
ISM-COURSE HANDBOOK

M.SC. APPLIED BUSINESS DATA SCIENCE

VALID FOR STUDENTS STARTING FROM 1st MARCH 2022
(VERSION OF MARCH 2023)

ISM-COURSE HANDBOOK

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CURRICULUM

Full-time (4 semesters)

SEMESTER	1.	2.	3.	4.
BASIC SUBJECTS Self-regulated learning	Applied Statistics & Data Literacy M-STA	Innovation & Strategic Management M-LSM	Ethics & Law M-ETH	
ECTS	10	10	10	
SPECIALIZATION Self-regulated learning	Quantitative Methods in Information Systems M-ADS1	Advanced Applied Statistics M-ADS3	Elective: Essentials of Digital Communication M-DIM6	
ECTS	10	10		
SPECIALIZATION Live seminar run by a faculty member	Trends in Data Science M-ADS2	Applications in Data Science M-ADS4	or Policies & Trends in Sustainability M-SUS2	
ECTS	5	5	5	
SKILLS Live seminar run by a faculty member	Leadership M-SK1		Negotiation & Consulting M-SK3	
ECTS	5		5	
Projects		Digital Bootcamp M-SK2	Research & Consulting Project M-RCP	Master Thesis MAT
ECTS		5	10	30
TOTAL	30	30	30	30

Part-time (6 semesters)

SEMESTER	1.	2.	3.	4.	5.	6.
BASIC SUBJECTS Self-regulated learning	Applied Statistics & Data Literacy M-STA	Innovation & Strategic Management M-LSM		Ethics & Law M-ETH		
ECTS	10	10		10		
SPECIALIZATION Self-regulated learning		Quantitative Methods in Information Systems M-ADS1	Advanced Applied Statistics M-ADS3	Elective: Essentials of Digital Communication M-DIM6		
ECTS		10	10	or		
SPECIALIZATION Live seminar run by a faculty member	Trends in Data Science M-ADS2		Applications in Data Science M-ADS4	Policies & Trends in Sustainability M-SUS2		
ECTS	5		5	5		
SKILLS Live seminar run by a faculty member	Leadership M-SK1			Negotiation & Consulting M-SK3		
ECTS	5			5		
Projects			Digital Bootcamp M-SK2		Research & Consulting Project M-RCP and Masterthesis MAT	Master Thesis MAT
ECTS			5		10+10	20
TOTAL	20	20	20	20	20	20

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Part-time (8 semesters)

SEMESTER	1.	2.	3.	4.	5.	6.	7.	8.
BASIC SUBJECTS Self-regulated learning	Applied Statistics & Data Literacy M-STA		Innovation & Strategic Management M-LSM		Ethics & Law M-ETH			
ECTS	10		10		10			
SPECIALIZATION Self-regulated learning		Quantitative Methods in Information Systems M-ADS1		Advanced Applied Statistics M-ADS3		Elective: Essentials of Digital Communication M-DIM6		
ECTS		10		10		or		
SPECIALIZATION Live seminar run by a faculty member			Trends in Data Science M-ADS2		Applications in Data Science M-ADS4	Policies & Trends in Sustainability M-SUS2		
ECTS			5		5	5		
SKILLS Live seminar run by a faculty member	Leadership M-SK1			Negotiation & Consulting M-SK3				
ECTS	5			5				
Projects		Digital Bootcamp M-SK2				Research & Consulting Project M-RCP	Master Thesis MAT	
ECTS		5				10	30	
TOTAL	15	15	15	15	15	15	15	15

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MODULES

Advanced Applied Statistics

Module code	Semester	Duration	ECTS credits
M-ADS3	2	1 semester	10
Course type	Language	Intake	Workload
Compulsory	English	Ongoing	300 hours
1	Content The module provides a well-rounded introduction to advanced statistical methods which are necessary to extract knowledge from data. These comprise the following study units: Statistical Frameworks ▪ Probability theory ▪ Random variables / special Distributions ▪ Simulation (MC, bootstrap) ▪ Reporting suites ▪ Graphical representation of (multivariate / time series) data Multivariate Statistics ▪ Multiple linear / logistic regression ▪ Dimension reduction methods ▪ Classification ▪ Segmentation Inferential Statistics ▪ Hypotheses testing (1/2/>2 sample procedures) ▪ Parametric tests (e.g., t-test, One way/ two way ANOVA) ▪ Non-parametric tests (e.g., Chisquare/Binomial/Kruskal-Wallis/Friedman) ▪ Parameter estimation ▪ Methods of finding estimators ▪ Properties of estimators Time Series Analysis ▪ The decomposition model ▪ Describing and modeling the components (e.g., ACF, spectrum, ARMA) ▪ Forecasting All practical applications are based on the software R as well as SPSS. A thorough introduction is part of the module.		
2	Learning outcomes Successful students are able to skillfully apply appropriate methods in order to extract the desired insights from data. In particular, this means: ▪ understanding a business case and being able to make the appropriate transition to a statistical analysis scenario		

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	▪ producing good graphs that capture the essence of a data set with respect to a given claim and / or task ▪ finding relationships within data sets between variables and / or cases ▪ understanding and employing the statistical tools R as well as SPSS ▪ translating a statistical analysis into a proper hypotheses constellation ▪ choosing the correct hypothesis test as well as performing the test and interpreting the results correctly with respect to the hypotheses situation. ▪ finding appropriate models for a given data situation – multivariate as well as time series based ▪ being able to communicate these outcomes to potential stakeholders via presentations and / or reportings
3	Teaching and learning methods For the course units, students receive written study material that summarizes the essential content of the module. In addition, learning videos, which explain and deepen the content and illustrate it with examples, are provided on the learning platform. These materials are supplemented by practical examples, short case studies, exercises and review questions, which help students to monitor their learning success. In addition, the learning platform provides students with further information on supplementary written and audiovisual learning material as well as recommendations on the order in which the material should be worked on. Discussions and feedback also take place via the learning platform. All contents are didactically prepared in such a way that the students can work on them independently according to their individual timelines.
4	Prerequisites for participation Formal requirements: none Recommended prior knowledge: basic mathematical as well as statistical understanding, module “Applied Statistics & Data Literacy”
5	Combination with other study areas Applicability within the study course: module “Applications in Data Science” Applicability for other study courses: none
6	Type and duration of exam E-portfolio (case study with presentation)
7	Weight of the mark in the final grade 10/120
8	Literature Students can find references to current literature on the learning platform.

