Retrieval, 2nd ed., Addison Wesley, 2010.#

T 4.113 Course: Innovationtheory and -Policy [T-WIWI-102840]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101478 - Innovation und Wachstum

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2560236	Innovationtheory and -policy	SWS	Lecture (V)	Ott
SS 2019	2560237	Übung zu Innovationstheorie und -politik	SWS	Practice (Ü)	Ott, Eraydin
Exams					
WS 18/19	7900077	Innovationtheory and -Policy		Prüfung (PR)	Ott

Competence Certificate
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.
Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

Prerequisites
None

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Below you will find excerpts from events related to this course:

V Innovationtheory and -policy

2560236, SS 2019, SWS, Open in study portal **Lecture (V)**

Learning Content

- Incentives for the emergence of innovations
- Patents
- Diffusion
- Impact of technological progress
- Innovation Policy

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Excerpt:

- Aghion, P., Howitt, P. (2009), The Economics of Growth, MIT Press, Cambridge MA.
- de la Fuente, A. (2000), Mathematical Methods and Models for Economists. Cambridge University Press, Cambridge, UK.
- Klodt, H. (1995), Grundlagen der Forschungs- und Technologiepolitik. Vahlen, München.
- Linde, R. (2000), Allokation, Wettbewerb, Verteilung - Theorie, UNIBUCH Verlag, Lüneburg.
- Ruttan, V. W. (2001), Technology, Growth, and Development. Oxford University Press, Oxford.
- Scotchmer, S. (2004), Incentives and Innovation, MIT Press.
- Tirole, Jean (1988), The Theory of Industrial Organization, MIT Press, Cambridge MA.

T 4.114 Course: Integral Equations [T-MATH-105834]

Responsible: PD Dr. Tilo Arens
PD Dr. Frank Hettlich
Prof. Dr. Andreas Kirsch

Organisation: KIT Department of Mathematics

Part of: M-MATH-102874 - Integralgleichungen

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	8	Irregular	1

T 4.115 Course: Interactive Information Systems [T-WIWI-108461]

Responsible: Prof. Dr. Alexander Mädche
Dr. Stefan Morana
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104068 - Information Systems in Organizations

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4,5	Each summer term	3

Events					
SS 2019	2540558	Interactive Systems	3 SWS	Lecture (V)	Mädche, Morana
Exams					
WS 18/19	7900228	Interactive Information Systems		Prüfung (PR)	Mädche

Competence Certificate
Assessment consists of a written exam of 1 hour length following §4 (2), 1 of the examination regulation and by submitting written papers as part of the exercise following §4 (2), 3 of the examination regulation.
Students receive one aggregated grade consisting of a written exam (70%) and research paper (30%). The exam and the research paper need to be both passed. A fail in one element results in a fail of the entire lecture. There will be one retake possibility for the exam, no retake possibilities will be provided for the research paper.

Prerequisites
None

Annotation
This course replaces T-WIWI-106342 "Interactive Systems" starting summer term 2018.
The course is held in english.

Below you will find excerpts from events related to this course:

V Interactive Systems

2540558, SS 2019, 3 SWS, Open in study portal **Lecture (V)**

Description
Advanced information and communication technologies make interactive systems ever-present in the users' private and business life. They are an integral part of smartphones, devices in the smart home, mobility vehicles as well as at the working place in production and administration (e.g. in the form of dashboards).

With the continuous growing capabilities of computers, the design of the interaction between human and computer becomes even more important. The aim of this course is to introduce the foundations, theoretical grounding, key concepts and principles as well as current practice of interactive systems. The contents of the course abstract from the technical implementation details. The students get the necessary knowledge to guide the successful implementation of interactive systems in business and private life.

Notes
The lecture is complemented with a capstone project assignment, where students analyze and review existing interactive systems and suggest areas of improvement / extensions.

Learning Content
· Basics
· Theoretical foundations
· Key concepts and design principles for specific interactive systems classes
· Capstone project

Literature
The lecture bases to a large extend on

· Benyon, D. (2014). Designing interactive systems: A comprehensive guide to HCI, UX and interaction design (3. ed.). Harlow: Pearson.

Additional literature will be provided in the lecture.

T 4.116 Course: International Finance [T-WIWI-102646]

Responsible: Prof. Dr. Marliese Uhrig-Homburg
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101483 - Finance 2

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	3	Each summer term	1

Events					
SS 2019	2530570	International Finance	2 SWS	Lecture (V)	Walter, Uhrig-Homburg
Exams					
WS 18/19	7900052	International Finance		Prüfung (PR)	Uhrig-Homburg

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Annotation
See German version.

Below you will find excerpts from events related to this course:

V International Finance
2530570, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Description
The main aspects of this course are the chances and the risks which are associated with international transactions. We carry outour analysis fromtwo distinctperspectives:First the point of view of an international investor second that, of an international corporation.Several alternativesto the management of foreignexchangerisks are shown. Due to the importance of foreign exchangerisks, the first part of the course deals withcurrency markets. Furthermore current exchange rate theories are discussed.

Learning Content
The main aspects of this course are the chances and the risks which are associated with international transactions. We carry out our analysis from two distinct perspectives: First the point of view of an international investor second that, of an international corporation. Several alternatives to the management of foreign exchange risks are shown. Due to the importance of foreign exchange risks, the first part of the course deals with currency markets. Furthermore current exchange rate theories are discussed.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Elective literature:

- Eiteman, D. et al., Multinational Business Finance, 13. edition, 2012.
- Solnik, B. and D. McLeavey, Global Investments, 6. edition, 2008.

T 4.117 Course: Introduction into Particulate Flows [T-MATH-105911]

Responsible: Prof. Dr. Willy Dörfler
Organisation: KIT Department of Mathematics
Part of: M-MATH-102943 - Einführung in Partikuläre Strömungen

Type	Credits	Version
Prüfungsleistung mündlich	3	1

Prerequisites
none

T 4.118 Course: Introduction to Geometric Measure Theory [T-MATH-105918]

Responsible: PD Dr. Steffen Winter
Organisation: KIT Department of Mathematics
Part of: M-MATH-102949 - Einführung in die geometrische Maßtheorie

Type	Credits	Version
Prüfungsleistung mündlich	6	1

Prerequisites
none

T 4.119 Course: Introduction to Kinetic Theory [T-MATH-108013]

Responsible: Prof. Dr. Martin Frank
Organisation: KIT Department of Mathematics
Part of: M-MATH-103919 - Einführung in die kinetische Theorie

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	4	Each winter term	1

Events					
WS 18/19	0155450	Introduction to Kinetic Theory	2 SWS	Lecture (V)	Frank
WS 18/19	0155460	Tutorial for 0155450 (Introduction to Kinetic Theory)	1 SWS	Practice (Ü)	Frank
Exams					
WS 18/19	7700078	Introduction to Kinetic Theory		Prüfung (PR)	Frank

Prerequisites
none

Below you will find excerpts from events related to this course:

V Introduction to Kinetic Theory

0155450, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
- From Newton's equations to Boltzmann's equation
- Rigorous derivation of the linear Boltzmann equation
- Properties of kinetic equations (existence & uniqueness, H theorem)
- The diffusion limit
- From Boltzmann to Euler & Navier-Stokes
- Method of Moments
- Closure techniques
- Selected numerical methods

T 4.120 Course: Introduction to Matlab and Numerical Algorithms [T-MATH-105913]

Responsible: Dr. Daniel Weiß
Prof. Dr. Christian Wieners

Organisation: KIT Department of Mathematics

Part of: M-MATH-102945 - Einführung in Matlab und numerische Algorithmen

Type	Credits	Version
Prüfungsleistung schriftlich	5	1

Prerequisites
none

T 4.121 Course: Introduction to Scientific Computing [T-MATH-105837]

Responsible: Prof. Dr. Willy Dörfler
Prof. Dr. Marlis Hochbruck
Prof Dr Tobias Jahnke
Prof. Dr. Andreas Rieder
Prof. Dr. Christian Wieners

Organisation: KIT Department of Mathematics

Part of: M-MATH-102889 - Einführung in das Wissenschaftliche Rechnen

Type	Credits	Version
Prüfungsleistung mündlich	8	2

Events					
SS 2019	0165000	Einführung in das Wissenschaftliche Rechnen	3 SWS	Lecture (V)	Wieners
SS 2019	0166000	Praktikum zu 0165000	3 SWS	Practical course (P)	Wieners

T 4.122 Course: Introduction to Stochastic Optimization [T-WIWI-106546]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodische Grundlagen des OR
M-WIWI-102832 - Operations Research im Supply Chain Management
M-WIWI-103289 - Stochastische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2550470	Einführung in die Stochastische Optimierung	2 SWS	Lecture (V)	Rebennack
SS 2019	2550471	Übung zur Einführung in die Stochastische Optimierung	1 SWS	Practice (Ü)	Rebennack, Assistenten
Exams					
WS 18/19	7900143	Introduction to Stochastic Optimization		Prüfung (PR)	Rebennack

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Prerequisites
None.

T 4.123 Course: Inverse Problems [T-MATH-105835]

Responsible: PD Dr. Tilo Arens
PD Dr. Frank Hettlich
Prof. Dr. Andreas Kirsch
Prof. Dr. Andreas Rieder

Organisation: KIT Department of Mathematics

Part of: M-MATH-102890 - Inverse Probleme

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
WS 18/19	0105100	Inverse Probleme	4 SWS	Lecture (V)	Griesmaier
WS 18/19	0105110	Übungen zu 0105100 (Inverse Probleme)	2 SWS	Practice (Ü)	Griesmaier
Exams					
WS 18/19	7700046	Inverse Problems		Prüfung (PR)	Hettlich, Griesmaier

T 4.124 Course: Key Moments in Geometry [T-MATH-108401]

Responsible: Prof. Dr. Wilderich Tuschmann
Organisation: KIT Department of Mathematics
Part of: M-MATH-104057 - Schlüsselmomente der Geometrie

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	5	Irregular	1

Prerequisites
none

T 4.125 Course: Knowledge Discovery [T-WIWI-102666]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each winter term	1

Events					
WS 18/19	2511302	Knowledge Discovery	2 SWS	Lecture (V)	Sure-Vetter, Rettinger
WS 18/19	2511303	Exercises to Knowledge Discovery	1 SWS	Practice (Ü)	Sure-Vetter, Rettinger, Thoma, Weller
Exams					
WS 18/19	7900013	Knowledge Discovery		Prüfung (PR)	Sure-Vetter
SS 2019	7900039	Knowledge Discovery		Prüfung (PR)	Sure-Vetter

Competence Certificate
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation.

Students can be awarded a bonus on their final grade if they successfully complete special assignments.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Knowledge Discovery

2511302, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Description
Knowledge discovery is a well-established field with a large community investigating methods for the discovery of patterns and regularities in large data sets, including relational databases and unstructured text.

A variety of methods are available to assist in extracting patterns that, if interpreted, provide valuable, possibly previously unknown, insights. This information can be predictive or descriptive in nature.

This lecture provides an overview of this field. The lecture imparts specific techniques and methods, challenges and current and future research workin this field.

Learning Content
Topics of the lectures comprise the whole Machine Learning and Data Mining process like CRISP, data warehousing, OLAP-techniques, learning algorithms, visualization and empircial evaluation. Covered learning techniques range from traditional approaches like decision trees, neural networks and support vector machines to selected approaches resulting from current research. Discussed learning problems are amongst others feauturevector-based learning, text mining and social network analysis.

Workload

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 67.5 hours
- Exam and exam preperation: 37.5 hours

Literature

- T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning: Data Mining, Inference, and Prediction (http://www-stat.stanford.edu/~tibs/ElemStatLearn/)
- T. Mitchell. Machine Learning. 1997
- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley

V Exercises to Knowledge Discovery

2511303, WS 18/19, 1 SWS, Open in study portal

Practice (Ü)

Description
Multiple exercises are held that capture the topics, held in the lecture Knowledge Discovery, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

Learning Content
Topics of the lectures comprise the whole Machine Learning and Data Mining process like CRISP, data warehousing, OLAP-techniques, learning algorithms, visualization and empircial evaluation. Covered learning techniques range from traditional approaches like decision trees, neural networks and support vector machines to selected approaches resulting from current research. Discussed learning problems are amongst others feauturevector-based learning, text mining and social network analysis.

Workload
The total workload for the lecture Knowledge Discovery is given out on the description of the lecture.

Literature

- T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning: Data Mining, Inference, and Prediction (http://www-stat.stanford.edu/~tibs/ElemStatLearn/)
- T. Mitchell. Machine Learning. 1997
- M. Berhold, D. Hand (eds). Intelligent Data Analysis - An Introduction. 2003
- P. Tan, M. Steinbach, V. Kumar: Introduction to Data Mining, 2005, Addison Wesley

T 4.126 Course: L2-Invariants [T-MATH-105924]

Responsible: Dr. Holger Kammeyer
Prof. Dr Roman Sauer
Organisation: KIT Department of Mathematics
Part of: M-MATH-102952 - L2-Invarianten

Type	Credits	Version
Prüfungsleistung mündlich	5	1

Prerequisites
none

T 4.127 Course: Large-scale Optimization [T-WIWI-106549]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematische Optimierung
M-WIWI-102832 - Operations Research im Supply Chain Management
M-WIWI-103289 - Stochastische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	1

Events					
SS 2019	2550475	Large-Scale Optimization	2 SWS	Lecture (V)	Rebennack
SS 2019	2550476	Übung zu Large-Scale Optimization	1 SWS	Practice (Ü)	Rebennack
Exams					
WS 18/19	7900155	Large-scale Optimization		Prüfung (PR)	Rebennack

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Prerequisites
None.

T 4.128 Course: Lie groups and Lie algebras [T-MATH-108799]

Responsible: Prof. Dr. Enrico Leuzinger
Organisation: KIT Department of Mathematics
Part of: M-MATH-104261 - Lie Gruppen und Lie Algebren

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	8	Irregular	1

Events					
WS 18/19	0106000	Lie-Gruppen und Lie-Algebren	4 SWS	Lecture (V)	Leuzinger
WS 18/19	0106010	Übungen zu 0106000 (Lie-Gruppen und Lie-Algebren)	2 SWS	Practice (Ü)	Leuzinger
Exams					
WS 18/19	7700008	Lie Groups and Lie Algebras - Oral Exam		Prüfung (PR)	Leuzinger

T 4.129 Course: Machine Learning 1 - Basic Methods [T-WIWI-106340]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each winter term	1

Events					
WS 18/19	2511500	Machine Learning 1 - Fundamental Methods	2 SWS	Lecture (V)	Zöllner
WS 18/19	2511501	Exercises for Machine Learning 1 - Fundamental Methods	1 SWS	Practice (Ü)	Zöllner
Exams					
WS 18/19	7900076	Machine Learning 1 - Basic Methods		Prüfung (PR)	Zöllner
SS 2019	7900154	Machine Learning 1 - Basic Methods		Prüfung (PR)	Zöllner

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None.

Annotation
New course starting winter term 2017/2018.

Below you will find excerpts from events related to this course:

V Machine Learning 1 - Fundamental Methods

2511500, WS 18/19, 2 SWS, Open in study portal — **Lecture (V)**

Description
The field of knowledge acquisition and machine learning is a rapidly expanding field of knowledge and the subject of numerous research and development projects. The acquisition of knowledge can take place in different ways. Thus a system can benefit from experiences already made, it can be trained, or it draws conclusions from extensive background knowledge.

The lecture covers symbolic learning methods such as inductive learning (learning from examples, learning by observation), deductive learning (explanation-based learning) and learning from analogies, as well as sub-symbolic techniques such as neural networks, support vector machines and genetic algorithms. The lecture introduces the basic principles and structures of learning systems and examines the algorithms developed so far. The structure and operation of learning systems is presented and explained with some examples, especially from the fields of robotics and image processing.

Learning Content
The field of knowledge acquisition and machine learning is a rapidly expanding field of knowledge and the subject of numerous research and development projects. The acquisition of knowledge can take place in different ways. Thus a system can benefit from experiences already made, it can be trained, or it draws conclusions from extensive background knowledge.

The lecture covers symbolic learning methods such as inductive learning (learning from examples, learning by observation), deductive learning (explanation-based learning) and learning from analogies, as well as sub-symbolic techniques such as neural networks, support vector machines and genetic algorithms. The lecture introduces the basic principles and structures of learning systems and examines the algorithms developed so far. The structure and operation of learning systems is presented and explained with some examples, especially from the fields of robotics and image processing.

Literature
The slides are available as a PDF

Related Literature

- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Further (specific) literature on individual topics will be given in the lecture.

T 4.130 Course: Machine Learning 2 – Advanced Methods [T-WIWI-106341]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik
M-WIWI-101637 - Analytics und Statistik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each summer term	1

Events					
SS 2019	2511502	Machine Learning 2 - Advanced methods	2 SWS	Lecture (V)	Zöllner
SS 2019	2511503	Exercises for Machine Learning 2 - Advanced Methods	1 SWS	Practice (Ü)	Zöllner
Exams					
WS 18/19	7900050	Machine Learning 2 – Advanced Methods		Prüfung (PR)	Zöllner
SS 2019	7900080	Machine Learning 2 – Advanced Methods		Prüfung (PR)	Zöllner

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None.

Annotation
New course starting summer term 2017.

Below you will find excerpts from events related to this course:

V Machine Learning 2 - Advanced methods

2511502, SS 2019, 2 SWS, Open in study portal **Lecture (V)**

Description
The field of machine decision-making and inference procedures, taking into account uncertainties and incomplete knowledge, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.

The focus of this lecture is on the embedding and application of machine-learning methods in decision and inference systems starting with methods of dimension reduction, feature selection/evaluation via semi-supervised learning to methods of probabilistic inference (e.g. Dempster Shafer information fusion, dynamic and object-oriented Bayesian networks, POMDP, etc).

The lecture introduces the basic principles and structures and explains algorithms developed so far. The structure and operation of the procedures and methods are presented and explained using a number of application scenarios, in particular from the field of technical (semi-)autonomous systems.

Learning Content
The subject area of machine intelligence and, in particular, machine learning, taking into account real challenges of complex application domains, is a rapidly expanding field of knowledge and the subject of numerous research and development projects.

The lecture "Machine Learning 2" deals with advanced methods of machine learning such as semi-supervised and active learning, deep neural networks (deep learning), pulsed networks, hierarchical approaches, e.g. As well as dynamic, probabilistic relational methods. Another focus is the embedding and application of machine learning methods in real systems.

The lecture introduces the latest basic principles as well as extended basic structures and elucidates previously developed algorithms. The structure and the mode of operation of the methods and methods are presented and explained by means of some application scenarios, especially in the field of technical (sub) autonomous systems (robotics, neurorobotics, image processing, etc.).

Literature
The slides are available as a PDF

Related Literature

- Artificial Intelligence: A Modern Approach - Peter Norvig and Stuart J. Russell
- Machine Learning - Tom Mitchell
- Pattern Recognition and Machine Learning - Christopher M. Bishop
- Reinforcement Learning: An Introduction - Richard S. Sutton and Andrew G. Barto
- Deep Learning - Ian Goodfellow, Yoshua Bengio, Aaron Courville

Further (specific) literature on individual topics will be given in the lecture.

T 4.131 Course: Management of IT-Projects [T-WIWI-102667]

Responsible: Dr. Roland Schätzle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each summer term	2

Events					
SS 2019	2511214	Management of IT-Projects	2 SWS	Lecture (V)	Schätzle
SS 2019	2511215	Übungen zu Management von Informatik-Projekten	1 SWS	Practice (Ü)	Schätzle
Exams					
WS 18/19	7900014	Management of IT-Projects		Prüfung (PR)	Oberweis
SS 2019	7900045	Management of IT-Projects		Prüfung (PR)	Oberweis

Competence Certificate
The assessment of this course is a written examination (60 min) in the first week after lecture period according to Section 4(2), 1 of the examination regulation.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Management of IT-Projects

2511214, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
The lecture deals with the general framework, impact factors and methods for planning, handling, and controlling of IT projects. Especially following topics are addressed:

- project environment
- project organisation
- project planning including the following items:
  - plan of the project structure
  - flow chart
  - project schedule
  - plan of resources
- effort estimation
- project infrastructur
- project controlling
- risk management
- feasibility studies
- decision processes, conduct of negotiations, time management.

Workload
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam &1h

Total: 150h

Literature

- B. Hindel, K. Hörmann, M. Müller, J. Schmied. Basiswissen Software-Projektmanagement. dpunkt.verlag 2004
- Project Management Institute Standards Committee. A Guide to the Project Management Body of Knowledge (PMBoK guide). Project Management Institute. Four Campus Boulevard. Newton Square. PA 190733299. U.S.A.

Further literature is given in each lecture individually.

T 4.132 Course: Market Research [T-WIWI-107720]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101490 - Marketing Management

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2571150	Market Research	2 SWS	Lecture (V)	Klarmann
SS 2019	2571151	Market Research Tutorial	1 SWS	Practice (Ü)	Honold

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
None

Annotation
Please note that this course has to be completed successfully by students interested in master thesis positions at the Marketing & Sales Research Group.

Below you will find excerpts from events related to this course:

V Market Research
2571150, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
Within the lecture, essential statistical methods for measuring customer attitudes (e.g. satisfaction measurement), understanding customer behavior and making strategic decisions will be discussed. The practical use as well as the correct handling of different survey methods will be taught, such as experiments and surveys. To analyze the collected data, various analysis methods are presented, including hypothesis tests, factor analyses, cluster analyses, variance and regression analyses. Building on this, the interpretation of the results will be discussed.

Topics addressed in this course are for example:

- Theoretical foundations of market research
- Statistical foundations of market research
- Measuring customer attitudes
- Understanding customer reactions
- Strategical decision making

Annotation
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Workload
The total workload for this course is approximately 135.0 hours.

Presence time: 30 hours

Preparation and wrap-up of the course: 45.0 hours

Exam and exam preparation: 60.0 hours

Literature
Homburg, Christian (2016), Marketingmanagement, 6th. ed., Wiesbaden.

