
ISM-COURSE HANDBOOK

M. SC. BUSINESS INTELLIGENCE & DATA SCIENCE

VERSION WITH 4 SEMESTERS (120 ECTS-CREDITS): VALID FOR STUDENTS STARTING FROM
WINTER SEMESTER 2026/27

VERSION WITH 3 SEMESTERS (90 ECTS-CREDITS): VALID FOR STUDENTS STARTING FROM
WINTER SEMESTER 2026/27

VERSION OF MAY 2027

CONTENT

STUDY PLAN (120 ECTS)	2
STUDY PLAN (90 ECTS)	3
MODULES	4
Data Management	4
Computational Engineering	8
Quantitative Methods.....	11
Leadership Skills.....	14
Digital Business Structures & Processes.....	19
Business Analytics	22
Business Control	26
Consulting	30
Big Data Project	34
Internship	37
Study abroad.....	39
Master's Thesis	42

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

STUDY PLAN (120 ECTS)

1. Semester Winter semester	ECTS	2. Semester Summer semester	ECTS	3. Semester Winter semester	ECTS	4. Semester Winter semester / Summer semester	ECTS
Data Management	6	Business Analytics	6	Study Abroad	24	Master's Thesis	30
Introduction to Data Science & Business Intelligence	2	Optimization Techniques	2	Electives, depending on ISM partner university and individual specialization	24	Master's Thesis	30
Database Systems & Information Integration	2	Simulation & Forecasting Techniques	2				
ERP Systems	2	Machine Learning & Artificial Intelligence Techniques	2				
Computational Engineering	6	Business Control	6				
IT Management	2	IT-enabled Information Systems	2				
Software Engineering	2	Decision Support Systems	2				
Programming	2	Management Information Systems	2				
Quantitative Methods	6	Consulting	6				
Linear Algebra & Numerical Mathematics	2	Strategy & Market	2				
Structure-detecting Methods	2	Innovation & Design Thinking	2				
Structure-validating Procedures	2	Consulting Instruments	2				
Leadership Skills	6	Big Data Project	6				
Corporate Governance & Business Ethics	2	Agile Project Management	1				
Negotiation, Communication & Executive Presentations	2	Scientific Methods	1				
Cross Cultural Leadership	2	Field Project	4				
Digital Business Structures & Processes	6	Internship	12				
Theory of the Firm	2	Practical Experience Phase I	6	Practical Experience Phase II	6		
Digital Process Management	2						
Digital Value Networks & Business Models	2						
Total	30	Total	30	Total	30	Total	30

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

STUDY PLAN (90 ECTS)

1. Semester Winter semester	ECTS	2. Semester Summer semester	ECTS	3. Semester Winter semester / Summer semester	ECTS
Data Management	6	Business Analytics	6	Master's Thesis	30
Introduction to Data Science & Business Intelligence	2	Optimization Techniques	2	Master's Thesis	30
Database Systems & Information Integration	2	Simulation & Forecasting Techniques	2		
ERP Systems	2	Machine Learning & Artificial Intelligence Techniques	2		
Computational Engineering	6	Business Control	6		
IT Management	2	IT-enabled Information Systems	2		
Software Engineering	2	Decision Support Systems	2		
Programming	2	Management Information Systems	2		
Quantitative Methods	6	Consulting	6		
Linear Algebra & Numerical Mathematics	2	Strategy & Market	2		
Structure-detecting Methods	2	Innovation & Design Thinking	2		
Structure-validating Procedures	2	Consulting Instruments	2		
Leadership Skills	6	Big Data Project	6		
Corporate Governance & Business Ethics	2	Agile Project Management	1		
Negotiation, Communication & Executive Presentations	2	Scientific Methods	1		
Cross Cultural Leadership	2	Field Project	4		
Digital Business Structures & Processes	6	Internship	6		
Theory of the Firm	2	Practical Experience Phase I	6		
Digital Process Management	2				
Digital Value Networks & Business Models	2				
Total	30	Total	30	Total	30

* Subject to modifications

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

MODULES

Data Management

Module code BIDS1		Semester 1	Duration 1 Semester		ECTS-Credits 6	
Course type Core		Language English	Intake Winter semester		SWS 6	
1	Lectures of the module		Hours of presence	Hours of self-study	Total workload (h)	SWS
	Introduction to Data Science & Business Intelligence		18	42	60	2
	Database Systems & Information integration		18	42	60	2
	ERP Systems		18	42	60	2
2	Content The module provides an overview of current techniques of data science and business intelligence for the description, improvement and prediction of business questions based on distributed databases. In particular, traditional (e.g. automation) as well as innovative (e.g., deep learning networks) methods are taught, with which company-internal data can be managed, integrated, manipulated and evaluated. Supportive software solutions integrating data and processes (such as ERP systems), which are particular important in consulting projects, are trained in different scenarios/cases. Introduction to Data Science & Business Intelligence ▪ Importance of data and information flows for competitive advantage in the enterprise ▪ Principles and techniques of supplying and analysing data (e.g., Data Warehouse, NoSQL) as well as machine learning ▪ Digital knowledge management techniques (e.g., neural networks, generic algorithms) ▪ Current examples from business practice and use cases for data-driven evaluations and business decisions ▪ Industrial trends in IT-based management and evaluation of data sets ▪ Research trends and scientific discourse on data management Database Systems & Information Integration ▪ Features and architecture patterns for database systems including layer architecture of IT communication ▪ Steps, tasks and techniques in the classical data organization process ▪ Processes and solutions for the integration of homogeneous and heterogeneous data (e.g., ETL process) ▪ Alternative and new processing techniques (e.g., SQL, Hadoop)					

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	▪ Practical application of the learned techniques and notations (e.g., data modelling, operational implementation of an integration) ▪ Modern application scenarios (e.g., geo-marketing, customer journey in customer life-cycle management, simulations in product development) 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)
3	Learning outcomes/ competencies Expertise (knowledge and capabilities) After successful completion of the module students can: ▪ Design digital data science methods and tools conceptually for complex and/or international business questions ▪ Engineer requirements for database systems and implement the process of data organization ▪ Organize the lifecycle of software (e.g., ERP systems) in business practice Interdisciplinary competencies (social competence and autonomy) After successful completion of the module students can: ▪ Argue on technical systems for the data-driven solution of consulting questions ▪ Develop and assess emerging data science techniques and software solutions independently and classify their use in an enterprises
4	Teaching and learning methods ▪ Lectures ▪ Peer discussion ▪ Group work ▪ Case studies
5	Prerequisites for participation Formal requirements: None. Recommended requirements: None.