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Applications in Data Science

Module code M-ADS4	Semester 2	Duration 1 semester	ECTS credits 5
Course type Compulsory	Language English	Intake Winter semester / summer semester	Workload 150 hours
1	Content This module connects the acquired statistical as well as data techniques and skills to business-related, real-world problems. This will be achieved via the following study units: Recognition and Analysis Framework ▪ Verticals of the business value chain: how to create higher levels of efficiency and efficacy through data methods ▪ The data model / data warehouse as the basis for performing valid analyses ▪ Proper tools for performing valid analyses ▪ Understanding the different roles / players, i.e., stakeholder / owner vs. lead / analyst / reporter ▪ Appreciating the different process models (e.g., CRISP, SEMMA) to perform a useful and successful analysis ▪ Understanding the importance and the prominent role of the closed loop architecture idea: setting up, training, testing, evaluating Creating Added Value – applications in these areas along the value chain: ▪ Pre analyses – establishing the necessary cause and effect chains and demonstrating these (KPI / graphs) ▪ A/B testing – e.g. pricing, SERP analyses ▪ Pattern detection – analyzing and making use of pattern and seasonal relationships, e.g., in sales ▪ Cross- and up-sale scores as well as churn predictions ▪ Optimization / simulation – e.g., pricing, SEA bid management, SEO ▪ Lead management – finding segments as well as classifying objects, e.g., potential customers, correctly ▪ Creating scores / indexes – e.g., customer performance or success scores ▪ Recommendations / next best offer ▪ Association analysis ▪ KPI / reporting – communicating the results via ad hoc or standard reporting All concepts are embedded in real-life business value applications. SPSS, R and SQL are the tools used to perform the analyses.		

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2	Learning outcomes Successful students will appreciate the difference a thorough and targeted data analysis can make with respect to a business value chain. The particularities are: ▪ understanding the aims and goals of an analysis to help enhance the value chain. ▪ appreciating the necessary steps of a thorough pre analysis, i.e., defining the role of trigger and target variables as well as establishing and quantifying that relationship. ▪ achieving the ability to determine the correct statistical / data analysis as well as methods and tools to achieve the determined target and thus helping a particular stakeholder. ▪ becoming a statistical communicator to deliver the message properly and thus truly help the stakeholder by making him or her understand the value of the achieved outcome.
3	Teaching and learning methods The module draws from different learning and education tools: ▪ Synchronous lectures with group-based task assignments dealing with real-world business-related problems ▪ Invited guest speakers and insights into data-driven problems in the business world ▪ The students will follow a hands-on approach in accordance with constructivist concepts to learn and perform all the necessary steps to become a worthy contributor in the data science realm. ▪ Research and analysis tasks
4	Prerequisites for participation Formal requirements: none Recommended prior knowledge: basic mathematical as well as statistical understanding
5	Combination with other study areas Applicability within the study course: none Applicability for other study courses: none
6	Type and duration of exam E-portfolio (case study with presentation)
7	Weight of the mark in the final grade 5/120
8	Literature Students can find references to current literature on the learning platform.

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Applied Statistics & Data Literacy

Module code M-STA	Semester 1	Duration 1 semester	ECTS credits 10
Course type Compulsory	Language English	Intake Ongoing	Workload 300 hours
1	Content This module familiarizes students with common quantitative and qualitative methods and lays the foundation for the module “Advanced Applied Statistics”. The module covers methodological aspects of operationalization, data acquisition and processing, interpretation, and testing of theoretical assumptions. The relevant methods are reflected upon in a differentiated manner, and their application is discussed in relation to specific questions and hypotheses. The module introduces the concept of probability and discusses it in detail, especially with reference to relevant distributions. The theory of statistical tests is taught, and location and distribution tests are discussed, which form the basis of applied statistics. The selection and application of methods will be practiced in a hands-on fashion using case studies and programs like SPSS, PSPP or R. Students will learn how to conduct simple linear and multiple linear regression analyses, hierarchical cluster analyses and exploratory factor analyses. In addition, exercises cover the range of multivariate analysis techniques. A short overview of qualitative methods is also part of this module. Characteristics and quality criteria of qualitative methodology will be covered, and a comparison of quantitative and qualitative methods will be conducted. Another goal of the module is to teach subject-specific data literacy, i.e., the ability to use data in a planned manner as a basis for decisions, but also to question their significance. For this, it is necessary to be able to assess the quality of the data, as well as to consider its source and underlying motivations. Students learn not only to collect and manage data, but also to create appropriate visualizations, interpret them and put them into context. To support the application of what is learned, the module will work with specific case studies, e.g., on A/B testing, recommendations or churn analyses. In addition, students will work with freely available datasets (Open Data), such as those provided by the National Climatic Data Center (U.S. or global climate and weather datasets), Global Health Observatory-data by the WHO as well as repositories provided by academic institutions (e.g., UCLA) or statistical software packages (e.g., R) and use them, as a basis for secondary analyses, to create graphs or decision templates. In this context, students also discuss how Big Data could be used for decisions, e.g., in the area of personnel selection, and which ethical issues are current in this context (e.g., ethical blindness, informational self-determination, or transparency).		
2	Learning outcomes After working on this module, students know the basic methods of quantitative and qualitative data analyses. Students have further enhanced their data analysis and presentation capabilities as well as strengthened their competency to use data to answer questions and prepare decisions. They are able to perform complex statistical analyses using SPSS or Excel, e.g., in the fields of controlling, market research or sales. Students are able to select suitable		

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	empirical analysis methods on the basis of the specific advantages and disadvantages in each case in order to answer a specific research question. They can familiarize themselves with complex research questions and create an adequate research design. Students can collect and evaluate data systematically and in a methodically sound manner as well as interpret and evaluate it with reference to scientific and application-oriented aspects. They know how to carry out largely self-directed research or application-oriented projects and independently develop the necessary knowledge and select adequate methods. They can structure complex issues and deal with them creatively and innovatively. Students are also able to present their complex problem sets in a structured, concise, clear, and correct language, discuss their conclusions with experts, and make an active contribution to research and science.
3	Teaching and learning methods For the learning units, students receive a commented reading list with mandatory literature or media, they have to work on. In addition, learning videos are provided, which explain and deepen the content and illustrate it with examples. This material is supplemented by practical examples, short case studies, exercises and review questions, which serve to check the students' learning success. In addition, students will find further references to supplementary written and audiovisual learning, as well as recommendations on the order in which the material should be worked on. All contents are didactically prepared in such a way that the students can work on them independently.
4	Prerequisites for participation Formal requirements: none. Recommended prior knowledge: none.
5	Combination with other study areas Applicability within the study course: module „Advanced Applied Statistics“ Applicability for other study courses: none
6	Type and duration of exam Written exam (120 minutes)
7	Weight of the mark in the final grade 10/120
8	Literature Students can find references to supplementary material on the learning platform.