T 4.133 Course: Marketing Strategy Business Game [T-WIWI-102835]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101490 - Marketing Management

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	1,5	Each summer term	1

Events					
SS 2019	2571183	Marketing Strategy Business Game	1 SWS	Block (B)	Klarmann, Assistenten
Exams					
SS 2019	7900022	Marketing Strategy Business Game		Prüfung (PR)	Klarmann

Competence Certificate
Non exam assessment (§4 (2), 3 SPO 2007) respectively alternative exam assessments (§4(2), 3 SPO 2015). The assessment consists of a group presentation and a subsequent round of questions totalling 20 minutes.

Prerequisites
None

Recommendation
None

Annotation
Please note that only one of the following courses can be chosen in the Marketing Management Module: Marketing Strategy Business Game, Strategic Brand Management, Open Innovation – Concepts, Methods and Best Practices or Business Plan Workshop.

Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.

In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

Below you will find excerpts from events related to this course:

V Marketing Strategy Business Game

2571183, SS 2019, 1 SWS, Open in study portal **Block (B)**

Learning Content
Using Markstrat, a marketing strategy business game, students work in groups representing a company that competes on a simulated market against the other groups' companies.

Annotation

- Please note that only one of the following courses can be chosen in the Marketing Management Module: Marketing Strategy Business Game, Strategic Brand Management, Open Innovation – Concepts, Methods and Best Practices or Business Plan Workshop. Exception: In summer term 2016 exceptionally two courses can be chosen or, in case one course has already been chosen previously, a second course can be chosen.
- Please note: The number of participants for this course is limited. The Marketing and Sales Research Group typically provides the possibility to attend a course with 1.5 ECTS in the respective module to all students. Participation in a specific course cannot be guaranteed.
- In order to participate in this course, you need to apply. Applications are usually accepted at the start of the lecture period in summer term. Detailed information on the application process is usually provided on the website of the Marketing and Sales Research Group (marketing.iism.kit.edu) shortly before the lecture period in summer term starts.

Workload
The total workload for this course is approximately 45.0 hours. For further information see German version.

Literature
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

T 4.134 Course: Markov Decision Processes [T-MATH-105921]

Responsible: Prof. Dr. Nicole Bäuerle
Organisation: KIT Department of Mathematics
Part of: M-MATH-102907 - Markovsche Entscheidungsprozesse

Type	Credits	Version
Prüfungsleistung mündlich	5	1

Events					
SS 2019	0159900	Brownsche Bewegung	2 SWS	Lecture (V)	Bäuerle
SS 2019	0159910	Übungen zu 0159900 (Brownsche Bewegung)	1 SWS	Practice (Ü)	Bäuerle

Prerequisites
none

T 4.135 Course: Master Thesis [T-MATH-105878]

Responsible: Dr. Sebastian Grensing
Organisation: KIT Department of Mathematics
Part of: M-MATH-102917 - Modul Masterarbeit

Type	Credits	Version
Abschlussarbeit	30	1

Exams				
WS 18/19	7700068	Discretely self-similar solutions of the Chen-Struwe flow		Lamm
WS 18/19	7700079	Development of a model for fraud detection at the time of application		Uhrig-Homburg
WS 18/19	7700080	TEST-WIMA		Spitzmüller
WS 18/19	7700082	Anomaly Detection on SAP Transport Data		Grothe

Final Thesis
This course represents a final thesis. The following periods have been supplied:

Submission deadline 6 months
Maximum extension period 3 months
Correction period 8 weeks

T 4.136 Course: Mathematical Methods in Signal and Image Processing [T-MATH-105862]

Responsible: Prof. Dr. Andreas Rieder
Organisation: KIT Department of Mathematics
Part of: M-MATH-102897 - Mathematische Methoden in Signal- und Bildverarbeitung

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Prerequisites
none

T 4.137 Course: Mathematical Methods of Imaging [T-MATH-106488]

Responsible: Prof. Dr. Andreas Rieder
Organisation: KIT Department of Mathematics
Part of: M-MATH-103260 - Mathematische Methoden der Bildgebung

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	5	Irregular	1

Prerequisites
None

T 4.138 Course: Mathematical Modelling and Simulation in Practise [T-MATH-105889]

Responsible: PD Dr. Gudrun Thäter
Organisation: KIT Department of Mathematics
Part of: M-MATH-102929 - Mathematische Modellierung und Simulation in der Praxis

Type	Credits	Version
Prüfungsleistung mündlich	4	2

Events					
WS 18/19	0109400	Mathematical Modelling and Simulation	2 SWS	Lecture (V)	Thäter
WS 18/19	0109410	Tutorial for 0109400	1 SWS	Practice (Ü)	Thäter
Exams					
WS 18/19	0100055	Mathematical Modelling and Simulation in Practise		Prüfung (PR)	Thäter

Below you will find excerpts from events related to this course:

V Mathematical Modelling and Simulation

0109400, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Literature
Hans-Joachim Bungartz e.a.: Modeling and Simulation: An Application-Oriented Introduction, Springer, 2013 (English)

T 4.139 Course: Mathematical Statistics [T-MATH-105872]

Responsible: Prof. Dr. Norbert Henze
Dr. Bernhard Klar
Organisation: KIT Department of Mathematics
Part of: M-MATH-102909 - Mathematische Statistik

Type	Credits	Version
Prüfungsleistung mündlich	4	1

Prerequisites
none

T 4.140 Course: Mathematical Topics in Kinetic Theory [T-MATH-108403]

Responsible: Prof. Dr. Dirk Hundertmark
Organisation: KIT Department of Mathematics
Part of: M-MATH-104059 - Mathematische Themen in der kinetischen Theorie

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	4	Irregular	1

Prerequisites
none

T 4.141 Course: Maxwell's Equations [T-MATH-105856]

Responsible: PD Dr. Tilo Arens
PD Dr. Frank Hettlich
Prof. Dr. Andreas Kirsch

Organisation: KIT Department of Mathematics

Part of: M-MATH-102885 - Maxwellgleichungen

Type	Credits	Version
Prüfungsleistung mündlich	8	1

T 4.142 Course: Medical Imaging [T-MATH-105861]

Responsible: Prof. Dr. Andreas Rieder
Organisation: KIT Department of Mathematics
Part of: M-MATH-102896 - Bildgebende Verfahren in der Medizintechnik

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Prerequisites
none

T 4.143 Course: Mixed Integer Programming I [T-WIWI-102719]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematische Optimierung
M-WIWI-102832 - Operations Research im Supply Chain Management
M-WIWI-103289 - Stochastische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	1

Exams				
WS 18/19	7900215_WS1819	Mixed Integer Programming I	Prüfung (PR)	Stein

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.

The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

The examination can also be combined with the examination of*Mixed Integer Programming II*[25140]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

T 4.144 Course: Mixed Integer Programming II [T-WIWI-102720]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematische Optimierung
M-WIWI-102832 - Operations Research im Supply Chain Management
M-WIWI-103289 - Stochastische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	1

Exams				
WS 18/19	7900150_NK_WS1819	Mixed Integer Programming II	Prüfung (PR)	Stein

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation.

The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

The examination can also be combined with the examination of*Mixed Integer Programming I*[2550138]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (kop.ior.kit.edu).

T 4.145 Course: Modeling and OR-Software: Advanced Topics [T-WIWI-106200]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102832 - Operations Research im Supply Chain Management

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4,5	Each winter term	2

Events					
WS 18/19	2550490	Modellieren und OR-Software: Fortgeschrittene Themen	3 SWS	Practical course (P)	Nickel, Reuter-Oppermann
Exams					
WS 18/19	00019	Modeling and OR-Software: Advanced Topics		Prüfung (PR)	Nickel

Competence Certificate
The assessment is a 120 minutes examination, including a written and a practical part (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the software laboratory and the following term.

Prerequisites
None.

Recommendation
Basic knowledge as conveyed in the module*Introduction toOperations Research*is assumed.

Successful completion of the courseModeling and OR-Software: Introduction.

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is held in every term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Modellieren und OR-Software: Fortgeschrittene Themen

2550490, WS 18/19, 3 SWS, Open in study portal — **Practical course (P)**

Learning Content
After an introduction to general concepts of modelling tools (implementation, data handling, result interpretation, ...), the software IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL will be discussed which can be used to solve OR problems on a computer-aided basis.

Subsequently, a broad range of exercises will be discussed. The main goals of the exercises from literature and practical applications are to learn the process of modeling optimization problems as linear or mixed-integer programs, to efficiently utilize the presented tools for solving these optimization problems and to implement heuristic solution procedures for mixed-integer programs.

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is offered in every winter term. The planned lectures and courses for the next three years are announced online.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

T 4.146 Course: Modeling and OR-Software: Introduction [T-WIWI-106199]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Anwendungen des Operations Research

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4,5	Each summer term	1

Events					
SS 2019	2550490	Modellieren und OR-Software: Einführung	3 SWS	Practical course (P)	Nickel, Bakker

Competence Certificate
The assessment is a 120 minutes examination, including a written and a practical part (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the software laboratory and the following term.

Prerequisites
None

Recommendation
Firm knowledge of the contents from the lecture*Introduction to Operations Research I*[2550040] of the module*Operations Research*[WW1OR].

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is offered in every term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Modellieren und OR-Software: Einführung

2550490, SS 2019, 3 SWS, Open in study portal **Practical course (P)**

Learning Content
The task of solving combinatorial and nonlinear optimization problems imposes much higher requirements on suggested solution approaches as in linear programming.

During the course of this software laboratory, students get to know important methods from combinatorial optimization, e.g. Branch & Cut- or Column Generation methods and are enabled to solve problems with the software system IBM ILOG CPLEX Optimization Studio and the corresponding modeling language OPL. In addition, issues of nonlinear optimization, e.g. quadratic optimization, are addressed. As an important part of the software laboratory, students get the possibility to model combinatorial and nonlinear problems and implement solution approaches in the software system.

The software laboratory also introduces some of the most frequently used modelling and programming languages that are used in practice to solve optimization problems.

Annotation
Due to capacity restrictions, registration before course start is required. For further information see the webpage of the course.

The lecture is held irregularly. The planned lectures and courses for the next three years are announced online.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

T 4.147 Course: Monotonicity Methods in Analysis [T-MATH-105877]

Responsible: PD Dr. Gerd Herzog
Organisation: KIT Department of Mathematics
Part of: M-MATH-102887 - Monotoniemethoden in der Analysis

Type	Credits	Version
Prüfungsleistung mündlich	3	1

Events					
SS 2019	0103000	Monotoniemethoden in der Analysis	2 SWS	Lecture (V)	Herzog

T 4.148 Course: Multivariate Statistical Methods [T-WIWI-103124]

Responsible: Prof. Dr. Oliver Grothe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematische Optimierung
M-WIWI-101637 - Analytics und Statistik
M-WIWI-101639 - Ökonometrie und Statistik II
M-WIWI-103289 - Stochastische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation. A bonus program can improve the grade by one grade level (i.e. by 0.3 or 0.4).

The exam is offered every semester. Re-examinations are offered only for repeaters.

Prerequisites
None

Recommendation
The course covers highly advanced statistical methods with a quantitative focus. Hence, participants are necessarily expected to have advanced statistical knowledge, e.g. acquired in the course "Advanced Statistics". Without this, participation in the course is not advised.

Previous attendance of the course Analysis of Multivariate Data is recommended. Alternatively, the script can be provided to interested students.

T 4.149 Course: Nature-Inspired Optimisation Methods [T-WIWI-102679]

Responsible: Dr. rer. nat. Pradyumn Kumar Shukla
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each summer term	1

Events					
SS 2019	2511106	Nature-Inspired Optimization Methods	2 SWS	Lecture (V)	Shukla
SS 2019	2511107	Übungen zu Nature-Inspired Optimization Methods	1 SWS	Practice (Ü)	Shukla
Exams					
WS 18/19	7900016	Nature-Inspired Optimisation Methods		Prüfung (PR)	Shukla
SS 2019	7900026	Nature-Inspired Optimisation Methods		Prüfung (PR)	Shukla

Competence Certificate
The assessment consists of a written exam (60 min) (according to Section 4(2), 1 of the examination regulation) and an additional written examination called “bonus exam”, 60 min (according Section 4(2), 3 of the examination regulation) or a selection of exersices . The bonus exam may be split into several shorter written tests.

The grade of this course is the achieved grade in the written examination. If this grade is at least 4.0 and at most 1.3, a passed bonus exam will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Nature-Inspired Optimization Methods

2511106, SS 2019, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
Many optimization problems are too complex to be solved to optimality. A promising alternative is to use stochastic heuristics, based on some fundamental principles observed in nature. Examples include evolutionary algorithms, ant algorithms, or simulated annealing. These methods are widely applicable and have proven very powerful in practice. During the course, such optimization methods based on natural principles are presented, analyzed and compared. Since the algorithms are usually quite computational intensive, possibilities for parallelization are also investigated.

T 4.150 Course: Non- and Semiparametrics [T-WIWI-103126]

Responsible: Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Ökonometrie und Statistik I
M-WIWI-101639 - Ökonometrie und Statistik II

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	1

Competence Certificate
The assessment consists of a written exam (90 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
Knowledge of the contents covered by the course *"Applied Econometrics"* [2520020]

Annotation
The course takes place every second winter semester: 2018/19 then 2020/21

T 4.151 Course: Nonlinear Analysis [T-MATH-107065]

Responsible: Prof. Dr. Tobias Lamm
Organisation: KIT Department of Mathematics
Part of: M-MATH-103539 - Nichtlineare Analysis

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	8	Irregular	1

Prerequisites
none

T 4.152 Course: Nonlinear Maxwell Equations [T-MATH-106484]

Responsible: Prof. Dr. Roland Schnaubelt
Organisation: KIT Department of Mathematics
Part of: M-MATH-103257 - Nichtlineare Maxwellsche Gleichungen

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	3	Irregular	1

Prerequisites
Keine

T 4.153 Course: Nonlinear Optimization I [T-WIWI-102724]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodische Grundlagen des OR
M-WIWI-101473 - Mathematische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	3

Events					
WS 18/19	2550111	Nichtlineare Optimierung I	2 SWS	Lecture (V)	Stein
WS 18/19	2550112	Übungen zu Nichtlineare Optimierung I + II	SWS	Practice (Ü)	Stein, Mohr
WS 18/19	2550142	Rechnerübung zu Nichtlineare Optimierung I + II	SWS	Practice (Ü)	Stein, Mohr
Exams					
WS 18/19	7900002_HK_WS1819	Nonlinear Optimization I		Prüfung (PR)	Stein

Competence Certificate
The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

The exam takes place in the semester of the lecture and in the following semester.

The examination can also be combined with the examination of*Nonlinear Optimization II*[2550113]. In this case, the duration of the written examination takes 120 minutes.

Prerequisites
The module component exam T-WIWI-103637 "Nonlinear Optimization I and II" may not be selected.

Annotation
Part I and II of the lecture are held consecutively in the *same*semester.

Below you will find excerpts from events related to this course:

V Nichtlineare Optimierung I

2550111, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions for unconstrained problems
- Optimality conditions for unconstrained convex problems
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Annotation
Part I and II of the lecture are held consecutively in the*same*semester.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 4.154 Course: Nonlinear Optimization I and II [T-WIWI-103637]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodische Grundlagen des OR
M-WIWI-101473 - Mathematische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	9	Each winter term	5

Events					
WS 18/19	2550111	Nichtlineare Optimierung I	2 SWS	Lecture (V)	Stein
WS 18/19	2550112	Übungen zu Nichtlineare Optimierung I + II	SWS	Practice (Ü)	Stein, Mohr
WS 18/19	2550113	Nichtlineare Optimierung II	2 SWS	Lecture (V)	Stein
WS 18/19	2550142	Rechnerübung zu Nichtlineare Optimierung I + II	SWS	Practice (Ü)	Stein, Mohr
Exams					
WS 18/19	7900151_HK_WS1819	Nonlinear Optimization I and II		Prüfung (PR)	Stein

Competence Certificate
The assessment consits of a written exam (120 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.

The exam takes place in the semester of the lecture and in the following semester.

Prerequisites
None.

Annotation
Part I and II of the lecture are held consecutively in the **same** semester.

Below you will find excerpts from events related to this course:

V Nichtlineare Optimierung I

2550111, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. The lecture is structured as follows:

- Introduction, examples, and terminology
- Existence results for optimal points
- First and second order optimality condtions for unconstrained problems
- Optimality conditions for unconstrained convex problems
- Numerical methods for unconstrained problems (line search, steepest descent method, variable metric methods, Newton method, Quasi Newton methods, CG method, trust region method)

Constrained problems are the contents of part II of the lecture.

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Annotation
Part I and II of the lecture are held consecutively in the*same*semester.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

V

Nichtlineare Optimierung II

2550113, WS 18/19, 2 SWS, Open in study portal

Lecture (V)

Learning Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of the lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Annotation
Part I and II of the lecture are held consecutively in the*same*semester.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 4.155 Course: Nonlinear Optimization II [T-WIWI-102725]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101414 - Methodische Grundlagen des OR
M-WIWI-101473 - Mathematische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	2

Events					
WS 18/19	2550112	Übungen zu Nichtlineare Optimierung I + II	SWS	Practice (Ü)	Stein, Mohr
WS 18/19	2550113	Nichtlineare Optimierung II	2 SWS	Lecture (V)	Stein
Exams					
WS 18/19	7900050_HK_WS1819	Nonlinear Optimization II		Prüfung (PR)	Stein

Competence Certificate
The assessment consits of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation and possibly of a compulsory prerequisite.
The exam takes place in the semester of the lecture and in the following semester.

The exam can also be combined with the examination of *Nonlinear OptimizationI* [2550111]. In this case, the duration of the written exam takes 120 minutes.

Prerequisites
None.

Annotation
Part I and II of the lecture are held consecutively in the same semester.

Below you will find excerpts from events related to this course:

V Nichtlineare Optimierung II

2550113, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
The lecture treats the minimization of smooth nonlinear functions under nonlinear constraints. For such problems, which occur very often in economics, engineering, and natural sciences, we derive optimality conditions that form the basis for numerical solution methods. Part I of the lecture treats unconstrained optimization problems. Part II of the lecture is structured as follows:

- Topology and first order approximations of the feasible set
- Theorems of the alternative, first and second order optimality conditions for constrained problems
- Optimality conditions for constrained convex problems
- Numerical methods for constrained problems (penalty method, multiplier method, barrier method, interior point method, SQP method, quadratic optimization)

The lecture is accompanied by computer exercises in which you can learn the programming language MATLAB and implement and test some of the methods for practically relevant examples.

Annotation
Part I and II of the lecture are held consecutively in the*same*semester.

Literature
Elective literature:

- W. Alt, Nichtlineare Optimierung, Vieweg, 2002
- M.S. Bazaraa, H.D. Sherali, C.M. Shetty, Nonlinear Programming, Wiley, 1993
- O. Güler, Foundations of Optimization, Springer, 2010
- H.Th. Jongen, K. Meer, E. Triesch, Optimization Theory, Kluwer, 2004
- J. Nocedal, S. Wright, Numerical Optimization, Springer, 2000

T 4.156 Course: Nonparametric Statistics [T-MATH-105873]

Responsible: Prof. Dr. Norbert Henze
Dr. Bernhard Klar
Organisation: KIT Department of Mathematics
Part of: M-MATH-102910 - Nichtparametrische Statistik

Type	Credits	Version
Prüfungsleistung mündlich	4	2

Events					
WS 18/19	0162300	Nichtparametrische Statistik	2 SWS	Lecture (V)	Klar
WS 18/19	0162310	Übungen zu 0162300 (Nichtparametrische Statistik)	1 SWS	Practice (Ü)	Klar
Exams					
WS 18/19	7700027	Nonparametric Statistics		Prüfung (PR)	Klar

T 4.157 Course: Numerical Continuation Methods [T-MATH-105912]

Responsible: Prof. Dr. Jens Rottmann-Matthes
Organisation: KIT Department of Mathematics
Part of: M-MATH-102944 - Numerische Fortsetzungsmethoden

Type	Credits	Version
Prüfungsleistung mündlich	5	1

Prerequisites
none

T 4.158 Course: Numerical Linear Algebra for Scientific High Performance Computing [T-MATH-107497]

Responsible: Dr. Hartwig Anzt
Organisation: KIT Department of Mathematics
Part of: M-MATH-103709 - Numerische Lineare Algebra für das wissenschaftliche Rechnen auf Hochleistungsrechnern

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Irregular	1

Events					
WS 18/19	0110650	Numerical Linear Algebra for Scientific High Performance Computing	2 SWS	Lecture (V)	Anzt
Exams					
WS 18/19	77107497	Numerical Linear Algebra for Scientific High Performance Computing		Prüfung (PR)	

Prerequisites
none

T 4.159 Course: Numerical Linear Algebra in Image Processing [T-MATH-108402]

Responsible: PD Dr. Volker Grimm
Organisation: KIT Department of Mathematics
Part of: M-MATH-104058 - Bildverarbeitung mit Methoden der numerischen linearen Algebra

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	6	Irregular	1

Prerequisites
none

T 4.160 Course: Numerical Methods for Differential Equations [T-MATH-105836]

Responsible: Prof. Dr. Willy Dörfler
Prof. Dr. Marlis Hochbruck
Prof. Dr Tobias Jahnke
Prof. Dr. Andreas Rieder
Prof. Dr. Christian Wieners

Organisation: KIT Department of Mathematics

Part of: M-MATH-102888 - Numerische Methoden für Differentialgleichungen

Type	Credits	Version
Prüfungsleistung schriftlich	8	1

Events					
WS 18/19	0110700	Numerische Methoden für Differentialgleichungen	4 SWS	Lecture (V)	Wieners
WS 18/19	0110800	Übungen zu 0110700	2 SWS	Practice (Ü)	Wieners
Exams					
WS 18/19	7700028	Numerical Methods for Differential Equations		Prüfung (PR)	Wieners
SS 2019	7700009	Numerical Methods for Differential Equations		Prüfung (PR)	Wieners

T 4.161 Course: Numerical Methods for Hyperbolic Equations [T-MATH-105900]

Responsible: Prof. Dr. Willy Dörfler
Organisation: KIT Department of Mathematics
Part of: M-MATH-102915 - Numerische Methoden für hyperbolische Gleichungen

