

82006000 / Ma-DS-7
Analysing Networks
 Analysing Networks

Modulverantwortliche/r:	Prof. Dr. rer. nat. Peter Niemeyer
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. rer. nat. Peter Niemeyer
Zu belegende Lehrveranstaltungen:	1 lecture (2 contact hours)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (2. Semester)
Inhalte:	Students learn the basics of graph theory and network analysis. Furthermore, the following topics will be treated in-depth: network metrics, generative models, community detection, social influence in networks. Tools for the generation, the representation and the analysis of networks will be discussed (e.g. Pajek, UCInet, Rsienna).
Fachkompetenz:	<p>Specialized Knowledge:</p> <ul style="list-style-type: none"> · graph theoretical foundations · network metrics · models of random graphs (Erdős-Renyi, Preferential Attachment, Watts-Strogatz, Exponential Random, Graph Models) · clustering methods <p>Professional Competences:</p> <ul style="list-style-type: none"> · analysis of networks with appropriate software tools (e.g. R, UCInet, Pajek) · tests of network hypothesis · visualization of networks
Personale Kompetenz:	Students, as teamwork, can develop project goals and time those realistically. Furthermore, they can reflect on their working results and evaluate them.
Lehr- und Lernformen:	lecture /student-led tutorial
Prüfungsoptionen:	Klausur (90 Minuten) ODER Kombinierte wissenschaftliche Arbeit
Hinweise zu Studien-/Prüfungsleistungen:	1 written examination (90 min.) or 1 combined examination
Lehr/Lernmengen:	Präsenzzeit in LV(en) des Moduls: 28 Stunden Vor- und Nachbereitungszeit der LV(en): 56 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 66 Stunden Workload insgesamt: 150 Stunden
Creditpoints:	5

Dauer und Häufigkeit des Angebots: Duration: 1 semester
Frequency: once a year, in the summer term

Empfohlene Vorkenntnisse: not specified

Sonstiges: not specified

82014000 / Ma-DS-3

Applied Statistical Data Analysis

Applied Statistical Data Analysis

Modulverantwortliche/r:	Prof. Dr. Henrik von Wehrden
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. Henrik von Wehrden
Zu belegende Lehrveranstaltungen:	1 lecture (2 contact hours) and 1 exercise (2 contact hours)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (1. Semester)
Inhalte:	The module introduces available software tools with regard to the topic "Big Data". The focus is set on R. After introducing the programming language R, the students learn how to create loops and functions as well as data management instructions. The course closes with data instructions for data mining and visualization.
Fachkompetenz:	Basics in Big Data software, especially R. Learning relevant instructions in R and knowledge of Big Data analysis in R. Methodological competence Fundamentals in data editing and analysis.
Personale Kompetenz:	Learning how to create own instructions (e.g. functions) and research in R regarding new analysis steps.
Lehr- und Lernformen:	Lecture and exercise
Prüfungsoptionen:	Klausur (90 Minuten) ODER Kombinierte wissenschaftliche Arbeit
Hinweise zu Studien-/Prüfungsleistungen:	1 written examination (90 min.) or 1 combined examination
Lehr/Lernmengen:	Präsenzzeit in LV(en) des Moduls: 56 Stunden Vor- und Nachbereitungszeit der LV(en): 28 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 66 Stunden Workload insgesamt: 150 Stunden
Creditpoints:	5
Dauer und Häufigkeit des Angebots:	Duration: 1 semester Frequency: once a year, in the winter term
Empfohlene Vorkenntnisse:	Skills in R, basics in statistics