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Digital Bootcamp

Module code M-SK2	Semester 2	Duration 1 semester	ECTS credits 5
Course type Compulsory	Language English	Intake Ongoing	Workload 150 hours
1	Content The module “Digital Bootcamp” provides an introduction and an overview of the current state of the art of digital technologies and their application in a business environment. The students get a better understanding of the possibilities, but also the limitations, of digital technologies through a hands-on approach combined with theoretical inputs. The module also discusses economic basics of digital technologies and how digitalization influences business models and value chains. Students get insights into the fundamentals of computational thinking and into understanding and designing algorithms. Students also learn how to implement agile project management. They understand the background and origins of software development, Scrum and Kanban as prominent methods, their application in non-software environments and software tools to support agile project management. During their work in virtual teams the students cover current aspects of digital technologies and their application for business, e.g., developing a smartphone app using a visual programming language such as Scratch or a programming environment such as MIT App Inventor, using process mining tools to analyze business process data in order to discover inefficient or non-compliant process variants, using robotic process automation to automate tasks that are repetitive, manual, time-intensive or error-prone when performed by humans.		
2	Learning outcomes Having completed the module, students will have an in-depth understanding of the possibilities associated with digital technologies as well as their limitations. They will be able to use computational thinking to frame questions, look at different ways to solve problems, evaluate these ways and select the most appropriate way to solve a problem. They will also have applied agile project management methods to the group project they’ve been working on, including collaboration tools to facilitate coordinating their geographically distributed teams. In particular, they will gain profound knowledge of the subject (e.g., process mining, robotic process automation) covered in the specific iteration of the bootcamp they were part of. Regarding this subject, they will gain hands-on experience with current IT tools and methods to solve real-world problems. Having presented their results and having discussed their solutions and the solutions of their peers, they will also be able to critically assess different approaches to solving a problem and to defend their own approach within multidisciplinary teams.		
3	Teaching and learning methods This module is a synchronous seminar-based course, which takes place as a virtual hackathon, where the students work together in virtual teams. The goal is to collaborate to solve a larger problem with limited time, using the well-known format of a hackathon. Only that in this case the hackathon is virtual, and thus, the teams do not meet in person. The problems		

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	or cases that are to be solved are submitted by the students themselves or in cooperation with partners from the field. In preparation for the hackathon, (digital) reading recommendations are provided with additional references to supporting material like videos, case studies, empirical papers or essays, which prepare them for the problem they have to solve during the hackathon.
4	Prerequisites for participation Formal requirements: none Recommended prior knowledge: in the module, students use the subject-specific content already learned to solve specific problems from the field and to develop ideas for digital products and services.
5	Combination with other study areas Applicability within the study course: "Research & Consulting Project", "Masterthesis" Applicability for other study courses: compulsory for the study programs "Digital Marketing Management", "Sustainability Management", "Medien- & Kommunikationspsychologie", and "Applied Business Data Science".
6	Type and duration of exam E-portfolio
7	Weight of the mark in the final grade 5/120
8	Literature Students can find references to supplementary material on the learning platform.

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Essentials of Digital Communication

Module code M-DIM6	Semester 3	Duration 1 semester	ECTS credits 5
Course type Elective	Language English	Intake Ongoing	Workload 150 hours
1	Content The module “Essentials of Digital Communication” provides a basic overview of the various communication approaches for reaching customer target groups via digital channels. To this end, current developments in social media and digital communication are examined and special communication knowledge on storytelling and content marketing is taught. One focus of the module is on social media management and community management. The module covers the approach and content of building and retaining a fan base online (e.g., through vlogs, blogs, Snapchat, Instagram, Facebook, etc.). The different channels in social media as well as their fit for different objectives are highlighted. Furthermore, it is discussed that simply using the channels is not sufficient to achieve effective communication. In order to be successful, companies must build, manage and – eventually – leverage digital communities. In addition, the topic of influencer marketing is addressed and the design and steps of influencer marketing from a company's perspective are discussed. Successful influencer marketing must be strategically planned. Accordingly, the module addresses, on the one hand, the question of what theoretical explanations exist for influencer marketing and in which circumstances influencer marketing works. On the other hand, the module examines the different types of influencers and how companies can select suitable influencers. Aspects of budgeting, campaign design, and success control also play a role. Finally, the module addresses the basics and success factors of integrated communication and the role of storytelling for successful (online) communication campaigns.		
2	Learning outcomes After successful completion of the module, students have basic knowledge in the field of digital communication. Students will be familiar with theories, rules, and principles in the area of digital communication management, particularly in social media. They know how to plan, design, and implement integrated communication campaigns. Students learn to explore strategic communication problems in an online context, to evaluate and assess them from a company and market perspective, and to arrive at an integrated coordination and control of digital communication instruments. Students develop skills regarding the analysis and assessment of options for the design and implementation of digital marketing communication.		
3	Teaching and learning methods For the course units, students receive written study material that summarizes the essential content of the module. In addition, learning videos, which explain and deepen the content and illustrate it with examples, are provided on the learning platform. These materials are supplemented by practical examples, short case studies, exercises and review questions, which help students to monitor their learning success. In addition, the learning platform provides students with further information on supplementary written and audiovisual learning material as well as recommendations on the order in which the material should be worked		

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	on. Discussions and feedback also take place via the learning platform. All contents are didactically prepared in such a way that the students can work on them independently according to their individual timelines and on the location of their choosing.
4	Prerequisites for participation Formal requirements: none Recommended prior knowledge: none
5	Combination with other study areas Applicability in the study course: The module adds an interdisciplinary perspective to the study program and addresses the relationship between the subject-specific content and the topic of digital communication. Applicability to other degree programs: none
6	Type and duration of exam Term paper (3,500 to 5,000 words)
7	Weight of the mark in the final grade 5/120
8	Literature Students can find references to current literature on the learning platform.

