Hochschule Reutlingen
Reutlingen University

Module Manual DBM

Faculty of Computer Science
Reutlingen University

Degree Programme

Master:

Digital Business Management (DBM)

Version: September 2024

Module Manual DBM M.Sc.

Graphical representation of the Digital Business Management Master's programme curriculum

Semester	Modules Master's Programme in Digital Business Management | Degree: Master of Science																												
4	Master's Thesis (2 SWS)																												
3	Cloud Computing (4 SWS)						Elective 2 (4 hours per week)						Change Management (2 hours per week)				Internet of Things (2 hours per week)												
2	Digital Strategy (4 hours per week)						Elective 1 (4 hours per week)						Software Management (6 hours per week)																
1	Digital Business Essentials (4 hours per week)						Digital Business Processes (4 SWS)						Enterprise Architecture Management (6 hours per week)																
ECTS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

SWS = Semester weekly hour (45 minutes)
1 ECTS credit corresponds to 30 hours of work (attendance and independent study)

The colour blocks are marked with different colours:

Thesis
Business
Computer science
Computer Science

Each module is outlined and the module name appears centred. At the bottom of each module, the number of SWS (semester hours per week) assigned to the module is indicated in brackets. The horizontal scale indicates how many ECTS (credit points) are assigned to each individual module.

Module Manual DBM M.Sc.

Module list:

1st semester:	modules/courses	ECTS
DBM11	Digital Business Essentials	6
DBM12	Digital Business Processes	6
DBM13	Enterprise Architecture Management	8

2nd semester:	modules/courses	ECTS
DBM21	Digital Strategy	6
DBM22	Elective 1	6
DBM23	Software Management	8

3rd semester:	modules/courses	ECTS
DBM31	Cloud Computing	6
DBM32	Elective 2	6
DBM33	Change Management	4
DBM34	Internet of Things	4

4th semester:	modules/courses	ECTS
DBM41	Master's thesis	30

DBMZL	Additional work: research project, practical project or professional practice	ECTS 30

Module description:

The individual modules are described in detail below. Unless otherwise stated, the examination requirements are graded.

Module:	Digital Business Essentials
Abbreviation:	DBM11
Subtitle:	
Courses:	Lecture
Semester:	Winter semester only
Module coordinator:	Prof. Dr. Alexander Rossmann
Lecturer:	Prof. Dr. Alexander Rossmann, Various executives from the business practice
Language:	German
Curriculum allocation:	Digital Business Management Master's, Compulsory subject, 1st semester
Teaching format/SWS:	Lecture, 2 hours per week Exercise, 2 hours per week
Workload:	Classroom study, 50 hours Independent study, 130 hours
Credit points:	6 ECTS
Prerequisites:	None
Required English language skills:	Review and analysis of English-language literature
Study/examination requirements/ Examination format:	Term paper, presentation, written exam

Module objectives:

The Digital Business Essentials module covers fundamental issues relating to the analysis and modelling of digital business strategies. It pursues a variety of learning objectives. Upon completion of the module, participants will be able to differentiate between the terms 'business model' and 'operating model' and identify the key elements of the definition of corresponding models. In addition, the functional logic of different business and operating models will be explained in detail and illustrated with case studies. Subsequently, fundamental characteristics of digital transformation are defined. Participants will be able to distinguish between different phases of digital transformation, e.g. the development of Web 1.0, Web 2.0 and Web 3.0. Important core concepts of digital transformation are discussed. The increasing change in media usage behaviour and the influence of media usage on the economy and society are also discussed. On this basis, basic technological concepts that are essential for describing digital transformation projects are defined.

Furthermore, the influence of digitalisation on established business and operating models is characterised. The focus is on the areas of customer experience and production or operations (Industry 4.0). Both the influence on established models and the disruptive development of new models are discussed. On this basis, programme participants will be

able to determine the influence of digitalisation on different companies and industries. Participants will then gain insights into basic concepts of digital strategies, e.g. the use and management of software, the IT architecture of companies and basic concepts of the digitalisation of business processes.

Intended learning outcomes:

Knowledge: Participants build up knowledge on the key topics of digitalisation. The main focus is on gaining a broad understanding of the topics and how they interact with each other. The knowledge imparted is therefore broad in scope and relates to terms, core topics and contexts. The individual areas of knowledge are explored in greater depth in the follow-up modules.

Skills: The skills acquired in this module relate primarily to the analysis of organisations with regard to relevant aspects of digitalisation. This includes, for example, the analysis of business models based on the Business Model Canvas and the assessment of key communication channels to enhance the customer experience. In addition, participants will be able to apply key basic concepts of Industry 4.0 to companies.

Competencies: The competencies acquired in the module relate to the application of the knowledge outlined in the form of case studies. In addition, after completing the module, participants will be able to aggregate relevant knowledge modules on individual sub-topics of digitalisation from databases. Competencies in the field of scientific work will also be further developed.

Content:

- Characteristics and phases of digital transformation.
- Changes in customer behaviour.
- Fundamental questions regarding the configuration of business and operating models, business model canvas, value proposition canvas.
- Guidelines for the strategic planning of business and operating models.
- Transformation of business and operating models in practice.
- The influence of digitalisation on the customer experience and the internal operating model (operations).
- Industry 4.0, digitalisation of production systems.
- Linking IT and business issues.
- Digitalisation of business processes.
- Technological developments, Web 1.0, Web 2.0, social media and the Internet of Things
- Digital governance: management of digital transformation processes.
- Agile organisational models.

Methodological competence:

Methodological skills are taught in this module with a focus on conducting systematic literature analysis and structuring academic work.

Media forms:

Lectures, exercises, case studies, lecture notes with PPT slides, sample publications, in-depth concept work on case studies, presentations.

Literature:

- Bones, C., Hammersley, J., Shaw, N. (2019) Optimising Digital Strategy. Kogan Page
- Brynjolfsson, E. & McAfee, A. (2014): The Second Machine Age. Work, Progress, and Prosperity in a Time of Brilliant Technologies. Norton & Company 2014
- Forsgren, N., Humble, J., & Kim, G. (2018). Accelerate-Building and Scaling High Performing Technology Organisations. IT Revolution ISBN, 978-1942788331.
- Kotter, J. P. (2019). Accelerate. Elex Media Komputindo.
- Osterwalder, A. & Pigneur, Y. (2010): Business Model Generation: A handbook for visionaries, game changers, and challengers. John Wiley & Sons 2010
- Osterwalder, A. et al. (2014): Value proposition design: How to create products and services customers want. John Wiley & Sons 2014
- Reis, E. (2011). The Lean Startup. New York: Crown Business, 27, 2016-2020.
- Ross, J. W., Beath, C. M., & Mocker, M. (2019). Designed for digital: How to architect your business for sustained success. Mit Press.
- Urbach, N. et al. (2019). The impact of digitalisation on the IT department. Business & Information Systems Engineering 61, 123-131.
- Westerman, G., Bonnet, D. & McAfee, A. (2014): Leading digital: Turning technology into business transformation. Harvard Business Review Press 2014.

Module:	Digital Business Processes
Abbreviation:	DBM12
Subtitle:	
Courses:	Lecture
Semester:	Winter semester only
Module coordinator:	Prof. Dr. Dieter Hertweck
Lecturer:	Prof. Dr. Dieter Hertweck, Prof. Dr. Martin Schmollinger, Dr. Holger Wittges
Language:	German
Curriculum assignment:	Digital Business Management Master's, Compulsory subject, 1st semester
Teaching format/SWS:	Lecture, 2 hours per week Exercise, 2 hours per week
Workload:	Classroom study, 50 hours Independent study, 130 hours
Credit points:	6 ECTS
Prerequisites:	None
Required English language skills:	Review and analysis of English-language literature, use of English-language software
Study/examination requirements/ Examination format:	Term paper, presentation, oral exam

Module objectives:

The Digital Business Processes module addresses the key question of how the value proposition in digital business models can be implemented through cooperative business processes within and between companies. The module starts with the basics of process organisation in companies and uses case studies to show how business processes can be identified, modelled with BPMN 2.0, and gradually automated using workflow platforms. Building on this, business processes are treated as the basis for digital services. This includes the modelling, simulation and prototypical execution of collaborative service processes between companies and in service ecosystems, as well as the use of suitable cloud platforms.