Sonstiges: not specified

82003000 / Ma-DS-4

Data Economy
Data Economy

Modulverantwortliche/r:	Prof. Dr. Paul Drews
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. Paul Drews
Zu belegende Lehrveranstaltungen:	1 lecture (2 contact hours)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (1. Semester)
Inhalte:	The module deals with basics in data economy. The topics comprise: data repositories, data valuation by different stakeholder groups, data quality management, e-business and digital business models, open data initiatives as well as knowledge co-creation. A crucial topic is utilizing data by algorithms and technologies of data science in enterprises and the accompanying transformation of enterprises, business models and branches.
Fachkompetenz:	The students acquire a good knowledge in the implementation of methods and technologies of data sciences in different business contexts and branches as well as methods to evaluate und manage business data. They learn how to analyse business models in a systematic way and how to further develop those by using data science methods and technologies.
Personale Kompetenz:	The students are able to gather the economic and social dimensions of data-driven business models and to reflect them in multiple perspectives. They deepen their team working skills in producing results, writing them down and presenting them cooperatively.
Lehr- und Lernformen:	Lecture and project (groupwork)
Prüfungsoptionen:	Klausur (90 Minuten) ODER Kombinierte wissenschaftliche Arbeit
Hinweise zu Studien-/Prüfungsleistungen:	1 written examination (90 min.) or 1 combined examination
Lehr/Lernmengen:	Präsenzzeit in LV(en) des Moduls: 28 Stunden Vor- und Nachbereitungszeit der LV(en): 56 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 66 Stunden Workload insgesamt: 150 Stunden
Creditpoints:	5
Dauer und Häufigkeit des Angebots:	Duration: 1 semester Frequency: once a year, in the winter term
Empfohlene Vorkenntnisse:	not specified

Sonstiges: not specified

82008000 / Ma-DS-9

Data Privacy and Ethics

Data Privacy and Ethics

Modulverantwortliche/r:	Prof. Dr. Andreas Möller
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. Andreas Möller
Zu belegende Lehrveranstaltungen:	1 Lectures (2 SWS)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (3. Semester)
Inhalte:	<p>Within the last 20 years, the data-centered field of computer sciences has been massively improved: data bases, search engines, data mining, distributed storage and distributed processing, virtualization, real-time simulation, sensors, etc. These technologies represent the basis for the subject field of "Big Data", a buzz word which is in itself rather unspecific. The idea behind the term is to combine and evaluate all the available data, whether it comes from wind sensors or personal smart phones. This approach results in interesting questions regarding data privacy up to questions regarding public safety and the public good.</p> <p>For more details read the content of the two lectures.</p>
Fachkompetenz:	<p>While combining huge quantities of data from different sources in order to deduce further economic, social or even political relevant information, ethical questions arise. These questions are strongly connected with the term "responsibility". The topic "Big Data" prompts ethical questions of how to deal scientifically and economically with heterogeneous data, which can be collected worldwide and is thus subject to different legal conditions.</p> <p>The students learn how to deal with questions like:</p> <ul style="list-style-type: none"> - What are previous and new, specific challenges of this topic area? - What are the challenges in generating new information out of extensive heterogeneous databases? - To whom belong the data, which data should or may I not use? Which data should / must not be used or combined in order to derive further information? Are there agreements - out of ethical reasons - that should be retained even if there might be a big economic benefit otherwise? - Which technical possibilities can support complying with these boundaries? <p>In addition to the purely mathematic-technical perspective, strategies and tools in the context of data security are also taught. Thus, the students gain an insight into ethical aspects of scientific and economic values in terms of "What should possibly not be done even if it could be done?"</p>
Personale Kompetenz:	The students build up ethical perspectives in order to deal with public and private data in a responsible way within the IT-oriented civil society.
Lehr- und Lernformen:	Seminar with assignments of texts, presentations, discussions, analysis of exemplary case studies
Prüfungsoptionen:	Klausur (90 Minuten) ODER Kombinierte wissenschaftliche Arbeit
Hinweise zu Studien-/ Prüfungsleistungen:	1 written examination (90 min.) or 1 combined examination

Lehr/Lernmengen: Präsenzzeit in LV(en) des Moduls: 28 Stunden
Vor- und Nachbereitungszeit der LV(en): 56 Stunden
ggf. Erarbeitung von Studienleistungen: 0 Stunden
Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 66 Stunden
Workload insgesamt: 150 Stunden

Creditpoints: 5

Dauer und Häufigkeit des Angebots: Duration: 1 semester
Frequency: once a year, in the winter term

Empfohlene Vorkenntnisse: not specified

Sonstiges:

82010000 / Ma-DS-11a
Data Science Seminar
Data Science Seminar

Modulverantwortliche/r:	Prof. Dr. Paul Drews
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. Paul Drews, Prof. Dr. rer. nat. Burkhardt Funk, Prof. Dr. rer. nat. Jürgen Jacobs, Prof. Dr. rer. nat. Peter Niemeyer, Prof. Dr. Lin Xie
Zu belegende Lehrveranstaltungen:	1 seminar (2 contact hours)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (3. Semester)
Inhalte:	In this module up-to-date topics in the field of data science are deepened. The students work independently on certain topics of this subject field. The topics may focus on a methodical, content-related or reflective approach. The main topics will be described in the course announcements.
Fachkompetenz:	Depends on the thematic focus of this module. The students obtain the competence to become acquainted with challenging areas within the field of data science.
Personale Kompetenz:	The students broaden their skills to search and evaluate international scientific references in a systematic way. Moreover, they extend their skills in presenting and documenting their own scientific results corresponding to requirements of the international research community.
Lehr- und Lernformen:	Seminar
Prüfungsoptionen:	Kombinierte wissenschaftliche Arbeit
Hinweise zu Studien-/Prüfungsleistungen:	1 combined examination
Lehr/Lernmengen:	Präsenzzeit in LV(en) des Moduls: 28 Stunden Vor- und Nachbereitungszeit der LV(en): 56 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 66 Stunden Workload insgesamt: 150 Stunden
Creditpoints:	5
Dauer und Häufigkeit des Angebots:	Duration: 1 semester Frequency: once a year, in the winter term
Empfohlene Vorkenntnisse:	not specified
Sonstiges:	not specified

82007000 / Ma-DS-8

Forecasting and Simulation

Forecasting and Simulation

Modulverantwortliche/r:	Prof. Dr. rer. nat. Jürgen Jacobs
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. rer. nat. Jürgen Jacobs
Zu belegende Lehrveranstaltungen:	1 lecture (2 contact hours) and 1 exercise (2 contact hours)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (2. Semester)
Inhalte:	<p>The module provides a survey of the theory and application of data-based computational techniques to forecast and simulate data with temporal dependencies. Selected statistical and/or machine learning approaches dealing with the special role of time in modeling will be discussed in detail. Topics of interest include:</p> <ul style="list-style-type: none"> - stationary and non-stationary time series (ARIMA models) - conditional heteroscedastic time series (ARCH and GARCH models) - multivariate time series (VAR and VARMA models) - state space models (Kalman Filter) - neural network models (e.g. recurrent neural networks)
Fachkompetenz:	On successful completion of the module, students will have gained knowledge in selected methods of forecasting and simulating data with temporal dependencies and will be able to use these methods in various applications.
Personale Kompetenz:	Students can critically reflect on results of forecasting and simulations.
Lehr- und Lernformen:	Classical and interactive lectures with embedded exercises, self-study assignments.
Prüfungsoptionen:	Klausur (90 Minuten) ODER Kombinierte wissenschaftliche Arbeit
Hinweise zu Studien-/Prüfungsleistungen:	1 written examination (90 min.) or 1 combined examination
Lehr/Lernmengen:	<p>Präsenzzeit in LV(en) des Moduls: 56 Stunden Vor- und Nachbereitungszeit der LV(en): 28 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 66 Stunden Workload insgesamt: 150 Stunden</p>
Creditpoints:	5
Dauer und Häufigkeit des Angebots:	Duration: 1 semester Frequency: once a year, in the summer term

Empfohlene
Vorkenntnisse: not specified

Sonstiges: not specified

82001000 / Ma-DS-2
Learning from Data
Learning from Data

Modulverantwortliche/r:	Prof. Dr. rer. nat. Burkhardt Funk
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. rer. nat. Burkhardt Funk
Zu belegende Lehrveranstaltungen:	1 lecture (2 contact hours) and 1 exercise (1 contact hours per week)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (1. Semester)
Inhalte:	This module provides theoretical foundations and frameworks of statistical learning. These include linear models (regression, classification) and concepts like regularization, model selection and evaluation. Besides a broad variety of methods, practical implementations will be looked at.
Fachkompetenz:	Students know the theoretical underpinning of supervised learning and understand the mathematical details and implementation of basic machine learning algorithms (linear and logistic regression, perceptron, neural networks, KNN).
Personale Kompetenz:	Students are able to reflect and discuss own (and their peer's) working results.
Lehr- und Lernformen:	2 hour lecture per week and 2 hour exercise with assignments every other week
Prüfungsoptionen:	Klausur (90 Minuten)
Hinweise zu Studien-/Prüfungsleistungen:	1 written examination (90 min.)
Lehr/Lernmengen:	Präsenzzeit in LV(en) des Moduls: 42 Stunden Vor- und Nachbereitungszeit der LV(en): 56 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 52 Stunden Workload insgesamt: 150 Stunden
Creditpoints:	5
Dauer und Häufigkeit des Angebots:	Duration: 1 semester Frequency: once a year, in the winter term
Empfohlene Vorkenntnisse:	basic math and programming skills (Python) and
Sonstiges:	not specified