Type	Credits	Version
Prüfungsleistung mündlich	6	1

Events					
SS 2019	0160800	Numerical methods for hyperbolic equations	3 SWS	Lecture (V)	Dörfler
SS 2019	0160810	Tutorial for 0160800 (Numerical Methods for Hyperbolic Equations)	1 SWS	Practice (Ü)	Dörfler

Prerequisites
none

T 4.162 Course: Numerical Methods for Integral Equations [T-MATH-105901]

Responsible: PD Dr. Tilo Arens
PD Dr. Frank Hettlich
Prof. Dr. Andreas Kirsch

Organisation: KIT Department of Mathematics

Part of: M-MATH-102930 - Numerische Methoden für Integralgleichungen

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
WS 18/19	0112600	Numerische Methoden für Integralgleichungen	4 SWS	Lecture (V)	Arens
WS 18/19	0112610	Übungen zu 0112600	2 SWS	Practice (Ü)	Arens
Exams					
WS 18/19	7700063	Numerical Methods for Integral Equations		Prüfung (PR)	Arens

T 4.163 Course: Numerical Methods for Maxwell's Equations [T-MATH-105920]

Responsible: Prof. Dr. Marlis Hochbruck
Prof. Dr Tobias Jahnke

Organisation: KIT Department of Mathematics

Part of: M-MATH-102931 - Numerische Verfahren für die Maxwellgleichungen

Type	Credits	Version
Prüfungsleistung mündlich	6	1

T 4.164 Course: Numerical Methods for Time-Dependent Partial Differential Equations [T-MATH-105899]

Responsible: Prof. Dr. Marlis Hochbruck
Prof. Dr Tobias Jahnke

Organisation: KIT Department of Mathematics

Part of: M-MATH-102928 - Numerische Methoden für zeitabhängige partielle Differentialgleichungen

Type	Credits	Version
Prüfungsleistung mündlich	8	1

T 4.165 Course: Numerical Methods in Computational Electrodynamics [T-MATH-105860]

Responsible: Prof. Dr. Willy Dörfler
Prof. Dr. Marlis Hochbruck
Prof. Dr Tobias Jahnke
Prof. Dr. Andreas Rieder
Prof. Dr. Christian Wieners

Organisation: KIT Department of Mathematics

Part of: M-MATH-102894 - Numerische Methoden in der Elektrodynamik

Type	Credits	Version
Prüfungsleistung mündlich	6	1

Prerequisites
none

T 4.166 Course: Numerical Methods in Fluid Mechanics [T-MATH-105902]

Responsible: Prof. Dr. Willy Dörfler
PD Dr. Gudrun Thäter

Organisation: KIT Department of Mathematics

Part of: M-MATH-102932 - Numerische Methoden in der Strömungsmechanik

Type	Credits	Version
Prüfungsleistung mündlich	4	1

Events					
SS 2019	0161600	Numerical Methods in Fluidmechanics	2 SWS	Lecture (V)	Dörfler
SS 2019	0161610	Tutorial for 0161600	1 SWS	Practice (Ü)	Dörfler

T 4.167 Course: Numerical Methods in Mathematical Finance [T-MATH-105865]

Responsible: Prof. Dr Tobias Jahnke
Organisation: KIT Department of Mathematics
Part of: M-MATH-102901 - Numerische Methoden in der Finanzmathematik

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
WS 18/19	0107800	Numerical methods in mathematical finance	4 SWS	Lecture (V)	Jahnke
WS 18/19	0107900	Tutorial for 0107800	2 SWS	Practice (Ü)	Jahnke
Exams					
WS 18/19	6700028	Numerical Methods in Mathematical Finance		Prüfung (PR)	Jahnke

Prerequisites
none

T 4.168 Course: Numerical Methods in Mathematical Finance II [T-MATH-105880]

Responsible: Prof. Dr Tobias Jahnke
Organisation: KIT Department of Mathematics
Part of: M-MATH-102914 - Numerische Methoden in der Finanzmathematik II

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Competence Certificate
Mündliche Prüfung im Umfang von ca. 30 Minuten

Prerequisites
none

T 4.169 Course: Numerical Optimisation Methods [T-MATH-105858]

Responsible: Prof. Dr. Willy Dörfler
Prof. Dr. Marlis Hochbruck
Prof. Dr Tobias Jahnke
Prof. Dr. Andreas Rieder
Prof. Dr. Christian Wieners

Organisation: KIT Department of Mathematics

Part of: M-MATH-102892 - Numerische Optimierungsmethoden

Type	Credits	Version
Prüfungsleistung mündlich	8	1

T 4.170 Course: Operations Research in Health Care Management [T-WIWI-102884]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	2

Exams				
WS 18/19	7900124	Operations Research in Health Care Management	Prüfung (PR)	Nickel

Competence Certificate
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation).
The examination is held in the term of the lecture and the following lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module "Introduction to Operations Research" is assumed.

Annotation
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

T 4.171 Course: Operations Research in Supply Chain Management [T-WIWI-102715]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematische Optimierung
M-WIWI-102805 - Service Operations
M-WIWI-102832 - Operations Research im Supply Chain Management
M-WIWI-103289 - Stochastische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	2

Events					
SS 2019	2550480	Operations Research in Supply Chain Management	2 SWS	Lecture (V)	Nickel
SS 2019	2550481	Übungen zu OR in Supply Chain Management	1 SWS	Practice (Ü)	Dunke

Competence Certificate
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation).

The examination is held in the term of the lecture and the following lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module Introduction to Operations Research and in the lectures Facility Location and Strategic SCM,Tactical and operational SCMis assumed.

Annotation
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

Below you will find excerpts from events related to this course:

V Operations Research in Supply Chain Management

2550480, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
Supply Chain Management constitutes a general tool for logistics process planning in supply networks. To an increasing degree quantitative decision support is provided by methods and models from Operations Research. The lecture "OR in Supply Chain Management" conveys concepts and approaches for solving practical problems and presents an insight to current research topics. The lecture's focus is set on modeling and solution methods for applications originating in different domains of a supply chain. The emphasis is put on mathematical methods like mixed integer programming, valid inequalities or column generation, and the derivation of optimal solution strategies.

In form and content, the lecture addresses all levels of Supply Chain Management: After a short introduction, the tactical and operational level will be discussed with regard to inventory models, scheduling as well as cutting and packing. The strategic level will be discussed in terms of layout planning. Another main focus of the lecture is the application of methods from online optimization. This optimization discipline has gained more and more importance in the optimization of supply chains over the several past years due to an increasing amount of dynamic data flows.

Annotation
The course is offered irregularly. Planned lectures for the next three years can be found in the internet at http://dol.ior.kit.edu/english/Courses.php.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Simchi-Levi, D.; Chen, X.; Bramel, J.: The Logic of Logistics: Theory, Algorithms, and Applications for Logistics and Supply Chain Management, 2nd edition, Springer, 2005
- Simchi-Levi, D.; Kaminsky, P.; Simchi-Levi, E.: Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies, McGraw-Hill, 2000
- Silver, E. A.; Pyke, D. F.; Peterson, R.: Inventory Management and Production Planning and Scheduling, 3rd edition, Wiley, 1998
- Blazewicz, J.: Handbook on Scheduling - From Theory to Applications, Springer, 2007
- Pinedo, M. L.: Scheduling - Theory, Algorithms, and Systems (3rd edition), Springer, 2008
- Dyckhoff, H.; Finke, U.: Cutting and Packing in Production and Distribution - A Typology and Bibliography, Physica-Verlag, 1992
- Borodin, A.; El-Yaniv, R.: Online Computation and Competitive Analysis, Cambridge University Press, 2005
- Francis, R. L.; McGinnis, L. F.; White, A.: Facility Layout and Location: An Analytical Approach, 2nd edition, Prentice-Hall, 1992

T 4.172 Course: Optimisation and Optimal Control for Differential Equations [T-MATH-105864]

Organisation: KIT Department of Mathematics
Part of: M-MATH-102899 - Optimierung und optimale Kontrolle bei Differentialgleichungen

Type	Credits	Version
Prüfungsleistung mündlich	4	1

Events					
SS 2019	0164200	Optimierung und optimale Kontrolle bei Differentialgleichungen	2 SWS	Lecture (V)	Thäter
SS 2019	0164210	Übungen zu 0164210 (Optimierung und Optimale Kontrolle bei Differentialgleichungen)	1 SWS	Practice (Ü)	Thäter

Prerequisites
none

T 4.173 Course: Optimization in Banach Spaces [T-MATH-105893]

Responsible: Prof. Dr. Andreas Kirsch
Organisation: KIT Department of Mathematics
Part of: M-MATH-102924 - Optimierung in Banachräumen

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Prerequisites
none

T 4.174 Course: Optimization under Uncertainty [T-WIWI-106545]

Responsible: Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Anwendungen des Operations Research
M-WIWI-103289 - Stochastische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Irregular	1

Events					
WS 18/19	2550464	Optimierungsansätze unter Unsicherheit	SWS	Lecture (V)	Sinske
WS 18/19	2550465	Übungen zu Optimierungsansätze unter Unsicherheit	SWS	Practice (Ü)	Füllner
WS 18/19	2550466	Rechnerübungen zu Optimierungsansätze unter Unsicherheit	2 SWS	Practice (Ü)	Füllner
Exams					
WS 18/19	7900158	Optimization under uncertainty		Prüfung (PR)	Rebennack

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Prerequisites
None.

T 4.175 Course: Panel Data [T-WIWI-103127]

Responsible: Dr. Wolf-Dieter Heller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Ökonometrie und Statistik I
M-WIWI-101639 - Ökonometrie und Statistik II

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2520320	Paneldaten	2 SWS	Lecture (V)	Heller
SS 2019	2520321	Übungen zu Paneldaten	2 SWS	Practice (Ü)	Heller

Prerequisites
None

T 4.176 Course: Parallel Computing [T-MATH-102271]

Responsible: Dr. rer. nat. Mathias Krause
Prof. Dr. Christian Wieners

Organisation: KIT Department of Mathematics

Part of: M-MATH-101338 - Paralleles Rechnen

Type	Credits	Version
Prüfungsleistung mündlich	5	1

T 4.177 Course: Parametric Optimization [T-WIWI-102855]

Responsible: Prof. Dr. Oliver Stein
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101473 - Mathematische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	1

Exams				
WS 18/19	7900141_HK_WS1819	Parametric Optimization	Prüfung (PR)	Stein

Competence Certificate
The assessment of the lecture is a written examination (60 minutes) according to §4(2), 1 of the examination regulation. The examination is held in the semester of the lecture and in the following semester.

Prerequisite for admission to the written examination is attaining at least 30% of the exercise points. Therefore the online-registration for the written examination is subject to fulfilling the prerequisite.

Prerequisites
None

Recommendation
It is strongly recommended to visit at least one lecture from the Bachelor program of this chair before attending this course.

Annotation
The lecture is offered irregularly. The curriculum of the next three years is available online (www.ior.kit.edu).

T 4.178 Course: Percolation [T-MATH-105869]

Responsible: Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: M-MATH-102905 - Perkolation

Type	Credits	Version
Prüfungsleistung mündlich	6	1

Prerequisites
none

T 4.179 Course: Poisson Processes [T-MATH-105922]

Responsible: Prof. Dr. Vicky Fasen-Hartmann
Prof. Dr. Daniel Hug
Prof. Dr. Günter Last

Organisation: KIT Department of Mathematics

Part of: M-MATH-102922 - Der Poisson-Prozess

Type	Credits	Version
Prüfungsleistung mündlich	5	1

Events					
SS 2019	0152700	Der Poisson-Prozess	2 SWS	Lecture (V)	Winter

Prerequisites
none

T 4.180 Course: Portfolio and Asset Liability Management [T-WIWI-103128]

Responsible: Dr. Mher Safarian
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101639 - Ökonometrie und Statistik II

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2520357	Portfolio and Asset Liability Management	2 SWS	Lecture (V)	Safarian
SS 2019	2520358	Übungen zu Portfolio and Asset Liability Management	2 SWS	Practice (Ü)	Safarian

Competence Certificate
The assessment of this course consists of a written examination (following §4(2), 1 SPOs, 180 min.) and of possible additional assignments during the course (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015).

Prerequisites
None

Below you will find excerpts from events related to this course:

V Portfolio and Asset Liability Management

2520357, SS 2019, 2 SWS, Open in study portal **Lecture (V)**

Description
Portfolio theory: principles of investment, Markowitz- portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, arbitragepricing theory (APT), arbitrage and hedging, multi factorial models, equity-portfolio management, passive strategies, active investment

Asset liability: statistical portfolio analysis in stock allocation, measures of success, dynamic multi seasonal models, models in building scenarios, stochastic programming in bond and liability management, optimal investment strategies, integrated asset liability management

Learning Content
Portfolio theory: principles of investment, Markowitz- portfolio analysis, Modigliani-Miller theorems and absence of arbitrage, efficient markets, capital asset pricing model (CAPM), multi factorial CAPM, arbitragepricing theory (APT), arbitrage and hedging, multi factorial models, equity-portfolio management, passive strategies, active investment

Asset liability: statistical portfolio analysis in stock allocation, measures of success, dynamic multi seasonal models, models in building scenarios, stochastic programming in bond and liability management, optimal investment strategies, integrated asset liability management

Workload
The total workload for this course is approximately 150 hours. For further information see German version.

Literature
To be announced in lecture.

Elective literature:

To be announced in lecture.

T 4.181 Course: Potential Theory [T-MATH-105850]

Responsible: PD Dr. Tilo Arens
PD Dr. Frank Hettlich
Prof. Dr. Andreas Kirsch
Prof. Dr. Wolfgang Reichel

Organisation: KIT Department of Mathematics

Part of: M-MATH-102879 - Potentialtheorie

Type	Credits	Version
Prüfungsleistung mündlich	8	1

T 4.182 Course: Practical Seminar: Health Care Management (with Case Studies) [T-WIWI-102716]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4,5	Each term	2

Events					
SS 2019	2550498	Practical seminar: Health Care Management	5 SWS	Event (Veranst.)	Nickel, Reuter-Oppermann
Exams					
WS 18/19	7900105	Practical Seminar: Health Care Management (with Case Studies)		Prüfung (PR)	Nickel

Competence Certificate
The assessment consists in a case study, the writing of a corresponding paper, and an oral exam (according to §4(2), 2 of the examination regulation).

Prerequisites
None.

Recommendation
Basic knowledge as conveyed in the module *Introduction toOperations Research* is assumed.

Annotation
The credits have been reduced to 4,5 starting summer term 2016.
The lecture is offered every term.

The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Practical seminar: Health Care Management

2550498, SS 2019, 5 SWS, Open in study portal — **Event (Veranst.)**

Learning Content
Processes in a hospital are often grown historically ("We have always done it this way"), so that there has not been the need to analyze processes until reforms of the health system have put increasing pressure on hospitals. Consequently, nowadays hospitals look for possibilities to improve their processes. The students are confronted with case studies and are asked to develop a solution. Therefore they have to collect and analyze relevant data , processes and structures. When developing the solution the students have to bear in mind that besides the economic efficiency also the quality of care and patient satisfaction (e.g. measured in waiting time) may not be neglected in the health care sector.

Annotation
The lecture is offered every term.

The planned lectures and courses for the next three years are announced online.

Workload
The total workload for this course is approximately135 hours. For further information see German version.

Literature
Elective literature:

- Fleßa: Grundzüge der Krankenhausbetriebslehre, Oldenbourg, 2007
- Fleßa: Grundzüge der Krankenhaussteuerung, Oldenbourg, 2008
- Hall: Patient flow: reducing delay in healthcare delivery, Springer, 2006

T 4.183 Course: Practical Seminar: Information Systems and Service Design [T-WIWI-108437]

Responsible: Prof. Dr. Alexander Mädche
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-104068 - Information Systems in Organizations

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4,5	Each term	2

Events					
SS 2019	2540554	Practical Seminar: Information Systems & Service Design	3 SWS	Lecture (V)	Mädche

Competence Certificate
The assessment of this course is according to §4(2), 3 SPO in form of a written documentation, a presentation of the outcome of the conducted practical components and an active participation in class. Please take into account that, beside the written documentation, also a practical component (e.g. implementation of a prototype) is part of the course. Please examine the course description for the particular tasks. The final mark is based on the graded and weighted attainments (such as the written documentation, presentation, practical work and an active participation in class). In the winter terms, the course is only offered as a seminar.

Prerequisites
None.

Recommendation
Attending the course „Digital Service Design“ is recommended, but not mandatory.

Annotation
The course is held in English.

Below you will find excerpts from events related to this course:

V Practical Seminar: Information Systems & Service Design

2540554, SS 2019, 3 SWS, Open in study portal — **Lecture (V)**

Description
Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: “The destiny of computers – like other mass technologies like electricity, paper, and running water- is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes.” Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of **Future Corporate Management.** The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

Learning Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

T 4.184 Course: Predictive Mechanism and Market Design [T-WIWI-102862]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101505 - Experimentelle Wirtschaftsforschung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	1

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Annotation
The course is given every second fall term, e.g., WS2017/18, WS2019/20, ...

The retake exam is given in the summer term subsequent to the fall term where the course (lecture and final exam) is given.

T 4.185 Course: Pricing [T-WIWI-102883]

Responsible: Dr. Sven Feurer
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101490 - Marketing Management

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2572157	Pricing	2 SWS	Lecture (V)	Feurer
WS 18/19	2572169	Übung zu Pricing	1 SWS	Practice (Ü)	Klingemann
Exams					
WS 18/19	7900138	Pricing		Prüfung (PR)	Feurer
WS 18/19	7900286	Pricing		Prüfung (PR)	Feurer

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Pricing

2572157, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Learning Content
This course addresses central elements and peculiarities of pricing goods and services. The topics are below others:

- Price demand functions
- Concept of the price elasticity of demand
- Key concepts of behavioral pricing
- Decision-making areas in pricing

Annotation
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

T 4.186 Course: Probability Theory and Combinatorial Optimization [T-MATH-105923]

Responsible: Prof. Dr. Daniel Hug
Prof. Dr. Günter Last

Organisation: KIT Department of Mathematics

Part of: M-MATH-102947 - Wahrscheinlichkeitstheorie und kombinatorische Optimierung

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Prerequisites
none

T 4.187 Course: Process Mining [T-WIWI-109799]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each summer term	1

Events					
SS 2019	2511204	Process Mining	2 SWS	Lecture (V)	Oberweis
SS 2019	2511205	Exercise Process Mining	1 SWS	Practice (Ü)	Oberweis, Ullrich
Exams					
SS 2019	7900048	Process Mining		Prüfung (PR)	Oberweis

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Annotation
Former name (up to winter semester 2018/1019) "Workflow Management".

Below you will find excerpts from events related to this course:

V Process Mining

2511204, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
The area of process mining covers approaches which aim at deducting new knowledge on the basis of logfiles generated by information systems. Such information systems are e.g., workflow-management-systems which are used for an efficient control of processes in enterprises and organisations. The lecture introduces the foundations of processes and respective modeling and analysis techniques. In the following, the foundations of process mining and the three classical types of approaches - discovery, conformance and enhancement - will be taught. In addition to the theoretical basics, tools, application scenarios in practice and open research questions are covered as well.

Workload
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

Literature

- W. van der Aalst, H. van Kees: Workflow Management: Models, Methods and Systems, Cambridge, The MIT Press, 2002.
- W. van der Aalst: Process Mining: Data Science in Action. Springer, 2016.
- J. Carmona, B. van Dongen, A. Solti, M. Weidlich: Conformance Checking: Relating Processes and Models. Springer, 2018.
- A. Drescher, A. Koschmider, A. Oberweis: Modellierung und Analyse von Geschäftsprozessen: Grundlagen und Übungsaufgaben mit Lösungen. De Gruyter Studium, 2017.
- A. Oberweis: Modellierung und Ausführung von Workflows mit Petri-Netzen. Teubner-Reihe Wirtschaftsinformatik, B.G. Teubner Verlag, 1996.
- R. Peters, M. Nauroth: Process-Mining: Geschäftsprozesse: smart, schnell und einfach, Springer, 2019.
- F. Schönthaler, G.Vossen, A. Oberweis, T. Karle: Business Processes for Business Communities: Modeling Languages, Methods, Tools. Springer, 2012.
- M. Weske: Business Process Management: Concepts, Languages, Architectures. Springer, 2012.

Further literature is given in the lecture.

T 4.188 Course: Product and Innovation Management [T-WIWI-109864]

Responsible: Prof. Dr. Martin Klarmann
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101490 - Marketing Management

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	3	Each summer term	1

Events					
SS 2019	2571154	Product and Innovation Management	2 SWS	Lecture (V)	Klarmann

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Annotation
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Below you will find excerpts from events related to this course:

V Product and Innovation Management
2571154, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
This course addresses topics around the management of new as well as existing products. After the foundations of product management, especially the product choice behavior of customers, students get to know in detail different steps of the innovation process. Another section regards the management of the existing product portfolio.

Annotation
For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu).

Workload
Total effort for 3 credit points: approx. 90 hours

Presence time: 30 hours

Preparation and wrap-up of LV: 45.0 hours

Exam and exam preparation: 15.0 hours

Literature
Homburg, Christian (2016), Marketingmanagement, 6. ed., Wiesbaden.

T 4.189 Course: Project Centered Software-Lab [T-MATH-105907]

Responsible: PD Dr. Gudrun Thäter
Organisation: KIT Department of Mathematics
Part of: M-MATH-102938 - Projektorientiertes Softwarepraktikum

Type	Credits	Version
Prüfungsleistung anderer Art	4	1

Events					
SS 2019	0161700	Projektorientiertes Softwarepraktikum	4 SWS	Practical course (P)	Thäter, Krause, Klemens

Prerequisites
none

T 4.190 Course: Project Lab Cognitive Automobiles and Robots [T-WIWI-109985]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4	Each winter term	1

Events					
WS 18/19	2512501	Projektpraktikum Kognitive Automobile und Roboter	3 SWS	Practical course (P)	Zöllner

Competence Certificate
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

- a practical work
- a presentation and
- a written seminar thesis

Details of the grade formation will be announced at the beginning of the course.