Intended learning outcomes:

Knowledge: Participants should understand the basics of digitising business processes and converting them into digital services. This includes process strategies, service

business models, the conversion of business processes into workflows, and the economic fundamentals of service implementation.

Skills: Development of process-based business models using the value proposition design method, modelling of business processes using simple methods such as the service blueprint or more complex ones such as BPMN 2.0. Simulation and ROI analysis of digital service processes, derivation of digital workflows from service process models, prototyping of digital service fragments on cloud platforms, analysis and modelling of service ecosystems.

Competencies: Confident application of acquired knowledge and skills to new contexts in the context of case studies.

Content:

- Introduction and common fundamentals of business process management
- Introduction to the importance of business processes in digital transformation (strategy, development, implementation, control).
- Methods for surveying and modelling business processes with BPMN 2.0.
- Methods for workflow definition and process automation
- Development, modelling and simulation of digital service ecosystems.
- Digital platforms as a resource for process and service implementation.

Methodological competence:

Methodological skills are taught within the module, particularly with regard to the design and development of case studies and the application of project management methods.

Media formats:

Lectures, exercises, case studies, scripts with PPT slides, sample publications, modelling tools, workflow engines, cloud service platforms

Literature:

- Allweyer, T. (2014): Introduction to Business Process Management Systems. BoD Verlag Norderstedt 2014.
- Blaschke, Michael & Haki, Kazem & Aier, Stephan & Winter, Robert. (2018). Capabilities for Digital Platform Survival: Insights from a Business-to-Business Digital Platform. ICISS 2018 Proceedings.
- Califf, Christopher B.; Sarker, Saonee; Sarker, Suprateek; and Skilton, Mark (2016) "The Role and Value of a Cloud Service Partner," MIS Quarterly Executive: Vol. 15 : Iss. 3 , Article 4.
- Dumas et. al. (2013) Fundamentals of Business Process Management. Springer-Verlag, Berlin-Heidelberg 2013.
- Hanschke, I. et. al. (2014): Business Analysis – Understanding Business Requirements Simply and Effectively and Translating Them into IT Solutions. Hanser-Verlag, Munich 2014.

- Josey, A. et. al. (2014): Archimate 2.1. A pocket guide. The Open Group Publications. Van Haren Publishing, Zaltbommel NL 2014.
- Li, Mahei Manhai and Peters, Christoph, (2019). "FROM SERVICE SYSTEMS ENGINEERING TO SERVICE IN-NOVATION – A MODELLING APPROACH". In Proceedings of the 27th European Conference on Information Systems (ECIS), Stockholm & Uppsala, Sweden, 8–14 June 2019. ISBN 978-1-7336325-0-8 Research Papers.
- Palmer, N., Svenson, K. (2013): Empowering Knowledge Workers (BPM and Workflow Handbook Series). Future Strategies Inc., 2013.
- Rücker, Bernd, and Jakob Freund. Practical Handbook BPMN 2.0: With Introduction to DMN. Carl Hanser Verlag GmbH Co KG, 2019.
- Sapir, J., Fingar, P. (2014): Master your untamed business processes: How to build smart process applications on the Salesforce1 platform. E-book, salesforce.com
- van der Aalst, Wil MP. (2022): "Process mining: a 360 degree overview." Process Mining Handbook. Springer, Cham, 2022. 3-34.

Module:	Enterprise Architecture Management
Abbreviation:	DBM13
Subtitle:	
Courses:	Lecture
Semester:	Winter semester only
Module coordinator:	Prof. Dr. Uwe Breitenbücher
Lecturer:	Prof. Dr. Alfred Zimmermann, Prof. Dr. Dieter Hertweck, Prof. Dr. Uwe Breitenbücher, Dr. Christian Schweda, Dr. Dierk Jugel
Language:	German
Curriculum assignment:	Digital Business Management Master's, Compulsory subject, 1st semester
Teaching format/SWS:	Lecture, 4 hours per week Exercise, 2 hours per week
Workload:	Classroom study, 80 hours Independent study, 160 hours
Credit points:	8 ECTS
Prerequisites:	None
Required English language skills:	Review and analysis of English-language literature
Study/examination requirements/ Examination format:	Project work

Module objectives:

The module covers topics related to model-centric digital enterprise architectures for the digital business of the future and the associated coordinated IT, as well as related topics of IT governance, IT management and digital transformation. The course aims to enable participants to implement holistic enterprise architecture management for digital transformation. Participants will be able to holistically design, understand, analyse and optimise digital architectures for operational applications for intelligent products and services from a technical and technological perspective.

Knowledge: Participants acquire basic knowledge about the development, use, analysis, optimisation and further development of structured models for enterprise architectures. They also gain knowledge about IT governance and IT management. In this module, participants will acquire practical modelling skills, particularly through case studies, e.g. how enterprise architectures can be modelled using the ArchiMate modelling language.

Skills: Through a sequence of theories, exercises and practical creative work, standardised modelling languages, methods and tools of enterprise architecture management are applied to specific example scenarios. Participants expand their individual partial results into a comprehensive case study, thereby acquiring the skills to combine and integrate the various aspects of enterprise architecture management.

Competencies: Participants are able to use methods, modelling languages and standards for the creative development and analysis of holistic enterprise architecture management. The knowledge gained from lectures, exercises and case studies can be independently transferred by participants to other areas and applied in practice.

Content:

- Modern IT technologies and architecture styles
- Models and metamodels for digital architectures
- The digital ecosystem in the interaction between business and IT
- Digital transformation of companies, products and services
- Fundamental concepts of enterprise architecture management
- Methods for enterprise architecture and IT management
- ArchiMate for modelling enterprise architectures
- TOGAF
- COBIT
- Digital IT governance
- DEA – Digital Enterprise Architecture Reference Cube

Methodological competence:

Within the scope of the module, methodological skills are taught primarily in the modelling, analysis, optimisation and further development of modern IT and enterprise architectures.

Media formats:

Lectures, lecture notes, presentations, technology demonstrations, exercises, case studies, in-depth concept work, documentation, prototypes.

Literature:

A. McAfee, E. Brynjolfsson: Machine, Platform, Cloud. W. W. Norton, 2017.

S. Balakrushnan, O. Mamnoon, J. Bell, B. Currier, E. Harrington, B. Helstrom, P. Maloney, M. Martins: Microservices Architecture. White Paper, The Open Group, 2016.

S. Bente, U. Bombosch, S. Langade: Collaborative Enterprise Architecture. Morgan Kaufmann, 2012.

S. A. Bernard: EA3: An Introduction to Enterprise Architecture. AuthorHouse, 2012.

Blaschke, M. Haki, M. K., Riss, U. Aier, S. (2017) Design Principles for Business-Model-based Management Methods-A Service-Dominant Logic Perspective. In Maedche, A. et al. (Eds.) DESRIST 2017, 179-198, Springer

Bouguettaya, A. et al. (2017) A service computing manifesto: the next 10 years. Communications of the ACM, vol. 60, no. 4, 64–72

De Haes, S., Van Grembergen, W., Joshi, A., & Huygh, T. (2020) Enterprise Governance of Information Technology: Achieving Alignment and Value in Digital Organisations. Springer

Drescher, D. (2017) Blockchain Basics. Apress

Emery, D., Hilliard, R. (2009) Every Architecture Description needs a Framework: Expressing Architecture Frameworks Using ISO/IEC 42010. IEEE/IFIP WICSA/ECSA, 31-39

El-Sheikh, E., Zimmermann, A., Jain, L. (2016) Emerging Trends in the Evolution of Service-Oriented and Enterprise Architectures. Springer

Lankhorst, M. (2017) Enterprise Architecture at Work: Modelling, Communication and Analysis. Springer

McAfee, A., Brynjolfson, E. (2017) Machine Platform Crowd. Norton & Company

Object Management Group (2011) Meta Object Facility (MOF) Core Specification, Ver. 2.5

Open Group (2018) TOGAF Version 9.2. Van Haren Publishing

Open Group (2023) ArchiMate 3.2 Specification. Van Haren Publishing

Open Group (2017) Value Streams. The Open Group

Lüftenegger, E. R. (2014) Service-Dominant Business Logic. Eindhoven University of Technology