8000 / Ma-DS13
Master-Arbeit
Masters dissertation

Modulverantwortliche/r:	Prof. Dr. rer. nat. Peter Niemeyer
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. Paul Drews, Prof. Dr. rer. nat. Burkhardt Funk, Prof. Dr. rer. nat. Jürgen Jacobs, Prof. Dr. rer. nat. Peter Niemeyer, Prof. Dr. Lin Xie, Prof. Dr. Henrik von Wehrden
Zu belegende Lehrveranstaltungen:	No course/lecture
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (4. Semester)
Inhalte:	<p>The students show that, within 5 months, they are able to apply relevant scientific methods and/or theories to a specific research question.</p> <p>Qualification objectives: The students are able to pose a research question within the specialist field of their major on a Master's level. They are able to class the research question in a wide-ranging economic research context and to examine this with regard to their respective discipline.</p>
Fachkompetenz:	<p>The students deepen their professional skills in a selected subject field within their major. They widen their knowledge by classing a specific question with a wide-ranging economic context and strengthen their skills to reflect on and refine their specialist knowledge.</p> <p>Methodological competence: The students conceive the methods of scientific work and those that are necessary to deal with the specific research question. They practice to choose, establish and structure theoretical approaches, methodical access and empirical subject areas in a problem-centered and adequate way.</p>
Personale Kompetenz:	The students strengthen their competence to work autonomously and write a scientific sophisticated thesis effectively while pushed for time and performance. They are able to organize themselves in a productive way and motivate themselves to solve constructively unexpected problems.
Lehr- und Lernformen:	Learning forms: The students work on the exercise independently. They choose the methods and implement the studies by themselves.
Prüfungsoptionen:	Mündliche Prüfung (30 Minuten)
Hinweise zu Studien-/Prüfungsleistungen:	1 Master's Thesis // 1 oral examination (30 min.)
Lehr/Lernmengen:	<p>Präsenzzeit in LV(en) des Moduls: 0 Stunden Vor- und Nachbereitungszeit der LV(en): 0 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 750 Stunden Workload insgesamt: 750 Stunden</p>

Creditpoints:	25
Dauer und Häufigkeit des Angebots:	Duration: 5 months Frequency: each semester
Empfohlene Vorkenntnisse:	The Master's Thesis is usually written in the fourth semester after finishing all modules.
Sonstiges:	not specified

82012000 / Ma-DS-12
Master-Forum
Master-Forum

Modulverantwortliche/r:	Prof. Dr. rer. nat. Peter Niemeyer
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. Paul Drews, Prof. Dr. rer. nat. Burkhardt Funk, Prof. Dr. rer. nat. Jürgen Jacobs, Prof. Dr. rer. nat. Peter Niemeyer, Prof. Dr. Lin Xie, Prof. Dr. Henrik von Wehrden
Zu belegende Lehrveranstaltungen:	1 colloquium (1 contact hour)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (4. Semester)
Inhalte:	<p>Within the Masterforum, the students present their current status of their Master's Thesis in form of a presentation and discuss open questions. The Masterforum allows for the exchange between students as well as students and supervisor.</p> <p>Qualification objectives: The students gain fundamental knowledge and skills to develop, draft, present and discuss their own scientific work on a Master's level.</p>
Fachkompetenz:	<p>The students can work on, present and discuss analytical sophisticated research questions with the help of disciplinary methods and technics.</p> <p>Methodological competence: The students master methods of scientific work, i.e. disciplinary methods necessary to deal with the research question. They are able to present both the status of their work and research questions in a structured way and to discuss it goal-oriented.</p>
Personale Kompetenz:	The students are able to discuss scientifically ambitious questions constructively. They can frame and represent a scientific point of view and argue problem solving. They are prepared to discuss questions of their fellow students. The competence to articulate suggestions, criticism and objections is further enhanced by a critical reflection on the presented research projects.
Lehr- und Lernformen:	Presentation, position paper, discussion, moderation, evaluation, protocol, independent study (research, lecture, disambiguation)
Prüfungsoptionen:	Schriftliche wissenschaftliche Arbeit
Hinweise zu Studien-/Prüfungsleistungen:	1 term paper (passed / failed)
Lehr/Lernmengen:	Präsenzzeit in LV(en) des Moduls: 14 Stunden Vor- und Nachbereitungszeit der LV(en): 70 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 66 Stunden Workload insgesamt: 150 Stunden