Prerequisites
None

T 4.191 Course: Project Lab Machine Learning [T-WIWI-109983]

Responsible: Prof. Dr.-Ing. Johann Marius Zöllner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4	Each summer term	1

Events					
SS 2019	2512500	Projektpraktikum Maschinelles Lernen	3 SWS	Practical course (P)	Zöllner
Exams					
SS 2019	7900086	Project Lab Machine Learning		Prüfung (PR)	Zöllner

Competence Certificate
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of:

- a practical work
- a presentation and
- a written seminar thesis

Details of the grade formation will be announced at the beginning of the course.

Prerequisites
None

T 4.192 Course: Public Management [T-WIWI-102740]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101504 - Collective Decision Making

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2561127	Public Management	3 SWS	Lecture / Practice (VÜ)	Wigger
Exams					
WS 18/19	790puma	Public Management		Prüfung (PR)	Wigger
SS 2019	790puma	Public Management		Prüfung (PR)	Wigger

Competence Certificate
The assessment consists of an 1h written exam following Art. 4, para. 2, clause 1 of the examination regulation. The grade for this course equals the grade of the written exam.

Prerequisites
None

Recommendation
Basic knowledge of Public Finance is required.

Below you will find excerpts from events related to this course:

V Public Management

2561127, WS 18/19, 3 SWS, Open in study portal — **Lecture / Practice (VÜ)**

Learning Content
The lecture "Public Management" deals with the economic theory of public sector administration. It is divided into four parts. The first section gives an overview of the legal framework of governmental administration in the Federal Republic of Germany and introduces the classical theory of administration as developed by Weber. Part two studies concepts of public decision-making, which have a significant impact on the operation of public sector administrations and where one focus is on consistency problems of collective decision-making. The third chapter deals with efficiency problems arising in conventionally organized public administrations and companies. X-inefficiency, information and control problems, the isolated consideration of income-spending-relations as well as rent-seeking problems will be considered. In section four the concept of New Public Management, which is a new approach to public sector administration that is mainly based in contract theory, is introduced. Its foundations in institutional economics are developed, with a focus on the specific incentive structures in self-administered administrations. Finally, the achievements of New Public Management approaches are discussed.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Elective literature:

- Damkowski, W. and C. Precht (1995): Public Management; Kohlhammer
- Richter, R. and E.G. Furubotn (2003): Neue Institutionenökonomik; 3rd edition; Mohr
- Schedler, K. and I. Proeller (2003): New Public Management; 2nd edition; UTB
- Mueller, D.C. (2009): Public Choice III; Cambridge University Press
- Wigger, B.U. (2006): Grundzüge der Finanzwissenschaft; 2nd edition; Springer

T 4.193 Course: Random Graphs [T-MATH-105929]

Responsible: Dr. Matthias Schulte
Organisation: KIT Department of Mathematics
Part of: M-MATH-102951 - Zufällige Graphen

Type	Credits	Version
Prüfungsleistung mündlich	6	1

Prerequisites
none

T 4.194 Course: Ruin theory [T-MATH-108400]

Responsible: Prof. Dr. Vicky Fasen-Hartmann
Organisation: KIT Department of Mathematics
Part of: M-MATH-104055 - Ruintheorie

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	4	Irregular	1

Prerequisites
none

T 4.195 Course: Scattering Theory [T-MATH-105855]

Responsible: PD Dr. Tilo Arens
PD Dr. Frank Hettlich
Prof. Dr. Andreas Kirsch

Organisation: KIT Department of Mathematics

Part of: M-MATH-102884 - Streutheorie

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
SS 2019	0156000	Streutheorie	4 SWS	Lecture (V)	Griesmaier
SS 2019	0156010	Übungen zu 0156000 (Streutheorie)	2 SWS	Lecture (V)	Griesmaier

T 4.196 Course: Selected Issues in Critical Information Infrastructures [T-WIWI-109251]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4	Each summer term	1

Exams				
SS 2019	7900114	Selected Issues in Critical Information Infrastructures	Prüfung (PR)	Sunyaev

Competence Certificate
non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015). Details will be announced in the respective course.

Prerequisites
None.

T 4.197 Course: Selected Topics in Harmonic Analysis [T-MATH-109065]

Responsible: Prof. Dr. Dirk Hundertmark
Organisation: KIT Department of Mathematics
Part of: M-MATH-104435 - Ausgewählte Themen der harmonischen Analysis

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	3	Irregular	1

Events					
WS 18/19	0105350	Selected Topics in Harmonic Analysis	2 SWS	Lecture (V)	Pattakos
Exams					
WS 18/19	7700042	Selected Topics in Harmonic Analysis		Prüfung (PR)	Pattakos

Prerequisites
none

T 4.198 Course: Semantic Web Technologies [T-WIWI-102874]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each summer term	1

Events					
SS 2019	2511310	Semantic Web Technologies	2 SWS	Lecture (V)	Sure-Vetter, Acosta Deibe, Käfer
SS 2019	2511311	Exercises to Semantic Web Technologies	1 SWS	Practice (Ü)	Sure-Vetter, Acosta Deibe, Käfer
Exams					
WS 18/19	7900022	Semantic Web Technologies		Prüfung (PR)	Sure-Vetter
SS 2019	7900028	Semantic Web Technologies		Prüfung (PR)	Sure-Vetter

Competence Certificate
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None

Recommendation
Lectures on Informatics of the Bachelor on Information Systems (Semester 1-4) or equivalent are required.

Below you will find excerpts from events related to this course:

V Semantic Web Technologies

2511310, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Description
The aim of the Semantic Web is to make the meaning (semantics) of data on the web usable in intelligent systems, e.g. in e-commerce and internet portals

Central concepts are the representation of knowledge in form of RDF and ontologies, the access via Linked Data, as well as querying the data by using SPARQL. This lecture provides the foundations of knowledge representation and processing for the corresponding technologies and presents example applications.

Learning Content
The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Workload

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 67.5 hours
- Exam and exam preperation: 37.5 hours

Literature

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web – Grundlagen. Springer, 2008.
- John Domingue, Dieter Fensel, James A. Hendler (Editors). Handbook of Semantic Web Technologies. Springer, 2011.

Additional Literature

- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer, 2003.
- Tim Berners-Lee. Weaving the Web. Harper, 1999 geb. 2000 Taschenbuch.
- Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/
- Dean Allemang. Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Morgan Kaufmann, 2008.
- Tom Heath and Chris Bizer. Linked Data: Evolving the Web into a Global Data Space. Synthesis Lectures on the Semantic Web: Theory and Technology, 2011.

V Exercises to Semantic Web Technologies

2511311, SS 2019, 1 SWS, Open in study portal

Practice (Ü)

Description
Multiple exercises are held that capture the topics, held in the lecture Semantic Web Technologies, and discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

Learning Content
The following topics are covered:

- Resource Description Framework (RDF) and RDF Schema (RDFS)
- Web Architecture and Linked Data
- Web Ontology Language (OWL)
- Query language SPARQL
- Rule languages
- Applications

Workload
The total workload for the lecture Semantic Web Technologiesis given out on the description of the lecture.

Literature

- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web – Grundlagen. Springer, 2008.
- John Domingue, Dieter Fensel, James A. Hendler (Editors). Handbook of Semantic Web Technologies. Springer, 2011.

Additional Literature

- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer, 2003.
- Tim Berners-Lee. Weaving the Web. Harper, 1999 geb. 2000 Taschenbuch.
- Ian Jacobs, Norman Walsh. Architecture of the World Wide Web, Volume One. W3C Recommendation 15 December 2004. http://www.w3.org/TR/webarch/
- Dean Allemang. Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL. Morgan Kaufmann, 2008.
- Tom Heath and Chris Bizer. Linked Data: Evolving the Web into a Global Data Space. Synthesis Lectures on the Semantic Web: Theory and Technology, 2011.

T 4.199 Course: Seminar in Business Administration A (Master) [T-WIWI-103474]

Responsible: Professorenschaft des Fachbereichs Betriebswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102971 - Seminar

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Each term	1

Events					
WS 18/19	2500002	Automated Financial Advisory	2 SWS	Seminar (S)	Ulrich
WS 18/19	2530293	Seminar in Finance (Master)	2 SWS	Seminar (S)	Ruckes, Hoang, Luedecke, Strych, Benz, Scholz-Daneshgari, Schubert
WS 18/19	2530374	Applied Risk and Asset Management	2 SWS	Seminar (S)	Ulrich
WS 18/19	2540510	Master Seminar in Information Engineering and Management	2 SWS	Seminar (S)	Geyer-Schulz, Ball, Schweigert, Schweizer
WS 18/19	2540557	Literature Review Seminar: Information Systems and Service Design	SWS	Seminar (S)	Mädche, Augenstein
WS 18/19	2540559	Digital Service Design Seminar	3 SWS	Seminar (S)	Mädche
WS 18/19	2572181	Seminar in Marketing und Vertrieb (Master)	SWS	Seminar (S)	Klarmann
WS 18/19	2573010	Seminar Human Resources and Organizations	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 18/19	2573011	Seminar Human Resource Management	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 18/19	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar (S)	Glöser-Chahoud, Schultmann
WS 18/19	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar (S)	Volk, Schultmann
WS 18/19	2581978	Seminar in Production and Operations Management III	2 SWS	Seminar (S)	Wiens, Schultmann
WS 18/19	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar (S)	Keles
WS 18/19	2581981	Seminar Energiewirtschaft III	2 SWS	Seminar (S)	Ardone
SS 2019	2400121	Interactive Analytics Seminar	2 SWS	Proseminar (PS)	Beigl, Mädche, Pescara, Toreini
SS 2019	2500006	Seminar Human Resource Management (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
SS 2019	2500007	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
SS 2019	2530372	Automated Financial Advisory	2 SWS	Seminar (S)	Ulrich
SS 2019	2530374	Applied Risk and Asset Management	2 SWS	Seminar (S)	Ulrich
SS 2019	2530580	Seminar in Finance (Master, Prof. Uhrig-Homburg)	2 SWS	Seminar (S)	Uhrig-Homburg, Hofmann, Reichenbacher, Eska
SS 2019	2540510	Masterseminar Big Data Mining in Finance	2 SWS	Seminar (S)	Geyer-Schulz
SS 2019	2550493	Hospital Management	2 SWS	Block (B)	Hansis
SS 2019	2577915	Strategische Unternehmensführung	2 SWS	Seminar (S)	Klopfer

SS 2019	2579904	Seminar Management Accounting	2 SWS	Seminar (S)	Hammann, Disch
SS 2019	2579905	Special Topics in Management Accounting	2 SWS	Seminar (S)	Mickovic, Riar
SS 2019	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar (S)	Schultmann
Exams					
WS 18/19	7900008	Applied Risk and Asset Management		Prüfung (PR)	Ulrich
WS 18/19	7900009	Alternative and Big Data in Finance		Prüfung (PR)	Ulrich
WS 18/19	7900017	Seminar Smart Grid and Energy Markets		Prüfung (PR)	Weinhardt
WS 18/19	7900037	Analyzing and Evaluating Innovation Processes		Prüfung (PR)	Weissenberger-Eibl
WS 18/19	7900041	Current Issues in Innovation Management		Prüfung (PR)	Weissenberger-Eibl
WS 18/19	7900106	Hospital Management		Prüfung (PR)	Nickel
WS 18/19	7900133	Digital Service Design Seminar		Prüfung (PR)	Mädche
WS 18/19	7900159	Seminar in Marketing and Sales		Prüfung (PR)	Klarmann
WS 18/19	7900163	Seminar Human Resource Management (Master)		Prüfung (PR)	Nieken
WS 18/19	7900164	Seminar Human Resources and Organizations (Master)		Prüfung (PR)	Nieken
WS 18/19	7900165	Seminar Digital Experience and Participation		Prüfung (PR)	Weinhardt
WS 18/19	7900184	Seminar in Finance (Master)		Prüfung (PR)	Ruckes
WS 18/19	7900203	Seminar in Finance		Prüfung (PR)	Uhrig-Homburg
WS 18/19	7900233	Literature Review Seminar: Information Systems and Service Design (Seminar)		Prüfung (PR)	Mädche
WS 18/19	7900237	Case Studies Seminar: Innovation Management		Prüfung (PR)	Weissenberger-Eibl
WS 18/19	7900239	Technologies for Innovation Management		Prüfung (PR)	Weissenberger-Eibl
WS 18/19	7900252	Seminar in Business Administration A (Master)		Prüfung (PR)	Satzger
WS 18/19	7900267	Seminar in Business Administration A (Master)		Prüfung (PR)	Satzger
WS 18/19	7900283	Seminar Electronic Markets and User Behavior		Prüfung (PR)	Weinhardt
WS 18/19	79-2579905-02	Special Topics in Management Accounting (Master)		Prüfung (PR)	Wouters
WS 18/19	7981976	Seminar in Production and Operations Management I		Prüfung (PR)	Schultmann
WS 18/19	7981977	Seminar in Production and Operations Management II		Prüfung (PR)	Schultmann
WS 18/19	7981978	Seminar in Production and Operations Management III		Prüfung (PR)	Schultmann
WS 18/19	7981979	Seminar in Business Administration A (Master)		Prüfung (PR)	Fichtner
WS 18/19	7981980	Seminar in Business Administration A (Master)		Prüfung (PR)	Fichtner
WS 18/19	7981981	Seminar in Business Administration (Bachelor)		Prüfung (PR)	Fichtner
SS 2019	7900008	Hospital Management		Prüfung (PR)	Nickel
SS 2019	7900017	Soziale Innovationen unter die Lupe genommen		Prüfung (PR)	Weissenberger-Eibl
SS 2019	7900055	Roadmapping		Prüfung (PR)	Weissenberger-Eibl
SS 2019	7900093	Seminar in Business Administration A		Prüfung (PR)	Weinhardt
SS 2019	7900127	Seminar in Business Administration A (Master)		Prüfung (PR)	Uhrig-Homburg
SS 2019	7900242	Applied Risk and Asset Management		Prüfung (PR)	Ulrich

SS 2019	7900284	Digital Transformation and Business Models	Prüfung (PR)	Weissenberger-Eibl
SS 2019	79-2579904-02	Seminar Management Accounting (Master)	Prüfung (PR)	Wouters
SS 2019	79-2579905-02	Seminar Special Topics in Management Accounting (Master)	Prüfung (PR)	Wouters

Competence Certificate
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Automated Financial Advisory** **Seminar (S)**
2500002, WS 18/19, 2 SWS, Open in study portal

Learning Content
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

Workload
The total workload for this course is approximately 90 hours.

Literature
Literature will be distributed during the first lecture.

V **Master Seminar in Information Engineering and Management** **Seminar (S)**
2540510, WS 18/19, 2 SWS, Open in study portal

Learning Content
The seminar servers on one hand to improve the scientific working skills. On the other hand, the student should work intensively on a given topic and develop a scientific work, that is based on a profound literature research.

The seminar can also be a implementation of software for a scientific problem (e.g. Business Games/dynamic systems) according to the individual focus in the current semester. The software has to be well documented. The written elaboration covers a description and explanation of the software as well as a discussion about limits and extensibility. Furthermore the software must be deployable und shall be presented on the infrastructure stack of the chair. An implementation of a software has to examine the scientific state of the art in a critical way, too.

A concrete description of the current topics is announced in time for the begin of the application stage.

Workload
The total workload for this course is approximately 90 hours (3 ECTS). Depending on the realization of the work, the times may vary. The main focus is always on working independently.

V Digital Service Design Seminar

2540559, WS 18/19, 3 SWS, Open in study portal

Seminar (S)

Description
Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: “The destiny of computers – like other mass technologies like electricity, paper, and running water- is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes.” Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of **Future Corporate Management.** The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

Learning Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

V Seminar in Marketing und Vertrieb (Master)

2572181, WS 18/19, SWS, Open in study portal

Seminar (S)

Learning Content
The seminary teaches students to gain a systematic overview of a field of literature in Marketing - an important prerequisite for a successful master thesis. Central aspects are identification of relevant literature sources, systematization of the field, working out central insights, writing comprehensively, and identification of research gaps.

Annotation
Students interested in master thesis positions at the chair of marketing should participate in the marketing seminar. For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu)

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
will be announced in the seminary.

V Seminar Human Resources and Organizations

2573010, WS 18/19, 2 SWS, Open in study portal

Seminar (S)

Learning Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

Workload
The total workload for this course is approximately 90 hours.

Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

V Seminar Human Resource Management

2573011, WS 18/19, 2 SWS, Open in study portal

Seminar (S)

Workload
The total workload for this course is approximately 90 hours.

Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

V Seminar Human Resource Management (Master)
2500006, SS 2019, 2 SWS, Open in study portal — **Seminar (S)**

Learning Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

Workload
The total workload for this course is approximately 90 hours.

Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

Literature
Selected journal articles and books.

V Seminar Human Resources and Organizations (Master)
2500007, SS 2019, 2 SWS, Open in study portal — **Seminar (S)**

Learning Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

Workload
The total workload for this course is approximately 90 hours.

Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

V Automated Financial Advisory
2530372, SS 2019, 2 SWS, Open in study portal — **Seminar (S)**

Learning Content
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

Workload
The total workload for this course is approximately 90 hours.

Literature
Literature will be distributed during the first lecture.

V Seminar in Finance (Master, Prof. Uhrig-Homburg)
2530580, SS 2019, 2 SWS, Open in study portal — **Seminar (S)**

Learning Content
Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.

The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced at the end of the foregoing semester.

V Masterseminar Big Data Mining in Finance

2540510, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Literature
Literature:

- Goodfellow, I., Bengio, Y., & Courville, A. (2017). Deep Learning. MIT Press.
- Jean, N., Burke, M., Xie, M., Davis, W. M., Lobell, D. B., & Ermon, S. (2016). Combining satellite imagery and machine learning to predict poverty. *Science*, *353*(6301), 790-794.
- LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. N*ature*, *521*(7553), 436-444.
- Leskovec, J., Rajaraman, A., & Ullman, J. D. (2014). Mining of Massive Datasets. Cambridge University Press.
- Lopez De Prado, M. (2018). Advances in Financial Machine Learning. John Wiley & Sons

V Hospital Management

2550493, SS 2019, 2 SWS, Open in study portal

Block (B)

Description
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

Learning Content
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

Annotation
It is planned to offer the course every semester.

Workload
The total workload for this course is approximately 90 hours.

V Seminar Management Accounting

2579904, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Learning Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

V

Special Topics in Management Accounting

2579905, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Learning Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in four meetings that are spread throughout the semester.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

T 4.200 Course: Seminar in Business Administration B (Master) [T-WIWI-103476]

Responsible: Professorenschaft des Fachbereichs Betriebswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102972 - Seminar

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Each term	1

Events					
WS 18/19	2500002	Automated Financial Advisory	2 SWS	Seminar (S)	Ulrich
WS 18/19	2530293	Seminar in Finance (Master)	2 SWS	Seminar (S)	Ruckes, Hoang, Luedecke, Strych, Benz, Scholz-Daneshgari, Schubert
WS 18/19	2530374	Applied Risk and Asset Management	2 SWS	Seminar (S)	Ulrich
WS 18/19	2540510	Master Seminar in Information Engineering and Management	2 SWS	Seminar (S)	Geyer-Schulz, Ball, Schweigert, Schweizer
WS 18/19	2540557	Literature Review Seminar: Information Systems and Service Design	SWS	Seminar (S)	Mädche, Augenstein
WS 18/19	2540559	Digital Service Design Seminar	3 SWS	Seminar (S)	Mädche
WS 18/19	2572181	Seminar in Marketing und Vertrieb (Master)	SWS	Seminar (S)	Klarmann
WS 18/19	2573010	Seminar Human Resources and Organizations	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 18/19	2573011	Seminar Human Resource Management	2 SWS	Seminar (S)	Nieken, Mitarbeiter
WS 18/19	2581976	Seminar in Production and Operations Management I	2 SWS	Seminar (S)	Glöser-Chahoud, Schultmann
WS 18/19	2581977	Seminar in Production and Operations Management II	2 SWS	Seminar (S)	Volk, Schultmann
WS 18/19	2581978	Seminar in Production and Operations Management III	2 SWS	Seminar (S)	Wiens, Schultmann
WS 18/19	2581980	Seminar Energiewirtschaft II	2 SWS	Seminar (S)	Keles
WS 18/19	2581981	Seminar Energiewirtschaft III	2 SWS	Seminar (S)	Ardone
SS 2019	2500006	Seminar Human Resource Management (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
SS 2019	2500007	Seminar Human Resources and Organizations (Master)	2 SWS	Seminar (S)	Nieken, Mitarbeiter
SS 2019	2530372	Automated Financial Advisory	2 SWS	Seminar (S)	Ulrich
SS 2019	2530374	Applied Risk and Asset Management	2 SWS	Seminar (S)	Ulrich
SS 2019	2530580	Seminar in Finance (Master, Prof. Uhrig-Homburg)	2 SWS	Seminar (S)	Uhrig-Homburg, Hofmann, Reichenbacher, Eska
SS 2019	2540510	Masterseminar Big Data Mining in Finance	2 SWS	Seminar (S)	Geyer-Schulz
SS 2019	2550493	Hospital Management	2 SWS	Block (B)	Hansis
SS 2019	2577915	Strategische Unternehmensführung	2 SWS	Seminar (S)	Klopfer
SS 2019	2579904	Seminar Management Accounting	2 SWS	Seminar (S)	Hammann, Disch

SS 2019	2579905	Special Topics in Management Accounting	2 SWS	Seminar (S)	Mickovic, Riar
SS 2019	2581977	Seminar Produktionswirtschaft und Logistik II	2 SWS	Seminar (S)	Schultmann
Exams					
WS 18/19	7500175	Seminar: Energy Informatics		Prüfung (PR)	Wagner
WS 18/19	7900008	Applied Risk and Asset Management		Prüfung (PR)	Ulrich
WS 18/19	7900009	Alternative and Big Data in Finance		Prüfung (PR)	Ulrich
WS 18/19	7900017	Seminar Smart Grid and Energy Markets		Prüfung (PR)	Weinhardt
WS 18/19	7900037	Analyzing and Evaluating Innovation Processes		Prüfung (PR)	Weissenberger-Eibl
WS 18/19	7900041	Current Issues in Innovation Management		Prüfung (PR)	Weissenberger-Eibl
WS 18/19	7900106	Hospital Management		Prüfung (PR)	Nickel
WS 18/19	7900133	Digital Service Design Seminar		Prüfung (PR)	Mädche
WS 18/19	7900159	Seminar in Marketing and Sales		Prüfung (PR)	Klarmann
WS 18/19	7900163	Seminar Human Resource Management (Master)		Prüfung (PR)	Nieken
WS 18/19	7900164	Seminar Human Resources and Organizations (Master)		Prüfung (PR)	Nieken
WS 18/19	7900165	Seminar Digital Experience and Participation		Prüfung (PR)	Weinhardt
WS 18/19	7900184	Seminar in Finance (Master)		Prüfung (PR)	Ruckes
WS 18/19	7900203	Seminar in Finance		Prüfung (PR)	Uhrig-Homburg
WS 18/19	7900233	Literature Review Seminar: Information Systems and Service Design (Seminar)		Prüfung (PR)	Mädche
WS 18/19	7900237	Case Studies Seminar: Innovation Management		Prüfung (PR)	Weissenberger-Eibl
WS 18/19	7900239	Technologies for Innovation Management		Prüfung (PR)	Weissenberger-Eibl
WS 18/19	7900255	Seminar in Business Administration B (Master)		Prüfung (PR)	Satzger
WS 18/19	7900283	Seminar Electronic Markets and User Behavior		Prüfung (PR)	Weinhardt
WS 18/19	79-2579905-02	Special Topics in Management Accounting (Master)		Prüfung (PR)	Wouters
WS 18/19	7981976	Seminar in Production and Operations Management I		Prüfung (PR)	Schultmann
WS 18/19	7981977	Seminar in Production and Operations Management II		Prüfung (PR)	Schultmann
WS 18/19	7981978	Seminar in Production and Operations Management III		Prüfung (PR)	Schultmann
WS 18/19	7981979	Seminar in Business Administration A (Master)		Prüfung (PR)	Fichtner
WS 18/19	7981980	Seminar in Business Administration A (Master)		Prüfung (PR)	Fichtner
WS 18/19	7981981	Seminar in Business Administration (Bachelor)		Prüfung (PR)	Fichtner
SS 2019	7900008	Hospital Management		Prüfung (PR)	Nickel
SS 2019	7900017	Soziale Innovationen unter die Lupe genommen		Prüfung (PR)	Weissenberger-Eibl
SS 2019	7900055	Roadmapping		Prüfung (PR)	Weissenberger-Eibl
SS 2019	7900093	Seminar in Business Administration A		Prüfung (PR)	Weinhardt
SS 2019	7900127	Seminar in Business Administration A (Master)		Prüfung (PR)	Uhrig-Homburg
SS 2019	7900242	Applied Risk and Asset Management		Prüfung (PR)	Ulrich
SS 2019	7900284	Digital Transformation and Business Models		Prüfung (PR)	Weissenberger-Eibl
SS 2019	79-2579904-02	Seminar Management Accounting (Master)		Prüfung (PR)	Wouters

SS 2019	79-2579905-02	Seminar Special Topics in Management Accounting (Master)	Prüfung (PR)	Wouters

Competence Certificate
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Automated Financial Advisory** **Seminar (S)**
2500002, WS 18/19, 2 SWS, Open in study portal

Learning Content
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

Workload
The total workload for this course is approximately 90 hours.