Newman, S. (2015) Building Microservices: Designing Fine-Grained Systems. O'Reilly

Osterwalder, A., Y. Pigneur, Y. (2010) Business Model Generation. John Wiley, 2010

Osterwalder, A., Pigneur, Y. Bernarda, G., Smith, A., Papadokos, T. (2014) Value Proposition Design. John Wiley

Op't Land, M. Proper, H. A., Waage, M., Cloo, J., Steghuis, C. (2009) Enterprise Architecture – Creating Value by Informed Governance. Springer

Parker, G. G., Van Alstyne, M. W., Choudary, S. P. (2016) Platform Revolution. Norton & Company

Rogers, D. L. (2016) The Digital Transformation Playbook. Columbia University Press

Ross, J. W., Beath, C. M., Mocker, M. (2019) Designed for Digital. MIT Press

Uckelmann, D., Harrison, M., Michahelles, F. (2011) Architecting the Internet of Things. Springer

Weill, P., Ross, J. W. (2004) IT Governance. Harvard Business School Press

Wierda, G. (2017) Mastering ArchiMate. Edition III.TC1, P&A

Tiwana, A. (2014) Platform Ecosystems. Aligning, Architecture, Governance, and Strategy. Morgan Kaufmann

Zimmermann, A., Schmidt, R., Jain, L. (2021) Architecting the Digital Transformation. Springer

Zimmermann, A., Schmidt, R., Jain, L. (2023) Architecture of Digital Transformation. Springer

Module:	Digital Strategy
Abbreviation:	DBM21
Subtitle:	
Courses:	Lecture
Semester:	Summer semester only
Module coordinator:	Prof. Dr Alexander Rossmann
Lecturer:	Various lecturers from industry
Language	German
Curriculum assignment:	Digital Business Management Master's, Compulsory subject, 2nd semester
Teaching format/SWS:	Lecture, 2 hours per week Exercise, 2 hours per week
Workload:	Classroom study, 50 hours Independent study, 130 hours
Credit points:	6 ECTS
Requirements:	Digital Business Essentials
Required English language skills:	Review and analysis of English-language literature
Coursework/examination requirements/ Examination format:	Term paper

Module objectives:

The Digital Strategy module teaches fundamental concepts and methods for the development, analysis and evaluation of digital strategies. Digital transformation is omnipresent in the economy. Companies must adapt to digital change in the form of digital strategies or proactively shape it themselves. In addition to the basic concepts of digital strategies, the module covers the effects of digital strategies on digital transformation, enterprise and product architectures, innovation processes and strategy implementation using relevant application examples.

Intended learning outcomes:

Knowledge: Students are familiar with the various approaches to dealing with the basic concepts of digital strategies. They understand the interactions between digital strategies and other strategic concepts (e.g. corporate strategy, IT strategy) and are able to design essential components for the implementation of digital strategies.

Skills: Students will be able to analyse, evaluate and create strategy models for companies.

Competencies: After completing the module, students will be able to make recommendations for the use of digital strategies depending on given use cases and to communicate this knowledge systematically. Students will be able to design and model digital strategies and use the associated methods and tools.

Content:

The Digital Strategy module uses lectures and integrated exercises to teach forward-looking models and methods for digital strategies in companies. The lecture is supplemented by the study of theoretical principles, practical case studies, tools, instruments and procedures. The aim of the course is to effectively prepare students for the design of digital strategies. To this end, digital strategies are discussed conceptually and methodologically and then concretised using corporate examples. A special focus is placed on the transformation of the automotive industry towards software-defined vehicles.

Specifically, the focus is on the following content:

- Conceptual definition of digital strategies
- Distinction between digital strategy and corporate/IT strategy
- Strategy content and strategy processes
- Designing digital strategy: digital business models,
  digital customer interfaces, internal company decisions and operations
- Digital maturity and the design of digital companies: digital business design, customer data, operational backbone, digital platforms, developers and ecosystems
- Strategy processes, from idea to implementation: innovation ideas, digital vision and mission, digital business operating model, integration of strategy elements into the digital corporate strategy
- Strategic portfolio, strategic planning and strategic controlling

Media formats:

Lectures with integrated exercises, scripts in the form of presentations, whiteboard and PPT exercises, demonstrations, exercises, case studies.

Literature:

Benson, R. J., Bugnitz, T. L., Walton, W. B. (2004) From Business Strategy to IT Action. Wiley

Bones, C., Hammersley, J., & Shaw, N. (2018). *Optimising Digital Strategy: How to make informed, tactical decisions that deliver growth*. Kogan Page Publishers.

Forsgren, N., & Humble, J. (2018). *ACCELERATE: Building and Scaling High performing Technology Organisation*. MR. DLA.

Kim, G., Humble, J., Debois, P., Willis, J., & Forsgren, N. (2021). *The DevOps handbook: How to create world-class agility, reliability, & security in technology organisations*. IT Revolution.
Lankhorst, M. et. al. (2018). *Enterprise Architecture at Work: Modelling, Communication and Analysis*. Springer

Ross, J. W., Beath, C. M., & Mocker, M. (2019). *Designed for digital: How to architect your business for sustained success*. Mit Press.

Kotusev, S. (2018). *The practice of enterprise architecture: A modern approach to business and IT alignment*. Sk Publishing.

Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital: Turning technology into business transformation*. Harvard Business Press.

Further reading will be announced in the lecture.

Module:	Elective 1/1
Abbreviation:	DBM22
Subtitle:	Entrepreneurship & Innovation
Courses:	Lecture
Semester:	After announcement, only in the summer semester or winter semester
Module coordinator:	Prof. Dr. Jürgen Münch
Lecturer:	Prof. Dr. Jürgen Münch
Language:	German
Curriculum assignment:	Digital Business Management Master's, Elective
Teaching format/SWS:	Lecture, 2 hours per week Exercise, 2 hours per week
Workload:	Classroom study, 50 hours Independent study, 130 hours
Credit points:	6 ECTS
Prerequisites:	Digital Business Essentials
Required English language skills:	Review and analysis of English-language literature
Coursework/examination requirements/ Examination format:	Presentation, oral examination

Module objectives:

The objectives of this module are:

1. To provide participants with a comprehensive overview of the process of developing innovative products and services in established companies and start-ups.
2. To highlight ways in which promising innovation ideas can be accurately described, customer problems identified and important success criteria recognised.
3. To increase the probability of success for products and services by teaching participants to systematically generate new product ideas, test innovative ideas and understand growth strategies.

First, participants are given a comprehensive overview of the entrepreneurial process. The fundamental activities involved in developing new and innovative products and services under conditions of great uncertainty are presented and illustrated with examples. The different constraints in established companies and start-ups are discussed. It is explained how uncertainties can be actively used in the development process to produce successful

innovations. In addition, important principles and milestones (such as product-market fit) are discussed.

Subsequently, various options are presented for how promising innovation ideas can be described quickly and accurately. This explains how to find customer problems that are worth solving. Both theoretical foundations, such as the jobs-to-be-done theory, and practical methods, such as the creation of opportunity solution trees, are taught. In addition, it shows how to identify important success criteria and how to recognise and avoid critical risks associated with an idea at an early stage. Among other things, assumption mapping is used as a method for this.

Since many ideas are not successful on the market, the course shows how the probability of success for new products and services can be increased. To this end, a comprehensive overview of testing business ideas is provided. First, participants learn how to conduct customer interviews effectively and efficiently in order to discover and validate customer problems. Participants learn practical questioning techniques that enable them to obtain relevant information from potential customers. They also learn to recognise answers that could lead to incorrect conclusions in product development. Based on the principles of evidence-based product development (Lean Startup), the most important testing techniques and types of experimentation are presented and illustrated with practical examples. For example, participants learn how to validate solution assumptions with concierge MVPs and A/B testing, or how to determine and test product prices.

Building on a sound understanding of customer problems, the course shows how to generate new product ideas that are superior to existing products and services. Based on theoretical principles and fundamental design principles, various ideation techniques such as "Spark Canvas" are presented and applied in practical exercises. Participants will also learn how to transform the ideas they have developed into digital prototypes using tools such as Proto.io.