Creditpoints:	5
Dauer und Häufigkeit des Angebots:	Duration: 1 semester Frequency: once a year, in the summer term
Empfohlene Vorkenntnisse:	not specified
Sonstiges:	not specified

82000000 / Ma-DS-1

Mathematical Foundation

Mathematical Foundation

Modulverantwortliche/r:	Prof. Dr. rer. nat. Peter Niemeyer
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. rer. nat. Peter Niemeyer, Prof. Dr. Kathrin Padberg-Gehle
Zu belegende Lehrveranstaltungen:	1 lecture (2 contact hours) and 1 exercise (2 contact hours)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (1. Semester)
Inhalte:	<p>This module provides mathematical foundations in the following areas:</p> <ul style="list-style-type: none"> - probability theory and statistics <ul style="list-style-type: none"> - concept of probability (W-room, dependancy, random variables, conditional probability) - random variables - distributions - descriptive statistics - parameter estimation - statistical tests - linear algebra <ul style="list-style-type: none"> - vector spaces and subspaces - orthogonality - eigenvalues and -vectors - stochastic processes (markov chains) - analysis <ul style="list-style-type: none"> - differentiation of real-valued functions with several variables (partial derivative, gradients) - integration of real-valued functions with several variables
Fachkompetenz:	<p>Specialized Knowledge:</p> <ul style="list-style-type: none"> - discrete and constant random variables - popular distributions (PMF/PDF, CDF, variance, expected value) - parameter estimation - testing procedure - regression analysis - vector spaces (scalar products) - eigenvalues - (finite) Marcov-chains (irreducability, stationary distribution, application examples) <p>Professional Competences: The participants of the seminar are able to</p> <ul style="list-style-type: none"> - reflect statistical statements critically - calculate with vectors - apply finite Markov-chains
Personale Kompetenz:	The students can reflect on their working results and evaluate them.

Lehr- und Lernformen:	lecture / excecise
Prüfungsoptionen:	Klausur (90 Minuten)
Hinweise zu Studien-/Prüfungsleistungen:	1 written examination (90 min.)
Lehr/Lernmengen:	Präsenzzeit in LV(en) des Moduls: 56 Stunden Vor- und Nachbereitungszeit der LV(en): 28 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 66 Stunden Workload insgesamt: 150 Stunden
Creditpoints:	5
Dauer und Häufigkeit des Angebots:	Duration: 1 semester Frequency: once a year, in the winter term
Empfohlene Vorkenntnisse:	Basics in statistics and linear algebra
Sonstiges:	not specified

82005000 / Ma-DS-6
Probabilistic Modelling
Probabilistic Modelling

Modulverantwortliche/r:	Prof. Dr. rer. nat. Burkhardt Funk
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. rer. nat. Burkhardt Funk
Zu belegende Lehrveranstaltungen:	1 lecture (2 contact hours)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (2. Semester)
Inhalte:	The module deals with advanced concepts of modelling and focusses on the basics and implementation of probabilistic modelling (Bayesian Inference). The topics are: graphical models, Belief Networks, Monte Carlo approach and specific application packages (e.g. JAGS, Stan). The implementation will be demonstrated by multi-level regression- and classification methods.
Fachkompetenz:	Students understand the role of probabilistic models and methods in machine learning and are equipped to apply methods from Bayesian Inference. Students are able to conceptualize and build probabilistic models for various application contexts.
Personale Kompetenz:	Students are able to discuss and evaluate scientific papers (in the pobabilistic modeling domain) in small teams and can manage their own project work focussing on the implementation of probabilistic models.
Lehr- und Lernformen:	2 hour lecture per week and project work
Prüfungsoptionen:	Klausur (90 Minuten) ODER Kombinierte wissenschaftliche Arbeit
Hinweise zu Studien-/ Prüfungsleistungen:	1 written examination (90 min.) or 1 combined examination
Lehr/Lernmengen:	Präsenzzeit in LV(en) des Moduls: 28 Stunden Vor- und Nachbereitungszeit der LV(en): 42 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 80 Stunden Workload insgesamt: 150 Stunden
Creditpoints:	5
Dauer und Häufigkeit des Angebots:	Duration: 1 semester Frequency: once a year, in the summer term
Empfohlene Vorkenntnisse:	Programming skills
Sonstiges:	not specified