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Ethics & Law

Module code M-ETH	Semester 3	Duration 1 semester	ECTS credits 10
Course type Compulsory	Language English	Intake Ongoing	Workload 300 hours
1	Content This module deals with the theory and practice of corporate governance and corporate social responsibility (CSR), with a special focus on standards and principles for ethics-based, sustainable business strategies. Conditions, theories, standards, and applications of ethical and sustainable business behavior are discussed. This module also provides basic knowledge and expertise on international business law. In the first part of the module, analysis and implementation of ethical business decisions as well as the benefits and challenges of moral action in the national and international context are main focuses. On a theoretical economic basis, a business ethics concept is developed, critically examined and the application spectrum illustrated. Students will learn to apply different ethical theories and concepts and to illustrate humanistic principles of good leadership. The main focus is on moral challenges and how to overcome them to be a corporate citizen in the national and global context. Governance problems will be analyzed based on various theoretical backgrounds, including the theory of incomplete contracts and business networks as well as the stakeholder approach. Possible information, monitoring, and decision rights for stakeholders will be considered to achieve sustainable value creation and fair value distribution. The second part of the module gives an overview of the legal issues arising in national and international legal transactions and focuses on adequate methodologies to approach them. The students learn the basics of commercial and corporate law, e.g., permissible forms of organization of companies, their formation, and termination, as well as their permissible internal structure, in particular the formation of wills and the relationship of the partners with each other. Students also get an overview of the legal systems of the world, in particular the European continental legal systems (Civil Law) and the Common Law systems with a focus on the United Kingdom and the USA. The international legal framework defined by International Public Law and various supra-national organizations, such as the UN, WTO and EU is also addressed in this module. In addition, the module will introduce basic knowledge about compliance strategies. The students will learn methods to build compliance programs as well as relevant aspects of such programs like compliance standards and procedures or a culture of compliance. The role of privacy requirements and the relevant regulations regarding data protection (e.g., General Data Protection Regulation) will also be addressed in this module.		
2	Learning outcomes After completing the module, students know basic ethical concepts as they apply to business and are aware of the expectations and perceptions of a company's stakeholders and social environment. They can make prudent business decisions in the face of uncertainty that consider ethical social, regulatory and legal requirements. They can reflect and compare different points of view in virtual groups and present their positions, discuss them critically and		

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	defend them. Students are capable of transferring complex theoretical input to practical examples and problem sets. Students are also aware of the legal rules influencing the activities of organizations. They are capable of defining legal approaches to solve national and international cases and corresponding (legal) conflicts. They have learned to analyze, discuss, and elaborate case studies autonomously or jointly in teams and are able to represent their ideas and opinions as well as their elaborated results in front of the class. Students are aware of the relevance of data privacy in numerous areas and are able to implement data protection requirements in practice.
3	Teaching and learning methods For the learning units, students receive a commented reading list with mandatory literature or media, they have to work on. In addition, learning videos are provided, which explain and deepen the content and illustrate it with examples. This material is supplemented by practical examples, short case studies, exercises and review questions, which serve to check the students' learning success. In addition, students will find further references to supplementary written and audiovisual learning, as well as recommendations on the order in which the material should be worked on. All contents are didactically prepared in such a way that the students can work on them independently.
4	Prerequisites for participation Formal requirements: none. Recommended prior knowledge: student should have basic knowledge about management strategies and leadership within organizations.
5	Combination with other study areas Applicability within the study course: The content of the module strengthens students' awareness for ethical and legal issues that are relevant for managing companies and organizations and also relates to the module „Negotiation & Consulting“. Applicability for other study courses: compulsory for the study programs “Digital Marketing Management”, “Sustainability Management”, “Medien- & Kommunikationspsychologie” and “Applied Business Data Science”.
6	Type and duration of exam Written exam (120 minutes)
7	Weight of the mark in the final grade 10/120
8	Literature Students can find references to supplementary material on the learning platform.

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Innovation & Strategic Management

Module code M-ISM	Semester 2	Duration 1 semester	ECTS credits 10
Course type Compulsory	Language English	Intake Ongoing	Workload 300 hours
1	Content Strategic management continuously analyses, develops and implements corporate goals considering diverse methods and processes. Its future-orientation forces strategic management to acknowledge the fundamental unknowability of the future. Strategy needs to be culturally and contextually bound, i.e., be aware of the social, cultural and political conditions. The course provides detailed coverage of the practical implications of strategy tools in the real world and a coherent overview of the established ‘classics’ of strategic management, while taking an innovative approach to contemporary issues such as power and politics, ethics, globalization, and sustainability. This module focuses on practicing and integrating cross-linked knowledge with profound methodical, conceptual, and social competencies. It enables students to analyze the efficiency and effectiveness of processes and functions along a corporate value chain as well as the overall corporate performance. The aim is to teach students how to develop concepts and strategies, to monitor and coordinate their implementation, and to optimize organization in a complex environment through well-founded decisions. The module provides culturalist and critical perspectives with the goal to reconstruct strategies as cultural offerings to society and understand how strategic management can challenge established ideas, business models, and power structures. This module also discusses concepts and methods that identify and explore business potential in order to further elaborate and sustain performance, and it provides a wide range of tools for planning and managing corporate growth processes systematically. In addition, this module addresses digitization and its impact on business models, as well as concepts and scenarios for work design, on an organizational and individual level. How and in which format can innovative, flexible, and convertible structures be designed? Which innovative organizational models are adequate and feasible? To sustain international competitiveness, the idea of motivating employees to think and act entrepreneurial and to move continuously towards an agile startup-structure is discussed. The role of corporate culture, leadership and its strategic relevance, especially in situations of transformation from classic, traditional work structures to new work concepts, will also be covered.		
2	Learning outcomes Students understand uncertainty and ambiguity as starting points for strategy formulation and know how to apply theories dealing with these phenomena for strategic management and leadership. The goal of this module is to enable students to analyze corporate challenges and reflect their own leadership and management decisions. Students can develop relevant business strategies for enterprises and know the challenges and pitfalls in strategy implementation within a global organization. They can identify key success factors of business development and sustainability – from the strategic as well as		

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	operational perspective. They are also capable of evaluating theoretical models and strategies in relation to their impact of and relevance for current decision situations. Students work on their problem-solving skills, learn how to manage complexity, and understand that corporate decision-making is affected by multiple variables. They will be familiar with solving problems from a holistic perspective, are able to synthesize conflicting theories, and apply them to real-world-issues. Students will be aware of their role and show entrepreneurial spirit when developing, implementing, and controlling business concepts in the company as well as in consulting services.
3	Teaching and learning methods For the learning units, students receive a commented reading list with mandatory literature or media, they have to work through. In addition, learning videos are provided, which explain and deepen the content and illustrate it with examples. This material is supplemented by practical examples, short case studies, exercises and review questions, which serve to check the students' learning success. In addition, students will find further references to supplementary written and audiovisual learning, as well as recommendations on the order in which the material should be worked on. All contents are didactically prepared in such a way that the students can work on them independently.
4	Prerequisites for participation Formal requirements: none. Recommended prior knowledge: student should have basic knowledge about management strategies and leadership within organizations. They should also have visited the specialization modules from the first semester to apply the concepts and methods they learn in this module to cases from their field of study.
5	Combination with other study areas Applicability within the study course: module "Negotiation & Consulting" Applicability for other study courses: compulsory for the study programs "Digital Marketing Management", "Sustainability Management", "Medien- & Kommunikationspsychologie" and "Applied Business Data Science".
6	Type and duration of exam Term paper (3,500 to 5,000 words)
7	Weight of the mark in the final grade 10/120
8	Literature Students can find references to supplementary material on the learning platform.

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Leadership

Module code M-SK1	Semester 1	Duration 1 semester	ECTS credits 5
Course type Compulsory	Language English	Intake Winter semester / summer semester	Workload 150 hours
1	Content The module „Leadership“ addresses the full range of leadership styles and methods, from pre-modern power structures to modern leadership styles, to post-modern leadership methods in agile and self-organizing settings. The students will learn about and reflect on the development of power and leadership structures over the course of societal and economic development. They will deepen their prior understanding of how the coordination of human work has changed over the last centuries, starting with monarchic and feudal structures (e.g., “Machiavelli”), to the industrial revolution (e.g., “Taylorism”), to traditional 20th century management styles (e.g., “Management by Objectives”), ending with modern (e.g., “Servant Leadership”) and post-modern leadership styles (e.g., “Holocracy”). It will be discussed how the different styles are influenced and shaped by societal developments, as well as internal (e.g., ownership structure) and external forces (e.g., technological advancements) of an organization. Via experiential learning, reflection, and synthesizing, students will gain first-hand experience on leading and being led via different leadership styles. That way, additionally to expanding students’ knowledge base, throughout different assignments, the course will help students to evaluate what it “feels like” to be led by an emperor, to be assigned tasks by a superior, or to manage a project via self-organization without a formal hierarchy. Additionally, the course will help to assess the ethical foundations of different leadership styles and their respective use in organizations. As different leadership styles are shaped by different views on human nature and the nature of business, apart from broadening students’ scientific knowledge base, an important goal of the course is to help students develop their own perspective on leadership for the time when they will take on a management role in different organizations later in their lives.		
2	Learning outcomes Upon completion of this course, students will command excellent theoretical knowledge of the full gamut of leadership styles and settings, ranging from pre-modern power structures (e.g., Feudalism), traditional styles such as “Scientific Management” (Taylorism) and “Command & Control”, to modern styles such as “Management by Objectives” and “Transformational Leadership”, up to post-modern styles such as “OKR”, “Servant Leadership” and coordination via different agile methods and self-organization. Students will be able to contrast and appraise the nature, the premises, and the potential benefits of these different theories and frameworks. Students will know how to discern and interpret the historic and economic context, the pre-supposed mechanics, and the upsides and downsides of the different leadership styles. They will also be able to assess why different organizations adopt different styles over time – and explain why the different styles can be equally successful given different entrepreneurial strategies and market environments.		

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	Additionally, upon completion of readings, group exercises, and reflection of the latter, students will have gained first-hand experience of the different leadership styles' qualia – what it “feels like” to lead and be led via these different modes of leadership. This also includes an advanced comprehension, in theory and practice, of the ethical dimension of the relationship between leaders, followers, and the respective organizational setting. Ultimately, the goal is to assist students in designing and refining their own leadership stance and style.
3	Teaching and learning methods This module is a synchronous seminar-based course, which takes place on fixed times (12 × 90 min) in a virtual classroom. The lecturers provide the content structure of the seminar, prepare short introductory lessons, invite guests, bring in practical questions or set specific tasks. A digital semester apparatus with (digital) reading recommendations is provided for the courses with additional references to supporting material like videos, case studies, empirical papers or essays. The students work on the contents together, actively contribute and discuss the main ideas. Students are expected to make independent contributions, e.g., by actively participating in a discussion, summarizing papers, writing short essays, or giving presentations.
4	Prerequisites for participation Formal requirements: none Recommended prior knowledge: ideally, participants will have some prior leadership experience, e.g., from managing projects in a business environment, or university projects etc.
5	Combination with other study areas Applicability within the study course: none Applicability for other study courses: compulsory for the study programs “Digital Marketing Management”, “Sustainability Management”, “Medien- & Kommunikationspsychologie”, and “Applied Business Data Science”.
6	Type and duration of exam E-Portfolio
7	Weight of the mark in the final grade 5/120
8	Literature Students can find references to supplementary material in the learning platform.

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Negotiation & Consulting

Module code M-SK3	Semester 3	Duration 1 semester	ECTS credits 5
Course type Compulsory	Language English	Intake Ongoing	Workload 150 hours
1	Content This module deals with both traditional and current methods of strategy, and organizational and process consulting. The bandwidth ranges from external and internal strategic analysis to strategy formulation and strategic options at the levels of the business area and the overall company. Furthermore, instruments for increasing effectiveness and efficiency in operational and organizational structures will be discussed. More recent methods such as innovation management will also be examined and applied as part of the module. Students learn the basic principles of the acquisition, coordination, and management processes of internal and external consulting projects. They learn to take on the different roles within a project team and have advance knowledge about project communication and project controlling. Team building, group dynamics, and client relationship management approaches are also important topics of this module. In addition, this module conveys the wide range of interpersonal communication skills within as well as outside the company. Concepts, models, and strategies for team, management, and crisis communication are presented, the relationship between goal-oriented, cross-cultural and ethical interaction premises and their integration techniques are discussed, techniques for consensual persuasion results are shown. Structure, techniques, and practice of presentations, including the different possibilities to use them in meetings and strategies to adapt them to an intercultural context by modifying the words, images and gestures are discussed. Students also learn about fundamentals of adequate story lining and presentation design. They also discuss and extend their knowledge on scientific methods for scientifically robust problem-solving, e.g., techniques for structuring empirical studies and their line of argument and scientific research approaches.		
2	Learning outcomes After attending the module, students are familiar with different methods of organizational and process consulting and they are able to apply them in various situations. They develop their own understanding of roles in the consulting process and apply it in an authentic fashion. They understand how scientific methods can be used to solve problems from the field and how a project should be set up to be successful. Students know how to prepare professional presentations and deliver them in front of customers, team members or management boards with the goal to present their positions, discuss them critically and defend them. Students understand how decision-making processes within teams work and know about the influence of group dynamics. Students can deal with conflicts, reflect and compare different points of view in groups and organizations. In addition, they can reflect on the progress of a project.		

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3	Teaching and learning methods This module is a synchronous seminar-based course, which takes place at fixed time slots (12 × 90 min) in a virtual classroom. The lecturers provide the content structure of the seminar, prepare short introductory lessons, invite guests, bring in practical questions or set specific tasks. A digital semester apparatus with (digital) reading recommendations is provided with additional references to supporting material like videos, case studies, empirical papers or essays. The students work on the contents together, actively contribute and discuss the main ideas. Students are expected to make independent contributions, e.g., by actively participating in a discussion, summarizing papers, writing short essays, or giving presentations.
4	Prerequisites for participation Formal requirements: none Recommended prior knowledge: the student should have advanced knowledge about decision processes within teams and organizations and about methods and theories of strategic management (module “Innovation & Strategic Management”).
5	Combination with other study areas Applicability within the study course: the module imparts interdisciplinary skills, that will be applied repeatedly throughout the study course, e.g., within case studies, group discussions or other tasks that demand intercultural competencies, communication skills as well as a well-developed sense for ethically relevant issues. The methods and skills the students learn in this module will be strengthened in the module “Research & Consulting Project”. Applicability for other study courses: compulsory for the study programs “Digital Marketing Management”, “Sustainability Management”, “Medien- & Kommunikationspsychologie”, and “Applied Business Data Science”.
6	Type and duration of exam E-portfolio
7	Weight of the mark in the final grade 5/120
8	Literature Students can find references to supplementary material on the learning platform.

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Master Thesis

Module code MAT	Semester 4	Duration 22 weeks / 33 weeks / 44 weeks (depending on full-time or part-time)	ECTS credits 30
Course type Compulsory	Language English	Intake Ongoing	Workload 900 hours
1	Content The aim of the master thesis is to prove the ability to work autonomously on a scientific problem set from the field of Applied Business Data Science and to develop a scientifically and methodologically robust solution. The topic of this written thesis has to be related to one of the various areas that are part of the study course. It is intended to show that the student is capable of autonomously and consistently working on a quantitative/qualitative and practice-oriented problem set within a given timeframe. The focus should be set on discipline-specific details and the interdisciplinary context applying scientific theories and methodologies as well as practice-oriented tools and concepts. The subject and methodological competencies acquired in the study course should be applied in a targeted manner. The student has to collect, analyze, and interpret relevant data autonomously — using the acquired competencies to select suitable empirical methods and applying them professionally. The ideal procedure for the preparation of the master thesis is as follows: ▪ Topic identification and specification ▪ Definition of the research question, title, (rough) structure, scheduling and research design together with the first supervisor ▪ Identification and analysis of relevant theoretical contexts and independent literature research on state-of-the-art knowledge as well as related work ▪ Logical structuring of the thesis ▪ Methodological handling of the question (of quantitative and/or qualitative nature) ▪ Documentation of the study and its results according to the instructions (e.g., formal requirements of the ISM or APA guidelines)		
2	Learning outcomes The students deepen their professional competencies for the preparation of scientific papers and are able to familiarize themselves with complex research questions and create an adequate research design. They can conduct critical reviews, perform a comprehensive literature/evidence search, and select application-oriented theories and methods in a meaningful way to answer their research questions. Students can collect and evaluate data systematically and in a methodically sound manner as well as interpret and evaluate them with reference to scientific and application-oriented aspects. They can classify results in the context of the discussion on the current state of research, derive practical implications, develop implications, and assess limitations based on the chosen research approach. Students can carry out largely self-directed research or application-oriented projects and independently develop the necessary knowledge and select adequate methods. They prove their ability to find solutions to specific economic problems from science and practice. They can structure complex issues and deal with them creatively and innovatively. Students can		

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	also present their complex problem sets in a structured, argumentative, clear, and correct language, discuss their conclusions with experts, and make an active contribution to research and science.
3	Teaching and learning methods The master thesis is an independently written work that answers a relevant question from the field using scientific methods. Students receive written study material that summarizes methodological instructions for writing a master thesis and serves as a guideline for the preparation of the thesis. In addition, students should participate in an accompanying live seminar that supports them with further information about scientific writing and methodological issues and enables discussion, feedback, and reflection on their master thesis with their peers. Students have to attend at least two individual appointments with a supervising professor to discuss their topic and their methodical approach.
4	Prerequisites for participation Formal requirements: students can attend the module "Master Thesis" if at least 60 ECTS credits have been earned (see Examination Regulations § 20). Recommended prior knowledge: students have already completed the subjects specific to the study course and are familiar with the basic theories, models, and approaches of the field of study. In addition, they have completed the module "Applied Statistics & Data Literacy" and have knowledge in the field of statistics.
5	Combination with other study areas Applicability within the study course: students should attend the module at the end of a study course to integrate previously learned methods and theories. The students use the acquired knowledge to answer a practice-relevant question in a well-founded way. Applicability for other study courses: none.
6	Type and duration of exam To pass the module, students must have presented an exposé of their master thesis in one of the accompanying live seminar sessions. The module concludes with a written master's thesis, which is assessed and graded by two lecturers. Further details are regulated by the examination regulations.
7	Weight of the mark in the final grade 30/120
8	Literature Students can find references to supplementary material on the learning platform.

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Policies & Trends in Sustainability

Module code M-SUS2	Semester 3	Duration 1 semester	ECTS credits 5
Course type Elective	Language English	Intake Winter semester / summer semester	Workload 150 hours
1	Content The module “Policies & Trends in Sustainability” focuses on central global challenges and mega-trends of sustainability. Specific policy fields include climate change, energy transition, biodiversity loss, global equity, and challenges to democratic governance. Climate change is understood as the central social, political, ecological and economic challenge for decision makers in politics and business. Connected to climate change are questions of energy supply, agriculture, mobility, consumption, migration and global security. Regarding energy transition, this module highlights the global shift towards a renewable energy system and its benefits, especially for emerging and developing countries but also for collaboration between high- and low-income countries. Biodiversity will be understood in connection to industrialized agriculture and food systems but also in relation to an increased ecological footprint of human consumptive activities in general. The emergence of global pandemics can also be connected to a loss in biodiversity. Sustainability, however, is not only an ecological issue but also a global social issue when it comes to energy security, climate justice, and income distribution. All these political challenges will be understood by exploring global mega-trends like urbanization, neo-ecology, mobility, connectivity and digitization, as well as the demographic changes visible across the globe.		
2	Learning outcomes After attending the module, students will understand the major policy challenges in the field of sustainability. They are able to give practical examples of solutions to these challenges from a macro-perspective. They will have acquired in-depth knowledge about the various mega-trends shaping the notion of sustainability today as well as their relevance for the economic process. They can evaluate different global and national sustainable policies and understand their impacts on the micro-level of business. Students are then able to contribute to current economic and political debates about sustainability in a constructive and innovative manner.		
3	Teaching and learning methods This module is a synchronous seminar-based course, which takes place on fixed times (12 × 90 min) in a virtual classroom. The lecturers provide the content structure of the seminar, prepare short introductory lessons, invite guests, bring in practical questions or set specific tasks. A digital semester apparatus with (digital) reading recommendations is provided for the courses with additional references to supporting material like videos, case studies, empirical papers or essays. The students work on the contents together, actively contribute and discuss the main ideas. Students are expected to make independent contributions, e.g., by actively participating in a discussion, summarizing papers, writing short essays, or giving presentations.		

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4	Prerequisites for participation Formal requirements: none Recommended prior knowledge: none
5	Combination with other study areas Applicability within the study course: The module expands knowledge about policies, trends and current issues concerning sustainability. It forms a practical and policy-oriented companion to the more theoretical and conceptual module “Global Sustainable Development”. Applicability for other study courses: M.Sc. Applied Business Data Science, M.A. Digital Marketing Management
6	Type and duration of exam E-Portfolio
7	Weight of the mark in the final grade 5/120
8	Literature Students can find references to current literature on the learning platform.

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Quantitative Methods in Information System

Module code M-ADS1	Semester 1	Duration 1 semester	ECTS credits 10
Course type Compulsory	Language English	Intake Ongoing	Workload 300 hours
1	Content The module provides an extensive overview to data-driven and quantitative analysis procedures valid for the description, improvement and prediction of business questions. The automation of processes and integration of databases (such as ERP systems) are trained in different case scenarios. Furthermore, the module provides a deep understanding of mathematics that enables the swift adoption of the most recent technology changes. The module is comprised of the following major units: Applied Mathematics ▪ Logic ▪ Linear algebra ▪ Numerical analysis ▪ Optimization theory (linear and nonlinear) ▪ Algorithmic structures (in Python) Relational Databases ▪ Database Management ▪ SQL (MariaDB/MySQL) ▪ Data modeling and operational integration ▪ Modern alternatives (NoSQL) ERP Systems ▪ Importance of ERP systems for the operational and strategic business ▪ Typical system providers and niche solutions ▪ Transactions of ERP modules (e.g., logistics or production) for horizontal integration ▪ Usage of the software class to support strategic business decisions (e.g. vertical integration) ▪ Specifics of ERP systems in the software lifecycle (e.g., requirements, test and maintenance) ▪ Development trends and alternatives for ERP architectures (e.g., cloud approaches) Simulation & Forecasting Methods ▪ Simulation: approaches for modelling business problems, Computational solutions, scenario and sensitivity analysis, Monte Carlo method ▪ Forecasting: short term forecasts (single/double/triple exponential smoothing), Long term forecasts (GARCH models) Robotic Process Automation (RPA) ▪ Rule-based data manipulation ▪ Bots ▪ Web scraping tools ▪ Textmining ▪ Sentiment analysis		

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	Application example: robo-advisory Practical applications are based on Excel, VBA, Python, SQL and SAP. A thorough introduction is part of the module.
2	Learning outcomes Successful students are able to support IT transformation processes by - offering a broad portfolio of quantitative knowhow - creating abstract models of commercial problems - evaluating computational procedures with respect to suitability, complexity and performance - engineering requirements for database systems and implementing the process of data organization - designing solution processes of complex business questions - applying quantitative simulations and optimizations - identifying potentials for automation of processes and implementing analysis procedures
3	Teaching and learning methods For the course units, students receive written study material that summarizes the essential content of the module. In addition, learning videos, which explain and deepen the content and illustrate it with examples, are provided on the learning platform. These materials are supplemented by practical examples, short case studies, exercises and review questions, which help students to monitor their learning success. In addition, the learning platform provides students with further information on supplementary written and audiovisual learning material as well as recommendations on the order in which the material should be worked on. Discussions and feedback also take place via the learning platform. All contents are didactically prepared in such a way that the students can work on them independently according to their individual timelines.
4	Prerequisites for participation Formal requirements: none Recommended prior knowledge: basic mathematical as well as statistical understanding
5	Combination with other study areas Applicability within the study course: "Trends in Data Science", "Research & Consulting Project", "Master Thesis" Applicability for other study courses: none
6	Type and duration of exam E-Portfolio: Course accompanying exercises that need to be solved and handed in.
7	Weight of the mark in the final grade 10/120
8	Literature Students can find references to supplementary material on the learning platform.

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Research & Consulting Project

Module code M-RCP	Semester 3	Duration 1 semester	ECTS credits 10
Course type Compulsory	Language English	Intake Ongoing	Workload 300 hours
1	Content In this module, students gather (first hand) professional/management experience by working on real-world business problems and challenges that are common for business consultants. In the theoretical part, they are equipped with all relevant analytical methods and tools. In the project part, students work in teams on a real problem set from a corporate business partner — using different analytical and empirical methodologies for quantitative and qualitative data collection and evaluation – and receive direct feedback from the lecturer as well as the client in the course of several presentation rounds. The theoretical part of the module has the goal to equip students with the relevant tools and methods as well as an understanding of the overall scientific, empirical and structured approach towards problem sets — in theory and practice. Therefore, this course has two focal points: In the first part of the course, students gain an in-depth understanding of the acquisition, coordination, and management processes of consulting projects. They can transfer the methods of project management to the consulting business and balance the trilemma between quality, cost, and time constraints — always having customers' requirements in mind. In the project part the task of the students is to apply the methods they studied in the theoretical part during their work on a real consulting project and to develop a customer-oriented solution. The students will meet the business partner and receive the business challenge to be solved during a kick-off meeting at the beginning of the semester. Alternatively, they receive a comprehensive business case that they have to solve. They need to employ different forms of field research (qualitative and quantitative) and use methods and tools in a real-world business context. They learn how to approach, structure, and solve new and unknown challenges. During the consulting project, students apply the methodological knowledge they have gained from various lectures and practical experience. They strengthen their social and personal skills and develop an understanding for the consultant role. They know how to talk responsibility in teams, set targets, structure and carry out a consulting project. In addition, they train their problem-solving competency by applying analytical methods and theories in real life.		
2	Learning outcomes After attending the module, the students have gained a solid understanding of scientific methods and problem-solving and have deepened their knowledge on hypotheses building, target setting, strategy development, implementation, controlling, and presentation of consulting projects. They can analyze complex business problem sets and develop customer-oriented solutions. In addition, students get realistic insights into the business life of a consultant. Students can apply scientific and theoretical concepts, methods, and tools in a realistic consulting setting and are capable of assessing, monitoring, and reporting the project progress and introduce corrective action if required. Students can prepare and deliver pro-		

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	fessional presentations using video-conferencing tools. They actively contribute to the decision-making processes within the consulting team and learn how to handle group dynamics in a virtual setting. Students can reflect their individual as well as their group performance critically. Students learn how to interact with customers.
3	Teaching and learning methods This module is a synchronous seminar-based course that takes place on fixed times (12 × 90 min) in a virtual classroom (theoretical part). A digital semester apparatus with (digital) reading recommendations is provided for the course with additional references to supporting material like videos, case studies, empirical papers or essays that support them to solve the case. For the project part, the lecturers provide (if necessary, in cooperation with a partner from the field) a business case that relates to the learning content of the chosen course of study and can be dealt with using the methods learned during the course. The students work on this problem independently in virtual teams and prepare a presentation with the methods the used, results or data that support their recommendation and further information about the solution. Via the learning platform, students are given the opportunity to collaborate and exchange ideas. They use a virtual classroom for regular exchanges with the lecturer and the other members of the team. Here, the progress of the project is reflected upon. The lecturer gives feedback and supports the team by answering questions.
4	Prerequisites for participation Formal requirements: none. Recommended prior knowledge: students have already acquired in-depth knowledge of the theories, methods, and concepts relevant to their chosen course of study and can apply these to a new problem.
5	Combination with other study areas Applicability within the study course: Masterthesis Applicability for other study courses: compulsory for the study programs “Digital Marketing Management”, “Sustainability Management”, “Medien- & Kommunikationspsychologie”, and “Applied Business Data Science”.
6	Type and duration of exam Term paper (3,500 to 5,000 words)
7	Weight of the mark in the final grade 10/120
8	Literature Students can find references to supplementary material on the learning platform.

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Trends in Data Science

Module code M-ADS2	Semester 1	Duration 1 semester	ECTS credits 5
Course type Compulsory	Language English	Intake Winter semester / summer semester	Workload 150 hours
1	Content The module covers current state-of-the-art aspects of data-driven analysis, such as statistical learning methods, in their theoretical design as well as in their practical real-world application. Applied Optimization Theory ▪ Dual optimization theory ▪ Multivariate differential calculus ▪ Karush-Kuhn-Tucker conditions ▪ Non-linear optimization via numerical methods (Advanced Newton Methods) ▪ Optimization solvers in Python ▪ Visualization of solver solutions, transparency and sensitivity analysis ▪ Interpretation of statistical results Machine Learning & Artificial Intelligence Techniques: ▪ Artificial neural networks (ANN) ▪ Multi-layer ANNs and deep learning methods ▪ Operating principle and application fields (e.g. backpropagation algorithm) ▪ Decision tree learning ▪ Dynamic programming (e.g. recursive algorithms, evolutionary algorithms) ▪ Statistically focused procedures (e.g. Monte Carlo methods, inductive learning) ▪ Reinforcement learning (e.g. temporal difference learning, gradient method) ▪ Supervised vs. unsupervised learning ▪ Model evaluation and choice (e.g. considering advantages vs. disadvantages, sensible application in a commercial context) ▪ Application example: machine learning algorithms in robo-advisory All concepts are embedded in real-life business value applications via Python and KNIME.		
2	Learning outcomes After successful completion of the module, students can ▪ sensibly apply quantitative simulations as well as optimizations ▪ identify potentials for the automation of processes as well as analysis procedures ▪ create and implement efficient solutions for purposes of automation ▪ visualize problems via flow charts and evaluate the need for non-automated (un-standardized) process steps ▪ explain (in discussions) in a convincing manner the added value of standardized quantitative methods ▪ interpret the results of machine learning classifiers and improve their learning outcomes via model (re-)specification and (re-)calibration.		

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3	Teaching and learning methods This module is a synchronous seminar-based course, which take place on fixed times (12 × 90 min) in a virtual classroom. The lecturers provide the content structure of the seminar, prepare short introductory lessons, invite guests, bring in practical questions or set specific tasks. A digital semester apparatus with (digital) reading recommendations is provided for the courses with additional references to supporting material like videos, case studies, empirical papers or essays. The students work on the contents together, actively contribute and discuss the main ideas. Students are expected to make independent contributions, e.g. by actively participating in a discussion, summarizing papers, writing short essays, or giving presentations.
4	Prerequisites for participation Formal requirements: none Recommended prior knowledge: basic analytical calculus as well as basic probability theory.
5	Combination with other study areas Applicability within the study course: "Digital Bootcamp" Applicability for other study courses: none
6	Type and duration of exam E-portfolio (Case study with presentation)
7	Weight of the mark in the final grade 5/120
8	Literature Students can find references to current literature on the learning platform.