Literature
Literature will be distributed during the first lecture.

V **Master Seminar in Information Engineering and Management** **Seminar (S)**
2540510, WS 18/19, 2 SWS, Open in study portal

Learning Content
The seminar servers on one hand to improve the scientific working skills. On the other hand, the student should work intensively on a given topic and develop a scientific work, that is based on a profound literature research.

The seminar can also be a implementation of software for a scientific problem (e.g. Business Games/dynamic systems) according to the individual focus in the current semester. The software has to be well documented. The written elaboration covers a description and explanation of the software as well as a discussion about limits and extensibility. Furthermore the software must be deployable und shall be presented on the infrastructure stack of the chair. An implementation of a software has to examine the scientific state of the art in a critical way, too.

A concrete description of the current topics is announced in time for the begin of the application stage.

Workload
The total workload for this course is approximately 90 hours (3 ECTS). Depending on the realization of the work, the times may vary. The main focus is always on working independently.

V **Digital Service Design Seminar** **Seminar (S)**
2540559, WS 18/19, 3 SWS, Open in study portal

Description
Contemporary trends of every increasing digitalization in businesses lead to new challenges and fusion of technologies blurring the lines between the digital, physical and biological spheres, thereby calling for a new approaches for corporate management. Recently, physician Michio Kaku put it like the following: “The destiny of computers – like other mass technologies like electricity, paper, and running water- is to become invisible, that is, to disappear into the fabric of our lives, to be everywhere and nowhere, silently and seamlessly carrying out our wishes.” Michio Kaku (2016)

In the Practical Seminar Digital Service Design students address a real-world challenge in businesses and apply digital service design practices and tools. Furthermore, during the time of the seminar the students prototypical implement a running digital service.

Real-world challenges will vary over time. This time, the challenges are from the domain of **Future Corporate Management.** The practical seminar is carried out in close cooperation with SAP SE and leverages state-of-the-art digital platforms for prototyping.

Learning Content

- Foundations
- Digital Service Design Challenges in Future Corporate Management
- Basics of Digital Service Design practices and tools
- Prototyping and development Digital Services
- Delivering digital service prototypes

V Seminar in Marketing und Vertrieb (Master)

2572181, WS 18/19, SWS, Open in study portal

Seminar (S)

Learning Content
The seminary teaches students to gain a systematic overview of a field of literature in Marketing - an important prerequisite for a successful master thesis. Central aspects are identification of relevant literature sources, systematization of the field, working out central insights, writing comprehensively, and identification of research gaps.

Annotation
Students interested in master thesis positions at the chair of marketing should participate in the marketing seminar. For further information please contact Marketing & Sales Research Group (marketing.iism.kit.edu)

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
will be announced in the seminary.

V Seminar Human Resources and Organizations

2573010, WS 18/19, 2 SWS, Open in study portal

Seminar (S)

Learning Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

Workload
The total workload for this course is approximately 90 hours.

Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

V Seminar Human Resource Management

2573011, WS 18/19, 2 SWS, Open in study portal

Seminar (S)

Workload
The total workload for this course is approximately 90 hours.

Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

V Seminar Human Resource Management (Master)
2500006, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Learning Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

Workload
The total workload for this course is approximately 90 hours.

Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

Literature
Selected journal articles and books.

V Seminar Human Resources and Organizations (Master)
2500007, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Learning Content
The topics are redefined each semester on basis of current research topics. The topics will be announced on the website of the Chair.

Workload
The total workload for this course is approximately 90 hours.

Lecture 30h
Preparation of lecture 45h
Exam preparation 15h

V Automated Financial Advisory
2530372, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Learning Content
At the beginning of the semester, a selection of seminar topics will be discussed with each student of the seminar.

Workload
The total workload for this course is approximately 90 hours.

Literature
Literature will be distributed during the first lecture.

V Seminar in Finance (Master, Prof. Uhrig-Homburg)
2530580, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Learning Content
Within this seminar different topics of current concern are treated. These topics have their foundations in the contents of certain lectures.

The topics of the seminar are published on the website of the involved finance chairs at the end of the foregoing semester.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced at the end of the foregoing semester.

V Masterseminar Big Data Mining in Finance

2540510, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Literature
Literature:

- Goodfellow, I., Bengio, Y., & Courville, A. (2017). Deep Learning. MIT Press.
- Jean, N., Burke, M., Xie, M., Davis, W. M., Lobell, D. B., & Ermon, S. (2016). Combining satellite imagery and machine learning to predict poverty. *Science*, *353*(6301), 790-794.
- LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. N*ature*, *521*(7553), 436-444.
- Leskovec, J., Rajaraman, A., & Ullman, J. D. (2014). Mining of Massive Datasets. Cambridge University Press.
- Lopez De Prado, M. (2018). Advances in Financial Machine Learning. John Wiley & Sons

V Hospital Management

2550493, SS 2019, 2 SWS, Open in study portal

Block (B)

Description
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

Learning Content
The seminar 'Hospital Management' presents internal organization structures, work conditions and work environments at the example of hospitals und relates this to common and expected conditions of other service industries.

Covered topics include normative environment, intra-organizational structure, personnel management, quality, external networking and market appearance. The course consists of two full-day sessions.

Annotation
It is planned to offer the course every semester.

Workload
The total workload for this course is approximately 90 hours.

V Seminar Management Accounting

2579904, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Learning Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. You are to a large extent free to select your own topic. The seminar course is concentrated in four meetings that are spread throughout the semester.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

V

Special Topics in Management Accounting

2579905, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Learning Content
The course will be a mix of lectures, discussions, and student presentations. Students will write a paper in small groups, and present this in the final week. Topics are selectively prediscibed. The seminar course is concentrated in four meetings that are spread throughout the semester.

Meeting 1: Introductory lecture. You need to conduct a first literature search and at the end of the first week you should identify (provisionally) the topic for your paper.

Meeting 2 and 3: The purpose of the second week is to define the topics and research questions in much more detail. Different types of papers may be selected: literature review, research paper, descriptive case study, or teaching case. Students will present their ideas and all participants should ask questions, help each other focus, offer ideas, etc.

Meeting 4: In the third week we are going to present and discuss the final papers.

Annotation
Maximum of 24 students.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Will be announced in the course.

T 4.201 Course: Seminar in Economics A (Master) [T-WIWI-103478]

Responsible: Professorenschaft des Fachbereichs Volkswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102971 - Seminar

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Each term	1

Events					
WS 18/19	2512312	Cooperation seminar: Innovative applications on single board computers as well as their economic relevance	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Ott, Weller, Bälz
WS 18/19	2520405	Topics in Experimental Economics	SWS	Seminar (S)	Reiß, Hofmann, Mitarbeiter
WS 18/19	2560140	Topics on Political Economics	2 SWS	Seminar (S)	Szech, Engel
WS 18/19	2560141	Morals & Social Behavior	2 SWS	Seminar (S)	Szech, Huber
WS 18/19	2560400	Seminar in Macroeconomics	2 SWS	Seminar (S)	Brumm, Krause, Pegorari
WS 18/19	2561208	Ausgewählte Aspekte der europäischen Verkehrsplanung und -modellierung	1 SWS	Seminar (S)	Szimba
SS 2019	2521310	Advanced Topics in Econometrics	2 SWS	Seminar (S)	Schienle, Chen, Görgen
SS 2019	2560282	Wirtschaftspolitisches Seminar	2 SWS	Seminar (S)	Ott, Assistenten
SS 2019	2560552	Topics in Political Economics (Master)	2 SWS	Seminar (S)	Szech, Maus
SS 2019	2560554	Morals and Social Behavior (Master)	2 SWS	Seminar (S)	Szech, Huber
Exams					
WS 18/19	7900094	Selected Topics in Text Mining - Cooperation Seminar AIFB and ECON		Prüfung (PR)	Sure-Vetter, Ott
WS 18/19	7900132	Seminar in Economics A (Master)		Prüfung (PR)	Fuchs-Seliger
WS 18/19	7900139	Seminar in Economics (Bachelor/Master)		Prüfung (PR)	Mitusch
WS 18/19	7900257	Date Mining		Prüfung (PR)	Nakhaeizadeh
WS 18/19	7900260	Big Data Mining in Finance. Seminar in Economics A (Master)		Prüfung (PR)	Schienle
WS 18/19	7900278	Seminar on Morals and Social Behavior		Prüfung (PR)	Szech
WS 18/19	7900282	Seminar in Political Economics (Bachelor)		Prüfung (PR)	Szech
WS 18/19	79191ee	Seminar Topics in Experimental Economics		Prüfung (PR)	Reiß
WS 18/19	79sefi2	Seminar in Economics A (Master)		Prüfung (PR)	Wigger
SS 2019	7900059	Seminar in Economics B (Master)		Prüfung (PR)	Szech
SS 2019	7900060	Seminar in Economics B (Master)		Prüfung (PR)	Szech
SS 2019	79sefi2	Seminar in Economics A (Master)		Prüfung (PR)	Wigger

Competence Certificate
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Cooperation seminar: Innovative applications on single board computers as well as their economic relevance** **Seminar / Practical course (S/P)**
2512312, WS 18/19, 3 SWS, Open in study portal

Description
This seminar is offered cooperatively by the Chair of Web Science (AIFB) and the Chair of Economic Policy (ECON).

The cooperation seminar deals with the technical realization of innovative applications using single board computers such as Arduino (https://www.arduino.cc) or Raspberry Pi (https://www.raspberrypi.org). These single board computers can be extended by various sensors and modules, thus fulfilling a wide range of tasks. Thus, the addition of a camera allows for example gesture and face detection, or the equipment with different sensors enables the measurement of temperature and perception of moving objects.

At the same time, the implications of cost-effective availability of these basic technologies are analyzed from an economic-scientific perspective. The spread and use of these single-board computers, as well as the concepts associated with their success, can have a decisive impact on innovation processes. The reasons and obstacles as well as their relevance to innovation are therefore also addressed from an economic perspective.

Microcomputers such as the Raspberry Pi, for example, are increasingly being used and expanded in the private environment, with numerous applications being possible in the household sector. They can be used as a monitoring system, as a home server or as an electronic func- tion opener. Likewise, due to their low cost, size and ease of use, they can also significantly support the development of innovative processes, for example in the development of prototypes.

Within the scope of this seminar, the possibilities of a single board computer are investigated using the Raspberry Pi. The students are to conceive, realize and present innovative applications in two-teams. Each team is provided with a Raspberry Pi. In addition to the realization of an innovative application, each team has to deal with and discuss an economic science issue. The use of the Raspberry Pi or the underlying concepts from an innovation-economic perspective are to be analyzed.

In addition to the Raspberry Pis, various sensors and expansion modules are also provided and can be purchased after consultation with the supervisors. Furthermore, it may be necessary to develop extensions in Python during the seminar. Previous knowledge in Python and Semantic Web technologies are therefore an advantage but not an imperative requirement.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

V **Topics in Experimental Economics** **Seminar (S)**
2520405, WS 18/19, SWS, Open in study portal

Learning Content
The course covers selected topics in experimental economics and deepens the understanding of the experimental method. In particular, topics of current research into experimental and behavioral economics are discussed, along with a treatment of advanced methodic issues.

Annotation
The course is offered in summer 2016 for the first time. The course is not offered in every academic year.

Workload
The total workload for this course is approximately 90.0 hours. For further information see German version.

Literature
A selection of published papers is compulsory reading for the course. The course syllabus provides references and is announced at the beginning of the course.

V Topics on Political Economics — Seminar (S)
2560140, WS 18/19, 2 SWS, Open in study portal

Workload
About 90 hours.

V Advanced Topics in Econometrics — Seminar (S)
2521310, SS 2019, 2 SWS, Open in study portal

Annotation
The course will be offered in English.

V Topics in Political Economics (Master) — Seminar (S)
2560552, SS 2019, 2 SWS, Open in study portal

Description
In many companies relative reward schemes are used whereby employees earn a bonus if they perform better than their colleagues. Moreover, hierarchical structures mean that in many organizations, employees find themselves in constant competition for promotions. This is meant to provide incentives for higher performance. However, competitive remuneration schemes could also have detrimental effects such that individual workers may view their colleagues as direct competitors generating more selfish and/or less helpful behavior in the workplace. Furthermore, age, gender and culture seem to have impacts on willingness to compete. For example, in western cultures, adult men sometimes enter competition even though their performance level is way too low for success, i.e., they harm themselves by over-competitiveness. In contrast, adult females sometimes compete less than they could do successfully.

Another challenge in contest design, e.g. in sports, is that when competition takes place among workers with mixed abilities it may lead to a discouragement effect, which establishes that lower ability individuals often reduce effort competing against an individual they do not feel up to (e.g. it has been found that average golf players performed significantly worse when competing against a superstar like Tiger Woods). One solution suggested by the economic literature is to level the playing field between advantaged and disadvantaged individuals by favoring weaker individuals through bid-caps, asymmetric tie-breaking rules, or advances. In sports, asymmetric tie-breaking is already common, for instance, in the Champions League soccer playoffs “away goals” become the decisive factor in determining the winning team in case of a tie.

Contests are not only a well-established mechanism for incentivizing workers but also for encouraging innovation and advancing R&D. Elements of research and innovation contests can be found in the procurement of various goods and services. For instance, the construction of new buildings, proposals in a venture capital firm or TV shows for entertainment companies all flow through a similar innovation process that involves the solicitation of bids from multiple potential suppliers and the preparation of a pilot or a proposal. In other cases, e.g., in lobbying contests, it is often discussed whether investments are beneficial or not. Some authors have argued that investments into lobbying should be capped in order to soften competition among asymmetrically strong interest groups (e.g. the lobbying industry versus consumers’ interest groups). Of course, then the question arises whether such caps achieve the respective design goal or not.

In this seminar, we discuss questions like: How can we design workplaces and labor contracts to increase motivation and productivity? How can contests be used to foster innovation? Which role should social preferences play and how could they inspire specific contest designs? How should sport contests be engineered depending on the respective goals? How should we design lobbying contests?

Also related topics are very welcome!

Notes
Participation will be limited to 12 students.

Annotation
For further questions, please contact Patrick Maus (Patrick.Maus@kit.edu).

Workload
About 90 hours

Literature
Charness, G., Kuhn, P. (2011) Lab labor: What can labor economists learn from the lab? Handbook of labor economics, 4, 229-330.

Cassar, A., Friedman, D. (2004) Economics lab: an intensive course in experimental economics. Routledge.

Croson, R., Gneezy, U. (2009). Gender differences in preferences. Journal of Economic literature, 47(2), 448-474.

Dechenaux, Emmanuel, Dan Kovenock, and Roman M. Sheremeta. "A survey of experimental research on contests, all-pay auctions and tournaments." Experimental Economics 18.4 (2015): 609-669.

V Morals and Social Behavior (Master)

2560554, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Description
For a long time, economists studied given markets and mechanisms to predict outcomes, future developments or generally the participants' behavior. In contrast, Market Design uses theory, empirical and experimental work to design markets which incentivize their participants in a way that leads to a "desirable" outcome. In this, the designer can have different objectives, for example: Maximizing efficiency, welfare or minimizing negative externalities.

Prominent applications of Market Design include, quite topical, Germany's auction of 5G mobile licenses and matching markets, where there are two large populations that need to be matched to one another (think of hospitals and interns, students and dorm rooms or kidney donors and receivers). In this seminar, we think about ways to either design new markets or how we could alter existing ones in a socially beneficial way. Alternatively, research ideas could focus on finding failures or shortcomings of ineffectively designed markets.

Notes
Participation will be limited to 12 students.

Annotation
For further questions, please contact David Huber (david.huber@kit.edu).

Workload
About 90 hours.

T 4.202 Course: Seminar in Economics B (Master) [T-WIWI-103477]

Responsible: Professorenschaft des Fachbereichs Volkswirtschaftslehre
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102972 - Seminar

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Each term	1

Events					
WS 18/19	2512312	Cooperation seminar: Innovative applications on single board computers as well as their economic relevance	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Ott, Weller, Bälz
WS 18/19	2520405	Topics in Experimental Economics	SWS	Seminar (S)	Reiß, Hofmann, Mitarbeiter
WS 18/19	2560140	Topics on Political Economics	2 SWS	Seminar (S)	Szech, Engel
WS 18/19	2560141	Morals & Social Behavior	2 SWS	Seminar (S)	Szech, Huber
WS 18/19	2560400	Seminar in Macroeconomics	2 SWS	Seminar (S)	Brumm, Krause, Pegorari
WS 18/19	2561208	Ausgewählte Aspekte der europäischen Verkehrsplanung und -modellierung	1 SWS	Seminar (S)	Szimba
SS 2019	2521310	Advanced Topics in Econometrics	2 SWS	Seminar (S)	Schienle, Chen, Görgen
SS 2019	2560282	Wirtschaftspolitisches Seminar	2 SWS	Seminar (S)	Ott, Assistenten
SS 2019	2560552	Topics in Political Economics (Master)	2 SWS	Seminar (S)	Szech, Maus
SS 2019	2560554	Morals and Social Behavior (Master)	2 SWS	Seminar (S)	Szech, Huber
Exams					
WS 18/19	7900094	Selected Topics in Text Mining - Cooperation Seminar AIFB and ECON		Prüfung (PR)	Sure-Vetter, Ott
WS 18/19	7900132	Seminar in Economics A (Master)		Prüfung (PR)	Fuchs-Seliger
WS 18/19	7900259	Seminar in Economics B (Master)		Prüfung (PR)	Schienle
WS 18/19	7900278	Seminar on Morals and Social Behavior		Prüfung (PR)	Szech
WS 18/19	7900281	Seminar in Economics B (Master)		Prüfung (PR)	Mitusch
WS 18/19	7900282	Seminar in Political Economics (Bachelor)		Prüfung (PR)	Szech
WS 18/19	79191ee	Seminar Topics in Experimental Economics		Prüfung (PR)	Reiß
WS 18/19	79sefi3	Seminar in Economics B (Master)		Prüfung (PR)	Wigger
SS 2019	7900059	Seminar in Economics B (Master)		Prüfung (PR)	Szech
SS 2019	7900060	Seminar in Economics B (Master)		Prüfung (PR)	Szech
SS 2019	79sefi3	Seminar in Economics B (Master)		Prüfung (PR)	Wigger

Competence Certificate
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Cooperation seminar: Innovative applications on single board computers as well as their economic relevance** **Seminar / Practical course (S/P)**
2512312, WS 18/19, 3 SWS, Open in study portal

Description
This seminar is offered cooperatively by the Chair of Web Science (AIFB) and the Chair of Economic Policy (ECON).

The cooperation seminar deals with the technical realization of innovative applications using single board computers such as Arduino (https://www.arduino.cc) or Raspberry Pi (https://www.raspberrypi.org). These single board computers can be extended by various sensors and modules, thus fulfilling a wide range of tasks. Thus, the addition of a camera allows for example gesture and face detection, or the equipment with different sensors enables the measurement of temperature and perception of moving objects.

At the same time, the implications of cost-effective availability of these basic technologies are analyzed from an economic-scientific perspective. The spread and use of these single-board computers, as well as the concepts associated with their success, can have a decisive impact on innovation processes. The reasons and obstacles as well as their relevance to innovation are therefore also addressed from an economic perspective.

Microcomputers such as the Raspberry Pi, for example, are increasingly being used and expanded in the private environment, with numerous applications being possible in the household sector. They can be used as a monitoring system, as a home server or as an electronic func- tion opener. Likewise, due to their low cost, size and ease of use, they can also significantly support the development of innovative processes, for example in the development of prototypes.

Within the scope of this seminar, the possibilities of a single board computer are investigated using the Raspberry Pi. The students are to conceive, realize and present innovative applications in two-teams. Each team is provided with a Raspberry Pi. In addition to the realization of an innovative application, each team has to deal with and discuss an economic science issue. The use of the Raspberry Pi or the underlying concepts from an innovation-economic perspective are to be analyzed.

In addition to the Raspberry Pis, various sensors and expansion modules are also provided and can be purchased after consultation with the supervisors. Furthermore, it may be necessary to develop extensions in Python during the seminar. Previous knowledge in Python and Semantic Web technologies are therefore an advantage but not an imperative requirement.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

V **Topics in Experimental Economics** **Seminar (S)**
2520405, WS 18/19, SWS, Open in study portal

Learning Content
The course covers selected topics in experimental economics and deepens the understanding of the experimental method. In particular, topics of current research into experimental and behavioral economics are discussed, along with a treatment of advanced methodic issues.

Annotation
The course is offered in summer 2016 for the first time. The course is not offered in every academic year.

Workload
The total workload for this course is approximately 90.0 hours. For further information see German version.

Literature
A selection of published papers is compulsory reading for the course. The course syllabus provides references and is announced at the beginning of the course.

V Topics on Political Economics — Seminar (S)
2560140, WS 18/19, 2 SWS, Open in study portal

Workload
About 90 hours.

V Advanced Topics in Econometrics — Seminar (S)
2521310, SS 2019, 2 SWS, Open in study portal

Annotation
The course will be offered in English.

V Topics in Political Economics (Master) — Seminar (S)
2560552, SS 2019, 2 SWS, Open in study portal

Description
In many companies relative reward schemes are used whereby employees earn a bonus if they perform better than their colleagues. Moreover, hierarchical structures mean that in many organizations, employees find themselves in constant competition for promotions. This is meant to provide incentives for higher performance. However, competitive remuneration schemes could also have detrimental effects such that individual workers may view their colleagues as direct competitors generating more selfish and/or less helpful behavior in the workplace. Furthermore, age, gender and culture seem to have impacts on willingness to compete. For example, in western cultures, adult men sometimes enter competition even though their performance level is way too low for success, i.e., they harm themselves by over-competitiveness. In contrast, adult females sometimes compete less than they could do successfully.

Another challenge in contest design, e.g. in sports, is that when competition takes place among workers with mixed abilities it may lead to a discouragement effect, which establishes that lower ability individuals often reduce effort competing against an individual they do not feel up to (e.g. it has been found that average golf players performed significantly worse when competing against a superstar like Tiger Woods). One solution suggested by the economic literature is to level the playing field between advantaged and disadvantaged individuals by favoring weaker individuals through bid-caps, asymmetric tie-breaking rules, or advances. In sports, asymmetric tie-breaking is already common, for instance, in the Champions League soccer playoffs “away goals” become the decisive factor in determining the winning team in case of a tie.

Contests are not only a well-established mechanism for incentivizing workers but also for encouraging innovation and advancing R&D. Elements of research and innovation contests can be found in the procurement of various goods and services. For instance, the construction of new buildings, proposals in a venture capital firm or TV shows for entertainment companies all flow through a similar innovation process that involves the solicitation of bids from multiple potential suppliers and the preparation of a pilot or a proposal. In other cases, e.g., in lobbying contests, it is often discussed whether investments are beneficial or not. Some authors have argued that investments into lobbying should be capped in order to soften competition among asymmetrically strong interest groups (e.g. the lobbying industry versus consumers’ interest groups). Of course, then the question arises whether such caps achieve the respective design goal or not.

In this seminar, we discuss questions like: How can we design workplaces and labor contracts to increase motivation and productivity? How can contests be used to foster innovation? Which role should social preferences play and how could they inspire specific contest designs? How should sport contests be engineered depending on the respective goals? How should we design lobbying contests?

Also related topics are very welcome!

Notes
Participation will be limited to 12 students.

Annotation
For further questions, please contact Patrick Maus (Patrick.Maus@kit.edu).

Workload
About 90 hours

Literature
Charness, G., Kuhn, P. (2011) Lab labor: What can labor economists learn from the lab? Handbook of labor economics, 4, 229-330.

Cassar, A., Friedman, D. (2004) Economics lab: an intensive course in experimental economics. Routledge.

Croson, R., Gneezy, U. (2009). Gender differences in preferences. Journal of Economic literature, 47(2), 448-474.

Dechenaux, Emmanuel, Dan Kovenock, and Roman M. Sheremeta. "A survey of experimental research on contests, all-pay auctions and tournaments." Experimental Economics 18.4 (2015): 609-669.

V

Morals and Social Behavior (Master)

2560554, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Description
For a long time, economists studied given markets and mechanisms to predict outcomes, future developments or generally the participants' behavior. In contrast, Market Design uses theory, empirical and experimental work to design markets which incentivize their participants in a way that leads to a "desirable" outcome. In this, the designer can have different objectives, for example: Maximizing efficiency, welfare or minimizing negative externalities.

Prominent applications of Market Design include, quite topical, Germany's auction of 5G mobile licenses and matching markets, where there are two large populations that need to be matched to one another (think of hospitals and interns, students and dorm rooms or kidney donors and receivers). In this seminar, we think about ways to either design new markets or how we could alter existing ones in a socially beneficial way. Alternatively, research ideas could focus on finding failures or shortcomings of ineffectively designed markets.

Notes
Participation will be limited to 12 students.

Annotation
For further questions, please contact David Huber (david.huber@kit.edu).

Workload
About 90 hours.

T 4.203 Course: Seminar in Informatics A (Master) [T-WIWI-103479]

Responsible: Professorenschaft des Fachbereichs Informatik
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102973 - Seminar

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Each term	1

Events					
WS 18/19	2400125	Seminar "Privacy Awareness"	2 SWS	Seminar (S)	Boehm, Volkamer, Gerber
WS 18/19	2512301	Linked Data and the Semantic Web	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Acosta Deibe, Käfer, Heling, Weller
WS 18/19	2512311	Real-World Challenges in Data Science and Analytics	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Nickel, Weinhardt, Zehnder, Brandt
WS 18/19	2512312	Cooperation seminar: Innovative applications on single board computers as well as their economic relevance	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Ott, Weller, Bälz
WS 18/19	2513400	Emerging Trends in Critical Information Infrastructures	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
WS 18/19	2595470	Seminar Service Science, Management & Engineering	2 SWS	Seminar (S)	Weinhardt, Satzger, Nickel, Fromm, Fichtner, Sure-Vetter
SS 2019	2512300	Knowledge Discovery and Data Mining	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Färber, Nguyen, Weller
SS 2019	2513306	Data Science & Real-time Big Data Analytics	2 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Riemer, Zehnder
SS 2019	2513400	Emerging Trends in Critical Information Infrastructures	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
SS 2019	2595470	Seminar Service Science, Management & Engineering	2 SWS	Seminar (S)	Weinhardt, Nickel, Fichtner, Satzger, Sure-Vetter, Fromm
Exams					
WS 18/19	7900038	Linked Data and the Semantic Web		Prüfung (PR)	Sure-Vetter
WS 18/19	7900044	Seminar Service Science, Management & Engineering		Prüfung (PR)	Sure-Vetter
WS 18/19	7900094	Selected Topics in Text Mining - Cooperation Seminar AIFB and ECON		Prüfung (PR)	Sure-Vetter, Ott
WS 18/19	7900114	Emerging Trends in Critical Information Infrastructures		Prüfung (PR)	Sunyaev
WS 18/19	7900121	Seminar "Privacy Awareness"		Prüfung (PR)	Volkamer
WS 18/19	7900192	Data Science with Open Data		Prüfung (PR)	Sure-Vetter
SS 2019	7900090	Data Science & Real-time Big Data Analytics		Prüfung (PR)	Sure-Vetter
SS 2019	7900092	Seminar Service Science, Management & Engineering		Prüfung (PR)	Sure-Vetter
SS 2019	7900094	Knowledge Discovery and Data Mining		Prüfung (PR)	Sure-Vetter

Competence Certificate
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
Placeholder for seminars offered by the Institute AIFB.

Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Linked Data and the Semantic Web** **Seminar / Practical course (S/P)**
2512301, WS 18/19, 3 SWS, Open in study portal

Description
The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this practical seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

V **Real-World Challenges in Data Science and Analytics** **Seminar / Practical course (S/P)**
2512311, WS 18/19, 3 SWS, Open in study portal

Notes
The exact dates and information for registration will be announced at the event page.

V Cooperation seminar: Innovative applications on single board computers as well as their economic relevance

Seminar / Practical course (S/P)

2512312, WS 18/19, 3 SWS, Open in study portal

Description

This seminar is offered cooperatively by the Chair of Web Science (AIFB) and the Chair of Economic Policy (ECON).

The cooperation seminar deals with the technical realization of innovative applications using single board computers such as Arduino (https://www.arduino.cc) or Raspberry Pi (https://www.raspberrypi.org). These single board computers can be extended by various sensors and modules, thus fulfilling a wide range of tasks. Thus, the addition of a camera allows for example gesture and face detection, or the equipment with different sensors enables the measurement of temperature and perception of moving objects.

At the same time, the implications of cost-effective availability of these basic technologies are analyzed from an economic-scientific perspective. The spread and use of these single-board computers, as well as the concepts associated with their success, can have a decisive impact on innovation processes. The reasons and obstacles as well as their relevance to innovation are therefore also addressed from an economic perspective.

Microcomputers such as the Raspberry Pi, for example, are increasingly being used and expanded in the private environment, with numerous applications being possible in the household sector. They can be used as a monitoring system, as a home server or as an electronic func- tion opener. Likewise, due to their low cost, size and ease of use, they can also significantly support the development of innovative processes, for example in the development of prototypes.

Within the scope of this seminar, the possibilities of a single board computer are investigated using the Raspberry Pi. The students are to conceive, realize and present innovative applications in two-teams. Each team is provided with a Raspberry Pi. In addition to the realization of an innovative application, each team has to deal with and discuss an economic science issue. The use of the Raspberry Pi or the underlying concepts from an innovation-economic perspective are to be analyzed.

In addition to the Raspberry Pis, various sensors and expansion modules are also provided and can be purchased after consultation with the supervisors. Furthermore, it may be necessary to develop extensions in Python during the seminar. Previous knowledge in Python and Semantic Web technologies are therefore an advantage but not an imperative requirement.

Notes

The exact dates and information for registration will be announced at the event page.

Learning Content

Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

V Emerging Trends in Critical Information Infrastructures

Seminar (S)

2513400, WS 18/19, 2 SWS, Open in study portal

Description

The block seminar Emerging Trends in Critical Information Infrastructures aims to provide insights into emerging topics in the field of information systems and to offer students an opportunity to write their first academic paper alone or in a group of students. Each semester, different topics are offered around the lectures and research domains of Prof. Sunyaev's chair, especially Trusted Engineering, Digital Health, Internet Technologies as well as Auditing and Certifications. Students can also submit their own topic suggestions within the framework of the main topics specified in the respective semester.

V Seminar Service Science, Management & Engineering

Seminar (S)

2595470, WS 18/19, 2 SWS, Open in study portal

Learning Content

Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

Workload

The total workload for this course is approximately 120 hours. For further information see German version.

Literature
The student will receive the necessary literature for his research topic.

V Knowledge Discovery and Data Mining

2512300, SS 2019, 3 SWS, Open in study portal

Seminar / Practical course (S/P)

Description
The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

Literature
Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V Data Science & Real-time Big Data Analytics

2513306, SS 2019, 2 SWS, Open in study portal

Seminar / Practical course (S/P)

Description
Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

V Seminar Service Science, Management & Engineering

2595470, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Learning Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
The student will receive the necessary literature for his research topic.

T 4.204 Course: Seminar in Informatics B (Master) [T-WIWI-103480]

Responsible: Professorenschaft des Fachbereichs Informatik
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102974 - Seminar

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Each term	1

Events					
WS 18/19	2400125	Seminar "Privacy Awareness"	2 SWS	Seminar (S)	Boehm, Volkamer, Gerber
WS 18/19	2512301	Linked Data and the Semantic Web	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Acosta Deibe, Käfer, Heling, Weller
WS 18/19	2512311	Real-World Challenges in Data Science and Analytics	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Nickel, Weinhardt, Zehnder, Brandt
WS 18/19	2512312	Cooperation seminar: Innovative applications on single board computers as well as their economic relevance	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Ott, Weller, Bälz
WS 18/19	2513400	Emerging Trends in Critical Information Infrastructures	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
WS 18/19	2595470	Seminar Service Science, Management & Engineering	2 SWS	Seminar (S)	Weinhardt, Satzger, Nickel, Fromm, Fichtner, Sure-Vetter
SS 2019	2512300	Knowledge Discovery and Data Mining	3 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Färber, Nguyen, Weller
SS 2019	2513306	Data Science & Real-time Big Data Analytics	2 SWS	Seminar / Practical course (S/P)	Sure-Vetter, Riemer, Zehnder
SS 2019	2513400	Emerging Trends in Critical Information Infrastructures	2 SWS	Seminar (S)	Lins, Sunyaev, Thiebes
SS 2019	2595470	Seminar Service Science, Management & Engineering	2 SWS	Seminar (S)	Weinhardt, Nickel, Fichtner, Satzger, Sure-Vetter, Fromm
Exams					
WS 18/19	7500175	Seminar: Energy Informatics		Prüfung (PR)	Wagner
WS 18/19	7900038	Linked Data and the Semantic Web		Prüfung (PR)	Sure-Vetter
WS 18/19	7900044	Seminar Service Science, Management & Engineering		Prüfung (PR)	Sure-Vetter
WS 18/19	7900094	Selected Topics in Text Mining - Cooperation Seminar AIFB and ECON		Prüfung (PR)	Sure-Vetter, Ott
WS 18/19	7900114	Emerging Trends in Critical Information Infrastructures		Prüfung (PR)	Sunyaev
WS 18/19	7900121	Seminar "Privacy Awareness"		Prüfung (PR)	Volkamer
WS 18/19	7900192	Data Science with Open Data		Prüfung (PR)	Sure-Vetter
SS 2019	7900090	Data Science & Real-time Big Data Analytics		Prüfung (PR)	Sure-Vetter
SS 2019	7900092	Seminar Service Science, Management & Engineering		Prüfung (PR)	Sure-Vetter
SS 2019	7900094	Knowledge Discovery and Data Mining		Prüfung (PR)	Sure-Vetter

Competence Certificate
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
Placeholder for seminars offered by the Institute AIFB.

The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.

The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V **Linked Data and the Semantic Web** **Seminar / Practical course (S/P)**
2512301, WS 18/19, 3 SWS, Open in study portal

Description
The Linked Data principles are a set of practices for data publishing on the web. Linked Data builds on the web architecture and uses HTTP for data access, and RDF for describing data, thus aiming towards web-scale data integration. There is a vast amount of data available published according to those principles: recently, 4.5 billion facts have been counted with information about various domains, including music, movies, geography, natural sciences. Linked Data is also used to make web-pages machine-understandable, corresponding annotations are considered by the big search engine providers. On a smaller scale, devices on the Internet of Things can also be accessed using Linked Data which makes the unified processing of device data and data from the web easy.

In this practical seminar, students will build prototypical applications and devise algorithms that consume, provide, or analyse Linked Data. Those applications and algorithms can also extend existing applications ranging from databases to mobile apps.

For the seminar, programming skills or knowledge about web development tools/technologies are highly recommended. Basic knowledge of RDF and SPARQL are also recommended, but may be acquired during the seminar. Students will work in groups. Seminar meetings will take place as 'Block-Seminar'.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Topics of interest include, but are not limited to:

- Travel Security
- Geo data
- Linked News
- Social Media

V **Real-World Challenges in Data Science and Analytics** **Seminar / Practical course (S/P)**
2512311, WS 18/19, 3 SWS, Open in study portal

Notes
The exact dates and information for registration will be announced at the event page.

V Cooperation seminar: Innovative applications on single board computers as well as their economic relevance

Seminar / Practical course (S/P)

2512312, WS 18/19, 3 SWS, Open in study portal

Description
This seminar is offered cooperatively by the Chair of Web Science (AIFB) and the Chair of Economic Policy (ECON).

The cooperation seminar deals with the technical realization of innovative applications using single board computers such as Arduino (https://www.arduino.cc) or Raspberry Pi (https://www.raspberrypi.org). These single board computers can be extended by various sensors and modules, thus fulfilling a wide range of tasks. Thus, the addition of a camera allows for example gesture and face detection, or the equipment with different sensors enables the measurement of temperature and perception of moving objects.

At the same time, the implications of cost-effective availability of these basic technologies are analyzed from an economic-scientific perspective. The spread and use of these single-board computers, as well as the concepts associated with their success, can have a decisive impact on innovation processes. The reasons and obstacles as well as their relevance to innovation are therefore also addressed from an economic perspective.

Microcomputers such as the Raspberry Pi, for example, are increasingly being used and expanded in the private environment, with numerous applications being possible in the household sector. They can be used as a monitoring system, as a home server or as an electronic func- tion opener. Likewise, due to their low cost, size and ease of use, they can also significantly support the development of innovative processes, for example in the development of prototypes.

Within the scope of this seminar, the possibilities of a single board computer are investigated using the Raspberry Pi. The students are to conceive, realize and present innovative applications in two-teams. Each team is provided with a Raspberry Pi. In addition to the realization of an innovative application, each team has to deal with and discuss an economic science issue. The use of the Raspberry Pi or the underlying concepts from an innovation-economic perspective are to be analyzed.

In addition to the Raspberry Pis, various sensors and expansion modules are also provided and can be purchased after consultation with the supervisors. Furthermore, it may be necessary to develop extensions in Python during the seminar. Previous knowledge in Python and Semantic Web technologies are therefore an advantage but not an imperative requirement.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Topics of interest include, but are not limited to:

- Smart Home Applications
- Environmental measurements
- Gesture control
- Security systems

V Emerging Trends in Critical Information Infrastructures

Seminar (S)

2513400, WS 18/19, 2 SWS, Open in study portal

Description
The block seminar Emerging Trends in Critical Information Infrastructures aims to provide insights into emerging topics in the field of information systems and to offer students an opportunity to write their first academic paper alone or in a group of students. Each semester, different topics are offered around the lectures and research domains of Prof. Sunyaev's chair, especially Trusted Engineering, Digital Health, Internet Technologies as well as Auditing and Certifications. Students can also submit their own topic suggestions within the framework of the main topics specified in the respective semester.

V Seminar Service Science, Management & Engineering

Seminar (S)

2595470, WS 18/19, 2 SWS, Open in study portal

Learning Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

Workload
The total workload for this course is approximately 120 hours. For further information see German version.

Literature
The student will receive the necessary literature for his research topic.

V Knowledge Discovery and Data Mining
2512300, SS 2019, 3 SWS, Open in study portal
Seminar / Practical course (S/P)

Description
The seminar includes different methods of machine learning and data mining. Participants of the seminar should have basic knowledge of machine learning and programming skills.

Notes
The exact dates and information for registration will be announced at the event page.

Learning Content
Domains of interest include, but are not limited to:

- Medicine
- Social Media
- Finance Market

Literature
Detailed references are indicated together with the respective subjects. For general background information look up the following textbooks:

- Mitchell, T.; Machine Learning
- McGraw Hill, Cook, D.J. and Holder, L.B. (Editors) Mining Graph Data, ISBN:0-471-73190-0
- Wiley, Manning, C. and Schütze, H.; Foundations of Statistical NLP, MIT Press, 1999.

V Data Science & Real-time Big Data Analytics
2513306, SS 2019, 2 SWS, Open in study portal
Seminar / Practical course (S/P)

Description
Event processing and real-time data are everywhere: financial market data, sensors, business intelligence, social media analytics, logistics. Many applications collect large volumes of data in real time and are increasingly faced with the challenge of being able to process them quickly and react promptly. The challenges of this real-time processing are currently also receiving a great deal of attention under the term "Big Data". The complex processing of real-time data requires both knowledge of methods for data analysis (data science) and their processing (real-time analytics). Seminar papers are offered on both of these areas as well as on interface topics, the input of own ideas is explicitly desired.

V Seminar Service Science, Management & Engineering
2595470, SS 2019, 2 SWS, Open in study portal
Seminar (S)

Learning Content
Each Semester, the seminar will cover topics from a different selected subfield of Service Science, Management & Engineering. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.

See the KSRI website for more information about this seminar: www.ksri.kit.edu

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
The student will receive the necessary literature for his research topic.

T 4.205 Course: Seminar in Operations Research A (Master) [T-WIWI-103481]

Responsible: Prof. Dr. Stefan Nickel
Prof. Dr. Steffen Rebennack
Prof. Dr. Oliver Stein

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-102973 - Seminar

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Each term	1

Events					
WS 18/19	2550491	Seminar: Recent Topics in OR	SWS	Seminar (S)	Nickel, Mitarbeiter
SS 2019	2550132	Seminar zur Mathematischen Optimierung (MA)	2 SWS	Seminar (S)	Stein, Mohr, Neumann
SS 2019	2550473	Seminar on Power Systems Optimization (Master)	2 SWS	Seminar (S)	Rebennack, Assistenten
SS 2019	2550491	Seminar zur diskreten Optimierung	SWS	Block (B)	Nickel, Mitarbeiter
Exams					
WS 18/19	7900217_WS1819	Seminar in Operations Research A (Master)		Prüfung (PR)	Stein
WS 18/19	7900263	Seminar in Operations Research A (Master)		Prüfung (PR)	Nickel
SS 2019	7900018_SS2019	Seminar in Operations Research A (Master)		Prüfung (PR)	Stein

Competence Certificate
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V Seminar: Recent Topics in OR

2550491, WS 18/19, SWS, Open in study portal **Seminar (S)**

Learning Content
The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

Annotation
The seminar is offered in each term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

V

Seminar zur diskreten Optimierung

2550491, SS 2019, SWS, Open in study portal

Block (B)

Learning Content
The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

Annotation
The seminar is offered in each term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

T 4.206 Course: Seminar in Operations Research B (Master) [T-WIWI-103482]

Responsible: Prof. Dr. Stefan Nickel
Prof. Dr. Steffen Rebennack
Prof. Dr. Oliver Stein

Organisation: KIT Department of Economics and Management

Part of: M-WIWI-102974 - Seminar

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Each term	1

Events					
WS 18/19	2550491	Seminar: Recent Topics in OR	SWS	Seminar (S)	Nickel, Mitarbeiter
SS 2019	2550132	Seminar zur Mathematischen Optimierung (MA)	2 SWS	Seminar (S)	Stein, Mohr, Neumann
SS 2019	2550473	Seminar on Power Systems Optimization (Master)	2 SWS	Seminar (S)	Rebennack, Assistenten
SS 2019	2550491	Seminar zur diskreten Optimierung	SWS	Block (B)	Nickel, Mitarbeiter
Exams					
SS 2019	7900018_SS2019	Seminar in Operations Research A (Master)		Prüfung (PR)	Stein

Competence Certificate
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V Seminar: Recent Topics in OR

2550491, WS 18/19, SWS, Open in study portal **Seminar (S)**

Learning Content
The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

Annotation
The seminar is offered in each term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

V

Seminar zur diskreten Optimierung

2550491, SS 2019, SWS, Open in study portal

Block (B)

Learning Content
The topics of the seminar will be announced at the beginning of the term in a preliminaty meeting. Dates will be announced on the internet.

Annotation
The seminar is offered in each term.

Workload
The total workload for this course is approximately 90 hours. For further information see German version.

Literature
Literature and relevant sources will be announced at the beginning of the seminar.

T 4.207 Course: Seminar in Statistics A (Master) [T-WIWI-103483]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102971 - Seminar

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Each term	1

Events					
SS 2019	2521310	Advanced Topics in Econometrics	2 SWS	Seminar (S)	Schienle, Chen, Görgen
Exams					
WS 18/19	7900257	Date Mining		Prüfung (PR)	Nakhaeizadeh

Competence Certificate
The non examassessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015)consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V Advanced Topics in Econometrics

2521310, SS 2019, 2 SWS, Open in study portal **Seminar (S)**

Annotation
The course will be offered in English.

T 4.208 Course: Seminar in Statistics B (Master) [T-WIWI-103484]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Melanie Schienle
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102972 - Seminar

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Each term	1

Events					
SS 2019	2521310	Advanced Topics in Econometrics	2 SWS	Seminar (S)	Schienle, Chen, Görgen

Competence Certificate
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of

- a talk about the research topic of the seminar together with discussion,
- a written summary about the major issues of the topic and
- attending the discussions of the seminar

The grade is achieved by the weighted sum of the grades.

Prerequisites
None.

Recommendation
See seminar description in the course catalogue of the KIT (https://campus.kit.edu/)

Annotation
The listed seminar titles are placeholders. Currently offered seminars of each semester will be published on the websites of the institutes and in the course catalogue of the KIT. In general, the current seminar topics of each semester are already announced at the end of the previous semester. Furthermore for some seminars there is an application required.
The available places are listed on the internet: https://portal.wiwi.kit.edu.

Below you will find excerpts from events related to this course:

V Advanced Topics in Econometrics

2521310, SS 2019, 2 SWS, Open in study portal **Seminar (S)**

Annotation
The course will be offered in English.

T 4.209 Course: Seminar Mathematics [T-MATH-105686]

Organisation: KIT Department of Mathematics
Part of: M-MATH-102730 - Seminar

Type	Credits	Version
Studienleistung	3	1

Exams				
WS 18/19	7700048	Seminar Mathematics	Prüfung (PR)	Kühnlein
WS 18/19	7700055	Seminar Mathematics	Prüfung (PR)	Hug

T 4.210 Course: Service Oriented Computing [T-WIWI-105801]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each summer term	2

Exams				
WS 18/19	7900024	Service Oriented Computing	Prüfung (PR)	Sure-Vetter
SS 2019	7900038	Service Oriented Computing	Prüfung (PR)	Sure-Vetter

Competence Certificate
Please note that the exam will be offered to first-time applicants in the winter semester 2018/2019. A last examination possibility exists in the summer semester 2019 (only for repeaters).

The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the examination regulation or of an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.

Prerequisites
None

T 4.211 Course: Simulation of Stochastic Systems [T-WIWI-106552]

Responsible: Prof. Dr. Oliver Grothe
Prof. Dr. Steffen Rebennack
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103289 - Stochastische Optimierung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation. The exam takes place in every the semester.

Prerequisites
None.

T 4.212 Course: Smart Energy Infrastructure [T-WIWI-107464]

Responsible: Dr. Armin Ardone
Dr. Dr. Andrej Marko Pustisek
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101452 - Energiewirtschaft und Technologie

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	3	Each winter term	1

Events					
WS 18/19	2581023	(Smart) Energy Infrastructure	2 SWS	Lecture (V)	Ardone, Pustisek
Exams					
WS 18/19	7981023	Smart Energy Infrastructure		Prüfung (PR)	Fichtner

Competence Certificate
The assessment consists of a written exam (60 min.) according to § 4 paragraph 2 Nr. 1 of the examination regulation.

Prerequisites
None.

Annotation
New course starting winter term 2017/2018.

T 4.213 Course: Smart Grid Applications [T-WIWI-107504]

Responsible: Prof. Dr. Christof Weinhardt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103720 - eEnergy: Markets, Services and Systems

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2540452	Smart Grid Applications	2 SWS	Lecture (V)	Staudt, van Dinther
WS 18/19	2540453	Übung zu Smart Grid Applications	2 SWS	Lecture (V)	Staudt, Mengelkamp
Exams					
WS 18/19	7900235	Smart Grid Applications		Prüfung (PR)	Weinhardt
WS 18/19	7900288	Smart Grid Applications		Prüfung (PR)	Weinhardt

Competence Certificate
The assessment consists of a written exam (60 min) (according to §4(2), 1 of the examination regulations). By successful completion of the exercises (§4 (2), 3 SPO 2007 respectively §4 (3) SPO 2015) a bonus can be obtained. If the grade of the written exam is at least 4.0 and at most 1.3, the bonus will improve it by one grade level (i.e. by 0.3 or 0.4).

Prerequisites
None

Recommendation
None

Annotation
The lecture will be read for the first time in winter term 2018/19.

T 4.214 Course: Sobolev Spaces [T-MATH-105896]

Responsible: Prof. Dr. Andreas Kirsch
Organisation: KIT Department of Mathematics
Part of: M-MATH-102926 - Sobolevräume

Type	Credits	Version
Prüfungsleistung mündlich	5	1

T 4.215 Course: Social Choice Theory [T-WIWI-102859]

Responsible: Prof. Dr. Clemens Puppe
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101500 - Microeconomic Theory
M-WIWI-101504 - Collective Decision Making

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	1

Events					
SS 2019	2520537	Social Choice Theory	2 SWS	Lecture (V)	Puppe, Müller
SS 2019	2520539	Übung zu Social Choice Theory	1 SWS	Practice (Ü)	Puppe, Müller

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation). The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Social Choice Theory

2520537, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
The course provides a comprehensive treatment of preference and judgement aggregation, including proofs of general results that have Arrow's famous impossibility theorem and Gibbard's oligarchy theorem as corollaries. The second part of the course is devoted to voting theory. Among other things, we prove the Gibbard-Satterthwaite theorem.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature
Main texts:

- Hervé Moulin: Axioms of Cooperative Decision Making, Cambridge University Press, 1988
- Christian List and Clemens Puppe: Judgement Aggregation. A survey, in: Handbook of rational & social choice, P.Anand, P.Pattanaik, C.Puppe (Eds.), Oxford University Press 2009.

Secondary texts:

- Amartya Sen: Collective Choice and Social Welfare, Holden-Day, 1970
- Wulf Gaertner: A Primer in Social Choice Theory, revised edition, Oxford University Press, 2009
- Wulf Gaertner: Domain Conditions in Social Choice Theory, Oxford University Press, 2001

T 4.216 Course: Sociotechnical Information Systems Development [T-WIWI-109249]

Responsible: Prof. Dr. Ali Sunyaev
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	4	Each term	1

Events					
WS 18/19	2512400	Entwicklung Soziotechnischer Informationssysteme	SWS	Practical course (P)	Sunyaev, Kromat
Exams					
SS 2019	7900016	Sociotechnical Information Systems Development		Prüfung (PR)	Sunyaev

Competence Certificate
The non exam assessment (§4(2), 3 SPO 2007) or alternative exam assessment (§ 4(2), 3 SPO 2015) consists of an implementation and a final thesis documenting the development and use of the application.

Prerequisites
None.

Below you will find excerpts from events related to this course:

V Entwicklung Soziotechnischer Informationssysteme

2512400, WS 18/19, SWS, Open in study portal **Practical course (P)**

Description
The aim of this course is to provide a practical introduction into developing socio-technical information systems, such as web platforms, mobile apps, or desktop applications. Course participants will create (individually or in groups) software solutions for specific problems from various practical domains. The course tasks comprise requirements assessment, system design, and software implementation. Furthermore, course participants will gain insights into software quality assurance methods and software documentation.

Workload
4 ECTS = approx. 120 h

T 4.217 Course: Software Quality Management [T-WIWI-102895]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each summer term	1

Events					
SS 2019	2511208	Software Quality Management	2 SWS	Lecture (V)	Oberweis
SS 2019	2511209	Übungen zu Software-Qualitätsmanagement	1 SWS	Practice (Ü)	Oberweis, N.N.
Exams					
WS 18/19	7900027	Software Quality Management		Prüfung (PR)	Oberweis
SS 2019	7900031	Software Quality Management		Prüfung (PR)	Oberweis

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation in the first week after lecture period.

Prerequisites
None

Annotation
This course was formely named "Software Technology: Quality Management".

Below you will find excerpts from events related to this course:

V Software Quality Management
2511208, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
This lecture imparts fundamentals of active software quality management (quality planning, quality testing, quality control, quality assurance) and illustrates them with concrete examples, as currently applied in industrial software development. Keywords of the lecture content are: software and software quality, process models, software process quality, ISO 9000-3, CMM(I), BOOTSTRAP, SPICE, software tests.

Annotation
This course was formely named "Software Technology: Quality Management".

Workload
Lecture 30h
Exercise 15h

Preparation of lecture 30h
Preparation of exercises 30h
Exam preparation 44h
Exam 1h

Total: 150h

Literature

- Helmut Balzert: Lehrbuch der Software-Technik. Spektrum-Verlag 2008
- Peter Liggesmeyer: Software-Qualität, Testen, Analysieren und Verifizieren von Software. Spektrum Akademischer Verlag 2002
- Mauro Pezzè, Michal Young: Software testen und analysieren. Oldenbourg Verlag 2009

Further literature is given in lectures.

T 4.218 Course: Spatial Economics [T-WIWI-103107]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101496 - Wachstum und Agglomeration

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Exams				
WS 18/19	7900075	Spatial Economics	Prüfung (PR)	Ott

Competence Certificate
The assessment consists of a written exam (60 minutes) (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required. The attendance of the course Introduction to economic policy [2560280] is recommended.

Annotation
Due to the research semester of Prof. Dr. Ingrid Ott, the course is not offered in the winter term 2018/19.

T 4.219 Course: Spatial Stochastics [T-MATH-105867]

Responsible: Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: M-MATH-102903 - Räumliche Stochastik

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
WS 18/19	0105600	Räumliche Stochastik	4 SWS	Lecture (V)	Last
WS 18/19	0105700	Übungen zu 0105600 (Räumliche Stochastik)	2 SWS	Practice (Ü)	Last
Exams					
WS 18/19	7700054	Spatial Stochastics		Prüfung (PR)	Last

Prerequisites
none

T 4.220 Course: Special Functions and Applications in Potential Theory [T-MATH-102274]

Responsible: Prof. Dr. Andreas Kirsch
Organisation: KIT Department of Mathematics
Part of: M-MATH-101335 - Spezielle Funktionen und Anwendungen in der Potentialtheorie

Type	Credits	Version
Prüfungsleistung mündlich	5	1

Prerequisites
None

T 4.221 Course: Special Topics of Enterprise Information Systems [T-WIWI-102676]

Responsible: Prof. Dr. Andreas Oberweis
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each term	1

Events					
WS 18/19	2511228	Spezialvorlesung Betriebliche Informationssysteme: Industrie 4.0	2 SWS	Lecture (V)	Koschmider
Exams					
WS 18/19	7900029	Special Topics of Enterprise Information Systems: Industry 4.0		Prüfung (PR)	Oberweis

Competence Certificate
The assessment of this course is a written examination (60 min.) or (if necessary) oral examination (30 min.) according to §4(2) of the examination regulation.

Please note that the exam "Special Lecture on Business Information Systems: Industry 4.0" will be offered for the last time in summer semester 2019 (only for repeaters).

Prerequisites
None

T 4.222 Course: Special Topics of Numerical Linear Algebra [T-MATH-105891]

Responsible: Prof. Dr. Marlis Hochbruck
Organisation: KIT Department of Mathematics
Part of: M-MATH-102920 - Spezielle Themen der numerischen linearen Algebra

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
SS 2019	0160400	Topics in Numerical Linear Algebra	4 SWS	Lecture (V)	Neher

Prerequisites
none

T 4.223 Course: Spectral Theory - Exam [T-MATH-103414]

Responsible: PD Dr. Gerd Herzog
Dr. Peer Kunstmann
Dr. Christoph Schmoeger
Prof. Dr. Roland Schnaubelt
Prof. Dr. Lutz Weis

Organisation: KIT Department of Mathematics

Part of: M-MATH-101768 - Spektraltheorie

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
SS 2019	0163700	Spectral Theory	4 SWS	Lecture (V)	Kunstmann
SS 2019	0163710	Tutorial 0163700 (Spectral Theory)	2 SWS	Practice (Ü)	Kunstmann
Exams					
WS 18/19	7700072	Spectral Theory - Exam		Prüfung (PR)	Kunstmann

Below you will find excerpts from events related to this course:

V Spectral Theory

0163700, SS 2019, 4 SWS, Open in study portal **Lecture (V)**

Description
The spectrum of a linear operator on a Banach space generalizes the concept of an eigenvalue of a matrix. In Banach spaces spectral theoretic methods play an equally important role as the eigenvalue theory im finite dimensions. These methods are used everywhere in analysis and its applications.

At the beginning we discuss the basic properties of the spectrum. In view of the applications on differential operators this is not only done for bounded operators, but also for a certain class of unbounded linear operators, the so-called closed operators. To treat differential operators on L^p spaces, we introduce weak derivatives in the L^p setting and Sobolev spaces. One can develop a detailed spectral theory for two main classes of operators. We first deal with compact operators, where the spectrum determined by the eigenvalues to a large extent. In this context we also prove the so-called Fredholm alternative, which has important applications e.g. to integral equations. Then we study (possibly only closed) self adjoint operators on Hilbert spaces. For such operators the spectral theorem is a far reaching extension of the diagonalisation of hermitian matrices. Finally, we treat the functional calculi for self adjoint, bounded and sectorial operators.

Literature
On my webpage one can find the PDF file of the manuscript of my lecture Spectral Theory from summer semester 2010. Presumably, an updated version will be delivered during lecture time. A few relevant monographs:

- H.W. Alt: Lineare Funktionalanalysis. Springer.
- H. Brezis: Functional Analysis, Sobolev Spaces and Partial Differential Equations. Springer.
- J.B. Conway: A Course in Functional Analysis. Springer.
- N. Dunford, J.T. Schwartz: Linear Operators. Part I: General Theory. Wiley.
- T Kato: Perturbation Theory of Linear Operators. Springer.
- A.E. Taylor, D.C. Lay: Introduction to Functional Analysis. Wiley.
- D. Werner: Funktionalanalysis. Springer.

T 4.224 Course: Statistical Modeling of Generalized Regression Models [T-WIWI-103065]

Responsible: Dr. Wolf-Dieter Heller
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101638 - Ökonometrie und Statistik I
M-WIWI-101639 - Ökonometrie und Statistik II

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2521350	Statistische Modellierung von Allgemeinen Regressionsmodellen	2 SWS	Lecture (V)	Heller
Exams					
WS 18/19	7900146	Statistical Modeling of generalized regression models		Prüfung (PR)	Heller

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation.

Prerequisites
None

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MATH-105870 - Generalized Regression Models must not have been started.

Recommendation
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Below you will find excerpts from events related to this course:

V Statistische Modellierung von Allgemeinen Regressionsmodellen

2521350, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Annotation
Knowledge of the contents covered by the course "Economics III: Introduction in Econometrics" [2520016]

Workload
The total workload for this course is approximately 135 hours (4.5 credits).
regular attendance: 30 hours
self-study: 65 hours
exam preparation: 40 hours

T 4.225 Course: Stein's Method [T-MATH-105914]

Responsible: Dr. Matthias Schulte
Organisation: KIT Department of Mathematics
Part of: M-MATH-102946 - Steinsche Methode

Type	Credits	Version
Prüfungsleistung mündlich	5	1

Prerequisites
none

T 4.226 Course: Stochastic Calculus and Finance [T-WIWI-103129]

Responsible: Dr. Mher Safarian
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101639 - Ökonometrie und Statistik II

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2521331	Stochastic Calculus and Finance	2 SWS	Lecture (V)	Safarian
Exams					
WS 18/19	7900225	Stochastic Calculus and Finance		Prüfung (PR)	Safarian

Competence Certificate
The assessment of this course consists of a written examination (§4(2), 1 SPOs, 180 min.) and of possibble additional assignments during the course (§4 (3) SPO).

Prerequisites
None

Annotation
For more information see http://statistik.econ.kit.edu/

Below you will find excerpts from events related to this course:

V Stochastic Calculus and Finance

2521331, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Description
The course will provide rigorous yet focused training in stochastic calculus and finance. The program will cover modern approaches in stochastic calculus and mathematical finance. Topics to be covered:

1. Stochastic Calculus. Stochastic Processes, Brownian Motion and Martingales, Stopping Times, Local martingales, Doob-Meyer Decomposition, Quadratic Variation, Stochastic Integration, Ito Formula, Girsanov Theorem, Jump-diffusion Processes. Stable and tempered stable processes. Levy processes.
2. Mathematical Finance: Pricing Models. The Black-Scholes Model, State prices and Equivalent Martingale Measure, Complete Markets and Redundant Security Prices, Arbitrage Pricing with Dividends, Term-Structure Models (One Factor Models, Cox-Ingersoll-Ross Model, Affine Models), Term-Structure Derivatives and Hedging, Mortgage-Backed Securities, Derivative Assets (Forward Prices, Future Contracts, American Options, Look-back Options), Option pricing with tempered stable and Levy-Processes and volatility clustering, Optimal Portfolio and Consumption Choice (Stochastic Control and Merton continuous time optimization problem), Equilibrium models, Consumption-Based CAPM, Numerical Methods.

Learning Content
The course will provide rigorous yet focused training in stochastic calculus and finance. The program will cover modern approaches in stochastic calculus and mathematical finance. Topics to be covered:

1. Stochastic Calculus. Stochastic Processes, Brownian Motion and Martingales, Stopping Times, Local martingales, Doob-Meyer Decomposition, Quadratic Variation, Stochastic Integration, Ito Formula, Girsanov Theorem, Jump-diffusion Processes. Stable and tempered stable processes. Levy processes.
2. Mathematical Finance: Pricing Models. The Black-Scholes Model, State prices and Equivalent Martingale Measure, Complete Markets and Redundant Security Prices, Arbitrage Pricing with Dividends, Term-Structure Models (One Factor Models, Cox-Ingersoll-Ross Model, Affine Models), Term-Structure Derivatives and Hedging, Mortgage-Backed Securities, Derivative Assets (Forward Prices, Future Contracts, American Options, Look-back Options), Option pricing with tempered stable and Levy-Processes and volatility clustering, Optimal Portfolio and Consumption Choice (Stochastic Control and Merton continuous time optimization problem), Equilibrium models, Consumption-Based CAPM, Numerical Methods.

Stochastic processes (Poisson-process, Brownian motion, martingales), stochastic Integral (Integral, quadratic und co-variation, Ito-formula), stochastic differential equation for price-processes, trading strategies, option pricing(Feynman-Kac), neutral risk rating(equivalent martingale measure, Girsanov theorem), term structure models

Workload
The total workload for this course is approximately 150 hours. For further information see German version.

Literature
To be announced in lecture.
Elective literature:

- Dynamic Asset Pricing Theory, Third Edition. by Darrell Duffie, Princeton University Press, 1996
- Stochastic Calculus for Finance II: Continuous-Time Models, by Steven E. Shreve , Springer, 2003
- An Introduction to Stochastic Integration (Probability and its Applications) by Kai L. Chung , Ruth J. Williams , Birkhaueser,
- Methods of Mathematical Finance by Ioannis Karatzas , Steven E. Shreve , Springer 1998
- Kim Y.S. ,Rachev S.T. ,Bianchi M-L, Fabozzi F. Financial market models with Levy processes and time-varying volatility, Journal of Banking and Finance, 32/7,1363-1378, 2008.
- Hull, J., Options, Futures, & Other Derivatives, Prentice Hall, Sixth Edition, (2005).

T 4.227 Course: Stochastic Control [T-MATH-105871]

Responsible: Prof. Dr. Nicole Bäuerle
Organisation: KIT Department of Mathematics
Part of: M-MATH-102908 - Steuerung stochastischer Prozesse

Type	Credits	Version
Prüfungsleistung mündlich	4	1

Prerequisites
none

T 4.228 Course: Stochastic Differential Equations [T-MATH-105852]

Responsible: Prof. Dr. Roland Schnaubelt
Prof. Dr. Lutz Weis

Organisation: KIT Department of Mathematics

Part of: M-MATH-102881 - Stochastische Differentialgleichungen

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
WS 18/19	0105500	Stochastische Differentialgleichungen	4 SWS	Lecture (V)	Weis
WS 18/19	0105510	Übungen zu 0105500 (Stochastische Differentialgleichungen)	2 SWS	Practice (Ü)	Weis
Exams					
WS 18/19	7700077	Stochastic Differential Equations		Prüfung (PR)	Weis

T 4.229 Course: Stochastic Evolution Equations [T-MATH-105910]

Responsible: Prof. Dr. Lutz Weis
Organisation: KIT Department of Mathematics
Part of: M-MATH-102942 - Stochastische Evolutionsgleichungen

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Prerequisites
none

T 4.230 Course: Stochastic Geometry [T-MATH-105840]

Responsible: Prof. Dr. Daniel Hug
Prof. Dr. Günter Last
Organisation: KIT Department of Mathematics
Part of: M-MATH-102865 - Stochastische Geometrie

Type	Credits	Version
Prüfungsleistung mündlich	8	1

Events					
SS 2019	0152600	Stochastic Geometry	4 SWS	Lecture (V)	Hug
SS 2019	0152610	Übungen zu 0152600 (Stochastische Geometrie)	2 SWS	Practice (Ü)	Hug

T 4.231 Course: Strategic Management of Information Technology [T-WIWI-102669]

Responsible: Thomas Wolf
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each summer term	1

Events					
SS 2019	2511602	Strategic Management of Information Technology	2 SWS	Lecture (V)	Wolf
SS 2019	2511603	Übungen zu Strategisches Management der betrieblichen Informationsverarbeitung	1 SWS	Practice (Ü)	Wolf
Exams					
WS 18/19	7900030	Strategic Management of Information Technology		Prüfung (PR)	
SS 2019	7900034	Strategic Management of Information Technology		Prüfung (PR)	Wolf

Competence Certificate
The assessment of this course is a written (60 min.) or (if necessary) oral examination according (30 min.) to §4(2) of the examination regulation.

Prerequisites
None

Below you will find excerpts from events related to this course:

V Strategic Management of Information Technology

2511602, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Learning Content
The following topics will be covered: strategic planing of ICT, architecture of ICT, overall planning of ICT, outsourcing, operation and controlling of ICT.

Literature

- Nolan, R., Croson, D.: Creative Destruction: A Six-Stage Process for Transforming the Organization. Harvard Business School Press, Boston Mass. 1995
- Heinrich, L. J., Burgholzer, P.: Informationsmanagement, Planung, Überwachung, Steuerung d. Inform.-Infrastruktur. Oldenbourg, München 1990
- Nolan, R.: Managing the crises in data processing. Harvard Business Review, Vol. 57, Nr. 2 1979
- Österle, H. et al.: Unternehmensführung und Informationssystem. Teubner, Stuttgart 1992
- Thome, R.: Wirtschaftliche Informationsverarbeitung. Verlag Franz Vahlen, München 1990

T 4.232 Course: Strategy and Management Theory: Developments and “Classics” [T-WIWI-106190]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103119 - Strategie und Management: Fortgeschrittene Themen

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Irregular	1

Events					
WS 18/19	2577922	Strategy and Management Theory: Developments and "Classics"	2 SWS	Seminar (S)	Lindstädt, Klopfer, Graf
SS 2019	2577923	Workshop aktuelle Themen Strategie und Management (Master)	2 SWS	Seminar (S)	Lindstädt
Exams					
WS 18/19	7900120	Strategy and Management Theory: Developments and “Classics”		Prüfung (PR)	Lindstädt

Competence Certificate
Non exam assessment (following §4(2) 3 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Annotation
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the winter term 2017/18.

Below you will find excerpts from events related to this course:

V Strategy and Management Theory: Developments and "Classics"

2577922, WS 18/19, 2 SWS, Open in study portal **Seminar (S)**

Notes
This course is admission restricted. If you werealready admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

Learning Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Workload
The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

V

Workshop aktuelle Themen Strategie und Management (Master)
2577923, SS 2019, 2 SWS, Open in study portal

Seminar (S)

Notes
This course is admission restricted. If you werealready admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

Learning Content
In this lecture, students discuss and evaluate models in the field of strategic management with a focus on applicability and theory based limitations. Critical examination of current research results will be a substantial part of this course.

Workload
The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

T 4.233 Course: Supply Chain Management in the Process Industry [T-WIWI-102860]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-102805 - Service Operations

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2550494	Supply Chain Management in the Process Industry	3 SWS	Lecture / Practice (VÜ)	Blackburn
Exams					
WS 18/19	7900266	Supply Chain Management in the Process Industry		Prüfung (PR)	Nickel

Competence Certificate
The assessment is a 60 minutes written examination (according to §4(2), 1 of the examination regulation) (individual grading), case study presentation by student teams (team grading) and classroom participation (individual grading). The examination is held in the term of the lecture.

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the module Introduction to Operations Research is assumed.
Advanced knowledge of Operations Research (e.g., as conveyed in the lectures Facility Location and Strategic SCM, Tactical and operational SCM) is recommended.

Annotation
The number of participants is restricted due to the execution of interactive case studies and the resulting examination effort. Due to these capacity restrictions, registration before course start is required according to the information on the course website. The course is planned to be held every winter term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Supply Chain Management in the Process Industry

2550494, WS 18/19, 3 SWS, Open in study portal — **Lecture / Practice (VÜ)**

Learning Content
The course "Supply Chain Management in the Process Industry" covers fundamental concepts in the field of supply chain management with special focus on process industry. Strategic, planning and operational topics within the end-to-end supply chain are examined, covering relevant approaches in design, processes and performance measurement. Additional focus within the course is on showing the interdisciplinary linkages SCM has with information systems, performance management, project management, risk management and sustainability management. The course is enriched by various insights from the world´s leading chemical company BASF, provided by executive management as real life examples and cases.

Annotation
The number of participants is restricted due to the execution of interactive case studies and the resulting examination effort. Due to these capacity restrictions, registration before course start is required according to the information on the course website. The course is planned to be held every winter term. The planned lectures and courses for the next three years are announced online.

Workload
The total workload for this course is approximately 135.0 hours. For further information see German version.

Literature

- Chopra, S./Meindl, P.: Supply Chain Management – Strategy, Planning, & Operations, 4th edition, Upper Saddle River, 2009.
- Various case studies, which will be provided during the course

T 4.234 Course: Tactical and Operational Supply Chain Management [T-WIWI-102714]

Responsible: Prof. Dr. Stefan Nickel
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101413 - Anwendungen des Operations Research
M-WIWI-102832 - Operations Research im Supply Chain Management

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each summer term	3

Events					
SS 2019	2550486	Taktisches und operatives SCM	2 SWS	Lecture (V)	Nickel
SS 2019	2550487	Übungen zu Taktisches und operatives SCM	1 SWS	Practice (Ü)	Pomes
Exams					
WS 18/19	7900220	Tactical and Operational Supply Chain Management		Prüfung (PR)	Nickel

Competence Certificate
The assessment consists of a written exam (60 minutes) according to Section 4(2), 1 of the examination regulation.

The exam takes place in every the semester.

Prerequisite for admission to examination is the succesful completion of the online assessments.

Prerequisites
Prerequisite for admission to examination is the succesful completion of the online assessments.

Recommendation
None

Annotation
The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

Below you will find excerpts from events related to this course:

V Taktisches und operatives SCM

2550486, SS 2019, 2 SWS, Open in study portal — **Lecture (V)**

Description
Since the classical work 'Theory of the Location of Industries' of Weber from 1909, the determination of an optimal location of a new facility with respect to existing customers is strongly connectedto strategical logistics planning. Strategic decisions concerning the location of facilities as production plants, distribution centers or warehouses are of high importance for the rentability of supply chains. Thoroughly carried out, location planning allows an efficient flow of materials and leads to lower costs and increased customer service.
Subject of the course is an introduction to the most important terms and definitions in location planning as well as the presentation of basic quantitative location planning models. Furthermore, specialized location planning models for Supply Chain Management will be addressed as they are part in many commercial SCM tools for strategic planning tasks.

Learning Content
The lecture covers basic quantitative methods in location planning in the context of strategic Supply Chain Planning. Besides the discussion of several criteria for the evaluation of the locations of facilities, the students are acquainted with classical location planning models (planar models, network models and discrete models) and advanced location planning models designed for Supply Chain Management (single-period and multi-period models).The exercisesaccompanying the lecture offer the possibility to apply the considered models to practical problems.

Annotation
The lecture is held in every summer term. The planned lectures and courses for the next three years are announced online.

Literature
Elective Literature

- Daskin: Network and Discrete Location: Models, Algorithms, and Applications, Wiley, 1995
- Domschke, Drexl: Logistik: Standorte, 4. Auflage, Oldenbourg, 1996
- Francis, McGinnis, White: Facility Layout and Location: An Analytical Approach, 2nd Edition, Prentice Hall, 1992
- Love, Morris, Wesolowsky: Facilities Location: Models and Methods, North Holland, 1988
- Thonemann: Operations Management - Konzepte, Methoden und Anwendungen, Pearson Studium, 2005

T 4.235 Course: The Riemann Zeta Function [T-MATH-105934]

Responsible: Dr. Fabian Januszewski
Organisation: KIT Department of Mathematics
Part of: M-MATH-102960 - Die Riemannsche Zeta-Funktion

Type	Credits	Version
Prüfungsleistung mündlich	4	1

T 4.236 Course: Theory of Endogenous Growth [T-WIWI-102785]

Responsible: Prof. Dr. Ingrid Ott
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101478 - Innovation und Wachstum
M-WIWI-101496 - Wachstum und Agglomeration

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Exams				
WS 18/19	7900078	Theory of Endogenous Growth	Prüfung (PR)	Ott

Competence Certificate
The assessment consists of a written exam (60 min) according to Section 4(2), 1 of the examination regulation. The exam takes place in every semester. Re-examinations are offered at every ordinary examination date.

Students will be given the opportunity of writing and presenting a short paper during the lecture time to achieve a bonus on the exam grade. If the mandatory credit point exam is passed, the awarded bonus points will be added to the regular exam points. A deterioration is not possible by definition, and a grade does not necessarily improve, but is very likely to (not every additional point improves the total number of points, since a grade can not become better than 1). The voluntary elaboration of such a paper can not countervail a fail in the exam.

Prerequisites
None

Recommendation
Basic knowledge of micro- and macroeconomics is assumed, as taught in the courses Economics I [2600012], and Economics II [2600014]. In addition, an interest in quantitative-mathematical modeling is required.

Annotation
Due to the research semester of Prof. Dr. Ingrid Ott, the course is not offered in the winter term 2018/19.

T 4.237 Course: Time Series Analysis [T-MATH-105874]

Responsible: Prof. Dr. Norbert Henze
Dr. Bernhard Klar
Organisation: KIT Department of Mathematics
Part of: M-MATH-102911 - Zeitreihenanalyse

Type	Credits	Version
Prüfungsleistung mündlich	4	2

Events					
SS 2019	0161100	Time Series Analysis	2 SWS	Lecture (V)	Klar
SS 2019	0161110	Tutorial for 0161100	1 SWS	Practice (Ü)	Klar

T 4.238 Course: Topics in Experimental Economics [T-WIWI-102863]

Responsible: Prof. Dr. Johannes Philipp Reiß
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101505 - Experimentelle Wirtschaftsforschung

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Irregular	1

Events					
WS 18/19	2520405	Topics in Experimental Economics	SWS	Seminar (S)	Reiß, Hofmann, Mitarbeiter
Exams					
WS 18/19	79191ee	Seminar Topics in Experimental Economics		Prüfung (PR)	Reiß

Competence Certificate
The assessment consists of a written exam (following §4(2), 1 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge of Experimental Economics is assumed. Therefore, it is strongly recommended to attend the course Experimental Economics beforehand.

Annotation
The course is offered in summer 2020 for the next time, not in summer 2018.

Below you will find excerpts from events related to this course:

V Topics in Experimental Economics

2520405, WS 18/19, SWS, Open in study portal **Seminar (S)**

Learning Content
The course covers selected topics in experimental economics and deepens the understanding of the experimental method. In particular, topics of current research into experimental and behavioral economics are discussed, along with a treatment of advanced methodic issues.

Annotation
The course is offered in summer 2016 for the first time. The course is not offered in every academic year.

Workload
The total workload for this course is approximately 90.0 hours. For further information see German version.

Literature
A selection of published papers is compulsory reading for the course. The course syllabus provides references and is announced at the beginning of the course.

T 4.239 Course: Traveling Waves [T-MATH-105897]

Responsible: Prof. Dr. Jens Rottmann-Matthes
Organisation: KIT Department of Mathematics
Part of: M-MATH-102927 - Wandernde Wellen

Type	Credits	Version
Prüfungsleistung mündlich	6	1

T 4.240 Course: Uncertainty Quantification [T-MATH-108399]

Responsible: Prof. Dr. Martin Frank
Organisation: KIT Department of Mathematics
Part of: M-MATH-104054 - Quantifizierung von Unsicherheiten

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	4	Irregular	1

Events					
SS 2019	0164400	Uncertainty Quantification	2 SWS	Lecture (V)	Frank
SS 2019	0164410	Tutorial for 0164400	1 SWS	Practice (Ü)	Frank

Prerequisites
none

Below you will find excerpts from events related to this course:

V Uncertainty Quantification

0164400, SS 2019, 2 SWS, Open in study portal **Lecture (V)**

Description
"There are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – there are things we do not know we don't know." (Donald Rumsfeld)

In this class, we learn to deal with the "known unknowns", a field called Uncertainty Quantification (UQ). More specifically, we focus on methods to propagate uncertain input parameters through differential equation models. Given uncertain input, how uncertain is the output? The first part of the course ("how to do it") gives an overview on techniques that are used. Among these are:

- Sensitivity analysis
- Monte-Carlo methods
- Spectral expansions
- Stochastic Galerkin method
- Collocation methods, sparse grids

The second part of the course ("why to do it like this") deals with the theoretical foundations of these methods. The so-called "curse of dimensionality" leads us to questions from approximation theory. We look back at the very standard numerical algorithms of interpolation and quadrature, and ask how they perform in many dimensions.

Learning Content
In the first part, we learn about the techniques used in UQ. In hands-on programming exercises, students apply these techniques to either a problem of their own choice or one of several given examples. In the second part, we study the theoretical foundations of these methods.

Literature

- R.C. Smith: Uncertainty Quantification: Theory, Implementation, and Applications, SIAM, 2014.
- T.J. Sullivan: Introduction to Uncertainty Quantification, Springer-Verlag, 2015.
- D. Xiu: Numerical Methods for Stochastic Computations, Princeton University Press, 2010.
- O.P. Le Maître, O.M. Knio: Spectral Methods for Uncertainty Quantification, Springer-Verlag, 2010.
- R. Ghanem, D. Higdon, H. Owhadi:Handbook of Uncertainty Quantification, Springer-Verlag, 2017.

T 4.241 Course: Valuation [T-WIWI-102621]

Responsible: Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101480 - Finance 3
M-WIWI-101482 - Finance 1
M-WIWI-101483 - Finance 2

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	4,5	Each winter term	1

Events					
WS 18/19	2530212	Valuation	2 SWS	Lecture (V)	Ruckes
WS 18/19	2530213	Übungen zu Valuation	1 SWS	Practice (Ü)	Ruckes, Scholz-Daneshgari
Exams					
WS 18/19	7900057	Valuation		Prüfung (PR)	Ruckes
SS 2019	7900072	Valuation		Prüfung (PR)	Ruckes

Competence Certificate
See German version.

Prerequisites
None

Recommendation
None

Below you will find excerpts from events related to this course:

V Valuation

2530212, WS 18/19, 2 SWS, Open in study portal **Lecture (V)**

Description
Firms prosper when they create value for their shareholders and stakeholders. This is achieved by investing in projects that yield higher returns than their according cost of capital. Students are told the basic tools for firm and project valuation as well as ways to implement these tools in order to enhance a firm's value and improve its investment decisions. Among other things, the course will deal with the valuation of firms and individual projects using discounted cash flow and relative valuation approaches and the valuation of flexibility deploying real options.

Learning Content
Topics:

- Projections of cash flows
- Estimation of the cost of capital
- Valuation of the firm
- Mergers and acquisitions
- Real options

Literature
Elective Literature
Titman/Martin (2013): *Valuation - The Art and Science of Corporate Investment Decisions*, 2nd. ed. Pearson International.

T 4.242 Course: Wavelets [T-MATH-105838]

Responsible: Prof. Dr. Andreas Rieder
Organisation: KIT Department of Mathematics
Part of: M-MATH-102895 - Wavelets

Type	Credits	Recurrence	Version
Prüfungsleistung mündlich	8	Irregular	1

Competence Certificate
Mündliche Prüfung im Umfang von ca. 30 Minuten.

Prerequisites
none

T 4.243 Course: Web Science [T-WIWI-103112]

Responsible: Prof. Dr. York Sure-Vetter
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-101472 - Informatik

Type	Credits	Recurrence	Version
Prüfungsleistung schriftlich	5	Each winter term	1

Events					
WS 18/19	2511312	Web Science	2 SWS	Lecture (V)	Sure-Vetter
WS 18/19	2511313	Exercises to Web Science	1 SWS	Practice (Ü)	Sure-Vetter, Heling
Exams					
WS 18/19	7900031	Web Science		Prüfung (PR)	Sure-Vetter
SS 2019	7900032	Web Science		Prüfung (PR)	Sure-Vetter

Competence Certificate
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation or an oral exam (20 min) following §4, Abs. 2, 2 of the examination regulation.
The exam takes place every semester and can be repeated at every regular examination date.

Prerequisites
None

Annotation
New course starting winter term 2015/2016.

Below you will find excerpts from events related to this course:

V Web Science

2511312, WS 18/19, 2 SWS, Open in study portal — **Lecture (V)**

Description
Web Science is the emergent study of the people and technologies, applications, processes and practices that shape and are shaped by the World Wide Web. Web Science aims to draw together theories, methods and findings from across academic disciplines, and to collaborate with industry, business, government and civil society, to develop our knowledge and understanding of the Web: the largest socio-technical infrastructure in human history.

The lecture provides an introduction to basic concepts of Web Science. Essential theoretical foundations, phenomena and approaches are presented and explained.

Learning Content
This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

Workload

- The total workload for this course is approximately 150 hours
- Time of presentness: 45 hours
- Time of preperation and postprocessing: 67.5 hours
- Exam and exam preperation: 37.5 hours

Literature

- Networks, Crowds, and Markets: Reasoning About a Highly Connected World, by David Easley and Jon Kleinberg, 2010 (free online book: http://www.cs.cornell.edu/home/kleinber/networks-book/)
- Thelwall, M. (2009). Social network sites: Users and uses. In: M. Zelkowitz (Ed.), Advances in Computers 76. Amsterdam: Elsevier (pp. 19-73)

V Exercises to Web Science

2511313, WS 18/19, 1 SWS, Open in study portal

Practice (Ü)

Description
Multiple exercises are held that capture the topics, held in the lecture Web Scienceand discuss them in detail. Thereby, practical examples are given to the students in order to transfer theoretical aspects into practical implementation.

Learning Content
This course aims to provide students with a basic knowledge and understanding about the structure and analysis of selected web phenomena and technologies. Topics include the small world problem, network theory, social network analysis, graph search and technologies/standards/architectures.

Workload
The total workload for the lecture Web Science is given out on the description of the lecture.

Literature

- Networks, Crowds, and Markets: Reasoning About a Highly Connected World, by David Easley and Jon Kleinberg, 2010 (free online book: http://www.cs.cornell.edu/home/kleinber/networks-book/)
- Thelwall, M. (2009). Social network sites: Users and uses. In: M. Zelkowitz (Ed.), Advances in Computers 76. Amsterdam: Elsevier (pp. 19-73)

T 4.244 Course: Workshop Business Wargaming – Analyzing Strategic Interactions [T-WIWI-106189]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103119 - Strategie und Management: Fortgeschrittene Themen

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Each summer term	1

Events					
SS 2019	2577912	Workshop Business Wargaming - Analyzinig Strategic Interactions	2 SWS	Seminar (S)	Lindstädt

Competence Certificate
Non exam assessment (following §4(2) 3 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Annotation
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

The course is planned to be held for the first time in the summer term 2018.

Below you will find excerpts from events related to this course:

V Workshop Business Wargaming - Analyzinig Strategic Interactions

2577912, SS 2019, 2 SWS, Open in study portal **Seminar (S)**

Notes
This course is admission restricted. If you werealready admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

Learning Content
In this course, students simulate and analyze real-life conflict situations using Business Wargaming methods. The students will be able to understand the underlying structure and dynamics of various conflicts, this includes making own conclusions as well as deriving strategic recommendations.

Workload
The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a

T 4.245 Course: Workshop Current Topics in Strategy and Management [T-WIWI-106188]

Responsible: Prof. Dr. Hagen Lindstädt
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-103119 - Strategie und Management: Fortgeschrittene Themen

Type	Credits	Recurrence	Version
Prüfungsleistung anderer Art	3	Irregular	1

Events					
WS 18/19	2577921	Workshop Current Topics in Strategy and Management	2 SWS	Seminar (S)	Lindstädt, Burkardt, Müller
Exams					
WS 18/19	7900171	Workshop Current Topics in Strategy and Management		Prüfung (PR)	Lindstädt

Competence Certificate
Non exam assessment (following §4(2) 3 of the examination regulation).

Prerequisites
None

Recommendation
Basic knowledge as conveyed in the bachelor module „Strategy and Organization“ is recommended.

Annotation
This course is admission restricted. If you were already admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.
The course is planned to be held for the first time in the winter term 2017/18.

Below you will find excerpts from events related to this course:

V Workshop Current Topics in Strategy and Management

2577921, WS 18/19, 2 SWS, Open in study portal **Seminar (S)**

Learning Content
In this lecture, current economic trends will be discussed from a perspective of competition analysis and corporate strategies. Using appropriate frameworks, the students will be able to analyze collectively selected case studies and derive business strategies.

Annotation
This course is admission restricted. If you werealready admitted to another course in the module “Advanced Topics in Strategy and Management” the participation at this course will be guaranteed.

Workload
The total workload for this course is approximately 90 hours.

Lecture: 15 hours

Preparation of lecture: 75 hours

Exam preparation: n/a