82009000 / Ma-DS-10
Research Project
Research Project

Modulverantwortliche/r:	Prof. Dr. Ulf Brefeld
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. Ulf Brefeld, Prof. Dr. Paul Drews, Prof. Dr. rer. nat. Burkhardt Funk, Prof. Dr. rer. nat. Jürgen Jacobs, Prof. Dr. rer. nat. Peter Niemeyer, Prof. Dr. Henrik von Wehrden
Zu belegende Lehrveranstaltungen:	1 seminar (2 contact hours)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (3. Semester)
Inhalte:	Under guided instruction, students will elaborate on a research question or a question from the field of practice.
Fachkompetenz:	<p>Depending on the subject of the Research Project. The students learn how to deal analytically with the subject of a specific research project and to understand the scientific basics of their subject area. The focus is set on the critical analysis of the subject. Hence, the students gain competence to transfer knowledge to new research questions and to transfer scientific results from the field of practice to other research questions.</p> <p>Methodological competence: Research ability, planning and project management competence, consultation expertise, methodological skills, structure of scientific publications. The students train effective progress planning and the respective techniques. They are able to collect relevant information, evaluate and interpret these, deduce decisions from it and create further learning processes. Moreover, students present their intermediate and final results with the help of audiovisual systems.</p>
Personale Kompetenz:	<p>Ability to work in a team, to deal with conflicts, to lead a group and manage projects, to moderate meetings. The students learn how to advocate their own objectives and to follow an agenda without ignoring the interests of others. They take over responsibility in their project team. Hence, they train to formulate and defend argumentatively their point of view or their problem-solving approach.</p>
Lehr- und Lernformen:	A lot of hands-on data science/machine learning, weekly feedback rounds, mile stone presentations, producing a written report
Prüfungsoptionen:	Kombinierte wissenschaftliche Arbeit
Hinweise zu Studien-/ Prüfungsleistungen:	1 combined examination
Lehr/Lernmengen:	<p>Präsenzzeit in LV(en) des Moduls: 28 Stunden Vor- und Nachbereitungszeit der LV(en): 56 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 66 Stunden Workload insgesamt: 150 Stunden</p>

Creditpoints:	5
Dauer und Häufigkeit des Angebots:	Duration: 1 semester Frequency: once a year, in the winter term
Empfohlene Vorkenntnisse:	not specified
Sonstiges:	not specified

82011000 / Ma-DS-11b

Special Topics in Data Science

Special Topics in Data Science

Modulverantwortliche/r:	Prof. Dr. Lin Xie
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. Paul Drews, Prof. Dr. rer. nat. Burkhardt Funk, Prof. Dr. rer. nat. Jürgen Jacobs, Prof. Dr. rer. nat. Peter Niemeyer, Prof. Dr. Lin Xie
Zu belegende Lehrveranstaltungen:	1 lecture (2 contact hours)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (3. Semester)
Inhalte:	This module deals with methods of data science in a specific application context (e.g. Geo Information, Semantic Web, Social Media Platforms, Recommender Systems, Online Marketing, e-health).
Fachkompetenz:	Depending on the respective topic and context of application. The students learn to adapt data science technologies and methods to questions allocated in the respective context of application. In the course of this process, the critical reflection is focus on. Students learn how to apply data science technologies and methods to new research questions and how to transfer research results to further questions within the field of practice.
Personale Kompetenz:	The students are able to collect relevant information, evaluate and interpret these, deduce decisions from it and create further learning processes. Moreover, students present their intermediate and final results with the help of audiovisual systems.
Lehr- und Lernformen:	lecture
Prüfungsoptionen:	Kombinierte wissenschaftliche Arbeit
Hinweise zu Studien-/Prüfungsleistungen:	1 combined examination
Lehr/Lernmengen:	Präsenzzeit in LV(en) des Moduls: 28 Stunden Vor- und Nachbereitungszeit der LV(en): 56 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 66 Stunden Workload insgesamt: 150 Stunden
Creditpoints:	5
Dauer und Häufigkeit des Angebots:	Duration: 1 semester Frequency: once a year, in the winter term
Empfohlene Vorkenntnisse:	not specified