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

6	Combinations with other study areas Applicability within the study course: None. Applicability for other study courses: None.
7	Type and duration of exam Written exam (120 min)
8	Weight of the mark in the final grade 5.56% with 4 semesters (120 ECTS-Credits) 7.14% with 3 semesters (90 ECTS-Credits)
9	Special
10	Literature Introduction to Data Science & Business Intelligence <u>Core text:</u> O'Neil, C., Schutt, R. (2013): Doing Data Science: Straight Talk from the Frontline. O'Reilly Margaret, B., Eshwar, B. (2015): Database Systems with Case Studies. PHI. Sharda, R., Delen, D., Turban, E., King, D. (2014): Business Intelligence: A Managerial Perspective on Analytics. Pearson. <u>Supplementary literature:</u> Akerkar, R. (2019): Artificial Intelligence for Business. Springer. Corea, F. (2019): Applied Artificial Intelligence: Where AI Can Be Used In Business. Springer. Database Systems & Information Integration <u>Core text:</u> Barbucha, D., Thanh Nguyen, B., Batubara, J. (2015): New Trends in Intelligent Information and Database Systems. Springer. Panneerselvam, R. (2018): Database Management Systems. PHI. <u>Supplementary literature:</u> Emrouznejad, A., Charles, V. (2019): Big Data for the Greater Good. Springer. Kroenke, D., McKinney, E. (2015): Processes, Systems, and Information: An Introduction to MIS. Pearson. ERP Systems <u>Core text:</u>

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	DuttaRoy, S. (2016): SAP Business Analytics - A Best Practices Guide for Implementing Business Analytics Using SAP. Apress. Kalaimani, J. (2016): SAP Project Management Pitfalls - How to Avoid the Most Common Pitfalls of an SAP Solution. Apress. Michael Missbach, M., Staerk, T., Gardiner, C., McCloud, J., Madl, R., Tempes, M., Anderson, G. (2016): SAP on the Cloud. Springer. <u>Supplementary literature:</u> Case studies within the lecture
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ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

Computational Engineering

Module code BIDS2		Semester 1	Duration 1 Semester			ECTS-Credits 6
Course type Core		Language English	Intake Winter semester			SWS 6
1	Lectures of the module		Hours of presence	Hours of self-study	Total workload (h)	SWS
	IT Management		18	42	60	2
	Software Engineering		18	42	60	2
	Programming		18	42	60	2
2	Content Data scientists are using IT-based systems such as software (e.g., applications and databases) and hardware (e.g., technical input and output devices, Internet of Things) intensively. On the one hand, the lectures of this module provide the necessary knowledge to efficiently use and configure a company's existing technical resources. On the other hand, methods and practices are introduced with which systems can be designed, engineered and implemented autonomously to perform specific functions. IT Management - IT strategies and IT in the corporate environment - IT organization and IT frameworks (e.g., roles, process models) - Aarchitectures and application management (e.g., cloud computing, process-oriented software systems) - IT control and measurement (e.g., reporting) - IT security & IT law - IT governance and IT service management (e.g., ITIL, COBIT) Software Engineering - Software engineering as a discipline - Requirements engineering for software (e.g., quality planning) - Modeling and notations for software specification (e.g., UML) - Classic process models (e.g., example waterfall) - Agile development models (e.g., incremental prototyping, SCRUM) - Practical techniques and tools for software development (e.g., test automation, CASE) Programming - Principles of object-oriented programming (e.g., in Java or Python) - Strings, data types, variables, expressions and operators - Control structures, blocks, methods, classes, inheritance and polymorphism					

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	▪ File reading/interpreting, interfaces and streams ▪ Practical business applications (e.g., visualization) ▪ Applications in data science (e.g., probability, hypotheses, machine learning)
3	Learning outcomes/ competencies Expertise (knowledge and capabilities) After successful completion of the module students can: ▪ Plan an efficient organization for IT and monitor the operation of IT within different relevant dimensions. ▪ Support software development projects conceptually and practically. ▪ Design alternative technical resources for a complex data evaluation in business contexts and evaluate existing solutions. Interdisciplinary competencies (social competence and autonomy) After successful completion of the module students can: ▪ Adapt the expectations of different IT stakeholders to enforce data science requirements in the organizational structure and process organization. ▪ Independently acquire new technical developments in data science.
4	Teaching and learning methods ▪ Lectures ▪ Peer discussion ▪ Group work ▪ Case studies ▪ Research and analysis tasks
5	Prerequisites for participation Formal requirements: None. Recommended requirements: None.
6	Combinations with other study areas Applicability within the study course: None. Applicability for other study courses: None.
7	Type and duration of exam Written exam with accompanying course tests (90 min)
8	Weight of the mark in the final grade 5.56% with 4 semesters (120 ECTS-Credits) 7.14% with 3 semesters (90 ECTS-Credits)

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

9	Special -
10	Literature IT Management <u>Core text:</u> Selig, G. (2015): Implementing Effective IT Governance and IT Management. Van Haren. Pilorget, L., Schell, T. (2018): IT Management - The art of managing IT based on a solid framework leveraging the company's political ecosystem. Springer. <u>Supplementary literature:</u> Urbach, N., Ahlemann, F. (2019): IT Management in the Digital Age. A Roadmap for the IT Department of the Future. Springer. Software Engineering <u>Core text:</u> Sommerville, I. (2016): Software Engineering. Pearson. Foster, E.C. (2014): Software Engineering. Apress. <u>Supplementary literature:</u> Gruhn, V., Striemer, R. (2018): The Essence of Software Engineering. Springer. Programming <u>Core text:</u> Brzustowicz, M.R. (2017): Data Science with Java: Practical Methods for Scientists and Engineers. O'Reilly. Mailund, T. (2017): Beginning Data Science in R: Data Analysis, Visualization, and Modelling for the Data Scientist. Apress. <u>Supplementary literature:</u> Haroon, D. (2018): Python Machine Learning Case Studies - Five Case Studies for the Data Scientist. Apress.

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

Quantitative Methods

Module code BIDS3		Semester 1	Duration 1 Semester		ECTS-Credits 6	
Course type Core		Language English	Intake Winter semester		Hours per week (SWS) 6	
1	Lectures of the module		Hours of presence	Hours of self-study	Total workload (h)	SWS
	Linear Algebra & Numerical Mathematics		18	42	60	2
	Structure-detecting Methods		18	42	60	2
	Structure-validating Procedures		18	42	60	2
2	Content The module provides a basic understanding of all quantitative approaches and applications that are related to data analysis. Firstly, this concerns linear algebra & numerical mathematics as these subjects are essential for all forms of mathematical modelling and related computations. Furthermore, advanced statistical techniques are covered (highlighting the difference between structure-detecting vs. structure-validating procedures). Linear Algebra & Numerical Mathematics ▪ Modelling of commercial problems via systems of linear equations, in particular usage of matrices ▪ Matrix calculus ▪ Complexity evaluations of computation algorithms ▪ Algorithms for solving systems of linear equations ○ Direct procedures (e.g., Gauß algorithm) ○ Iterative procedures (e.g., Krylow approach) ▪ Efficiency and performance issues of algorithms ○ Dimension reduction of matrices ○ Error tolerance Structure-detecting Methods ▪ Cluster analysis: approaches for clustering large amounts of data ▪ Explorative factor analysis: procedure to discover the most important factors ▪ Linear discriminant analysis Structure-validating procedures ▪ Non-parametrical tests ▪ Basics of regression analysis					

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	▪ t-Test and simple analysis of variance ▪ Multi-dimensional analysis of variance (ANOVA) ▪ Confirmatory factor analysis
3	Learning outcomes/ competencies Expertise (knowledge and capabilities) After successful completion of the module students can: ▪ Create abstract models of commercial problems ▪ Evaluate related computation procedures with respect to suitability, complexity and performance ▪ Use advanced statistics to detect and validate structures Interdisciplinary competencies (social competence and autonomy) After successful completion of the module students can: ▪ Reduce problems and questions to their key aspects ▪ Give sensible evaluations of various approaches ▪ Perform free speech and discussions in a convincing manner
4	Teaching and learning methods ▪ Lectures ▪ Group work ▪ Case studies ▪ Research and analysis tasks
5	Prerequisites for participation Formal requirements: none Recommended requirements: Mathematical Basics
6	Combinations with other study areas Applicability within the study course: The techniques taught in the module are an important preparation for successfully mastering further tasks which can create commercial value via modern information technology, in particular within the Big Data project. Applicability for other study courses: The statistics courses can be used as parts of the module „Psychological Methods“ in the Master Psychology & Management.
7	Type and duration of exam Written exam (120 minutes)
8	Weight of the mark in the final grade

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	5.56% with 4 semesters (120 ECTS-Credits) 7.14% with 3 semesters (90 ECTS-Credits)
9	Special -
10	Literature Linear Algebra & Numerical Mathematics <u>Core text:</u> Strang G. (2016): Introduction to Linear Algebra. Wellesley-Cambridge Press. Wendland H. (2017): Numerical linear algebra. Cambridge University Press. <u>Supplementary literature:</u> D. C., Lay S. R. and McDonald J. J. (2015): Linear Algebra and Its Applications. Pearson. Jaques I. (2015): Mathematics for Economics and Business. Pearson. Structure-detecting Methods <u>Core text:</u> Chen D. et al. (2018): Advanced Statistical Methods in Data Science. Springer. Freeman J. et al. (2017): Statistics for Business and Economics. Cengage Learning EMEA. <u>Supplementary literature:</u> Bruce A. and Bruce P. (2017): Statistics for Data Scientists. O'Reilly. James G. et al. (2017): An Introduction to Statistical Learning. Springer. Structure-validating Procedures <u>Core text:</u> Chen D. et al. (2018): Advanced Statistical Methods in Data Science. Springer. Kaufman R. L. (2018): Interaction Effects in Linear and Generalized Linear Models. SAGE PUBLN. <u>Supplementary literature:</u> Bruce A. and Bruce P. (2017): Statistics for Data Scientists. O'Reilly. Freeman J. et al. (2017): Statistics for Business and Economics. Cengage Learning EMEA.

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

Leadership Skills

Modulecode LS		Semester 1	Duration 1 semester		ECTS-Credits 6	
Course type Compulsory		Teaching Language English	Intake Winter semester		Hours per week (SWS) 6	
1	Lectures of the module		Hours of presence	Hours of self-study	Total workload (h)	SWS
	Corporate Governance & Business Ethics		18	42	60	2
	Negotiation, Communication & Executive Presentations		18	42	60	2
	Cross Cultural Leadership		18	42	60	2
2	Content The module "Leadership Skills" develops the frameworks, explores the tools, and the methods and skills a manager needs to lead a company in an international environment. The course serves the development of intercultural skills, the training of communication, presentation and negotiation skills as well as the teaching of ethical-normative assistance for decision making in the context of corporate governance system. Corporate Governance & Business Ethics This course deals with the conditions, theories, standards and applications of ethical and sustainable business behavior. Corporate governance will be reconstructed as a central pillar of the notion of corporate social responsibility (CSR), with a special focus on standards and principles for ethics-based, sustainable business strategies. 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 base, a business ethics concept is developed, critically examined and the application spectrum illustrated. Participants will learn to apply different ethical theories and concepts through case studies and interactive seminar sessions. Emphasis is laid on humanistic principles of good leadership. The main focus is on moral challenges and how to overcome them in order to be a good 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 in order to achieve sustainable value creation and fair value distribution. Negotiation, Communication & Executive Presentations This course conveys the wide range of interpersonal communication within as well as outside the company. Concepts, models and strategies for team, management and crisis communications are presented, the relationship between goal-oriented, cross-cultural and ethical interaction premises and their integration techniques are discussed, techniques for					

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	consensual persuasion results are shown. The training of communication skills as well as the training for the realization of set targets takes place through negotiations, role-plays in negotiations as well as by small talk and networking for business communication processes. The course concludes with the structure, the techniques and the 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. Cross Cultural Leadership This course addresses the central models, concepts and theories for successful behavior in leadership and teamwork situations. It covers organizational psychological insights into leadership styles and role behavior, motivation and team effectiveness, the use of power and responsibility in decision-making processes, difficulties in change communication and conflict management as well as corporate hierarchies, framework and success factors. The course focuses on cultural awareness as well as scientific approaches and techniques in the field of intercultural communication and management for a diplomatic and confident manner, for example in bargaining situations in different cultures of the world. Ideas and concepts of cross-cultural management, research on culture and identity concepts (e.g. Hall, Hofstede), and the role of culture in the corporate environment will be presented and the techniques and strategies of verbal, non-verbal and para-verbal communication in intercultural contexts will be trained. Finally, the culture shock and other personal reactions to intercultural encounters will be discussed as well as the manager's toolkit of intercultural skills.
3	Learning outcomes On successful completion of the module, students: ▪ possess knowledge of basic ethical concepts as they apply to business. ▪ are aware of the expectations and perceptions from a company's business community and social environment. ▪ have knowledge of modern leadership and decision-making styles and their state-of-the-art application. ▪ have insights into intercultural management theory. ▪ are able to analyze intercultural business situations. ▪ are able to make prudent business decisions in the face of uncertainty that consider ethical social, regulatory and legal requirements. ▪ are able to assess the advantages of the adoption of social responsibility to identify appropriate decision corridors. ▪ lead decision-making processes and are able to deal with conflicts. ▪ present convincingly in intercultural contexts. ▪ reflect and compare different points of view in groups and organizations. ▪ work constructively and cooperate in a group. ▪ present their positions, discuss them critically and defend them. ▪ convince others and justify their own decisions in a team when needed. ▪ learn from experience regarding negotiation situations and thus to think and act critically.

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	▪ help to shape their social environment.
4	Teaching and learning methods ▪ Lectures ▪ Discussions ▪ Group work ▪ Case studies ▪ Exercises
5	Prerequisites for participation Formal requirements: none Recommended prior knowledge: none
6	Combinations with other study areas Applicability within the study course: The module imparts interdisciplinary skills, that will be applied repeatedly in the course of studies, e.g. within case studies, group discussions or other tasks that demand intercultural competences, communication skills as well as a well-developed sense for ethically relevant issues. Applicability for other study courses: M.Sc. International Management, M.Sc. International Logistics & Supply Chain Management, M.Sc. Real Estate Management, M.A. Digital Marketing, M.Sc. Psychology & Management, M.A. Entrepreneurship, M.Sc. Business Intelligence & Data Science, M.A. Strategic Marketing Management, M.Sc. Finance und MBA General Management.
7	Type and duration of exam Paper presentation
8	Weight of the mark in the final grade 5.56%
9	Special Showing and discussion of video clips
10	Literature Corporate Governance & Business Ethics <u>Compulsory reading:</u> Crane, A.; Matten, D.; Glozer, S. Spence, L. (2019): Business Ethics. Managing Corporate Citizenship and sustainability in the Age of Globalization, 5 th ed. Oxford: Oxford University <u>Supplementary literature:</u> Bleisch, B.; Huppenbauer, M., Baumberger, C. (2021): Ethische Entscheidungsfindung . Ein Handbuch für die Praxis, 3. vollst . Überarb Und actual. Aufl Nomos: Baden Baden CFA (2019): Ethics in practice. Ethics in Investment Management Casebook, 2 nd ed. https://www.cfainstitute.org/org/--/media/documents/ethics in practice/ethics in

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practice casebook 2nd edition web.pdf CFA Institute (2022): Code of Ethics and Standards of Professional Conduct, https://www.cfainstitute.org/en/ethics-standards/ethics/code-of-ethics-standards-of-conduct-guidance Europäische Kommission, Generaldirektion Justiz und Verbraucher (2020): Study on directors' duties and sustainable corporate governance : final report, Publications Office, 2020, https://data.europa.eu/doi/10.2838/472901 Fabisch , N. (2018): Compliance und Corporate Social Responsibility. In: Behringer, S . Hrsg .): Compliance kompakt . Best Practice im Compliance Management, 4. neu bearbeitete Aufl ., Berlin: Erich Schmidt Verlag, S. 341 361. Fischer, K. (2017): Corporate Sustainability Governance. Nachhaltigkeitsbezogene Steuerung von Unternehmen in einer globalisierten Welt. Wiesbaden: Springer Gabler Hilb, M. (2016): Integrierte Corporate Governance. Ein neues Konzept zur wirksamen Führung und Aufsicht von Unternehmen Kirwan , C.; McBride, H.; O'Riordan , C. (2018): Cases in Corporate Governance and Business Ethics, Institute of Chartered Accountants in Ireland Mallin , C., A. (2019): Corporate Governance , 6 th ed. Oxford: Oxford University. OECD (2021) 2021): OECD Corporate Governance Factbook 2021, www.oecd.org/corporate/corporate-governance-factbook.htm Negotiation, Communication & Executive Presentations <u>Compulsory reading:</u> Lewicki, R. J./Saunders, D. M./Barry, B. (2014): Negotiation. 7th ed., New York: McGraw-Hill. <u>Supplementary literature:</u> Cialdini, R. B. (2007): Influence – The Psychology of Persuasion. New York: Collins. Fisher, R./Ury, W. (2012): Getting to Yes. Negotiating an Agreement without Giving In. 3rd ed., London: Random House. Luecke, R. (2005): Negotiation. Your Mentor and Guide to Doing Business Effectively. 7th ed., Boston: Harvard Business School Press. Lax, D. A./Sebenius, J. K. (2011): The Manager as Negotiator – Bargaining for Cooperation Competitive Gain. Reprint, New York: Free Press. Cross Cultural Leadership <u>Compulsory reading:</u> Barmeyer, C./Franklin, P. (2016). Intercultural Management: A Case-Based Approach to Achieving Complementarity and Synergy. New York: Palgrave Mcmillan. <u>Supplementary literature:</u> Carté, P./Fox, C. (2008): Bridging the Culture Gap. A Practical Guide to International
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ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	Business Communication. 2nd ed., London: Kogan Page. Jacob, N. (2003): Intercultural Management. London: Kogan Page. Schein, E. H. (2010): Organizational culture and leadership. 4th ed., San Francisco: Jossey-Bass. Trompenaars, F./Woolliams, P. (2003): Business Across Cultures. Chichester: Capstone.
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ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

Digital Business Structures & Processes

Module code BIDS4		Semester 1	Duration 1 Semester		ECTS-Credits 6	
Course type Core		Language English	Intake Winter semester		SWS 6	
1	Lectures of the module		Hours of presence	Hours of self-study	Total workload (h)	SWS
	Theory of the Firm		18	42	60	2
	Digital Process Management		18	42	60	2
	Digital Value Networks & Business Models		18	42	60	2
2	Content The applications of data science and business intelligence are increasingly taking place against the background of digital transformation in companies. The module classifies companies with its internal workflows and dependence (e.g., transactions) on markets, employees and partners in value creation networks. Understanding the emergence and organization of companies helps to assess digital capabilities in processes as well as new data-driven business models. Theory of the Firm ▪ Emergence of companies ▪ Transactions using markets and companies ▪ Questions of existence, tasks, limits, organization, interactions and leadership, geographical structure, development, as well as heterogeneity of performance of companies ▪ Impact of digitization on companies ▪ Selected theoretical approaches and models ▪ Corporate structures and benefits/performance differences of companies Digital Process Management ▪ Process orientation and workflow management in organizations ▪ Views on processes and role models (e.g., CPO) ▪ Analysis (e.g., reengineering) and modeling techniques (e.g., BPMN) ▪ IT support paradigms (e.g., SOA) and BPM tools (e.g., WfMS) ▪ Process control and monitoring ▪ Modern further developments in classic BPM (e.g., case management) Digital Value Networks & Business Models ▪ Technical possibilities and digitization as a trend in economy and society ▪ Digital and virtual organization forms (e.g., information economy, digital leadership,					

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	Industry 4.0) ▪ Digital portfolio (e.g., smart products, e-services, platform strategies) ▪ Digitalisation of business relationships (e.g., digital collaboration networks, platforms) ▪ Patterns and trends of digital business models (e.g., co-creation)
3	Learning outcomes/ competencies Expertise (knowledge and capabilities) After successful completion of the module students can: ▪ Realistically assess the value of data in organizations ▪ Plan and implement digital products, services and business models within individual processes/transactions, the organization of a company as well in value chain networks ▪ Apply new technical possibilities and available data for process optimization and business model innovation. Interdisciplinary competencies (social competence and autonomy) After successful completion of the module students can: ▪ Evaluate different strategic approaches resulting from digital and data-driven business and represent them on different hierarchical levels. ▪ Classify emerging value creation and business models trends as well as develop innovative ideas independently
4	Teaching and learning methods ▪ Lectures ▪ Peer discussion ▪ Group work ▪ Case studies
5	Prerequisites for participation Formal requirements: None. Recommended requirements: None.
6	Combinations with other study areas Applicability within the study course: None. Applicability for other study courses: None.
7	Type and duration of exam Paper presentation
8	Weight of the mark in the final grade 5.56% with 4 semesters (120 ECTS-Credits)

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	7.14% with 3 semesters (90 ECTS-Credits)
9	Special -
10	Literature Theory of the Firm <u>Core text:</u> Wheelen, T.L., Hunger, J.D. (2015): Concepts in Strategic Management and Business Policy, Global Edition. Pearson. Walker, P. (2016): The Theory of the Firm: An overview of the economic mainstream. Taylor & Francis. <u>Supplementary literature:</u> Fazzini, M. (2018): Business Value. Palgrave Macmillan. Taylor, B. (2016): Introduction to Management Science. Pearson. Digital Process Management <u>Core text:</u> Weske, M. (2012): Business Process Management: Concepts, Languages, Architectures. Springer. Marlon Dumas, M., La Rosa, M., Mendling, J., Reijers, H.A. (2018): Fundamentals of Business Process Management. Springer. <u>Supplementary literature:</u> Lederer, M., Raake, D. & Kurz, M. (2014). The BSC Cookbook: Vol. 1 - Ingredients for a Successful Balanced Scorecard. Ingolstadt: I2P Vom Brocke, J., Mendling, J. (2017): Business Process Management Cases: Digital Innovation and Business Transformation in Practice. Springer. Digital Value Networks & Business Models <u>Core text:</u> Morabito, V. (2016): The Future of Digital Business Innovation: Trends and Practices. Springer. Ashurst, C. (2015): Competing with IT: Leading a Digital Business. Macmillan. <u>Supplementary literature:</u> Cordon, C., Garcia-Milà, P., Vilarino, T.F., Caballero, P. (2016): Strategy is Digital: How Companies Can Use Big Data in the Value Chain. Springer.

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

Business Analytics

Module code BIDS5		Semester 2	Duration 1 Semester		ECTS-Credits 6	
Course type Core		Language English	Intake Winter semester		SWS 6	
1	Lectures of the module		Hours of presence	Hours of self-study	Total workload (h)	SWS
	Optimization Techniques		18	42	60	2
	Simulation & Forecasting Techniques		18	42	60	2
	Machine Learning & Artificial Intelligence Techniques		18	42	60	2
2	Content The module covers central aspects of data-driven and quantitative analysis procedures (theoretically as well as practically). Firstly, this concerns optimization techniques which typically optimize commercially relevant target figures (for example maximizing profit or minimizing cost). Furthermore, simulation and forecasting techniques are absolutely necessary to create validated and well-grounded commercial plans. Finally, machine learning & artificial intelligence techniques are discussed. These techniques can be used for an automated analysis of and recommendations for commercial problems. Optimization Techniques ▪ Extreme value theory (via differential calculus) in one as well as several dimensions ▪ (e.g. with or without constraints, Lagrange procedure) ▪ Linear optimization and linear programming (e.g. simplex algorithm, ellipsoid method, interior-point method) ▪ Non-linear optimization via numerical techniques (e.g. simulated annealing, branch and bound) Simulation & Forecasting Techniques ▪ Simulation ○ Approaches to modelling of problems that arise from daily business ○ Usage of numerical techniques for computation purposes (e.g. computational models) ○ Scenario and/or sensitivity analysis concerning input/output interaction within the models ▪ Forecasting techniques via time series analysis: ○ Various types of regression analysis (e.g. linear and logistic regression analysis, multi-dimensional regression analysis) ○ Short term forecasts (e.g. single exponential smoothing, double & triple exponential smoothing)					

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	○ Long term forecasts (e.g. ARIMA models, Box-Jenkins approach) Machine Learning & Artificial Intelligence Techniques ▪ Artificial neural networks ○ Modelling of robots as artificial neural networks (e.g. multi-layer networks) ○ 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)
3	Learning outcomes/ competencies Expertise (knowledge and capabilities) 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 Interdisciplinary competencies (social competence and autonomy) After successful completion of the module students can ▪ Visualize problems via flow charts and evaluate the need for non-automated (unstandardized) process steps ▪ Explain (in discussions) in a convincing manner the added value of standardized quantitative methods
4	Teaching and learning methods ▪ Lectures ▪ Peer discussion ▪ Group work ▪ Case studies ▪ Research and analysis tasks
5	Prerequisites for participation Formal requirements: none Recommended requirements: Quantitative methods, Computational engineering

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

6	Combinations with other study areas Applicability within the study course: The techniques taught in the module are essential to successfully master further tasks in creating commercial value via modern information technology, in particular within the Big Data project. Applicability for other study courses: Selected courses can be used as parts of the module “International Operations” in the Master “International Management” and the Master “International Business”.
7	Type and duration of exam Accompanying course tests
8	Weight of the mark in the final grade 5.56% with 4 semesters (120 ECTS-Credits) 7.14% with 3 semesters (90 ECTS-Credits)
9	Special -
10	Literature Optimization Techniques <u>Core text:</u> Chvatal, V. (2016): Linear Programming. Bedford Books. Zörnig, P. (2014): Nonlinear Programming: An Introduction. De Gruyter. <u>Supplementary literature:</u> D., G. and Ye, Y. (2015): Linear and Nonlinear Programming. Springer. Jaques, I. (2015): Mathematics for Economics and Business. Pearson. Simulation & Forecasting Techniques <u>Core text:</u> Ragsdale, C.T. (2017): Spreadsheet Modelling and Decision Analysis: A Practical Introduction to Business Analytics. South-Western. Box, G.E.P., Jenkins G. M., Ljung G. M. and Reinsel G. C. (2015): Time Series Analysis: Forecasting and Control. Wiley. <u>Supplementary literature:</u> Shumway, R.H. and Stoffer, H. (2017): Time Series Analysis and its Applications. Springer. Morris, J.R. and Daley, J.P. (2017): Introduction to Financial Models for Management and Planning. Chapman and Hall/CRC.

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	Machine Learning & Artificial Intelligence Techniques <u>Core text:</u> Dinu, J. (2018): Foundations of Data Science. Addison-Wesley. Bonaccorso, G. (2018): Mastering Machine Learning Algorithms. Packt Publishing. <u>Supplementary literature:</u> Alpaydin, A. (2016): Machine Learning. MIT Press. James G., Hastie, T., Tibshirani R. and Witten D. (2017): An Introduction to Statistical Learning. Springer.
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ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

Business Control

Module code BIDS6		Semester 2	Duration 1 Semester		ECTS-Credits 6	
Course type Core		Language English	Intake Winter term		Hours per week 6	
1	Lectures of the module		Hours of presence	Hours of self-study	Total workload (h)	SWS
	IT-enabled Information Systems		18	42	60	2
	Decision Support Systems		18	42	60	2
	Management Information Systems		18	42	60	2
2	Content Business intelligence and data science techniques are used by companies in many different IT systems for controlling purposes. The module first gives an overview of the different dimensions of information integration in companies and thus introduces typical classes of information systems. The two types of intelligent decision support that are particularly relevant in business practice by means of data evaluation in strategic (decision support systems) and operational management (management information systems) are discussed in detail. IT-enabled Information Systems ▪ Classification of analytic information systems in the IT landscape of an enterprise (e.g., horizontal and vertical integration of data, functions and processes) ▪ Functions, potentials and architectural concepts of operational management ▪ IT-based implementation and analysis of primary processes in the enterprise (e.g., SCM, CRM and PLM) ▪ Profitability analysis, requirement engineering and selection process/development possibilities of tools for business intelligence ▪ Market overview of current solutions (e.g., niche products) ▪ Application of tools against the background of new economic trends (such as networking and Industry 4.0) Decision Support Systems ▪ Relevant criteria for negotiation and decision theory as well as relevance of intelligent decisions for competitive advantages in international business environments ▪ Concepts and solutions on data level (e.g., data sources, resource availability, data warehousing, typologies) ▪ Concepts and solutions on logical level (e.g., modelling in systems, data network) ▪ Concepts and solutions on the presentation level (e.g., usability, interface design and evaluation methods)					

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	▪ Example applications in selected sectors (e.g., hospital management) and structures (e.g., global SCM) Management Information Systems ▪ Structure and components of MIS ▪ Planning and controlling of success-critical business models components using information systems ▪ Potential benefits of MIS for operational and strategic management ▪ Efficiency, requirements and selection process of systems in business practice ▪ Internal organization and evolutionary steps of the business intelligence strategy (e.g., Intelligence Competency Center) ▪ Development trends in analytical information systems
3	Learning outcomes Professional competencies On successful completion of the module, students are able: ▪ To plan existing business models using information systems and to manage a data-driven transformation of existing companies. ▪ To support strategic and operational decisions in the company through the use of information systems. Generic competencies On successful completion of the module, students are able to: ▪ Evaluate technological alternatives and to specify a possible solution as well as to justify their ideas to technical stakeholders. ▪ Assess the general meaning of data for business decisions as well as for individual operational decisions against different professional backgrounds.
4	Teaching and learning methods ▪ Lecture ▪ In-class discussion ▪ Group work ▪ Case studies
5	Prerequisites for participation Formal requirements: None. Recommended prior knowledge: Data management.
6	Combinations with other study areas Applicability within the study course: None. Applicability for other study courses: None.

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

7	Type and duration of exam Written exam (120 minutes)
8	Weight of the mark in the final grade 5.56% with 4 semesters (120 ECTS-Credits) 7.14% with 3 semesters (90 ECTS-Credits)
9	Special -
10	Literature IT-enabled Information Systems <u>Core text:</u> Gronewald, K.D. (2017): Integrated Business Information Systems. Springer. Chesney, T., Stair, R. M. (2015): Principles of Business Information Systems. Cengage. <u>Supplementary literature:</u> Dornberger, R. (2018): Business Information Systems and Technology 4.0: New Trends in the Age of Digital Change. Springer. Stair, R., Reynolds, G. (2017): Fundamentals of Information Systems. Cengage. Decision Support Systems <u>Core text:</u> Sauter, V. (2014): Decision Support Systems for Business Intelligence. John Wiley & Sons. Papathanasiou, J., Ploskas, N. & Linden, I. (2016): Real-World Decision Support Systems. Case Studies. Springer. <u>Supplementary literature:</u> Ravindranath, B. (2003): Decision Support Systems and Data Warehouses. New Age International. Kowalczyk, M. (2017): The Support of Decision Processes with Business Intelligence and Analytics. Springer. Management Information Systems <u>Core text:</u> Gronwald, K.D. (2017): Integrated Business Information Systems. A Holistic View of the Linked Business Process Chain ERP-SCM-CRM-BI-Big Data. Springer. Laudon, J. P., Laudon, C. L. (2017): Management Information Systems: Managing the Digital Firm, Global Edition. Pearson.

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	<u>Supplementary literature:</u> Valacich, J., Schneider, C. (2017): Processes, Systems, and Information: An Introduction to MIS, Global Edition. Pearson. Sharma, S., Thakur, K.S. (2013): Management Information System. Horizon.
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ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

Consulting

Module code BIDS7		Semester 2	Duration 1 Semester		ECTS-Credits 6	
Course type Core		Language English	Intake Summer term		Hours per week 6	
1	Lectures of the module		Hours of presence	Hours of self-study	Total workload (h)	SWS
	Strategy & Markets		18	42	60	2
	Innovation & Design Thinking		18	42	60	2
	Consulting Instruments		18	42	60	2
2	Content Data science and business intelligence are often applied in the context of consulting projects. These projects can be realized as an in-house transformation of a company or as consulting services provided by an external consultancy firm. The module uses theories regarding strategies and markets, modern consulting instruments as well as different concepts of consulting processes to prepare students for consulting projects. Strategy & Markets - Management frameworks - Strategic business decisions - Implementation/cascading of visions and missions - Strategies on different organizational levels - Tools of internal and external strategic analysis - Application examples and case studies Innovation & Design Thinking - Innovation strategies and patterns (e.g., business model innovations) - Open and closed Innovation - Toolbox approaches to managing the innovation process - Creativity and internal/external marketing of new ideas - Basics, success factors and implementation of Design Thinking - Hands-on practice of the tools Consulting Instruments - Project work in consultation practice - Phases and tools in the consulting project lifecycle (e.g., initiation, team-building, targeting, structuring and execution) - Hypothesis-based approach of management					

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	- Management of customer expectations - Team and stakeholder management - Specific techniques of visualizing data and big data (e.g., data reduction, aggregated visualization, and interaction capabilities)
3	Learning outcomes Professional competencies On successful completion of the module, students are able to: - Know the theories as well as the practical tools to manage innovation throughout its entire lifecycle by using design thinking as a management method. - Explain theories, models, and methods related to strategic management. - Identify and analyze challenges and problems related to strategy and management, and decision making and to outline practical solutions to strategy and management challenges. - Analyze and assess the competitive environment, companies resources and capabilities - Understand and apply core concepts and theories in order to develop business-level. and corporate-level strategies. - Have detailed knowledge of concepts for analysis, target setting, strategy development, operational measures and control & audits and application to consulting projects. Generic competences On successful completion of the module, students are able to: - Apply specialized problem-solving skills. - Manage complexity. - Derive effective strategies. - Become more creative and innovative by applying tools and methodologies taught in the lectures. - Conceptualize strategic solutions.
4	Teaching and learning methods - Lecture - In-class discussion - Group work - Research and analysis tasks - Case studies
5	Prerequisites for participation Formal requirements: None. Recommended prior knowledge: None.

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

6	Combinations with other study areas Applicability within the study course: None. Applicability for other study courses: None.
7	Type and duration of exam Term paper (7,000 words)
8	Weight of the mark in the final grade 5.56% with 4 semesters (120 ECTS-Credits) 7.14% with 3 semesters (90 ECTS-Credits)
9	Special -
10	Literature Strategy & Markets <u>Core text:</u> Johnson, G.; Whittington, R.; Angwin, D.; Scholes, K.; Regnér, P. (2014). Exploring Strategy. Tenth edition. Pearson. Porter, M. (1996): What is Strategy? Harvard Business Review, No. 6, 61-78. <u>Supplementary literature:</u> Lynch, R. (2015): Strategic Management. Pearson. Rothaermel, F.T. (2013). Strategic Management. Mc Graw-Hill. Innovation & Design Thinking <u>Core text:</u> Tidd, J.; Bessant, J. (2018): Managing innovation. Integrating technological market and organizational change. Wiley Tidd, J.; Bessant, J. (2014): Strategic Innovation Management. Wiley. <u>Supplementary literature:</u> Kim, C; Mauborgne, R. (2015): Blue Ocean Strategy, Expanded Edition: How to Create Uncontested Market Space and Make the Competition Irrelevant. Harvard Business Review Press. Kim, C; Mauborgne, R. (2017): Blue Ocean Shift: Beyond Competing - Proven Steps to Inspire Confidence and Seize New Growth. Macmillan. Christensen, C. (2016): The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail. Harvard Business Review Press.

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	Christensen, C.; Raynor, M. (2013): The Innovator's Solution: Creating and Sustaining Successful Growth. Harvard Business Review Press. Dodgson, M.; Gann, D.; Phillips, N. (2015): The Oxford Handbook of Innovation Management. Oxford University Press. Consulting Instruments <u>Core text:</u> Baaij, M. (2014). An introduction to management consultancy. Sage. <u>Supplementary literature:</u> Wickham, L.; Wilcock, J. (2012): Management Consulting. Pearson.
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ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

Big Data Project

Module code BIDS8		Semester 2	Duration 1 Semester		ECTS-Credits 6	
Course type Core		Language English	Intake Summer semester		SWS 4	
1	Lectures of the module		Hours of presence	Hours of self-study	Total workload (h)	SWS
	Agile Project Management		9	21	30	1
	Scientific Methods		9	21	30	1
	Field Project		18	102	120	2
2	Content In this module, the students combine the methods they have learned in the course of their studies in a concrete consulting project and apply them to solve a complex business question. The problem-solving approach uses large and/or unstructured data (big data) in order to analyze and interpret information against the background of international complex business environments. At the same time, two lectures teach advanced techniques for the planning and implementation of the project as well as to provide a scientific foundation. Agile Project Management ▪ Relevance of process and project management in the company ▪ Traditional and agile development methods ▪ Agile manifesto ▪ Principles (e.g., self-organization, development cycles) and techniques (e.g., story mapping, review, timeboxing) of project planning and execution ▪ Transformation of established structures towards more agility ▪ Case studies on frameworks (e.g., SCRUM) from business practice Scientific Methods ▪ Added value of scientific foundations in data-driven business consulting ▪ Research design and quality criteria for scientific work ▪ Descriptive and constructivist methodology ▪ Working with different forms of evidences (e.g., digital and written sources) ▪ Scientific writing and visualization ▪ Publication forms for scientific results ▪ Techniques of presentation and visualization of data-driven insights					

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	Field Project - Organization of data concerning a business problem, which processes a large amount of data - Evaluation of data and derivation of findings as well as recommendations for managerial actions - Efficient control of the techniques/procedures applied and management tasks within the project execution - Presentation of the results in a management-oriented form against the background of complex primary data
3	Learning outcomes/ competencies Expertise (knowledge and capabilities) After successful completion of the module, students can: - Select appropriate scientific approaches and tools for a data projects - Efficiently manage the execution of projects in complex business environments - Derive results and make corresponding recommendations for explicit actions Interdisciplinary competencies (social competence and autonomy) After successful completion of the module, students can: - Purposefully interact with team members - Communicate the results of projects comprehensibly and are able to argue in line with the data analyzed
4	Teaching and learning methods - Lecture - In-class discussion - Group work - Case studies - Research and analysis tasks - Other
5	Prerequisites for participation Formal requirements: none Recommended requirements: Data management, Quantitative methods, Digital business structures & processes, Leadership skills
6	Combinations with other study areas Applicability within the study course: none. Applicability for other study courses: none.

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

7	Type and duration of exam Presentation.
8	Weight of the mark in the final grade 5.56% with 4 semesters (120 ECTS-Credits) 7.14% with 3 semesters (90 ECTS-Credits)
9	Special -
10	Literature Agile Project Management <u>Core text:</u> Feedmann, R. (2016): The Agile Consultant - Guiding Clients to Enterprise Agility. Apress. <u>Supplementary literature:</u> Brechtner, E. (2015): Agile Project Management with Kanban. Microsoft Press. Moreira, M. E. (2017): The Agile Enterprise - Building and Running Agile Organizations. Apress. Scientific Methods <u>Core text:</u> Chang, M. (2016): Principles of Scientific Methods. CRC. <u>Supplementary literature:</u> Bonamente, M. (2017): Statistics and Analysis of Scientific Data. Springer. Segall, R. S., Cook, J. S. (2018): Handbook of Research on Big Data Storage and Visualization Techniques. IGI Global. Field Project <u>Core text:</u> Information on the business scenario for the specification of the research questions is provided each semester; Data sets, data sources or open databases for the realization of the project are provided each semester. <u>Supplementary literature:</u> None.

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

Internship

Module code PR		Semester 2 / 3	Duration 12 weeks (120 ECTS program) or 6 weeks (90 ECTS program)		ECTS-Credits 12 (120 ECTS program) or 6 (90 ECTS program)	
Course type Core		Language Depending on the internship company	Intake Each semester, during the semester break		Hours per week 0	
1	Lectures of the module		Hours of presence	Hours of self-study	Total workload (h)	SWS
	Practical experience phases (120 ECTS program)		0	360	360	0
	Practical experience phases (90 ECTS program)		0	180	180	0
2	Content Internships, which are completed in Germany or abroad, give the students first insights into the requirements of the workplace and confront them with aspects of socialization, occupational problem areas and different work requirements. In addition, theoretical knowledge, techniques and tools acquired in the course of the degree program can be applied for practical problems. The practical phase should focus on aspects of the study program and can be carried out, for example, in the following areas: ▪ Data-driven creation, control and optimization of corporate processes, product and service portfolios or transactions ▪ IT-enabled business management ▪ Data-supported external or in-house consulting on economic questions of a company/a value network					
3	Learning outcomes Professional competencies On successful completion of the module, students can: ▪ Apply the theories, models and techniques previously learned to the practice of data science and/or business intelligence and check their applicability ▪ Anticipate the effect of one's own actions and its consequences ▪ Reflect on the impact of their own actions and behaviours in work processes Generic competencies On successful completion of the module, students are able to:					

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	- Participate in professional relationships with people of different backgrounds and from different hierarchical levels - Recognize, reflect and represent their own role in the organizational structure of the company - Critically reflect ethical aspects of their work in the company - Critically question their own communication, relationship and self-management skills - Solve practical problems using structured planning and working techniques - Deal with conflict and stress situations in the professional world
4	Teaching and learning methods "Learning by doing" in the internship; if necessary, individual advice on application strategies and networking / job coaching / vacancy research by professors.
5	Prerequisites for participation Formal requirements: none Recommended prior knowledge: In addition to intensive preparation by the student with regard to contents and objectives of an internship, the conditions in the internship company are also important to assess. The student needs clear arrangements with the company about tasks, goals, workplaces and his/her supervisor in advance. These are also mandatory components of the final report.
6	Combinations with other study areas Applicability within the study course: The experiences resulting from the practical module can give particular impulses for the topic of the final thesis. Applicability for other study courses: None.
7	Type and duration of exam Report.
8	Weight of the mark in the final grade 0 %
9	Special Self-responsibility and initiative of the student are encouraged and demanded.
10	Literature Public marketplaces (e.g., job portals) and ISM internal offerings (e.g., Career Center intranet area, ISM internship database, ISM job portal, event alerts, alumni network, etc.)

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

Study abroad

Module code AU		Semester 3		Duration 1 Semester		ECTS-Credits 24	
Course type Core (only 120 ECTS program)		Language Depending on the partner university		Intake Winter term		Hours per week Depending on the partner university	
1	Lectures of the module			Hours of presence	Hours of self-study	Total workload (h)	
	Study Abroad			Depending on the partner university		720	
2	Content The contents of the study abroad are determined by agreement between the partner university, program director, International Office and students in an individual "learning agreement". The semester abroad contributes to an academic (subject-specific and interdisciplinary) as well as personal maturity process. In terms of content, students must take at least 50 per cent subject-specific courses, while a maximum of 50 per cent of the subjects can be chosen freely in the sense of a “Studium Generale” with an business or technical background. Business languages can only be recognized as additional elective courses. The subject-specific contents can, for example, address the following areas: ▪ Data management, business intelligence & big data management ▪ Data science & information and knowledge management ▪ Business analytics and information systems ▪ Statistics, quantitative methods and business modelling ▪ Programming & software and computational engineering ▪ Consulting & value generation management ▪ IT-enabled business management An up-to-date overview of the elective subject-specific courses is provided to the students in the MOVEON database of ISM’s International Office.						
3	Learning outcomes Intercultural and social skills as well as an understanding of the important factors in this area are crucial competitive factors in the economy. The semester abroad is therefore an essential prerequisite for successful work as a data scientist or business intelligence expert. Professional competences Through their insight into management education in other countries, the students have a broad and integrated knowledge in the field of business management and data science/business intelligence, including in-depth knowledge of the current professional						

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	discourse in the host country. In addition, they are able to transfer the skills and abilities acquired during the 1-2 semesters to international business/consulting environments. The students are empowered to deal with complex contexts, to systematically assess them, taking intercultural and transnational aspects into account, and to develop new strategic or transnational solutions. They can summarize and integrate knowledge from different industries. Generic competences After successful completion of the module, the students are able to: ▪ Cooperate purposefully and constructively in an international group and thereby to shape their social environment. ▪ Take cultural differences in groups and organizations into account as they can reflect on different points of view, compare them and discuss them in an effective and efficient manner. If necessary, the students can take over a managerial position in a team, persuade others in a trend-setting manner and represent their assessment to others. ▪ Work independently: The students have a pronounced ability to self-organize and self-confidence due to the independently organized stay at the partner university.
4	Teaching and learning methods Depending on the partner university.
5	Prerequisites for participation See examination regulations.
6	Combinations with other study areas Applicability within the study course: None. Applicability for other study courses: Subject-specific modules - not suitable for other degree programs; Studium Generale: numerous interfaces to other programs.
7	Type and duration of exam Depending on the exam regulation of foreign university
8	Weight of the mark in the final grade 22.22% with 4 semesters (120 ECTS-Credits)
9	Special Group work with domestic and international students, guest lectures, approach to new topics and didactic approaches of the respective cultural group, lectures in a foreign language, strengthening negotiation competences in a foreign language
10	Literature According to the recommendations or norms by the partner universities. Additional recommendations (oriented towards the respective study program of the partner

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	university attended) can be made by program directors and lecturers of the ISM
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ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

Master's Thesis

Modul code		Semester 4 (120 ECTS program), 3 (90 ECTS program)	Duration 1 Semester		Intake Each semester	
Language: English		Type and duration of exam: Thesis and disputation - Length of the thesis: 25,000-30,000 words - The editing time: Master's Thesis = 18 weeks; - Disputation: Presentation and scientific discussion	Weight of the mark in the final grade 27.78 % with 4 semesters (120 ECTS-Credits) 35.71% with 3 semesters (90 ECTS-Credits)		ECTS credits 30	
1	Lectures of the module		Hours of presence	Hours of self-study	Total workload (h)	SWS
	Master's Thesis		1	899	900	0
2	Content The Master's thesis is a written final assignment addressing a complex issue within the respective field of study. It is intended to demonstrate that the candidate is capable of independently completing a practice-oriented task from their field within a specified period of time, applying both subject-specific knowledge and interdisciplinary connections using scientific and professional methods. In doing so, the subject-specific and methodological competencies acquired during the Master's program should be applied in a targeted manner. The ideal procedure for the preparation of the Master's thesis is as follows: - Identification and refinement of the topic - Definition of the research question, title, (rough) structure, scheduling and research design - 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 DGPs or APA guidelines) - Regular coordination with the first examiner - Disputation (oral examination)					
3	Learning outcomes Upon successful completion of this module, students will be able to: demonstrate a broad, detailed, and critical understanding of the current state of					

ISM-COURSE HANDBOOK

M.SC. BUSINESS INTELLIGENCE & DATA SCIENCE

	research in the field relevant to the thesis topic, based on systematic literature review. ▪ develop and clearly structure complex research questions and translate them into an appropriate research design. ▪ select and apply appropriate theories, concepts, and research methods to address the research question. ▪ collect, analyze, and interpret data in a systematic and methodologically sound manner. ▪ integrate findings into the existing body of research and, where appropriate, derive practical implications for business practice. ▪ structure and manage complex research and practice-oriented projects largely independently. ▪ develop well-founded and innovative solutions to business-related problems based on scientific approaches. ▪ communicate complex ideas and research results clearly, logically, and convincingly in written and oral form. ▪ present and defend research results in a disputation and engage in academic discussion with both specialists and non-specialists.
4	Teaching and learning methods Independently written paper. Disputation. ▪ Individual and regular advice provided by the first examiner.
5	Prerequisites for participation Formal requirements: see examination regulations