In order to understand how start-ups and innovation projects grow and scale, various growth strategies are presented. The metrics that are important for the growth of products and services are highlighted. This includes an explanation of how to describe and calculate "traction" as an overarching metric for the success of innovative products and services. Finally, McClure metrics are used to show how traction can be concretised in order to align development appropriately.

Innovation processes often involve a lot of data, and it is usually unclear which data is important at any given time. Therefore, we will show how to analyse relevant data and draw the right conclusions. The basics of cohort analysis are taught, which can be used to assess the success of product decisions statistically accurately and appropriately from an investor's perspective. In addition, the Theory of Constraints (TOC) is introduced, which can be used to assess which activity is important to carry out next.

To round off the content, important new technologies, known as enabling technologies, are presented that can lead to revolutionary product and business model innovations. The basics of start-up financing and interesting organisational issues (e.g. the difference between entrepreneurship and intrapreneurship, soft skills of start-up founders) are also covered.

Intended learning outcomes:

Knowledge: Participants learn the basics of lean innovation processes based on iterative product development and customer feedback. They gain insights into the implementation of start-up methods such as hypothesis formation, validation of critical assumptions and the creation of learning prototypes (minimum viable products). They will also be trained in product discovery and customer development, agile management, and data-driven decision-

making. The course also promotes entrepreneurial spirit and proactive action. With this knowledge, course participants will be better prepared to develop innovative and sustainable products and services that can meet the challenges of a dynamic market.

Skills: Upon completion of the "Entrepreneurship Skills" module, participants will be able to:

- Successfully conduct customer interviews to identify and understand the needs and challenges of the target group.
- Recognise and prioritise important customer problems.
- Develop and position prototypes and solutions in a targeted manner.
- Use validation techniques to test ideas and obtain early feedback in order to make data-driven decisions and increase market success.
- Develop growth strategies and model traction to successfully scale a business or innovation project.
- Perform cohort analysis to monitor and continuously optimise customer behaviour and the success of business activities.

Competencies: As a result of the course, participants acquire essential entrepreneurship skills. These include the ability to develop creative and goal-oriented ideas, take initiative and act proactively, and remain confident in the face of uncertainty, ambiguity and risk. The skills taught enable participants to select and apply appropriate activities, methods and principles in the innovation process in order to ensure sustainable success.

Content:

The "Entrepreneurship & Innovation" module provides a comprehensive overview of the development of innovative products and services in established companies and start-ups. Participants learn how to find promising innovation ideas, identify customer problems and recognise success criteria. The probability of success for products and services is increased through systematic idea development, innovation testing and growth strategies. Other topics include customer interviews, techniques for testing business and innovation ideas, and ideation techniques. Participants also learn about growth strategies and the data-based analysis and evaluation of product and service innovations. The module is rounded off with the organisation, implementation and communication of innovations in companies and the presentation of enabling technologies. The following topics are covered in chronological order:

Fundamentals:

- Concept formation: "start-up", "entrepreneurship", "innovation"
- Entrepreneurial process, continuous innovation
- Meta-principles

Description of innovation ideas:

- Structuring with Lean Canvas
- Jobs-to-be-done theory
- Analysis of forces when choosing or changing products or services, Forces Model
- Diagnosis of business models
- Problem exploration (problem-solution fit):
- Basic course on customer interviews and questioning techniques
- Identification and prioritisation of critical assumptions
- Testing business and innovation ideas, Lean Startup
- Solution development (product-market fit):
- Ideation techniques
- Communication of solution ideas and storytelling
- Development of digital prototypes and minimum viable products

Growth (scale):

- Strategies for entrepreneurs and innovators
- Development of a traction model, Fermi estimation
- Quantitative success measurement and monitoring
- McClure metrics for the customer lifecycle
- Benchmarking a start-up with cohort analysis
- Identification and elimination of bottlenecks (Theory of Constraints)

Related topics:

- Intrapreneurship vs. entrepreneurship
- Financing start-ups
- Enabling technologies

Methodological competence:

Within the framework of the module, methodological skills are deepened with regard to the selection and application of methods in the innovation process, testing ideas, conducting viable analyses for decision-making, quantitative success assessment and the development of growth strategies. The application of the methods is taught using consistent case studies and mini-workshops.

Media formats:

Lectures, individual/group/project work

Literature:

Alvarez, C. (2017). Lean Customer Development: Building Products Your Customers Will Buy, O'Reilly.

Bland, D. J., Osterwalder, A. (2019). Testing Business Ideas, Wiley.

Christensen, C. (2016). Competing Against Luck: The Story of Innovation and Customer Choice, Harper Business.

Constable, G. (2014). Talking to Humans: Success starts with understanding your customers, Giff Constable.

Fitzpatrick, R. (2013). The Mom Test: How to talk to customers & learn if your business is a good idea when everyone is lying to you, CreateSpace Independent Publishing Platform.

Goodwin, K. (2009). Designing for the Digital Age: How to Create Human-Centred Products and Services, Wiley.

Humble, J, Molesky, J. O'Reilly, B. (2014). Lean Enterprise: How High Performance Organisations Innovate at Scale. O'Reilly.

Maurya, A. (2022). Running Lean: Iterate from Plan A to a Plan That Works. 3rd edition, O'Reilly.

Maurya, A. (2016). Scaling Lean: Mastering the Key Metrics for Startup Growth. Portfolio.

Ries, E. (2011). The Lean Startup: How today's entrepreneurs use continuous innovation to create radically successful businesses. Crown Books.

Ries, E. (2017). The Startup Way: How Entrepreneurial Management Transforms Culture and Drives Growth. Portfolio Penguin.

Toma, D. and Gons, E. (2022). Innovation Accounting: A Practical Guide For Measuring Your Innovation Ecosystem's Performance, BIS Publishers, 1st edition

Viki, T. and Toma, D. (2017). The Corporate Startup: How Established Companies Can Develop Successful Innovation Ecosystems. Vakmedianet Management bv.

Vikiu, T. (2022). Pirates in the Navy: How Innovators Lead Transformation, Benneli Jacobs.

Module:	Elective 1/2
Abbreviation:	DBM22
Subtitle:	Artificial Intelligence
Courses:	Lecture
Semester of study:	After announcement, only in the summer semester or winter semester
Module coordinator:	Prof. Dr. Alexander Rossmann
Lecturer:	Prof. Dr Alexander Rossmann, Lecturers from industrial companies
Language:	German
Curriculum assignment:	Digital Business Management Master's, Elective
Teaching format/SWS:	Lecture, 2 hours per week Exercise, 2 hours per week
Workload:	Classroom study, 50 hours Independent study, 130 hours
Credit points:	6 ECTS
Prerequisites:	Digital Business Essentials
Required English language skills:	Review and analysis of English-language literature
Coursework/examination requirements/ Examination format:	Term paper, presentation

Module objectives:

The objectives of the module are to provide a theoretical introduction to the subject area of artificial intelligence (AI) and to develop prototypes for specific applications in the field of machine learning (ML) in a practice-oriented manner. For this, the module begins with an introduction to the concept and historical development of AI. The focus of the practical applications in the lecture is on machine learning approaches based on Python. Therefore, various learning and decision-making theories as well as methods of multivariate statistics are taught. The module focuses on probabilistic approaches to AI and their application in the field of machine learning. It also provides an in-depth look at neural networks and deep learning. From a practical perspective, the module focuses on the prototypical development and implementation of various ML applications in the form of micro-services. For this, cloud-based services are implemented for the development of selected resources in the areas of chatbots, text-to-speech, speech-to-text, natural language understanding, visual recognition and machine learning. The corresponding prototypes are assessed as part of the module.

Intended learning outcomes:

Knowledge: The knowledge imparted in the module focuses on the conceptual classification of AI and the assignment of relevant basic terms such as machine learning and deep learning. Students are familiar with the theoretical and historical context of AI and can evaluate the development of the subject area. Further knowledge relates to the use of data models and the application of multivariate statistical methods. Students will also learn about different applications of AI and the implementation of AI components as micro-services.

Skills: After completing the module, students' skills will primarily relate to the development and application of ML models in Python and the implementation of cloud-based AI services. To this end, they will first receive a basic introduction to the structure and logic of the relevant development environments. On this basis, students will implement their own prototypes and will be able to evaluate these as well as the associated development and learning process.

Skills: The skills taught in this module relate to basic assessment and development skills in the field of ML. Students will be able to evaluate relevant sub-areas of the subject and, on this basis, make decisions on the implementation of ML services and their integration into business models. This also involves basic practical skills for developing corresponding prototypes.

Content:

The Artificial Intelligence module teaches fundamental skills relating to the understanding, application and impact of artificial intelligence (AI). The core concept of AI is first classified in conceptual and social terms. The module also presents the fundamental concepts in the field of machine learning (ML) that are essential for understanding artificial intelligence. Further content on the design and application of neural networks and the associated approaches to deep learning form another focus of the module. Typical ML applications and platforms are then discussed. The module is rounded off with the implementation of specific project work based on Python and IBM Cloud. From a chronological perspective, the following topics are covered.

- Definition of the term "artificial intelligence" (AI).
- History of AI and the influence of AI on society.
- AI and digital business models, AI in customer experience, AI and operations.
- Machine learning (ML) as a subfield of AI, different forms of ML.
- Complex solution spaces and decisions under uncertainty, possible problem solutions, probabilistic approaches in AI.
- Introduction to multivariate statistics.
- Basic course in Python, application of Python for ML, basic modules and applications for ML in Python.
- Data preparation, data modelling and model evaluation in Python.
- Neural networks and deep learning, application examples with TensorFlow.
- Typical preconfigured AI applications in the IBM Cloud:
  chatbots, text to speech, speech to text, natural language understanding, visual recognition, etc.
- Deployment of ML services, application examples for ML services, integration of ML components as micro-services.

Methodological competence:

Methodological skills are deepened within the module, particularly with regard to the application of Python for the development and evaluation of ML models, the conceptual development of cloud solutions, and the use of AI cloud applications and rapid prototyping.

Media formats:

Lectures, individual, group and project work

Literature:

Aggarwal, C.C. (2018): Neural Networks and Deep Learning. Springer

Deloitte (2018): State of AI in the Enterprise. Deloitte

Economist (2016). Artificial Intelligence - Million-Dollar Babies. 2 April, https://www.economist.com/business/2016/04/02/million-dollar-babies

Ertel, W. (2016). Basic Course in Artificial Intelligence: A Practical Introduction. Springer-Verlag

IDC (2019): AI in a Nutshell: Opportunities and Challenges. IDC

Kaplan, A., & Haenlein, M. (2019). Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. Business Horizons, 62(1), 15-25.

Géron, A. (2020): Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow. O'Reilly

Russell, S. J., & Norvig, P. (2016). Artificial intelligence: a modern approach. Malaysia; Pearson Education Limited

Robert, A. (2019): Machine learning: The Complete Beginner's Guide to Learn and Effectively Understand Machine Learning Techniques

Shearer, C. (2000). The CRISP-DM model: the new blueprint for data mining. Journal of data warehousing, 5(4), 13-22

Module:	Software Management
Abbreviation:	DBM23
Subtitle:	
Courses:	Lecture
Semester:	Summer semester only
Module coordinator:	Prof. Dr. Christian Decker
Lecturer:	Prof. Dr. Christian Decker, Prof. Dr. Jürgen Münch, Prof. Dr. Karlheinz Blank Prof. Dr. Ben Marx Sebastian Eberhard
Language:	German
Curriculum assignment:	Digital Business Management Master's, Compulsory subject, 1st semester
Teaching format/SWS:	Lecture, 4 hours per week Exercise, 2 hours per week
Workload:	Classroom study, 80 hours Independent study, 160 hours
Credit points:	8 ECTS
Prerequisites:	None
Required English language skills:	Review and analysis of English-language literature, use of English-language software
Study/examination requirements/ Examination format:	Presentation, term paper, project work

Module objectives:

Software plays a central role in all products. The share of value added by software is growing steadily. This makes software, as an intangible product, an important management issue. The software manager creates the environment for successful software product development that corresponds to the company's goals.

The module introduces software management in a practical way through a simulation camp, in which participants learn about the working world of a software manager. The theoretical basics are taught along the software life cycle, the associated processes and process models.
Participants are familiarised with quantitative tools, methods for successful software product management and organisational forms for the continuous development of software products.

The module concludes with a series of topics on mobile application solutions, their design and use for optimising business processes, and current technologies. Participants in the module learn and understand the methods for successful software management and can apply them in companies.

Intended learning outcomes:

Knowledge: Participants acquire knowledge and experience of project management methods for the creation and implementation of software projects and knowledge of different systematic approaches to software development. In addition, knowledge of innovative product management methods and methods for recording and validating successful software products is imparted. Another focus is on building up expertise on the sensible use of open source and licensing models in a corporate environment. Finally, knowledge of the structure, current technologies and special restrictions of mobile solutions is developed.

Skills: In this module, participants acquire the skills of a software manager and learn how to apply them. Specifically, this means that software managers create the environment for successful software product development that corresponds to the company's goals. Software managers communicate with: software developers, customers, start-ups, researchers, the software "scene" – online/offline, other software managers, and other reference groups. Software managers recognise innovative developments in the field and successfully change their environment for the development of innovative software products.

Competencies: Participants are able to apply successful software management in companies. Depending on given use cases, they can make recommendations for the use of software management geared towards digital transformation and communicate this knowledge through case studies for practical and scientific purposes. They will be enabled to take responsibility for software product development in the future and lead it to successful software products.

Content:

- Project management simulation camp
- Process models for the production of software products
- Metrics for software products and processes
- Software product management
- Make-or-buy, use of open source software
- Management of distributed software development projects
- Mobile applications in context: expansion and optimisation of business processes with mobile devices
- Mobile solutions: manufacturer-specific and manufacturer-independent approaches
- Current mobile technologies: platforms, frameworks and sensors

Exercises are carried out in changing team compositions, with the teams taking on the role of software managers. The aim is to independently deepen the content and explore different perspectives.

Methodological competence:

Methodological skills are deepened within the module, particularly with regard to the application of project management methods.

Media formats:

Lecture, exercises, script with PDFs of the lecture slides, sample publications, opportunity to visit the laboratory

Literature:

- Balzert, H. & Ebert, C. (2008): *Textbook of Software Engineering: Software Management.* Spektrum Akademischer Verlag 2008
- Jonathan Rasmusson. 2010. *The Agile Samurai: How Agile Masters Deliver Great Software* (1st ed.). Pragmatic Bookshelf.
- Dan Olson (2015): *The Lean Product Playbook: How to Innovate With Minimum Viable Products and Rapid Customer Feedback*, Wiley Verlag.
- Marty Cagan (2018): Inspired, *How to Create Tech Products Customers Love*, Wiley Verlag.
- Teresa Torres (2021): *Continuous Discovery Habits: Discover Products That Create Customer Value and Business Value.* Product Talk LLC.

Further reading will be announced during the lecture.

Module:	Cloud Computing
Abbreviation:	DBM31
Subtitle:	
Courses:	Lecture and exercises
Semester:	Winter semester only
Module coordinator:	Prof. Dr. Uwe Breitenbücher
Lecturer:	Prof. Dr. Uwe Breitenbücher
Language	German
Curriculum assignment:	Digital Business Management Master's Degree, Compulsory subject, 3rd semester
Teaching format/SWS:	Lecture, 2 hours per week Exercise, 2 SWS
Workload:	Classroom study, 60 hours Independent study, 120 hours
Credit points:	6 ECTS
Prerequisites:	Digital Business Essentials
Required English language skills:	Review and analysis of English-language literature, working with English-language cloud platforms
Coursework/examination requirements/ Examination format:	Project work

Module objectives:

Modern software systems often have to be made available to a large number of users. Cloud environments offer both the necessary infrastructure and suitable services to scale software elastically and reduce the effort required to manage the underlying systems for the customer. The aim of this module is to introduce participants to the concepts, architectures and technologies of cloud computing. Participants will learn about the different services offered in typical cloud environments and understand the opportunities this presents for running their own software applications in the cloud. Furthermore, architectural styles suitable for cloud-based applications will be taught and applied in practice using various case studies, and their suitability will be evaluated. After completing the module, participants will therefore be able to analyse system architectures and evaluate their suitability for operation in the cloud.

Intended learning outcomes:

Knowledge: Participants will learn about cloud computing concepts, architectures and technologies and how to design applications for the cloud. The basics of scaling and elasticity will be taught, as well as the different cloud service models (IaaS, CaaS, PaaS, etc.) and deployment models (public cloud, private cloud, etc.) of cloud computing. By covering different architectural styles such as service orientation, microservices, REST and pipes and filters, participants will gain further knowledge about which approaches are suitable for large cloud-based systems and what consequences the respective approaches have for the scalability, elasticity, maintainability and adaptability of the overall system. In addition, the concepts of "strict consistency" and "eventual consistency" are introduced and their impact on cloud applications is discussed.

Skills: Participants will gain the ability to independently (1) design architectures for cloud-based applications and (2) select suitable cloud services for their operation. They develop an understanding of the interaction and dependencies of architectures and technologies, enabling them to design large systems for large numbers of users. These skills are reinforced in particular in the integrated exercises in the form of individual and group tasks.

Competencies: Students acquire the competence to develop suitable system architectures for cloud applications. Furthermore, after attending the module, students will be able to analyse, evaluate and optimise both architectures and their implementation with regard to various non-functional properties such as adaptability, scalability, vendor lock-in and availability.

Content:

- Fundamentals of cloud computing
- Cloud service models (IaaS, CaaS, PaaS, FaaS, SaaS and XaaS)
- Cloud deployment models (public cloud, private cloud variants, hybrid cloud, etc.)
- Virtualization and infrastructure as a service using the example of AWS EC2
- Container as a service using the example of Docker and AWS ECS
- Platform as a Service using AWS Elastic Beanstalk as an example
- Function as a Service using AWS Lambda as an example
- Multi-tenancy for Software as a Service and 12-Factor Methodology
- Cloud-native architectures for cloud applications (two-tier, three-tier, SOA, etc.)

Methodological competence:

Methodological skills are deepened within the module, particularly with regard to the development of architectures for cloud applications and the selection of suitable cloud services.

Media formats:

Lectures supported by presentations, PDFs of presentations as scripts, practical exercises on whiteboards, laptops and TVs

Literature:

- Erl, T. Cloud Computing: Concepts, Technology & Architecture, Prentice Hall, 2013. ISBN: 978-0133387520
- Fehling, C., Leymann, F. et al. Cloud Computing Patterns: Fundamentals to Design, Build, and Manage Cloud Applications, Springer, 2014. ISBN: 978-3709115671

Module:	Elective 2/1
Abbreviation:	DBM32
Subtitle:	Big Data Management & Analytics
Courses:	Lecture
Semester:	After announcement, only in the summer semester or winter semester
Module coordinator:	Prof. Dr. Michael Möhring
Lecturer:	Prof. Dr. Michael Möhring
Language:	German
Curriculum assignment:	Digital Business Management Master's, Elective, 3rd semester
Teaching format/SWS:	Lecture, 2 hours per week Exercise, 2 hours per week
Workload:	Classroom study, 50 hours Independent study, 130 hours
Credit points:	6 ECTS
Prerequisites:	Digital Business Essentials
Required English language skills:	Review and analysis of English-language literature, use of English-language software
Coursework/examination requirements/ Examination format:	Presentation, project work

Module objectives:

Today's digital companies have access to a flood of diverse data: a phenomenon that has become known as big data. In order for a company to generate added value from this data, it must be analysed appropriately. Big data analytics describes the methodology and technologies used to analyse big data. The aim of the module is to introduce participants to the basics, concepts, methods and technologies of the field of big data analytics. This requires first teaching the general fundamentals of data analysis. The characteristics of big data pose particular challenges for data analysis. Therefore, current big data technologies are presented and applied to overcome these challenges. Participants work independently on their own analysis project and document the methodological approach, the technologies used and the results in a term paper.

Intended learning outcomes:

Knowledge: Participants build up knowledge about the characteristics and applications of big data in a business context. The course begins with fundamental analytical questions

and canonical types of analysis. Participants also learn about the challenges of data analysis using big data. Participants will also learn a generic process model for performing data analysis (CRISP-DM). They will also build up expertise on the functioning and areas of application of selected analysis methods. Finally, they will develop knowledge of big data stacks and frameworks and gain insights into technologies for processing and analysing large amounts of data.

Skills: Participants will be able to independently perform data analysis using current big data technologies. This includes, in particular, setting up a data pipeline: ingesting, storing and transforming big data, as well as applying data analysis methods to specific analytical questions.

Competencies: Participants will gain a fundamental understanding of big data, its characteristics and possible use cases, and recognise that only through appropriate analysis of big data can added value be created for companies. Students will learn that successful data analysis requires the formulation of appropriate analytical questions and success criteria, and will be able to map an application problem to a canonical analysis task. Students can select suitable analysis methods and big data technologies to solve an analysis task, taking into account the characteristics of big data, and set up a data pipeline for ingesting, storing and transforming the data in order to successfully perform data analyses.

Content:

The module teaches the fundamentals, concepts, methods and technologies of the subject area "Big Data Analytics". Exercises during the lecture using classic data mining tools and current big data technologies reinforce the content. The module covered the following topics:

- Introduction to big data: big data characteristics, relationship to business intelligence, consequences and challenges for data analysis, use cases.
- Fundamentals of data analysis: analytical questions and analysis tasks.
- CRISP-DM as a generic process model for data analysis.
- Best practices: Analytical design patterns.
- Introduction and application of selected analysis methods.
- Data analysis with poly-structured data and data streams.
- Application and use of analysis results in the company.
- The role of the data scientist in the company.
- Overview of big data stacks and frameworks.
- Introduction and application of selected big data technologies for setting up data pipelines and performing data analyses.

Methodological competence:

Methodological skills are deepened within the module, particularly with regard to the application of project management methods and the use of quantitative methods.

Media formats:

Lecture, PDF documents of the lecture slides, additional material will be announced during the lecture, exercises, term paper on an analysis project.

Literature:

- Chapman P.; Clinton J.; Kerber, R.; Khabaza T.; Reinartz T., Shearer C. and Wirth, R. (2000) CRISP-DM 1.0, Step-by-step data mining guide. URL http://www.the-modeling-agency.com/crisp-dm.pdf
- Davenport, T.; Barth P. and Bean R. (2012) How 'Big Data' is Different. MIT Sloan Management Review 54(1):22–24
- Gormley, C. and Tong, Z. (2015) Elasticsearch: The Definitive Guide. O'Reilly Media, Inc.
- Grover, M.; Malaska, T.; Seidman, J. and Shapira, G. (2015) Hadoop Application Architectures (1st ed.). O'Reilly Media, Inc.
- Grus, J. (2015) Data Science From Scratch. O'Reilly.
- Hoffman, S. (2013) Apache Flume: Distributed Log Collection for Hadoop. Packt Publishing.
- Lanquillon, C. and Mallow, H. (2015) Advanced Analytics with Big Data. In Dorschel, J. (ed.): Practical Handbook of Big Data: Business – Law – Technology, Springer Gabler, 2015
- Lanquillon, C. and Mallow, H. (2015) Limits of Conventional Business Intelligence Solutions. In Dorschel, J. (ed.): Practical Handbook of Big Data: Business – Law – Technology, Springer Gabler, 2015
- Lanquillon, C. and Mallow, H. (2015) Big Data Solutions. In Dorschel, J. (ed.): Practical Handbook of Big Data: Business – Law – Technology, Springer Gabler, 2015
- Leek, J. (2015) The Elements of Data Analytic Style. Leanpup.
- Provost, F. and Fawcett, T. (2013) Data Science for Business. O'Reilly.
- Ryza, S., Laserson, U., Owen, S., & Wills, J. (2015) Advanced Analytics with Spark. O'Reilly.
- Schacht, S. and Kueller, P. (2015) Enterprise Architecture Management and Big Data, In Dorschel, J. (ed.): Practical Handbook of Big Data: Business – Law – Technology, Springer Gabler, 2015

Module:	Elective 2/2
Abbreviation:	DBM32
Subtitle:	Online Marketing, Social Media & eCommerce
Courses:	Lecture
Semester:	After announcement, only in the summer semester or winter semester
Module coordinator:	Prof. Dr Alexander Rossmann
Lecturer:	Prof. Alexander Rossmann, Christian Fenner
Language	German
Curriculum assignment:	Digital Business Management Master's, Elective
Teaching format/SWS:	Lecture, 2 hours per week Exercise, 2 hours per week
Workload:	Classroom study, 50 hours Independent study, 130 hours
Credit points:	6 ECTS
Prerequisites:	Digital Business Essentials
Required English language skills:	Review and analysis of English-language literature, use of English-language online marketing platforms
Coursework/examination requirements/ Examination format:	Term paper, presentation

Module objectives:

The elective course Online Marketing refers to the use of digital channels for various aspects of marketing strategy. The aim of the module is to classify the term online marketing and locate it within the overall marketing and corporate strategy. On this basis, essential approaches and methods for developing and implementing an online marketing strategy are developed. This essentially comprises the analysis and development of the customer journey across various customer touchpoints. In detail, individual options for the design of digital contact points are explored in depth, e.g. in the areas of search, display, social media and email. The aim of the module is also to provide an integrated analysis and consideration of the various digital marketing channels in the sense of a modern omni-channel marketing concept.

Intended learning outcomes:

Knowledge: Participants build up knowledge of the basic issues involved in designing a marketing concept using online media. Knowledge of the structure and design of a digital marketing strategy is also imparted. In addition, participants acquire knowledge of different channels and design options, especially with regard to search, social, display and email marketing.

Skills: The skills acquired after completing the module relate to the systematic application of marketing techniques and tools in the context of designing individual digital touchpoints. In addition, participants will acquire the ability to analyse individual digital marketing approaches in their overall context.

Competencies: Participants acquire basic competencies in the development and implementation of digital marketing strategies. These are taught primarily on the basis of case studies. In addition, participants' competencies in applying individual marketing approaches are significantly expanded upon completion of the module.

Content:

- Fundamentals of online marketing, key concepts, historical development.
- Development and implementation of an online marketing strategy, embedding online in marketing and corporate strategy, differences between online and offline marketing, new role concepts for marketing through the development of digital channels.
- Designing the customer experience, agile process models in marketing, data-based decision-making in marketing, modelling the consumer journey, measuring individual touchpoints.
- Content as the basis for marketing in digital channels, fundamental approaches to content marketing, different types and forms of content, integration and curation of content, internal organisation of content strategy.
- Search engine marketing (SEA), advertising with Google, managing an AdWords account, implementing AdWords campaigns, basics of search engine optimisation (SEO), SEO strategies in business practice.
- Procedural models for display advertising, different forms of displays, pricing models for displays, conversion optimisation.
- Social media marketing, advertising in the context of social media, networking social media with other channels.
- Introduction to email marketing, design of newsletter formats, permission-based marketing, obtaining subscriptions, improving data quality.
- Integration of different marketing channels, omni-channel marketing, integration of marketing approaches into other functional areas.

Methodological competence:

Methodological skills are deepened within the module, particularly with regard to the application of project management methods and the use of quantitative methods.

Media formats:

Lectures, exercises, case studies, scripts with PPT slides, sample publications, assignments, presentations.

Literature:

Chaffey, D., Smith, P. R., & Smith, P. R. (2012). eMarketing eXcellence: Planning and optimising your digital marketing. Routledge.

Kollmann, T. (2019). E-Business: Fundamentals of electronic business processes in the digital economy. Springer-Verlag.

Lammenett, E. (2015). Practical knowledge of online marketing. Springer Fachmedien.

Ryan, D. (2014). Understanding digital marketing: marketing strategies for engaging the digital generation. Kogan Page Publishers.

Further reading will be announced during the lecture.

Module:	Change Management
Abbreviation:	DBM33
Subtitle:	
Courses:	Lecture
Semester:	Winter semester only
Module coordinator:	Prof. Dr. Dieter Hertweck
Lecturer:	Prof. Dr Dieter Hertweck, Dr. Claus Hoffmann
Language:	German
Curriculum assignment:	Digital Business Management Master's, Compulsory subject, 3rd semester
Teaching format/SWS:	Lecture, 1 SWS Exercise, 1 SWS
Workload:	Classroom study, 40 hours Independent study, 80 hours
Credit points:	4 ECTS
Prerequisites:	Digital Business Essentials
Required English language skills:	Review and analysis of English-language literature
Coursework/examination requirements/ Examination format:	Term paper, presentation, oral examination

Module objectives:

The Change Management module addresses the central question of how organisational change can be managed in digital business. Increased collaboration between companies in cross-industry value networks and microstructures brings about significant changes in the self-image of employees and the organisation (e.g. changed responsibilities, role models, incentive systems, etc.). This is a change in which people must be taken along, involved and strengthened in their creativity. The module aims to teach which leadership styles, organisational structures and workplace concepts accompany this change.

Intended learning outcomes:

Knowledge: Teaching basic knowledge about social systems (behaviour of individuals in groups and corporate cultures) and communication (face-to-face, via media) in a

business context. Application of basic knowledge to different change management methods in organisations

Skills: Analysis of the change readiness of organisations, application of change management models according to Lewin, Streich and Kotter. Reflection on the leadership styles, (digital) and communication culture necessary for transformation. Use of digital platforms to support change processes.

Competencies: Students are able to apply and reflect on the knowledge and skills they have acquired in change management case studies of digital transformation.

Content:

- Introduction to the behaviour of individuals and groups.
- Introduction to the basics of interpersonal and media-mediated communication.
- Fundamentals of conflict management.
- Derivation of necessary organisational changes from the digital transformation strategy.
- Analysis of the change readiness of one's own organisation.
- Introduction to change management models according to Lewin, Streich and Kotter.
- Establishing a sustainable change culture through digital communication, governance and coordination forms.

Methodological competence:

Methodological skills are deepened within the module, particularly with regard to the implementation of case studies and the use of qualitative methods.

Media formats:

Lectures, exercises, case studies, lecture notes with PPT slides, sample publications.

Literature:

- Allen, David K., et al. "How should technology-mediated organisational change be explained? A comparison of the contributions of critical realism and activity theory." Mis Quarterly (2013): 835-854.

- Burnes, Bernard. "Kurt Lewin and the planned approach to change: a re-appraisal." Journal of Management studies 41.6 (2004): 977-1002.

- Bordeleau, Fanny-Ève and Felden, Carsten, (2019). "DIGITALLY TRANSFORMING ORGANISATIONS: A REVIEW OF CHANGE MODELS OF INDUSTRY 4.0". In Proceedings of the 27th European Conference on Information Systems (ECIS), Stockholm & Uppsala, Sweden, 8-14 June 2019. ISBN 978-1-7336325-0-8 Research Papers

- Czichos, Reiner. Change Management as a Success Factor: Actively Shaping and Communicating Change in Companies. Vol. 10103. Haufe-Lexware, 2014.

- Deutinger, Gerhild: Communication in Change: Communicating Successfully in Change Processes. Berlin 2017

- Hertweck, D./Krcmar,H. (2000): Theories on group behaviour, in Schwabe,G.,Streitz,N., Unland,R. (eds.): CSCW Compendium, Teaching and Handbook on Computer-Supported Cooperative Work, pp. 33-46.

- Hertweck, D. / Kinitzki, M. (2015): Data orientation instead of gut decisions: Leadership and organisational culture in data-oriented companies. In Ed. Dorschel, J. (2015): Practical Handbook of Big Data. Springer-Verlag Heidelberg, 2015.

- Kotter, John P. (1995): "Leading change: Why transformation efforts fail." Harvard Business Review 73.2 (1995): 59-67.

- Kreutzer, Ralf T., and Karl-Heinz Land (2015): "The Necessity of Change Management: Why Our Traditional Communication and Organisational Structures Are Becoming Obsolete." Digital Darwinism. Springer Berlin Heidelberg, 2015. 209-248.

- Nickel, Susanne/ Berndt, Christian: Let's change with innovative tools. Freiburg 2018

- Robertson, Brian J.: Holacracy: A revolutionary management system for a volatile world. Munich 2016

- Scire, P. (2007): "Applying Grief Stages to Organisational Change".

- Schein, Edgar H., and Peter A. Schein. Humble leadership: The power of relationships, openness, and trust. Berrett-Koehler Publishers, 2018.

- Scheller, Torsten: On the Way to an Agile Organisation. Munich 2017

- Schmid, Alexander M., (2019). "BEYOND RESISTANCE: TOWARD A MULTILEVEL PERSPECTIVE ON SOCIO-TECHNICAL INERTIA IN DIGITAL TRANSFORMATION". In Proceedings of the 27th European Conference on Information Systems (ECIS), Stockholm & Uppsala, Sweden, 8-14 June 2019. ISBN 978-1-7336325-0-8 Research Papers.

- Vahs, Dietmar/ Weiand, Achim: Workbook Change Management. Stuttgart 2013

- Westerman, G., et al. "Digital Transformation: A Roadmap for Billion-Dollar Organisations." MIT Centre for Digital Business and Capgemini Consulting (2011). https://www.capgemini.com/resources/digital-transformation-a-roadmap-for-billiondollar-organizations

Module:	Internet of Things
Abbreviation:	DBM34
Subtitle:	
Courses:	Lecture
Semester:	Winter semester only
Module coordinator:	Prof. Dr. Christian Decker
Lecturer:	Prof. Dr. Christian Decker
Language	German
Curriculum assignment:	Digital Business Management Master's, Compulsory subject, 3rd semester
Teaching format/SWS:	Lecture, 1 SWS Exercise, 1 SWS
Workload:	Classroom study, 40 hours Independent study, 80 hours
Credit points:	4 ECTS
Prerequisites:	Digital Business Essentials
Required English language skills:	Review and analysis of English-language literature
Coursework/examination requirements/ Examination format:	Project work

Module objectives:

The Internet of Things (IoT) deals with information processing in environments in which an extremely large number of miniaturised computer systems are networked with each other and can interact with users in a variety of ways.

The aim of the module is to introduce students to the basics, technologies and possible applications of the Internet of Things (IoT). This includes cross-layer know-how about the structure, functioning and networking of computer systems and their distributed information processing. This is achieved by imparting knowledge in the areas of hardware, software, communication protocols, middleware and system design.

Intended learning outcomes:

Knowledge: The module imparts the following knowledge.

- Changed characteristics of information processing through miniaturised networked computer systems
- Knowledge of the technological requirements for computer systems that are embedded in the real world in a virtually invisible manner
- Communication technologies and protocols for the massive networking of embedded computer systems
- Possibilities and use of sensor technology
- Classification of IoT applications and development methods
- IoT system design, platforms and communication patterns of integrated systems
- Value drivers and changes to business models through IoT
- Web as middleware in the Web of Things (WoT)

Skills: Students will be able to independently design and develop IoT applications at various levels within a company. They will develop a cross-layer understanding of computer systems and their networked information processing in conjunction with new possibilities for implicit user interaction. This includes the ability to perform related management functions and successfully integrate IoT approaches into business applications.

Competencies: Students are able to design IoT solutions. Through a cross-layer understanding of computer systems, they have the competence to assess the key characteristics of IoT technologies in order to realise novel or improved applications through the massive networking of embedded information technology. Finally, students can evaluate the solutions in terms of their business-relevant contribution.

Content:

The module teaches the basics and concepts of the Internet of Things. Hardware and software technologies, especially for sensory detection and communication protocols, are discussed. The focus is on smart object computers, IoT platforms, applications and development methods, and the Web of Things. Small tasks during the lecture reinforce the content. The module covers the following topics:

- Introduction and classification in the development of computer technology
- Enabling technology, embedding "The invisible computer", smart object computers
- Forms of communication in IoT technologies and sensory detection
- IoT applications and development methods
- IoT business models
- IoT platforms for integration with other information processing systems
- Web of Things (WoT)

Methodological competence:

Methodological skills are deepened within the module, particularly with regard to the application of project management methods.

Media formats:

PDF of the slides from the lecture.
Further material will be announced during the lecture.

Literature:

- Weiser, M. The computer for the 21st century
- Mattern F., Flörkemeier, Ch. From the Internet of Computers to the Internet of Things. Informatik Spektrum, Vol. 33, no. 2, pp. 107-121, April 2010
- Porter, M.E., Heppelmann, J.E., How Smart, Connected Products Are Transforming Competition. Harvard Business Review 92, no. 11, pp. 64-88, November 2014

Module:	Master's Thesis
Abbreviation:	DBM41
Subtitle:	
Courses:	Master's thesis
Semester:	Every semester
Module coordinator:	Prof. Dr. Alexander Rossmann
Lecturer:	All professors of the study programme
Language	German or English
Curriculum assignment:	Digital Business Management Master's, Compulsory subject, 4th semester
Teaching format/SWS:	Master's thesis
Workload:	On-campus study, no self-study, 900 hours
Credit points:	30 ECTS
Prerequisites:	All other courses in the study programme
Required English language skills:	Review and analysis of English-language literature, use of English-language software
Study/examination requirements/ Examination format:	Written thesis, colloquium on the Master's thesis

Module objectives:

The Master's thesis is a final examination paper in which the student demonstrates that they are able to independently work on a comprehensive interdisciplinary task from the field of digital business using fundamental scientific methods within a specified time frame. The Master's thesis consists of a written thesis as well as a presentation and defence of the thesis in the form of a colloquium.

Content:

Topics for master's theses relate to tasks in the field of digital business that are relevant to the discipline both now and in the foreseeable future. The topics include several aspects of computer science, software engineering, media, psychology, didactics, economics and other fields that are complexly interrelated with the solution of the task. The scope of the thesis should be such that it corresponds to six months of work. The thesis must be submitted no later than six months after registration.

Methodological competence:

Methodological skills are developed in depth within the module with regard to the formulation of research questions, the analysis of relevant research in the subject area and the rigorous implementation of appropriate research methods. In addition, participants' skills in writing a scientific paper and presenting and defending their results orally in the form of a colloquium are developed.

Media forms:

Technical and methodological supervision of the Master's thesis through consultation and supervision meetings, which also take place on site for company-related work. Students are also required to research and reference relevant information and, if necessary, demonstrate its relevance and target orientation in a business environment. Presentations by students on the progress of their work. A regular event on academic work is held, which is open to all students. The results of the theses are presented and discussed together in the form of a colloquium.

Literature, additional documents:

Topic-specific documents.

See also the guidelines supplementing the examination regulations with regard to the Master's thesis.

Module:	Additional work: Research work, practical project or professional practice
Abbreviation:	DBMZL
Subtitle:	
Courses:	Additional work, individual supervision
Semester:	Any semester
Module coordinator:	Prof. Dr. Alexander Rossmann
Lecturer:	All professors of the study programme
Language:	German
Curriculum assignment:	Digital Business Management Master's, optional module for obtaining 30 ECTS
Teaching format/SWS:	Written assignment, individual support
Workload:	Independent study, 900 hours
Credit points:	30 ECTS
Prerequisites:	None
Required English language skills:	Review and analysis of English-language literature
Study/examination requirements/ Examination format:	Term paper

Module objectives:

The module "Additional work: research paper, practical project or professional practice" applies to admitted students with a Bachelor's degree worth less than 210 ECTS credits. For Bachelor's degrees worth 180 (or less than 210) ECTS credits, the missing ECTS credits must be made up through additional coursework. The aim is to achieve the level of knowledge, skills and abilities of a graduate with 210 ECTS.

Content:

The content of the module refers to a free scientific paper on a relevant topic of the study programme or other relevant forms of work and results. In addition, the paper can be thematically linked to relevant professional experience, the completion of a practical project or the organisation of conferences. Details on the implementation are defined in the information sheet for the module "Research paper, practical project or professional practice".

Media formats:

Technical and methodological supervision of the term paper through consultation and supervision meetings, which also take place on site for company-related work. Students are also required to research and reference relevant information and, if necessary, demonstrate its relevance and goal orientation in the business environment. Presentations by students on the progress of their work.

Literature, additional documents:

Topic-specific documents.

See also the information sheet on the module "Research paper, practical project or professional practice".