Sonstiges: not specified

82013000 / Ma-DS-5
Deep Learning
 Deep Learning

Modulverantwortliche/r:	Prof. Dr. Ulf Brefeld
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. Ulf Brefeld
Zu belegende Lehrveranstaltungen:	1 Lecture (2 CH) and 1 Exercise (2 CH)
	1 Vorlesung (2 SWS) und 1 Übung (2 SWS)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (2. Semester)
Inhalte:	This course deals with deep neural networks, perceptrons, multi-layer perceptrons, backpropagation, autoencoder, GANs, LSTMs, deep reinforcement learning, etc. Dieses Modul behandelt tiefe neuronale Netze, Perzeptrons, Multi-layer Perzeptrons, Backpropagation, Autoencoder, GANs, LSTMs, Deep Reinforcement Learning, usw.
Fachkompetenz:	Students learn about general information processing in neural networks on the example of selected models. They are able to use and evaluate artificial neural networks and related approaches in a wide variety of applications. Studierende erwerben Kenntnisse in Bezug auf die allgemeine Informationsverarbeitung in neuronalen Netzen anhand von ausgewählten Modellen. Sie können diese und auch andere Methoden in verschiedensten Anwendungen einsetzen und evaluieren.
Personale Kompetenz:	Students acquire knowledge about general information processing in neural networks on the example of selected models. They can use and evaluate these models and related approaches in various applications. Studierende erwerben Kenntnisse in Bezug auf die allgemeine Informationsverarbeitung in neuronalen Netzen anhand von ausgewählten Modellen. Sie können diese und auch andere Methoden in verschiedensten Anwendungen einsetzen und evaluieren.
Lehr- und Lernformen:	lecture, exercise Vorlesung, Übung
Prüfungsoptionen:	Klausur (90 Minuten) ODER Kombinierte wissenschaftliche Arbeit
Hinweise zu Studien-/Prüfungsleistungen:	

Lehr/Lernmengen: Präsenzzeit in LV(en) des Moduls: 56 Stunden
Vor- und Nachbereitungszeit der LV(en): 28 Stunden
ggf. Erarbeitung von Studienleistungen: 0 Stunden
Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 66 Stunden
Workload insgesamt: 150 Stunden

Creditpoints: 5

Dauer und Häufigkeit des Angebots: Dauer: 1 Semester
Häufigkeit: i.d.R. jährlich im Sommersemester

Empfohlene Vorkenntnisse:

Sonstiges:

82004000 / Ma-DS-5

Storage and Mining of Massive Datasets

Storage and Mining of Massive Datasets

Modulverantwortliche/r:	Prof. Dr. Ulf Brefeld
Hauptamtlich Lehrende dieses Moduls:	Prof. Dr. Ulf Brefeld
Zu belegende Lehrveranstaltungen:	1 lecture (2 contact hours) and 1 exercise (2 contact hours)
Dieses Modul gehört zu folgenden Gebieten:	Masterprogramm Management (M.A./M.Sc.): Management & Data Science (2. Semester)
Inhalte:	This module deals with data base concepts RDBMS and NoSQL, and their practical implementations; preprocessing, reduction, analysis and mining of massive datasets; theory of MapReduce, typical applications and algorithms for diverse applications, e.g. link analysis, analysis of item sets, mining of data streams.
Fachkompetenz:	Professional knowledge: Knowledge of different database concepts and of how to handle and analyse huge amounts of data. Professional skills: Evaluation of appropriate software tools and techniques, practical experiences in dealing with databases.
Personale Kompetenz:	The students evaluate current developments in the field of analysis and storage of big data regarding their potentials, applications and risks. They are able to present and argue for their results.
Lehr- und Lernformen:	not specified
Prüfungsoptionen:	Klausur (90 Minuten) ODER Kombinierte wissenschaftliche Arbeit
Hinweise zu Studien-/Prüfungsleistungen:	1 written examination (90 min.) or 1 combined examination
Lehr/Lernmengen:	Präsenzzeit in LV(en) des Moduls: 56 Stunden Vor- und Nachbereitungszeit der LV(en): 28 Stunden ggf. Erarbeitung von Studienleistungen: 0 Stunden Prüfung: Erarbeitung/Vorbereitung sowie Prüfungsleistung(en): 66 Stunden Workload insgesamt: 150 Stunden
Creditpoints:	5
Dauer und Häufigkeit des Angebots:	Duration: 1 semester Frequency: once a year, in the summer term
Empfohlene Vorkenntnisse:	not specified

Sonstiges: