MODULE HANDBOOK

Master of Arts

Master Digital Product Management (FS-OI-EU-MAPRO-60)

60 CP

Distance Learning

INTERNATIONAL
UNIVERSITY OF
APPLIED SCIENCES

Classification: Non-consecutive

Contents

1. Semester

Fundamentals of Digital Product Management

Module Code: DLMPROFDPM

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	5	150 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester		English

Module Coordinator

Prof. Dr. Carolin Egger (Fundamentals of Digital Product Management)

Contributing Courses to Module

- Fundamentals of Digital Product Management (DLMPROFDPM01)

Module Exam Type

Module Exam	Split Exam
Study Format: Distance Learning Exam or Written Assessment: Written Assignment, 90 Minutes	

Weight of Module

see curriculum

Module Contents

- General Opportunities and Challenges in Digital Product Management
- Characteristics of Digital Products and Business Models
- Methods for Digital Product Management
- Data-Driven Approaches for Product Management
- Marketing in Digital Product Management
- Contemporary Organizational Forms

Learning Outcomes

Fundamentals of Digital Product Management

On successful completion, students will be able to

- explain and distinguish the general challenges in digital product management and VUCA / BANI business environments.
- critically examine the value creation by using digital technologies and develop an appropriate digital marketing mix based on personalization and automation from that.
- align data-driven approaches in digital product management and derive appropriate measures from data analytics including the aspects of AR / VR / AI.
- critically reflect on contemporary organizational forms enhancing digital products and business models.
- systematically reflect on the concepts and importance of digital product management.

Links to other Modules within the Study Program	**Links to other Study Programs of the University**
This module is similar to other modules in the field of Business Administration & Management	All Master Programs in the Business & Management field

Fundamentals of Digital Product Management

Course Code: DLMPROFDPM01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

This course aims at providing students with an overview of the particularities in digital product management. The course outlines how uncertainty constantly accompanies digital products and how digitally savvy customers must be addressed. Looking into the methods and tools of digital product management, the course also highlights how data-driven approaches are one of the main contributors to product development and improvement. Further, marketing aspects, such as crowd sourcing and funding, growth hacking, and individual pricings are considered. By discussing contemporary organizational models and considering new work aspects such as remote employees and diversity challenges, the course concludes with a broader perspective on product management. As a result, it helps students to develop an interdisciplinary understanding of product management and its opportunities and challenges in the digital transformation.

Course Outcomes

On successful completion, students will be able to

- explain and distinguish the general challenges in digital product management and VUCA / BANI business environments.
- critically examine the value creation by using digital technologies and develop an appropriate digital marketing mix based on personalization and automation from that.
- align data-driven approaches in digital product management and derive appropriate measures from data analytics including the aspects of AR / VR / AI.
- critically reflect on contemporary organizational forms enhancing digital products and business models.
- systematically reflect on the concepts and importance of digital product management.

Contents

1. General Challenges in Digital Product Management
   - 1.1 Relevance of Digital Trends in Product Management
   - 1.2 VUCA Versus BANI Business Environments
   - 1.3 Cynefin-Framework for Product Management
   - 1.4 Designing for Evolving Users
   - 1.5 Design for Change
2. Characteristics of Digital Products and Business Models

- 2.1 Digitally Savvy Customers
- 2.2 Value Creation Using Digital Technologies
- 2.3 Individuality & Customization
- 2.4 Personalization & Automation
- 2.5 Indestructibility, Transmutability & Reproducibility

3. Methods for Digital Product Management
   - 3.1 Agile (Software) Development
   - 3.2 Minimum Viable Products
   - 3.3 Rapid Prototyping
   - 3.4 Scrum
   - 3.5 Kanban

4. Data-Driven Approaches for Product Management
   - 4.1 Data as Central Perspective
   - 4.2 Data Sources Along the Product Lifecycle
   - 4.3 Data Analytics
   - 4.4 Augmented & Virtual Reality Approaches
   - 4.5 Artificial Intelligence in Product Management

5. Marketing in Digital Product Management
   - 5.1 Customer Co-Creation & Crowd Sourcing
   - 5.2 Crowd Funding
   - 5.3 Growth Hacking
   - 5.4 Individual Pricing

6. Contemporary Organizational Forms
   - 6.1 Objectives & Key Results
   - 6.2 Lateral Leadership
   - 6.3 Remote Employees
   - 6.4 Cross-Cultural Aspects and Diversity Considerations
   - 6.5 Contemporary Practical Approaches in Business Management

Literature
Compulsory Reading
Further Reading ▪ Cagan, M. & Jones, C. (2021). Empowered: Ordinary People, Extraordinary Products. Wiley. ▪ LeMay, M. (2022). Product Management in Practice: A Practical, Tactical Guide for Your First Day and Every Day After. O'Reilly. ▪ Project Management Institute, (2021). A Guide to the Project Management Body of Knowledge (PMBOK ® Guide). Project Management Institute. ▪ Utesheva, A. (2020). Designing Products for Evolving Digital Users: Study UX Behaviour Patterns, Online Communities, and Future Digital Trends. Berkley. ▪ Borek, A. & Prill, N. (2020). Driving digital transformation through data and AI. A practical guide to delivering data science and machine learning products. Kogan Page.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam or Written Assessment: Written Assignment, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
100 h	0 h	25 h	25 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	☑ Guideline
	☑ Slides	

Product Development

Module Code: DLMBPDDT1

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	5	150 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Dorian Mora (Product Development)

Contributing Courses to Module

- Product Development (DLMBPDDT01)

Module Exam Type

Module Exam	Split Exam
Study Format: myStudies Exam, 90 Minutes Study Format: Distance Learning Exam, 90 Minutes	

Weight of Module

see curriculum

Module Contents

- Production planning techniques
- Design tasks
- Product development approaches
- Digital product development and organizational aspects

Learning Outcomes

Product Development

On successful completion, students will be able to

- know the basic definitions and principles of (new) product development.
- understand the key skills in product development.
- discuss, differentiate, and select appropriate product development approaches with respect to a given scenario.
- work with digital product development tools and techniques like CAD, PDM and PLM at a basic level.
- develop own solutions and approaches to academic and practical questions.
- discuss, evaluate, and adapt different digital product development techniques and tools.

Links to other Modules within the Study Program	**Links to other Study Programs of the University**
This module is similar to other modules in the field of Design	All Master Programs in the Design, Architecture& Construction field

Product Development

Course Code: DLMBPDDT01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

This course aims to provide basic work and problem-solving methods for the successful development of products. It introduces the definition of key design tasks and various alternative product development approaches such as flow-based, lean product development, and design thinking. Finally, the students will become familiar with the use of computer-aided design (CAD) tools and how they integrate into modern product development approaches.

Course Outcomes

On successful completion, students will be able to

- know the basic definitions and principles of (new) product development.
- understand the key skills in product development.
- discuss, differentiate, and select appropriate product development approaches with respect to a given scenario.
- work with digital product development tools and techniques like CAD, PDM and PLM at a basic level.
- develop own solutions and approaches to academic and practical questions.
- discuss, evaluate, and adapt different digital product development techniques and tools.

Contents

1. Introduction
   - 1.1 Basic Definitions
   - 1.2 The Product Development Process
   - 1.3 Indicators and Metrics
   - 1.4 Product Development Models
   - 1.5 Current Trends in Product Development
2. The Product Development Process
   - 2.1 Planning
   - 2.2 Concept Development
   - 2.3 Design
   - 2.4 Testing and Refinement
   - 2.5 Production and Ramp-up

3. Product Development Approaches
   - 3.1 Lean Product Development
   - 3.2 Design Thinking
   - 3.3 Human-Centered Design
   - 3.4 User Experience Strategy
   - 3.5 Open Innovation

4. Digital Tools
   - 4.1 Computer-Aided Design
   - 4.2 Computer-Aided Quality
   - 4.3 Product Data Management
   - 4.4 Product Lifecycle Management

5. Organizational Perspective
   - 5.1 Incremental, Platform, and Breakthrough Development
   - 5.2 Building Teams
   - 5.3 Political Issues in Organizations
   - 5.4 Distributed New Product Development

Literature

Compulsory Reading

Further Reading

- Kahn, K. B., Kay, S. E., Slotegraaf, R. J., & Uban, S. (Eds.). (2012). The PDMA handbook of new productdevelopment (3rd ed.). Hoboken, NJ: John Wiley & Sons. (Database: ProQuest).
- Ottosson, S. (2018). Developing and managing innovation in a fast changing and complex world:Benefiting from dynamic principles. Cham: Springer. (Database: ProQuest).
- Ulrich, K. T., & Eppinger, S. D. (2016). Product design and development (6th ed.). New York, NY:McGraw Hill.

Study Format myStudies

Study Format	**Course Type**
myStudies	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
☑ Recorded Live Sessions	☑ Audio	
	☑ Slides	

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	
☑ Recorded Live Sessions	☑ Slides	

Digital Business Models

Module Code: DLMIDBM_E

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	5	150 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Frank Passing (Digital Business Models)

Contributing Courses to Module

- Digital Business Models (DLMIDBM01_E)

Module Exam Type

Module Exam	Split Exam
Study Format: Distance Learning Exam or Written Assessment: Case Study, 90 Minutes	

Weight of Module

see curriculum

Module Contents

- History and success factors of digital business
- Trends in Digital Business
- Knowledge and evaluation of alternative business models in digital business
- Procedure for the development of strategic corporate positioning in digital business
- Knowledge of alternative financing models
- Goals and procedures for the creation of the business plan for digital business models

Learning Outcomes

Digital Business Models

On successful completion, students will be able to

- know the history and framework of digital business models.
- understand the basic principles of innovation management.
- know and understand different business models of the digital economy and be able to evaluate their advantages and disadvantages.
- understand the basics of strategic and operational business model planning in e-commerce.
- independently create a business plan for a digital business model.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the fields of Business Administration & Management	All Master Programs in the Business & Management fields

Digital Business Models

Course Code: DLMIDBM01_E

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

This course deals with IT-driven start-ups and business models. Based on the discussion of the historical development and framework conditions of digital business, alternative business models in digital business are systematically presented, analyzed and evaluated with regard to their respective strengths and weaknesses. Students study the central approaches to developing an independent corporate positioning and are enabled to autonomously examine and evaluate the central factors influencing corporate success in digital business. Further, alternative financing concepts for digital business models are presented and critically evaluated and the central components of a business plan are detailed. In addition, the entire process of creating and defining a business plan is presented in detail and tested using practical examples.

Course Outcomes

On successful completion, students will be able to

- know the history and framework of digital business models.
- understand the basic principles of innovation management.
- know and understand different business models of the digital economy and be able to evaluate their advantages and disadvantages.
- understand the basics of strategic and operational business model planning in e-commerce.
- independently create a business plan for a digital business model.

Contents

1. Innovation Management and Business Model Definitions
   - 1.1 Basic Concepts of Innovation Management Regarding Digital Business Models
   - 1.2 Business Models: Genesis - Definition - Relation to Innovation
   - 1.3 Specifics of Digital Business Models and Comparison to Traditional Approaches
2. Digital Business Models: Definition and Elements
   - 2.1 New Elements of Digital Business Models
   - 2.2 Redefinition and Core Elements of Digital Business Models
   - 2.3 Value Architecture and Value Mechanics
3. Basic Architectures, Standard Patterns and Network Integration
   - 3.1 Basic Digital Business Model Architectures

Literature

Compulsory Reading

Further Reading

- Ahmed, P. K./Shepherd, C. D. (2010): Innovation Management. Context, strategies, systems and processes. Prentice Hall, Upper Saddle River, NJ.
- Bessant, J. R. / Tidd, J. (2018) : Innovation and entrepreneurship. 3rd edition, JOHN WILEY & Sons, Chichester.
- Brynjolfsson, E./Hu, J. Y./Smith, M. D. (2006): From Niches to Riches. Anatomy of the Long Tail. In: Sloan Management Review, 47. Jg., Heft 4, S. 67–71.
- Brynjolfsson, E./Smith M. D. (2000): Frictionless Commerce? A Comparison of Internet and Conventional Retailers. In: Management Science, 46. Jg., Heft 4, S. 563–585.
- Brynjolfsson, E./Hu, J. Y./Rahman, M. (2009): Battle of the Retail Channels. How Product Selection and Geography Drive Cross-Channel Competition. In: Management Science, 55. Jg., Heft 11, S. 1755–1765.
- Chaffey, D./Ellis-Chadwick, F. (2012): Digital Marketing. Strategy, Implementation and Practice. 5th edition, Pearson Education, London.
- Hanson, W./Kalyanam, K. (2007): Internet Marketing and e-Commerce. 2nd edition, Cengage, Boston, MA.
- Laudon, K./Traver, C. G. (2011): E-Commerce. 7th edition, Prentice Hall, Upper Saddle River, NJ.
- Lynch, J./Ariely, D. (2000): Wine Online. Search Costs and Competition on Price, Quality, and Distribution. In: Marketing Science, 19. Jg., Heft 1, S. 83–103.
- Osterwalder, A. / Pigneur, Y. / Clark, T. (2010): Business model generation: A handbook for visionaries, game changers, and challengers. Wiley, Hoboken, NJ.
- Rogers, D. L. (2016): The digital transformation playbook: Rethink your business for the digital age. Columbia Business School Publishing, New York.
- Varian, H. (2000): When Commerce Moves Online. Competition Can Work in Strange Ways. In: New York Times, 24 August 2000.
- Wirtz, B. W. (2019): Digital Business Models: Concepts, Models, and the Alphabet Case Study. Progress in IS. Springer International Publishing, Cham.
- Woerner, S. / Weill, P. (2018): What's Your Digital Business Model?: Six Questions to Help You Build the Next-Generation Enterprise: Harvard Business Review.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam or Written Assessment: Case Study, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
100 h	0 h	25 h	25 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	☑ Guideline
	☑ Slides	

Digital Analytics and Strategies

Module Code: DLMMADAS_E

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	5	150 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Rainer Lukas (Digital Analytics and Strategies)

Contributing Courses to Module

- Digital Analytics and Strategies (DLMMADAS01_E)

Module Exam Type

Module Exam	Split Exam
Study Format: Distance Learning Written Assessment: Case Study	

Weight of Module

see curriculum

Module Contents

- Basics of Digital Analytics
- Metrics of Digital Analytics
- Digital key performance indicators (KPIs) and their analysis
- digital strategy development
- further developments and perspectives of Digital Analytics

Learning Outcomes

Digital Analytics and Strategies

On successful completion, students will be able to

- understand the scope of digital analytics and define the field of web analytics including typical goals and application areas.
- understand, select and evaluate central data sources and metrics to analyze and interpret digital marketing data.
- independently plan and conduct web analyses, interpret the results, draw conclusions and discuss these.
- define key performance indicators (KPIs) of digital analytics and derive specific KPIs to answer potential questions.
- conceptually develop, evaluate and optimize a system to measure online performance indicators.
- analyze current or newly developed online strategies by looking at the customer journey and designing targeted measures to optimize the process especially at the contact points.
- evaluate, reflect and select new digital analysis approaches.

Links to other Modules within the Study Program	**Links to other Study Programs of the University**
This module is similar to other modules in the fields of Business Administration & Management	All Master Programs in the Business & Management fields

Digital Analytics and Strategies

Course Code: DLMMADAS01_E

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

Marketing has a wide range of online instruments and data at its disposal. However, due to the large number of information sources, it is a challenge to extract data, information and key figures based on their valuable contribution to online marketing strategies. Building on the theoretical foundations of suitable metrics to describe and analyze user behavior, key performance indicators (KPIs) are developed, discussed and reflected with regard to their relevance in online marketing. Subsequently, the acquired knowledge is transferred into online strategies, content marketing measures and online campaigns. The course concludes with the identification and discussion of further development possibilities and digital analytic trends in marketing.

Course Outcomes

On successful completion, students will be able to

- understand the scope of digital analytics and define the field of web analytics including typical goals and application areas.
- understand, select and evaluate central data sources and metrics to analyze and interpret digital marketing data.
- independently plan and conduct web analyses, interpret the results, draw conclusions and discuss these.
- define key performance indicators (KPIs) of digital analytics and derive specific KPIs to answer potential questions.
- conceptually develop, evaluate and optimize a system to measure online performance indicators.
- analyze current or newly developed online strategies by looking at the customer journey and designing targeted measures to optimize the process especially at the contact points.
- evaluate, reflect and select new digital analysis approaches.

Contents

1. Basics of Digital Analytics
   - 1.1 Introduction and Definition of Digital Analytics
   - 1.2 Goals of Digital Analytics
   - 1.3 Data and Information Sources
   - 1.4 Legal Framework

2. Metrics of Digital Analytics
   - 2.1 Fundamentals of Metrics
   - 2.2 Hits, Page Views, Visits and Visitors
   - 2.3 Other Metrics
   - 2.4 Limits of Metrics: Inaccuracies and Ambiguities

3. Digital Key Performance Indicators (KPIs) and Their Analysis
   - 3.1 Search Engine Marketing: Key Figures and Analytical Approaches
   - 3.2 Social Media: Monitoring and Analytical Approaches
   - 3.3 Website: Key Figures and Analytical Approaches
   - 3.4 Email: Key Figures and Analytical Approaches

4. Digital Strategy Development
   - 4.1 Fundamentals of the Customer Journey
   - 4.2 Derivation of Digital Marketing Goals Along the Customer Journey
   - 4.3 Application and Design Possibilities for Digital and Mobile Campaigns
   - 4.4 Application and Design Possibilities for Content Marketing
   - 4.5 Monitoring The Implementation of Strategies and Measures

5. Further Developments and Perspectives of Digital Analytics

Literature

Compulsory Reading

Further Reading

- Angel, G. (2016). Measuring the digital world: Using digital analytics to drive better experiences. Pearson.
- Phillips, J. (2016). Ecommence analytics: Analyze and improve the impact of your digital strategy. Pearson.
- Sponder, M., & Gohar, K. (2018). Digital analytics for marketing. Routledge.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Written Assessment: Case Study

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Online Tests
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Guideline
	☑ Audio	
	☑ Slides	

Digital Business Management

Module Code: DLMDBMDBM_E

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	5	150 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Inga Schlömer (Digital Business Management)

Contributing Courses to Module

- Digital Business Management (DLMDBMDBM01_E)

Module Exam Type

Module Exam	Split Exam
Study Format: Distance Learning Exam or Oral Assignment, 90 Minutes	

Weight of Module

see curriculum

Module Contents

- Digital Business
- Digital Economy
- Digital Business Models
- Digital Business Management

Learning Outcomes

Digital Business Management

On successful completion, students will be able to

- place digital business in the context of economic development.
- name and evaluate different forms of the digital economy and associated advantages and disadvantages.
- identify and describe exemplary digital business models.
- describe and execute the management of a digital business, from design to evolution.
- analyze and assess the development of digital business models.
- identify relevant management concepts of the digital age.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the fields of Business Administration & Management	All Master Programs in the Business & Management fields

Digital Business Management

Course Code: DLMDBMDBM01_E

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

Increasing digitalization has fundamentally changed society and the economy. The Internet in particular is expanding the ability of individuals and organizations to act. The resulting increase in dynamics and complexity and the change in competitive conditions are the subject of this course. Students will gain an overview of how to respond to this with changed ways of thinking and management approaches and the extent to which digital business models have gained in importance. The course will familiarize students with how business models represent in a simplified form how a company creates and captures value, providing an approach to simplify the complexity and dynamics of the digital economy. The goal of this course is to provide students with insight into digital business model management. Thus, digital business model management is introduced from design to evolution. In addition, case studies will provide practical relevance.

Course Outcomes

On successful completion, students will be able to

- place digital business in the context of economic development.
- name and evaluate different forms of the digital economy and associated advantages and disadvantages.
- identify and describe exemplary digital business models.
- describe and execute the management of a digital business, from design to evolution.
- analyze and assess the development of digital business models.
- identify relevant management concepts of the digital age.

Contents

1. The Digital Economy
   - 1.1 Drivers of the Digital Economy
   - 1.2 Forms of the Digital Economy and Their Advantages and Disadvantages
   - 1.3 Actors and Interaction Patterns
2. The Digital Business
   - 2.1 Forms and Components of Digital Business
   - 2.2 Development Stages of Digital Business
   - 2.3 Success Factors of Digital Business

3. Digital Business Models
   - 3.1 Definition of Digital Business Models
   - 3.2 Components of Digital Business Models
   - 3.3 Types of Digital Business Models, Business Model Patterns
   - 3.4 Business Model Innovation

4. Paradigm Shift in Management
   - 4.1 Challenges of the Digital Age
   - 4.2 Complexity vs. Uncertainty vs. Risk
   - 4.3 Management Approaches in the Digital Age
   - 4.4 Development of Management Along the Life Cycle of the Business Model

5. Digital Business Model Management
   - 5.1 Design
   - 5.2 Implementation
   - 5.3 Operation
   - 5.4 Adaptation
   - 5.5 Controlling

6. Practical Examples
   - 6.1 Case Studies
   - 6.2 Good Practice Examples

Literature

Compulsory Reading

Further Reading

- Cooke-Davies, T., Crawford, L., Patton, J. R., Stevens, C. & Williams, T. M. Aspects of Complexity - Managing Projects in a Complex World. Project Management Institute, Inc. (PMI).
- Mack, O., Khare, A., Krämer, A. & Burgartz, T. (2015). Managing in a VUCA World. Springer International Publishing AG. http://ebookcentral.proquest.com/lib/badhonnef/detail.action?docID=3567725
- Urbach, N. & Röglinger, M. (2018). Digitalization Cases : How Organizations Rethink Their Business for the Digital Age. Springer International Publishing AG. http://ebookcentral.proquest.com/lib/badhonnef/detail.action?docID=5520954
- Wirtz, B. W. (2020). Business Model Management: Design - Process - Instruments. Springer International Publishing AG.
- Wirtz, B. W. (2019). Digital Business Models: Concepts, Models, and the Alphabet Case Study. Springer International Publishing AG.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam or Oral Assignment, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
100 h	0 h	25 h	25 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
	☑ Video	☑ Online Tests
	☑ Audio	
	☑ Slides	

Applied Research

Module Code: DLMAF_E

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	None	MA	5	150 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Evangelos Zois (Applied Research)

Contributing Courses to Module

- Applied Research (DLMAF01_E)

Module Exam Type

Module Exam	Split Exam
Study Format: Distance Learning Written Assessment: Written Assignment	

Weight of Module

see curriculum

Module Contents

- Fundamentals of Empirical Research
- The Empirical Research Process
- Qualitative Survey Research
- Standardized Survey Research
- Experimental Research
- Specifics of Research with Secondary and Observational Data

Learning Outcomes

Applied Research

On successful completion, students will be able to

- evaluate the type and quality of empirical research and of concrete empirical research results based on relevant criteria.
- identify appropriate data and research methods to empirically address a specific problem or research question.
- name and critically compare the process steps as well as the potentials, aims and limitations of different quantitative and qualitative research methods.
- recognize and consider basic ethical and legal aspects while conducting empirical research.
- design an empirical and theory-based study on their own to adequately address a specific applied research problem.

Links to other Modules within the Study Program	**Links to other Study Programs of the University**
This module is similar to other modules in the field of Methods	All Master Programs in the Business & Management field

Applied Research

Course Code: DLMAF01_E

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	None

Course Description

The course teaches central concepts and methods of applied empirical research. The students acquire profound knowledge to evaluate the quality as well as the limitations of different empirical research approaches. First, students learn the central theoretical foundations of empirical research and the central process steps of empirical research projects. In doing so, students are also sensitised to the ethical and legal challenges. The course deals in depth with the application of central qualitative and quantitative research methods, for each of which the central goals and decision areas, their strengths, and weaknesses, as well as practical recommendations for application are discussed. The course enables students to develop an empirical study for an applied problem in their field or professional environment and to critically evaluate the quality of empirical findings as well as their validity.

Course Outcomes

On successful completion, students will be able to

- evaluate the type and quality of empirical research and of concrete empirical research results based on relevant criteria.
- identify appropriate data and research methods to empirically address a specific problem or research question.
- name and critically compare the process steps as well as the potentials, aims and limitations of different quantitative and qualitative research methods.
- recognize and consider basic ethical and legal aspects while conducting empirical research.
- design an empirical and theory-based study on their own to adequately address a specific applied research problem.

Contents

1. Fundamentals of Empirical Research
   - 1.1 Aims and Basic Approaches of Empirical Research
   - 1.2 Objectivity, Reliability, and Validity of Empirical Research
   - 1.3 Causality
2. The Empirical Research Process
   - 2.1 Determination of the Research Objective
   - 2.2 Choice of Research Design

- 2.3 Data Collection and Data Analysis
- 2.4 Interpretation and Presentation of Results
- 2.5 Ethical and Legal Aspects of Empirical Research

3. Qualitative Survey Research
   - 3.1 Fundamentals, Goals and Process Steps
   - 3.2 Central Forms of Data Collection
   - 3.3 Methods to Analyse Qualitative Data
   - 3.4 Quality Assessment

4. Standardized Survey Research
   - 4.1 Fundamentals, Goals and Process Steps
   - 4.2 Central Forms of Data Collection
   - 4.3 Questionnaire Design, Measurement and Operationalization
   - 4.4 Sampling and Sample Evaluation
   - 4.5 Quality Assessment

5. Experimental Research
   - 5.1 Fundamentals, Goals and Process Steps
   - 5.2 Types of Experiments and Experimental Designs
   - 5.3 Measurement and Manipulation of Variables
   - 5.4 Key Implementation Challenges
   - 5.5 Quality Assessment

6. Specifics of Research with Secondary and Observational Data
   - 6.1 Fundamentals, Goals and Specifics
   - 6.2 Selected Approaches to Analyse Secondary Data
   - 6.3 Selected Approaches to Analyse Observational Data

Literature
Compulsory Reading
Further Reading ▪ Flick, U. (2018). An Introduction to Qualitative Research (6th edition). Sage. ▪ Gravetter, F. J., & Forzano, L. A. B. (2018). Research Methods for the Behavioral Sciences (6th edition. Cengage Learning. ▪ Quinlan, C., Babin, B., Carr, J. Griffin, M., & Zikmund, W. G. (2019). Business Research Methods (2nd edition). Cengage Learning. ▪ Vomberg, A., & Klarmann, M. (2021). Crafting Survey Research: A Systematic Process for Conducting Survey Research. In C. Homburg, M. Klarmann, & A. E. (Eds.), Handbook of market research (pp. 1-53). Springer.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Written Assessment: Written Assignment

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Online Tests
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Guideline
☑ Recorded Live Sessions		

2. Semester

Seminar: Current Issues in Product Management

Module Code: DLMPROSCPM

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	5	150 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Irina Tiemann (Seminar: Current Issues in Product Management)

Contributing Courses to Module

- Seminar: Current Issues in Product Management (DLMPROSCPM01)

Module Exam Type

Module Exam	Split Exam
Study Format: Distance Learning Written Assessment: Research Essay	

Weight of Module

see curriculum

Module Contents

This course enables the students to delve into relevant, up-to-date topics related to Product Management. These include current issues in Product Management which are discussed in research and practice. The range of topics goes from new data-based tools and approaches to launching digital and sustainable products in today's and future markets to the general influence of major trends and technologies in the context of digitalization and sustainability in Product Management.

Learning Outcomes

Seminar: Current Issues in Product Management

On successful completion, students will be able to

- understand and explain major trends and developments in the field of Product Management.
- examine and judge the influence of such trends as digitalization and/or sustainability on Product Management.
- assess and critically examine the use of new concepts and tools in Product Management in the context of digitalisation and/or sustainability.
- derive conclusions for the future development of Product Management as an interdisciplinary discipline in research and practice.

Links to other Modules within the Study Program	**Links to other Study Programs of the University**
This module is similar to other modules in the field of Business Administration & Management	All Master Programs in the Business & Management field

Seminar: Current Issues in Product Management

Course Code: DLMPROSCPM01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

Digitalization and sustainability are two of the most powerful market influences in business today. Both have led to a great amount of research on how they will change business and society more broadly and management practice more narrowly. In this course students evaluate how these trends are changing the market conditions in which companies operate and what demands are emerging for Product Management. The range of topics goes from new data-based tools and approaches to launching digital and sustainable products in today's and future markets to the more general influence of major trends and technologies in the context of digitalization and sustainability in Product Management.

Course Outcomes

On successful completion, students will be able to

- understand and explain major trends and developments in the field of Product Management.
- examine and judge the influence of such trends as digitalization and/or sustainability on Product Management.
- assess and critically examine the use of new concepts and tools in Product Management in the context of digitalisation and/or sustainability.
- derive conclusions for the future development of Product Management as an interdisciplinary discipline in research and practice.

Contents

- In this course students evaluate how major trends and developments such as digitalization and sustainability are changing the market conditions in which companies operate and what demands are emerging for Product Management. The course enables the students to delve into relevant, up-to-date topics related to Product Management. These include current issues in Product Management in context of digitization and sustainability which are discussed in research and practice. The range of topics goes from new data-based tools and approaches to launching digital and sustainable products in today's and future markets to the general influence of major trends and technologies in context of digitalization and sustainability in Product Management.

Literature
Compulsory Reading
Further Reading ▪ Borek, A. & Prill, N. (2020). Driving digital transformation through data and AI. A practical guide to delivering data science and machine learning products. London: KoganPage. ▪ Agrawal, A., Gans, J. & Goldfarb, A. (2020). how to win with machine learning. In: Harvard Business Review 98 (5). ▪ Rusch, M., Schöggl, J.-P. & Baumgartner, R. J. (2022). Application of digital technologies for sustainable product management in a circular economy: A review. Business Strategy and the Environment ▪ Ellis, S. & Brown, M. (2017). Hacking growth. How today's fastest-growing companies drive breakout success. London: Virgin Books.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Seminar

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Written Assessment: Research Essay

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
Learning Material	**Exam Preparation**
☑ Slides	☑ Guideline

Data Science and Analytics

Module Code: DLMBDSA

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Ulrich Kerzel (Data Science) / Prof. Dr. Andrew Adjah Sai (Analytical Software and Frameworks)

Contributing Courses to Module

- Data Science (DLMBDSA01)
- Analytical Software and Frameworks (DLMBDSA02)

Module Exam Type

Module Exam	Split Exam
	Data Science • Study Format "myStudies": Exam, 90 Minutes • Study Format "Distance Learning": Exam, 90 Minutes Analytical Software and Frameworks • Study Format "Distance Learning": Written Assessment: Written Assignment • Study Format "myStudies": Written Assessment: Written Assignment

Weight of Module

see curriculum

Module Contents

Data Science

- Introduction to data science
- Use cases and performance evaluation
- Pre-processing of data
- Processing of data
- Selected mathematical techniques
- Selected artificial intelligence techniques

Analytical Software and Frameworks

- Introduction to analytical software and frameworks
- Data storage
- Statistical modeling
- Machine learning
- Cloud computing platforms
- Distributed computing
- Database technologies

Learning Outcomes

Data Science

On successful completion, students will be able to

- identify use cases and evaluate the performance of data-driven approaches.
- understand how domain specific knowledge for a particular application context is required to identify objectives and value propositions for data science use cases.
- appreciate the role and necessity for business-centric model evaluation apposite to the respective area of application.
- comprehend how data are pre-processed in preparation for analysis.
- develop typologies for data and ontologies for knowledge representation.
- decide for appropriate mathematical algorithms to utilize data analysis for a given task.
- understand the value, applicability, and limitations of artificial intelligence for data analysis.

Analytical Software and Frameworks

On successful completion, students will be able to

- comprehend how cloud computing and distributed computing support the field of data analytics.
- understand in-memory database technologies for real-time analytics.
- apply advanced statistics and machine learning solutions to solve data analysis problems.
- compare the capabilities and limitations of the presented software solutions.
- understand how to identify the right technological solution for a specific application domain.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the field of Data Science & Artificial Intelligence	All Master Programmes in the IT & Technology field

Data Science

Course Code: DLMBDSA01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

The course provides the framework to create value from data. After an introduction the course covers how to identify suitable use cases and evaluate the performance of data-driven methods. In an interdisciplinary approach, the requirements from a specific application domain need to be understood and transferred to the technological understanding to identify the objectives and value proposition of a Data Science project. The course covers techniques for the technical processing of data and then introduces advanced mathematical techniques and selected methods from artificial intelligence that are used to analyze data and make predictions.

Course Outcomes

On successful completion, students will be able to

- identify use cases and evaluate the performance of data-driven approaches.
- understand how domain specific knowledge for a particular application context is required to identify objectives and value propositions for data science use cases.
- appreciate the role and necessity for business-centric model evaluation apposite to the respective area of application.
- comprehend how data are pre-processed in preparation for analysis.
- develop typologies for data and ontologies for knowledge representation.
- decide for appropriate mathematical algorithms to utilize data analysis for a given task.
- understand the value, applicability, and limitations of artificial intelligence for data analysis.

Contents

1. Introduction to Data Science
   - 1.1 Overview of Data Science
   - 1.2 Terms and Definitions
   - 1.3 Applications & Notable Examples
   - 1.4 Sources of Data
   - 1.5 Structured, Unstructured, Streaming
   - 1.6 Typical Data Sources and their Data Type
   - 1.7 The 4 V's of Data: Volume, Variety, Velocity, Veracity
   - 1.8 Introduction to Probability Theory
   - 1.9 What Are Probabilities and Probability Distributions

- 1.10 Introduction to Bayesian Statistics
- 1.11 Relation to Data Science: Prediction as a Probability

2. Use Cases and Performance Evaluation
   - 2.1 Identification of Use Cases for Data Science
   - 2.2 Identifying Data Science Use Cases
   - 2.3 From Prediction to Decision: Generating Value from Data Science
   - 2.4 Evaluation of Predictions
   - 2.5 Overview of Relevant Metrics
   - 2.6 Business-centric Evaluation: the Role of KPIs
   - 2.7 Cognitive Biases and Decision-making Fallacies

3. Pre-Processing of Data
   - 3.1 Transmission of Data
   - 3.2 Data Quality and Cleansing of Data
   - 3.3 Transformation of Data (Normalization, Aggregation)
   - 3.4 Reduction of Data Dimensionality
   - 3.5 Data Visualisation

4. Processing of Data
   - 4.1 Stages of Data Processing
   - 4.2 Methods and Types of Data Processing
   - 4.3 Output Formats of Processed Data

5. Selected Mathematical Techniques
   - 5.1 Linear Regression
   - 5.2 Principal Component Analysis
   - 5.3 Clustering
   - 5.4 Time-series Forecasting
   - 5.5 Overview of Further Approaches

6. Selected Artificial Intelligence Techniques
   - 6.1 Support Vector Machines
   - 6.2 Neural Networks and Deep Learning
   - 6.3 Feed-forward Networks
   - 6.4 Recurrent Networks and Memory Cells
   - 6.5 Convolutional Networks
   - 6.6 Reinforcement Learning

6.7 Overview of Further Approaches

Literature

Compulsory Reading

Further Reading

- Akerar, R., & Sajja, P.S. (2016). Intelligent techniques for data science. Cham: Springer.
- Bruce, A., & Bruce, P. (2017). Practical statistics for data scientists: 50 essential concepts. Newton, MA: O'Reilly Publishers.
- Fawcett, T. & Provost, F. (2013). Data science for business: What you need to know about data mining and data-analytic thinking. Newton, MA: O'Reilly Media.
- Hodeghatta, U. R., & Nayak, U. (2017). Business analytics using R – A practical approach. Berkeley, CA: Apress Publishing. (Database: ProQuest).
- Liebowitz, J. (2014). Business analytics: An introduction. Boca Raton, FL: Auerbach Publications. (Available online).
- Runkler, T. A. (2012). Data analytics: Models and algorithms for intelligent data analysis. Wiesbaden: Springer Vieweg.
- Skiena, S. S. (2017). The data science design manual. Cham: Springer.

Study Format myStudies

Study Format	Course Type
myStudies	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	
	☑ Slides	

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	
	☑ Slides	

Analytical Software and Frameworks

Course Code: DLMBDSA02

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

Analytical Software and Frameworks provides insight into contemporary software and platforms solutions for data analytics in business. The course introduces relevant frameworks and software used in modern data science projects. Commercial and open-source for cloud computing, distributed computing and machine learning, as well as a commercial development platform for in-memory database analytics, are covered. Additional software solutions may be covered by the lecturer as convenient. In particular in the written assignment, students are required to apply their technological knowledge to a specific scenario which requires interdisciplinary thinking of how to merge the particularities of a given application domain with the technological options.

Course Outcomes

On successful completion, students will be able to

- comprehend how cloud computing and distributed computing support the field of data analytics.
- understand in-memory database technologies for real-time analytics.
- apply advanced statistics and machine learning solutions to solve data analysis problems.
- compare the capabilities and limitations of the presented software solutions.
- understand how to identify the right technological solution for a specific application domain.

Contents

1. Introduction
   - 1.1 Software Systems
   - 1.2 Frameworks
   - 1.3 Distributed Computing
   - 1.4 Databases and Data Warehousing
2. Data Storage
   - 2.1 Data Clustering
   - 2.2 Data Replication
   - 2.3 Data Indexing
   - 2.4 Data Warehousing
3. Statistical Modeling Frameworks

- 3.1 The R Project for Statistical Computing
- 3.2 The Python Ecosystem

4. Machine Learning & Artificial Intelligence
   - 4.1 Overview of Modern Machine Learning Frameworks
   - 4.2 Introduction to TensorFlow & Keras

5. Cloud Computing Platforms & On-Premise Solutions
   - 5.1 Advantages and Disadvantages of Cloud, On-premise, and Edge Solutions
   - 5.2 Overview of Cloud Computing Solutions

6. Distributed Computing
   - 6.1 Overview of Distributed Computing Approaches
   - 6.2 Overview of Streaming Approaches
   - 6.3 Other Solutions

7. Database Technologies
   - 7.1 Overview of Database Approaches
     - 7.1.1 Row-based versus Column-based
     - 7.1.2 In Memory DB
     - 7.1.3 Relational DB versus noSQL
     - 7.1.4 Timeseries DB
   - 7.2 Overview of Database Implementations

Literature

Compulsory Reading

Further Reading

- Konstantinos Domdouzis, Peter Lake, & Paul Crowther. (2021). Concise Guide to Databases: A Practical Introduction: Vol. Second edition Konstantinos Domdouzis, Peter Lake, Paul Crowther. Springer.
- Perkins, L., Redmond, E., & Wilson, J. R. (2018). Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement: Vol. Second edition. Pragmatic Bookshelf.
- Keith Gordon. (2022). Principles of Data Management: Facilitating Information Sharing: Vol. Third edition. BCS, The Chartered Institute for IT.
- Mahanti, R. (2019). Data quality: dimensions, measurement, strategy, management, and governance /. ASQ Quality Press.
- Avinash Navlani, Armando Fandango, & Ivan Idris. (2021). Python Data Analysis: Perform Data Collection, Data Processing, Wrangling, Visualization, and Model Building Using Python: Vol. Third edition. Packt Publishing.
- Gayathri Rajagopalan. (2021). A Python Data Analyst's Toolkit: Learn Python and Python-based Libraries with Applications in Data Analysis and Statistics. Apress.
- Latifian, A. (2022). How does cloud computing help businesses to manage big data issues. Kybernetes, 51(6), 1917–1948.
- Wolfram Wingerath, Norbert Ritter, & Felix Gessert. (2019). Real-Time & Stream Data Management: Push-Based Data in Research & Practice. Springer.
- Alka Jarvis, Jose Johnson, & Prakash Ananad. (2022). Successful Management of Cloud Computing and DevOps. ASQ Quality Press.
- Golightly, L., Chang, V., Xu, Q. A., Gao, X., & Liu, B. S. (2022). Adoption of cloud computing as innovation in the organization. International Journal of Engineering Business Management, 14, 1–17.
- J. Dinesh Peter, Amir H. Alavi, & Bahman Javadi. (2018). Advances in Big Data and Cloud Computing: Proceedings of ICBDCC18 (Vol. 1st ed. 2019). Springer.
- Sharma, S., Chang, V., Tim, U. S., Wong, J., & Gadia, S. (2019). Cloud and IoT-based emerging services systems. Cluster Computing, 22(1), 71–91.
- Alejandro Vaisman, & Esteban Zimányi. (2022). Data Warehouse Systems: Design and Implementation: Vol. Second edition. Springer.
- Harsh Chawla, & Pankaj Khattar. (2020). Data Lake Analytics on Microsoft Azure: A Practitioner's Guide to Big Data Engineering: Vol. 1st ed. Apress.
- Andreas Meier, & Michael Kaufmann. (2019). SQL & NoSQL Databases: Models, Languages, Consistency Options and Architectures for Big Data Management. Springer Vieweg.
- Lindsay, D., Gill, S. S., Smirnova, D., & Garraghan, P. (2021). The evolution of distributed computing systems: from fundamental to new frontiers. Computing, 103(8), 1859–1878.
- Rashmi Ranjan Rout, Soumya Kanti Ghosh, Prasanta K. Jana, Asis Kumar Tripathy, Jyoti Prakash Sahoo, & Kuan-Ching Li. (2022). Advances in Distributed Computing and Machine Learning: Proceedings of ICADCML 2022. Springer.
- Rehman, T. B. (2018). Cloud computing basics. Sterling, VA: Stylus Publishing, LLC.
- M. Tamer Özsu, & Patrick Valduriez. (2019). Principles of Distributed Database Systems. Springer.
- Cloud networking and storage. (2020). CompTIA Cloud Essentials+ Study Guide; Page 35-76.
- Robert Johansson. (2018). Numerical Python: Scientific Computing and Data Science Applications with Numpy, SciPy and Matplotlib. Apress.
- Ashwin Pajankar, & Aditya Joshi. (2022). Hands-on Machine Learning with Python: Implement

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Written Assessment: Written Assignment

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Online Tests
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Guideline
	☑ Audio	
	☑ Slides	

Study Format myStudies

Study Format	Course Type
myStudies	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Written Assessment: Written Assignment

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed ☑ Intensive Live Sessions/Learning Sprint	☑ Course Book	☑ Online Tests

Data Miner

Module Code: DLMDMEDM

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	▪ DLMDMEDM01 ▪ none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Frank Passing (Leveraging Data Sources & Data Mining) / Prof. Dr. Frank Passing (Project: Leveraging Data Sources & Data Mining)

Contributing Courses to Module

- Leveraging Data Sources & Data Mining (DLMDMEDM01)
- Project: Leveraging Data Sources & Data Mining (DLMDMEDM02)

Module Exam Type

Module Exam	Split Exam
	Leveraging Data Sources & Data Mining • Study Format "Distance Learning": Exam, 90 Minutes Project: Leveraging Data Sources & Data Mining • Study Format "Distance Learning": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

Leveraging Data Sources & Data Mining

- Data Mining Process
- Data Quality and Data Preparation
- Data Retrieval Strategies
- Types of Data Sources
- Data Mining Techniques
- Web Mining
- Data Economy
- Legal Regulations and Usage Policies

Project: Leveraging Data Sources & Data Mining

In this course, students learn to apply the data mining concepts they learned in previous modules in a real-world project using Python.

Learning Outcomes

Leveraging Data Sources & Data Mining

On successful completion, students will be able to

- explain the main concepts of data mining.
- know different strategies of data retrieval, the techniques of data preparation and data quality assurance.
- comprehend the various types of data sources used in data mining.
- apply the main techniques of data and web mining.
- summarize the key players and components of data economy.
- describe the legal regulations and usage policies in data mining.

Project: Leveraging Data Sources & Data Mining

On successful completion, students will be able to

- implement a data mining project using Python.
- practice and refine the learned knowledge.
- explore, transfer, convert and experiment with different types of data.
- evaluate the outcomes of the data mining project.
- demonstrate meaningful use of technical skills by documentation.
- present the major techniques of data mining and all related procedures.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the field of Data Science & Artificial Intelligence	All Master Programs in the IT & Technology field

Leveraging Data Sources & Data Mining

Course Code: DLMDMEDM01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

This course provides an overview of data mining and its key aspects and methods. For this purpose, data mining processes, data retrieval strategies and data quality and preparation methods are introduced, the nature of data sources is learned, and some important data mining and web scraping techniques are discussed. In addition, the concepts of data economy and the legal requirements and usage guidelines associated with data mining are discussed.

Course Outcomes

On successful completion, students will be able to

- explain the main concepts of data mining.
- know different strategies of data retrieval, the techniques of data preparation and data quality assurance.
- comprehend the various types of data sources used in data mining.
- apply the main techniques of data and web mining.
- summarize the key players and components of data economy.
- describe the legal regulations and usage policies in data mining.

Contents

1. Data Mining Process
   - 1.1 The Role of Data in Businesses
   - 1.2 Understanding Data
   - 1.3 Modeling
   - 1.4 Evaluation
   - 1.5 Deployment

2. Data Quality and Data Preparation
   - 2.1 Gathering Data
   - 2.2 Data Selection
   - 2.3 Data Cleansing
   - 2.4 Sparse Data and Missing Values
   - 2.5 Data Consistency

3. Data Retrieval Strategies
   - 3.1 Query Driven
   - 3.2 Mining Data Streams
   - 3.3 Large-Scale Data Mining
   - 3.4 Process Mining
   - 3.5 Information Extraction

4. Types of Data Sources
   - 4.1 APIs, Flat files and Unusual formats
   - 4.2 Relational Databases
   - 4.3 Non-relational Databases
   - 4.4 Streaming Data
   - 4.5 Open Data Sources

5. Data Mining Techniques
   - 5.1 Statistical Methods
   - 5.2 Machine Learning
   - 5.3 Data Warehousing
   - 5.4 Event Processing
   - 5.5 Real-time Processing

6. Web Mining
   - 6.1 Information Retrieval
   - 6.2 Web Content Mining
   - 6.3 Web Structure and Usage Mining
   - 6.4 Web Search and Spamdexing
   - 6.5 Access and Mine the Data Lake

7. Data Economy
   - 7.1 Data Producers and Aggregators
   - 7.2 Data Monetization
   - 7.3 Internet of Things
   - 7.4 Data Mining in Industry 4.0
   - 7.5 Big Data

8. Legal Regulations and Usage Policies
   - 8.1 General Data Protection Regulation
   - 8.2 Personal Information

8.3 Legal Basis for Data Processing
8.4 Data Protection and Transparency
8.5 Copyright Compliance

Literature

Compulsory Reading

Further Reading

- Bhatia, P. (2019). Data Mining and Data Warehousing: Principles and Practical Techniques. Cambridge University Press.
- Bramer, M. (2020). Principles of Data Mining. Springer.
- Rajaraman, A., & Ullman, J. (2020). Mining of Massive Datasets. Cambridge University Press.
- Tan, P.-N., Steinbach, M., Kumar, V., & Karpatne, A. (2019). Introduction to Data Mining. Addison Wesley.
- Witten, I. H., & Frank, E. (2016). Data Mining: Practical Machine Learning Tools and Techniques. Morgan Kaufmann Publishers.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	
☑ Recorded Live Sessions	☑ Slides	

Project: Leveraging Data Sources & Data Mining

Course Code: DLMDMEDM02

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	DLMDMEDM01

Course Description

The focus of this course is to apply previously acquired data mining knowledge to a project implementation and reflect on the results. Students will carry out this project and document the results. In doing so, they reflect on the data mining concepts applied and the impact of these concepts on the success of the project.

Course Outcomes

On successful completion, students will be able to

- implement a data mining project using Python.
- practice and refine the learned knowledge.
- explore, transfer, convert and experiment with different types of data.
- evaluate the outcomes of the data mining project.
- demonstrate meaningful use of technical skills by documentation.
- present the major techniques of data mining and all related procedures.

Contents

- In this course, students conduct and document a data mining project using the topics covered in previous module using Python.

Literature

Compulsory Reading

Further Reading

- Greeneltch, Nathan. (2019): Python Data Mining Quick Start Guide: A beginner's guide to extracting valuable insights from your data. Packt Publishing.
- Mitchell, Ryan. (2018): Web Scraping with Python. O'Reilly Media, Inc.
- Porcu, Valentina. (2018): Python for Data Mining Quick Syntax Reference. Apress Media LLC.
- Tan, Pang-Ning / Steinbach, Michael / Kumar, Vipin / Karpatne , Anuj. (2019): Introduction to Data Mining. Addison Wesley.
- Bramer, Max. (2020): Principles of Data Mining. Springer.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
Learning Material	**Exam Preparation**
☑ Slides	☑ Guideline

Artificial Intelligence

Module Code: DLMIMWKI

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimaldauer: 1 Semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Claudia Heß (Artificial Intelligence) / Prof. Dr. Tim Schlippe (Seminar: AI and Society)

Contributing Courses to Module

- Artificial Intelligence (DLMAIAI01)
- Seminar: AI and Society (DLMAISAIS01)

Module Exam Type

Module Exam	Split Exam
	Artificial Intelligence • Study Format "Distance Learning": Exam, 90 Minutes • Study Format "myStudies": Exam, 90 Minutes Seminar: AI and Society • Study Format "Distance Learning": Written Assessment: Research Essay • Study Format "myStudies": Written Assessment: Research Essay

Weight of Module

see curriculum

Module Contents

Artificial Intelligence

- History of AI
- AI application areas
- Expert systems
- Neuroscience
- Modern AI systems

Seminar: AI and Society

In this module, students will reflect on current societal and political implications of artificial intelligence. To this end, pertinent topics will be introduced via articles that are then critically evaluated by the students in the form of a written essay.

Learning Outcomes

Artificial Intelligence

On successful completion, students will be able to

- remember the historical developments in the field of artificial intelligence.
- analyze the different application areas of artificial intelligence.
- comprehend expert systems.
- apply Prolog to simple expert systems.
- comprehend the brain and cognitive processes from a neuro-scientific point of view.
- understand modern developments in artificial intelligence.

Seminar: AI and Society

On successful completion, students will be able to

- name selected current societal topics and issues in artificial intelligence.
- explain the influence and impact of artificial intelligence on societal, economic, and polital topics.
- transfer theoretically-acquired knowledge to real-world cases.
- treat in a scientific manner a select topic in the form of a written essay.
- critically question and discuss current societal and political issues arising from the recent advances in artificial intelligence methodology.
- develop own problem-solving skills and processes through reflection on the possible impact of their future occupation in the sector of artificial intelligence.

Links to other Modules within the Study Program	**Links to other Study Programs of the University**
This module is similar to other modules in the field of Data Science & Artificial Intelligence.	All Master Programmes in the IT & Technology field.

Artificial Intelligence

Course Code: DLMAIAI01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

The quest for artificial intelligence has captured humanity's interest for many decades and has been an active research area since the 1960s. This course will give a detailed overview of the historical developments, successes, and set-backs in AI, as well as the development and use of expert systems in early AI systems.In order to understand cognitive processes, the course will give a brief overview of the biological brain and (human) cognitive processes and then focus on the development of modern AI systems fueled by recent developments in hard- and software. Particular focus will be given to discussion of the development of "narrow AI" systems for specific use cases vs. the creation of general artificial intelligence.The course will give an overview of a wide range of potential application areas in artificial intelligence, including industry sectors such as autonomous driving and mobility, medicine, finance, retail, and manufacturing.

Course Outcomes

On successful completion, students will be able to

- remember the historical developments in the field of artificial intelligence.
- analyze the different application areas of artificial intelligence.
- comprehend expert systems.
- apply Prolog to simple expert systems.
- comprehend the brain and cognitive processes from a neuro-scientific point of view.
- understand modern developments in artificial intelligence.

Contents

1. History of AI
   - 1.1 Historical Developments
   - 1.2 AI Winter
   - 1.3 Notable Advances in AI
2. Expert Systems
   - 2.1 Overview Over Expert Systems
   - 2.2 Introduction to Prolog
3. Neuroscience
   - 3.1 The (Human) Brain

3.2 Cognitive Processes

4. Modern AI Systems
   - 4.1 Recent Developments in Hard- and Software
   - 4.2 Narrow vs General AI
   - 4.3 NLP and Computer Vision

5. AI Application Areas
   - 5.1 Autonomous Vehicles & Mobility
   - 5.2 Personalized Medicine
   - 5.3 FinTech
   - 5.4 Retail & Industry

Literature

Compulsory Reading

Further Reading

- Chowdhary, K. R. (2020). Fundamentals of Artificial Intelligence. Springer India.
- Russell, S. & Norvig, P. (2022). Artificial intelligence. A modern approach (4th ed.). Pearson Education.
- Ward, J. (2020). The student's guide to cognitive neuroscience. (4th ed.). Taylor & Francis Group.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
☑ Recorded Live Sessions	☑ Audio	
	☑ Slides	

Study Format myStudies

Study Format	Course Type
myStudies	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
☑ Recorded Live Sessions	☑ Audio	
	☑ Slides	

Seminar: AI and Society

Course Code: DLMAISAIS01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

In the current decade, impressive advances have been achieved in the field of artificial intelligence. Several cognitive tasks like object recognition in images and video, natural language processing, game strategy, and autonomous driving and robotics are now being performed by machines at unprecedented levels of ability. This course will examine some of societal, economic, and political implications of these developments.

Course Outcomes

On successful completion, students will be able to

- name selected current societal topics and issues in artificial intelligence.
- explain the influence and impact of artificial intelligence on societal, economic, and polital topics.
- transfer theoretically-acquired knowledge to real-world cases.
- treat in a scientific manner a select topic in the form of a written essay.
- critically question and discuss current societal and political issues arising from the recent advances in artificial intelligence methodology.
- develop own problem-solving skills and processes through reflection on the possible impact of their future occupation in the sector of artificial intelligence.

Contents

- The seminar covers current topics concerning the societal impact of artificial intelligence. Each participant must create a seminar paper on a topic assigned to him/her. A current list of topics is given in the Learning Management System.

Literature
Compulsory Reading
Further Reading ▪ Bailey, S. J. (2020). Academic writing for international students of business and economics (Third edition). Routledge. ▪ Day, T. (2018). Success in academic writing. (Second edition) ▪ Fang, Z. (2021). Demystifying academic writing: genres, moves, skills, and strategies. Routledge, Taylor & Francis Group. ▪ Silvia, P. J. (2019). How to write a lot: a practical guide to productive academic writing (Second edition). American Psychological Association.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Seminar

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Written Assessment: Research Essay

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed ☑ Intensive Live Sessions/Learning Sprint ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

Study Format myStudies

Study Format	Course Type
myStudies	Seminar

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Written Assessment: Research Essay

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
Learning Material	**Exam Preparation**
☑ Slides	☑ Guideline

Data Driven Marketing and Controlling

Module Code: DLMOMDDMC_E

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Carolin Egger (Data Driven Marketing) / Tanja Moehler (Advanced Marketing Controlling)

Contributing Courses to Module

- Data Driven Marketing (DLMOMDDMC01_E)
- Advanced Marketing Controlling (DLMMAAMC01_E)

Module Exam Type

Module Exam	Split Exam
	Data Driven Marketing • Study Format "Distance Learning": Exam, 90 Minutes Advanced Marketing Controlling • Study Format "Distance Learning": Exam, 90 Minutes

Weight of Module

see curriculum

Module Contents

Data Driven Marketing

- Introduction: Data Driven Marketing
- Big data
- Conversion optimizing with automation and personalization
- Customer experience
- Attribution

Advanced Marketing Controlling

- Classification and tasks of marketing controlling
- The target system of marketing
- Strategic marketing controlling
- Balanced scorecard as a framework for strategic marketing controlling
- Operational marketing controlling
- New approaches and possibilities of market intelligence approaches for marketing controlling

Learning Outcomes

Data Driven Marketing

On successful completion, students will be able to

- use methods and concepts for decision making in marketing
- managing big data in marketing based on tools and methods
- optimize conversion with automation and personalization
- analyze customer experience based on various methods
- apply static and dynamic attribution models.

Advanced Marketing Controlling

On successful completion, students will be able to

- understand and design the goals, tasks and functions of marketing controlling in the company.
- describe the complex interplay of behavioral and economic success factors and to derive consequences for the design of marketing controlling.
- understand and design strategic marketing controlling as well as available concepts and instruments.
- understand the concept of the marketing related Balanced Score Card, identify and relate key drivers and metrics of marketing performance.
- evaluate the instruments of strategic marketing controlling in terms of content and apply them independently, even in complex conditions.
- reflect on the tasks and contents of operative marketing controlling and creatively design and apply instruments and approaches.
- calculate performance indicators for customer satisfaction and sales planning and link them to the overall performance goals of the performance measurement system.
- evaluate strengths and weaknesses of various marketing control indicators and models.
- discuss marketing decisions with regard to their effectiveness and efficiency and to apply and assess different concepts and methods of measuring effectiveness and efficiency in marketing.
- evaluate new developments and approaches from marketing intelligence in marketing controlling and apply them independently.

Links to other Modules within the Study Program	**Links to other Study Programs of the University**
This module is similar to other modules in the fields of Marketing & Sales and Planning & Controlling	All Master Programmes in the Marketing & Communication and Business & Management fields

Data Driven Marketing

Course Code: DLMOMDDMC01_E

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

This course facilitates key aspects of Data Driven Marketing and provides students with the skills of operating marketing efficiently and successfully. Therefore, this course is contributing to students' capacity to use methods and concepts for decision making. Students will learn to handle data. The issue of automation and personalization will be prominently addressed. In addition, this course provides students with the skills to analyse and optimize customer experience. Students will learn how to use attribution to be more efficient in marketing.

Course Outcomes

On successful completion, students will be able to

- use methods and concepts for decision making in marketing
- managing big data in marketing based on tools and methods
- optimize conversion with automation and personalization
- analyze customer experience based on various methods
- apply static and dynamic attribution models.

Contents

1. Introduction: Data Driven Marketing
   - 1.1 Transformation in marketing
   - 1.2 Added value through customer intelligence
   - 1.3 Automation and personalization
   - 1.4 VUCA
2. Big data
   - 2.1 Data management
   - 2.2 Relevance and features of big data
   - 2.3 Analysis tools
   - 2.4 Smart data science methods (AI, deep learning, machine learning)
3. Conversion optimizing with automation and personalization
   - 3.1 Data driven e-mail and messenger marketing
   - 3.2 Targeting for data driven online campaigns

3.3 Programmatic advertising
3.4 On-site personalization: website, online shop, landing page

4. Customer Experience
4.1 Sales funnel
4.2 Customer journey
4.3 A/B-testing
4.4 Multivariate testing
4.5 Pattern recognition

5. Attribution
5.1 Static attribution models
5.2 Dynamic attribution models
5.3 Data-based budget allocation

Literature

Compulsory Reading

Further Reading

- Grigsby, M. (2018): Marketing Analytics. A Practical Guide to Improving Consumer Insights Using Data Techniques. 2nd edition, Kogan Page, London.
- Luengo, J./García-Gil, D./Ramírez-Gallego, S./García López, S./Herrera, F. (2020): Big Data Preprocessing. Enabling Smart Data. Springer, Cham.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	
☑ Recorded Live Sessions	☑ Slides	

Advanced Marketing Controlling

Course Code: DLMMAAMC01_E

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

Based on the strategic corporate goals, marketing is faced with the challenge of implementing its own measures and ensuring their efficiency and effectiveness. This is the purpose of marketing controlling. Against this background, students learn about the functions and tasks of strategic and operative marketing controlling and understand the interaction of the various target and success factors in marketing. Alternative instruments and methods are reflected upon, analyzed with regard to their respective strengths and weaknesses, and evaluated with regard to their suitability for the various objectives of marketing controlling. In this way, a comprehensive understanding of concepts for measuring and increasing marketing performance on a strategic and operational level can be created. Finally, the possibilities and limitations of the use of market intelligence are highlighted and discussed.

Course Outcomes

On successful completion, students will be able to

- understand and design the goals, tasks and functions of marketing controlling in the company.
- describe the complex interplay of behavioral and economic success factors and to derive consequences for the design of marketing controlling.
- understand and design strategic marketing controlling as well as available concepts and instruments.
- understand the concept of the marketing related Balanced Score Card, identify and relate key drivers and metrics of marketing performance.
- evaluate the instruments of strategic marketing controlling in terms of content and apply them independently, even in complex conditions.
- reflect on the tasks and contents of operative marketing controlling and creatively design and apply instruments and approaches.
- calculate performance indicators for customer satisfaction and sales planning and link them to the overall performance goals of the performance measurement system.
- evaluate strengths and weaknesses of various marketing control indicators and models.
- discuss marketing decisions with regard to their effectiveness and efficiency and to apply and assess different concepts and methods of measuring effectiveness and efficiency in marketing.
- evaluate new developments and approaches from marketing intelligence in marketing controlling and apply them independently.

Contents

Literature
Compulsory Reading
Further Reading ▪ Farris, P., Bendle, N., Pfeifer, P. E., & Reibstein, D. (2015). Marketing metrics: The managers guide tomeasuring marketing performance (3rd ed.). Pearson FT Press. ▪ Reichmann, T. (1997). Controlling: Concepts of management control, controllership, and ratios.Springer. ▪ Romaniuk, J. (2018). Building distinctive brand assets. Oxford University Press. ▪ Stewart, D. W., & Gugel, C. (2016). Accountable marketing: Linking marketing actions to financialperformance. Routledge.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	
	☑ Slides	

Digital Transformation in Production

Module Code: DLMPROEDTP

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Mario Boßlau (Platforms and Technologies as Enablers of Digital Transformation in Production) / Prof. Dr. Meike Schröder (Project: Digital Transformation in Production)

Contributing Courses to Module

- Platforms and Technologies as Enablers of Digital Transformation in Production (DLMDTMPTETP01)
- Project: Digital Transformation in Production (DLMDTMPDTP01)

Module Exam Type

Module Exam	Split Exam
	Platforms and Technologies as Enablers of Digital Transformation in Production • Study Format "Distance Learning": Exam or Written Assessment: Case Study, 90 Minutes Project: Digital Transformation in Production • Study Format "Distance Learning": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

Platforms and Technologies as Enablers of Digital Transformation in Production

- Digital Engineering
- Smart Production Operations
- Intelligent Robotized Automation
- Privacy-Aware and Secure Production
- Integrated Infrastructures and Architectures
- Applications and Trends

Project: Digital Transformation in Production

In this course, participants will demonstrate their abilities to address challenges around digital transformation in production within the scope of practice-relevant scenarios.

Learning Outcomes

Platforms and Technologies as Enablers of Digital Transformation in Production

On successful completion, students will be able to

- describe architectures of digital platforms and technologies for production purposes.
- integrate functionalities of digital tools to carry out digital transformations in production.
- explain how privacy-aware secure data management strenghtens platform functionalities.

Project: Digital Transformation in Production

On successful completion, students will be able to

- run a status quo analysis to ascertain the necessity of a digital transformation in practice.
- identify maturity levels for a digital transformation and derive useful actions.
- use agile project management to plan the operationalization of a digital transformation.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the fields of IT & Technology and Business & Management	All Master Programs in the Engineering and Project Management fields

Platforms and Technologies as Enablers of Digital Transformation in Production

Course Code: DLMDTMPTETP01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

This course instills competencies in participants for the understanding and usage of platforms and technologies that help companies adapt their production capabilities and benefit from volatile demands and opportunities from markets. Knowledge is provided to participants to critically explore goals, architectures, and effectiveness logics of underlying technological levers as well as their integration to propel smart production. Participants develop and sharpen their skills in the evaluation and application of core data-driven and privacy-aware functionalities that help sustainably tap into new markets and offer an individualized and trustworthy experience to customers. The course familiarizes participants with an up-to-date panoramic view of trends and emerging concepts around platforms and technologies that drive digital transformations.

Course Outcomes

On successful completion, students will be able to

- describe architectures of digital platforms and technologies for production purposes.
- integrate functionalities of digital tools to carry out digital transformations in production.
- explain how privacy-aware secure data management strenghtens platform functionalities.

Contents

1. Digital Engineering
   - 1.1 Big Data Analytics
   - 1.2 Rapid Prototyping
   - 1.3 Digital Shadow and Twin
   - 1.4 Simulation-Driven Virtual Testbeds
   - 1.5 Cyber-Physical Production Systems
2. Smart Production Operations
   - 2.1 Communication Standards
   - 2.2 Industrial Monitoring
   - 2.3 Extended Reality
   - 2.4 Workforce Collaboration Interfaces

2.5 Customer Access Interfaces

3. Intelligent Robotized Automation
   - 3.1 Smart Integration
   - 3.2 Production Consistency
   - 3.3 Additive Manufacturing
   - 3.4 Robotized Reconfiguration
   - 3.5 Human-Robot-Collaboration

4. Privacy-Aware and Secure Production
   - 4.1 Privacy by Design
   - 4.2 Privacy by Default
   - 4.3 Blockchains
   - 4.4 Secure Connectors
   - 4.5 Trusted Multiparty Cloud Computing

5. Integrated Infrastructures and Architectures
   - 5.1 Industrial Internet of Things
   - 5.2 Internet of Production
   - 5.3 Distributed Ledgers

6. Applications and Trends
   - 6.1 Industry 4.0
   - 6.2 Made in China 2025
   - 6.3 Manufacturing USA
   - 6.4 Uganda's National 4IR Strategy
   - 6.5 I-Korea 4.0

Literature

Compulsory Reading

Further Reading

- Elangovan, U. (2020). Product Lifecycle Management (PLM): A Digital Journey Using Industrial Internet of Things (IIoT). CRC Press.
- Mudler, J. (2020). Multi-Cloud Architecture and Governance: Leverage Azure, AWS, GCP, and VMware vSphere to build effective multi-cloud solutions (1st edition). Packt Publishing.
- Tao, F., Zhang, M., & Nee, A. Y. C. (2019). Digital twin driven smart manufacturing. Academic Press.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam or Written Assessment: Case Study, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
100 h	0 h	25 h	25 h	0 h	150 h

Instructional Methods	
Learning Material	**Exam Preparation**
☑ Course Book	☑ Practice Exam
☑ Video	☑ Online Tests
☑ Audio	☑ Guideline
☑ Slides	

Project: Digital Transformation in Production

Course Code: DLMDTMPDTP01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

In this course, participants intensify and expand their practical knowledge about digital transformation in the production realm. Against this background, participants are first exposed to specific on-field situations with potentially cross-domain boundary conditions. Then, participants consolidate and deepen their knowledge by addressing practice-oriented applications of digital transformation in production. Among others, analytics and uncertainty-handling capacities are further developed by designing solutions at different planning and implementation stages. These range from the early conceptualization up to the evaluation and robustification of an ongoing transformation.

Course Outcomes

On successful completion, students will be able to

- run a status quo analysis to ascertain the necessity of a digital transformation in practice.
- identify maturity levels for a digital transformation and derive useful actions.
- use agile project management to plan the operationalization of a digital transformation.

Contents

- Participants consolidate, deepen, and strengthen their knowledge in this course by addressing and reflecting challenges and opportunities that populate practice-oriented scenarios of a digital transformation in production. These include (but are not limited to) status quo analysis, initiating actions from identified maturity levels along with their operationalization based upon agile project management methods.

Literature

Compulsory Reading

Further Reading

- Belling, S. (2020). Succeeding with Agile Hybrids: Project Delivery Using Hybrid Methodologies. Apress.
- Dennis, P., & Simon, L. (2020). Harnessing Digital Disruption: How Companies Win with Design Thinking, Agile, and Lean Startup. Productivity Press.
- Wolf, R., & Lepratti, R. (2020). Smart Digital Manufacturing: A Guide for Digital Transformation with Real Case Studies Across Industries. Wiley.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
Learning Material	**Exam Preparation**
☑ Slides	☑ Guideline

Big Data Applications

Module Code: DLMITEBDA

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Christian Müller-Kett (Big Data Technologies) / Dr. Sheikh Radiah Rahim Rivu (Data Utilization)

Contributing Courses to Module

- Big Data Technologies (DLMDSBDT01)
- Data Utilization (DLMBBD01)

Module Exam Type

Module Exam	Split Exam
	Big Data Technologies • Study Format "myStudies": Oral Assignment • Study Format "Distance Learning": Oral Assignment Data Utilization • Study Format "myStudies": Exam, 90 Minutes • Study Format "Distance Learning": Exam, 90 Minutes

Weight of Module

see curriculum

Module Contents

Big Data Technologies

- Data types and data sources
- Databases
- Modern storage frameworks
- Data formats
- Distributed computing

Data Utilization

- Pattern recognition
- Natural language processing
- Image recognition
- Detection and sensing
- Problem-solving
- Decision-making

Learning Outcomes

Big Data Technologies

On successful completion, students will be able to

- identify different types and sources of data.
- understand different database concepts.
- learn to build new database structures.
- evaluate various data storage frameworks w.r.t. project requirements.
- analyze which data format to use for a given project.
- understand what roles you could take in such projects.
- create a distributed computing environment for a given project.
- understand the ethical impact of big data technology choices.

Data Utilization

On successful completion, students will be able to

- understand how identity, similarity, and diversity of data can be utilized in problem-solving approaches.
- differentiate between complicated and complex systems of investigation.
- identify the variability of a problem under investigation.
- distinguish between invariant and dynamic features of an investigated system.
- synthesize gained insights to propose a reliable data analytics solution.
- apply different approaches for acquiring and using a knowledge management system.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the field of Data Science & Artificial Intelligence	All Master Programmes in the IT & Technology field

Big Data Technologies

Course Code: DLMDSBDT01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

Data are often considered the “new oil”, the raw material from which value is created. To harness the power of data, the data need to be stored and processed on a technical level. This course introduces the four “Vs” of data, as well as typical data sources and types. This course then discusses how data are stored in databases. Particular focus is given to database structures and different types of databases, e.g., relational, noSQL, NewSQL, and time-series.Beyond classical and modern databases, this course covers a wide range of storage frameworks such as distributed filesystems, streaming, and query frameworks. This is complemented by a detailed discussion of data storage formats ranging from classical approaches such as CSV and HDF5 to more modern approaches like Apache Arrow and Parquet.Finally, this course gives an overview of distributed computing environments based on local clusters, cloud computing facilities, and container-based approaches.

Course Outcomes

On successful completion, students will be able to

- identify different types and sources of data.
- understand different database concepts.
- learn to build new database structures.
- evaluate various data storage frameworks w.r.t. project requirements.
- analyze which data format to use for a given project.
- understand what roles you could take in such projects.
- create a distributed computing environment for a given project.
- understand the ethical impact of big data technology choices.

Contents

1. Data Types and Data Sources
   - 1.1 The 4Vs of data: volume, velocity, variety, veracity
   - 1.2 Data sources
   - 1.3 Data types
2. Databases
   - 2.1 Database structures
   - 2.2 Introduction to SQL

2.3 Relational databases
2.4 nonSQL, NewSQL databases
2.5 Timeseries DB

3. Modern data storage frameworks
3.1 Distributed Filesystems
3.2 Streaming frameworks
3.3 Query frameworks

4. Data formats
4.1 Traditional data exchange formats
4.2 Apache Arrow
4.3 Apache Parquet

5. Distributed Computing
5.1 Cluster-based approaches
5.2 Containers
5.3 Cloud-based approaches

Literature

Compulsory Reading

Further Reading

- Date, C. J. (2003). An introduction to database systems. Pearson.
- Kleppmann, M. (2017). Designing data-intensive applications. O'Reilly.
- Wiese, L. (2015). Advanced data management. De Gruyter.

Study Format myStudies

Study Format	**Course Type**
myStudies	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Oral Assignment

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Online Tests
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Guideline
☑ Recorded Live Sessions	☑ Audio	
	☑ Slides	

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Oral Assignment

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Guideline
☑ Intensive Live Sessions/Learning Sprint	☑ Video	
☑ Creative Lab		
☑ Recorded Live Sessions		

Data Utilization

Course Code: DLMBBD01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

The course Data Utilization introduces case-based applications that take advantage of regularities and patterns found within continuously generated texts, images, or sensor data. The cases solve issues of pattern recognition, natural language processing, image recognition, detection and sensing, problem-solving, and decision support. The cases are related to the application fields of cybersecurity, linguistics, augmented reality, intelligent transportation, problem-solving, and decision support.

Course Outcomes

On successful completion, students will be able to

- understand how identity, similarity, and diversity of data can be utilized in problem-solving approaches.
- differentiate between complicated and complex systems of investigation.
- identify the variability of a problem under investigation.
- distinguish between invariant and dynamic features of an investigated system.
- synthesize gained insights to propose a reliable data analytics solution.
- apply different approaches for acquiring and using a knowledge management system.

Contents

1. Introduction
   - 1.1 The Meaning of Identity, Similarity, and Diversity
   - 1.2 Data Patterns and Ontologies
2. Pattern Recognition
   - 2.1 Analysis of User Interaction, Attitude, and Behavior
   - 2.2 Predictive Analytics
   - 2.3 Preventing the Unknown: User Behavior Analytics in Cybersecurity
3. Natural Language Processing
   - 3.1 Concepts of Natural Language
   - 3.2 Speech Recognition and Acoustic Modeling
   - 3.3 Discerning the Meaning: Linguistics and Social Media

4. Image Recognition
   - 4.1 Basics of Image Representation
   - 4.2 Integral Transforms and Compression
   - 4.3 Exploiting the Visual: Image Recognition for Augmented Reality

5. Detection and Sensing
   - 5.1 Sensor Construction and Techniques
   - 5.2 Intelligent Agents and Surveillance
   - 5.3 Managing the Complex: Sensor Networks in Intelligent Transportation Systems

6. Problem-solving
   - 6.1 Knowledge Sharing and the Cloud
   - 6.2 Rule-based Systems
   - 6.3 Learning from Nature: Expert Systems in Business

7. Decision Support
   - 7.1 Invariants, Determinants, and Alternatives in Decision-making
   - 7.2 Correlation and Causality in Strategic Decision-making
   - 7.3 Approaching the Crossroads: Dashboards and Visualization

8. Data Security and Data Protection
   - 8.1 Securing Data Storage and Processing Infrastructure Against Unauthorized Access
   - 8.2 Compliance and Regulations, GPDR

Literature

Compulsory Reading

Further Reading

- Bajcsy, P., Chalfoun, J., & Simon, M. (2017). Web microanalysis of big image data. Berlin:Springer. (Database: ProQuest).
- Delen, D. (2015). Real-world data mining: Applied business analytics and decision making. NewYork, NY: Pearson.
- Farzindar, A., Inkpen, D., & Hirst, G. (2017). Natural language processing for social media (2nd ed.).San Rafael, CA: Morgan & Claypool Publishers. (Database: ProQuest).
- Hsu, H., Chang, C., & Hsu, C. (Eds.). (2017). Big data analytics for sensor-network collectedintelligence. Cambridge, MA: Academic Press. (Database: ProQuest).
- Pearl, J., & Mackenzie, D. (2018). The book of why: The new science of cause and effect. New York,NY: Basic Books.

Study Format myStudies

Study Format	Course Type
myStudies	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed ☑ Intensive Live Sessions/Learning Sprint	☑ Course Book	☑ Online Tests

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	
☑ Recorded Live Sessions	☑ Slides	

UI/UX Expert

Module Code: DLMAIEUIUX

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	▪ DLMAIEUIUX01 ▪ none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Adelka Niels (User Interface and Experience) / Prof. Dr. Adelka Niels (Project: Human Computer Interaction)

Contributing Courses to Module

- User Interface and Experience (DLMAIEUIUX01)
- Project: Human Computer Interaction (DLMAIEUIUX02)

Module Exam Type

Module Exam	Split Exam
	User Interface and Experience • Study Format "Distance Learning": Exam, 90 Minutes • Study Format "myStudies": Exam, 90 Minutes Project: Human Computer Interaction • Study Format "myStudies": Portfolio • Study Format "Distance Learning": Portfolio

Weight of Module

see curriculum

Module Contents

User Interface and Experience

- ROI of UX design
- Role and mindset of UX design in IT projects
- The UX design process
- UX psychology: How the human mind works
- User research
- UX design basics

Project: Human Computer Interaction

In this course the students will gain practical experience in user experience design. They will conduct user testing for a given user interface and work on developing improvements. The work process and the results will become part of a portfolio.

Learning Outcomes

User Interface and Experience

On successful completion, students will be able to

- Understand what design is about and the crucial aspects of good design
- understand and define the role of the UI/UX designer within a project.
- explain the UX design process and the user-centered mindset.
- advocate the importance of UX design for IT projects.
- describe the basic methods of user research, user testing, and user-centered design.

Project: Human Computer Interaction

On successful completion, students will be able to

- evaluate the usability of a user interface.
- conduct user testing.
- understand the practical implications of putting users first.
- make small changes in existing user interfaces and recognize the situations in which a user experience designer should be consulted.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the fields of Data Science & Artificial Intelligence	All Master Programs in the IT & Technology fields

User Interface and Experience

Course Code: DLMAIEUIUX01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

UX design is crucial to the development of new IT services and applications and enhances the quality of the outcome. Applying UX design techniques can significantly and positively change the software development process, and good UX design is the result of effective teamwork. Within this course the students will understand the mindset, basic techniques, and impact of UX design on IT projects. They will learn how the UX design process works and the role of the UX designer within IT projects. They will also gain skills in the type of collaboration that produces the best results. Using their basic knowledge about good design, the students will know when it is appropriate that they make small changes to UIs themselves and when it is time to consult a designer.

Course Outcomes

On successful completion, students will be able to

- Understand what design is about and the crucial aspects of good design
- understand and define the role of the UI/UX designer within a project.
- explain the UX design process and the user-centered mindset.
- advocate the importance of UX design for IT projects.
- describe the basic methods of user research, user testing, and user-centered design.

Contents

1. ROI of UX design
   - 1.1 Efficacy
   - 1.2 Efficiency
   - 1.3 The impact of design on use errors
2. Role and Mindset of UX design in IT projects
   - 2.1 The role of UX design: the UX designer
   - 2.2 The UX mindset: putting the user first
3. The UX design Process
   - 3.1 In a waterfall process environment
   - 3.2 In an agile process environment
4. UX Psychology: How the Human Mind Works

4.1 Perceptual psychology
4.2 Information processing
4.3 Decision-making
4.4 Situation awareness
4.5 Errors

5. User Research
5.1 The benefit of user research
5.2 Basic research techniques
5.3 User testing

6. UX design Basics
6.1 Interaction design
6.2 Information architecture
6.3 Screen design
6.4 Graphic design
6.5 Rules of good design

Literature

Compulsory Reading

Further Reading

- Cooper, A., Reimann, R., Cronin, D., & Noessel, C. (2014). About face: The essentials of interaction design (5th ed.). Wiley.
- Johnson, J. (2010). Designing with the mind in mind. Elsevier.
- Preece, J., Sharp, H., & Rogers, Y. (2015). Interaction design: Beyond human-computer interaction (5th ed.). Wiley.
- Unger, R., & Chandler, C. (2012). A project guide to UX design: For user experience designers in the field or in the making. New Riders Pub.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	
	☑ Slides	

Study Format myStudies

Study Format	Course Type
myStudies	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods
Tutorial Support ☑ Course Feed ☑ Intensive Live Sessions/Learning Sprint ☑ Recorded Live Sessions

Project: Human Computer Interaction

Course Code: DLMAIEUIUX02

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	DLMAIEUIUX01

Course Description

In this course the students will gain practical experience in user experience design. They will set up and conduct a user testing for a given user interface and develop improvements. The work process and the results will become part of a portfolio.

Course Outcomes

On successful completion, students will be able to

- evaluate the usability of a user interface.
- conduct user testing.
- understand the practical implications of putting users first.
- make small changes in existing user interfaces and recognize the situations in which a user experience designer should be consulted.

Contents

- User experience design focusses on the needs of users. Within this portfolio project the students put into practice basic techniques which lead to good user-centered design. They learn how to test the user experience and usability of an application by conducting user tests, and they also learn how to develop and test ideas for improvement. Students will finish this course having gained practical experience working within the mindset of putting users first.

Literature
Compulsory Reading
Further Reading ▪ Barnum, C. (2010): Usability Testing Essentials: Ready, Set...Test!, Morgan Kaufmann, Burlington, USA ▪ Cooper, A., Reimann, R., Cronin, D., & Noessel, C. (2014). About face: The essentials of interaction design. New York, NY: Wiley. ▪ Johnson, J. (2010). Designing with the mind in mind. Burlington, MA: Elsevier. ▪ Preece, J., Sharp, H., & Rogers, Y. (2015). Interaction design: Beyond human-computer interaction. New York, NY: Wiley. ▪ Microsoft Windows Dev Center. (2018). Guidelines. [Web page]. Retrieved from https://docs.microsoft.com/en-us/windows/desktop/uxguide/guidelines ▪ Unger, R., & Chandler, C. (2012). A project guide to UX design. Berkeley, CA: New Riders.

Study Format myStudies

Study Format	Course Type
myStudies	

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Portfolio

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods
Tutorial Support ☑ Course Feed ☑ Intensive Live Sessions/Learning Sprint ☑ Recorded Live Sessions

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Portfolio

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed ☑ Intensive Live Sessions/Learning Sprint	☑ Slides	☑ Guideline

Entrepreneurship and Disruptive Innovation

Module Code: DLMPROEEI

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Esin Bozyazi (Entre- and Intrapreneurship) / Sabine Pur (Disruptive Innovation)

Contributing Courses to Module

- Entre- and Intrapreneurship (DLMIEEEIS01)
- Disruptive Innovation (DLMIEEEDT01)

Module Exam Type

Module Exam	Split Exam
	Entre- and Intrapreneurship • Study Format "Distance Learning": Exam, 90 Minutes (100) • Study Format "myStudies": Exam, 90 Minutes Disruptive Innovation • Study Format "Distance Learning": Exam, 90 Minutes

Weight of Module

see curriculum

Module Contents

Entre- and Intrapreneurship

- Fundamentals of Entrepreneurship
- Fundamentals of Intrapreneurship
- Entrepreneurs and Intrapreneurs
- Corporate Innovation Management
- Methods of Innovation Management
- Innovation Management in Practice

Disruptive Innovation

- Major Areas of Innovation
- Introduction to Disruptive Innovation
- The Process of Disruption
- Significance of Disruptive Innovation
- Management of Disruptive Innovation
- Examples of Disruptive Innovation

Learning Outcomes

Entre- and Intrapreneurship

On successful completion, students will be able to

- define the motives, goals and relevance of entrepreneurship as a driver for economic wealth and social prosperity.
- determine the motives, goals and relevance of intrapreneurship as a driver for creating a competitive advantage for an organization.
- analyze the preconditions and determinants that shape an entre- and intrapreneurial mindset.
- explain the types, drivers and success factors of corporate innovation as well as the management practices to foster innovation.
- apply main management methods to create, discover and realize business opportunities.
- derive best-practice learnings from the innovation management of existing companies for own business ventures and innovation activities.

Disruptive Innovation

On successful completion, students will be able to

- explain the definitions and basic theory dealing with disruptive innovation.
- distinguish disruptive innovation from other forms of innovation.
- assess major areas in which disruptive innovation may occur.
- understand the essential elements of the process of disruption.
- determine and evaluate the significance of disruptive innovation.
- comprehend and evaluate examples of disruptive innovation.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the fields of Business & Management	All Master Programs in the Business Administration & Management fields

Entre- and Intrapreneurship

Course Code: DLMIEEEIS01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

Entre- and intrapreneurship are the engine for economic wealth and social progress and a core element of the innovation capacity of a company. Whereas entrepreneurship refers to entrepreneurs who design and build up an own business, intrapreneurship is related to individuals who work on developing new ideas and products within the confines of the business that they already work at. Intrapreneurs include any person within the company that applies entrepreneurial skills, vision, and forward thinking into the role that they have in the company. Both entrepreneurs and intrapreneurs have a drive to foster innovation whenever possible, which is why they share many traits between them, such as persistence, determination, goal orientation, opportunity seeking and hard working. A main difference lies in the risk involved in being an entrepreneur or intrapreneur. Entrepreneurs are required to take on all of the risk that comes along with developing a business, which means that the losses can be significant if failure occurs. However, the rewards can also be practically incalculable. As for intrapreneurs, the risks are minimal, which is also true of the rewards. This course introduces the students to these commonalities and differences of entre- and intrapreneurship. The course is designed to support the students in finding and determining their own motives and goals of becoming an entre- or intrapreneur. The main characteristics of entre- and intrapreneurship are discussed and related to the methods and practices of innovation management. An insight into the innovation management of well-known companies fosters the transfer of the theoretical concepts of entre- and intrapreneurship to a practical context.

Course Outcomes

On successful completion, students will be able to

- define the motives, goals and relevance of entrepreneurship as a driver for economic wealth and social prosperity.
- determine the motives, goals and relevance of intrapreneurship as a driver for creating a competitive advantage for an organization.
- analyze the preconditions and determinants that shape an entre- and intrapreneurial mindset.
- explain the types, drivers and success factors of corporate innovation as well as the management practices to foster innovation.
- apply main management methods to create, discover and realize business opportunities.
- derive best-practice learnings from the innovation management of existing companies for own business ventures and innovation activities.

Contents

Literature
Compulsory Reading
Further Reading ▪ Brown, T. (2019). Change by design, revised and updated: How design thinking transformsorganizations and inspires innovation. Harper Business. ▪ Kuratko, D. F. (2020). Entrepreneurship: Theory, process, and practice (11th ed.). Cengage Learning. ▪ Lewrick, M. (2022). Design thinking for business growth: How to design and scale business modelsand business ecosystems. Wiley.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	
	☑ Slides	

Study Format myStudies

Study Format	Course Type
myStudies	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed ☑ Intensive Live Sessions/Learning Sprint	☑ Course Book	☑ Online Tests

Disruptive Innovation

Course Code: DLMIEEEDT01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

The term “Disruptive Innovation” was defined by the American scholar Clayton M. Christensen. A disruptive innovation is an innovative product, service, or business model that eventually overturns the existing dominant businesses in the market. It is therefore also about the failure of incumbent companies to stay on top of their industries when they encounter disruptive types of market and technological changes. Disruptive innovations tend to be produced by small teams, outsiders, or entrepreneurs in start-ups, rather than existing market-leading companies. This module focusses on the process of disruption and the significance of disruptive innovation. It highlights approaches for its management and concludes with examples of disruptive innovations from recent years.

Course Outcomes

On successful completion, students will be able to

- explain the definitions and basic theory dealing with disruptive innovation.
- distinguish disruptive innovation from other forms of innovation.
- assess major areas in which disruptive innovation may occur.
- understand the essential elements of the process of disruption.
- determine and evaluate the significance of disruptive innovation.
- comprehend and evaluate examples of disruptive innovation.

Contents

1. Major Areas of Innovation
   - 1.1 Invention Versus Innovation
   - 1.2 Product and Service Innovation
   - 1.3 Business Model Innovation
   - 1.4 Process and Technology Innovation
   - 1.5 Social and Environmental Innovation
2. Introduction to Disruptive Innovation
   - 2.1 Theory of Disruptive Innovation
   - 2.2 Definition and Classification of Disruptive Innovation
   - 2.3 Types of Disruptive Innovation

2.4 Characteristics of Disruptive Innovation

3. The Process of Disruption
   - 3.1 Modelling Theory of Disruptive Innovation
   - 3.2 Performance Oversupply
   - 3.3 Asymmetry of Motivation
   - 3.4 New-Market-, and Low-End Disruption Process
   - 3.5 Performance Trajectories

4. Significance of Disruptive Innovation
   - 4.1 Characteristics of Disruptor Companies
   - 4.2 Implication for Incumbent Companies
   - 4.3 Possible Responses to Disruptive Innovations

5. Management of Disruptive Innovation
   - 5.1 Triggers of Disruptive Innovation
   - 5.2 “Designing” Disruptive Innovation
   - 5.3 Implementing Disruptive Innovation

6. Examples of Disruptive Innovation
   - 6.1 Retail Versus Amazon
   - 6.2 Physical Media Versus Music/Video Streaming Services
   - 6.3 Hotels Versus Airbnb/Taxis Versus Uber
   - 6.4 In-Classroom Teaching Versus Distance Learning
   - 6.5 Traditional Manufacturing Versus 3D Printing

Literature
Compulsory Reading
Further Reading ▪ Christensen, C. M. (1997): The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail. Boston, MA: Harvard Business School Press. ▪ Gutsche, J., & Gladwell, M. (2020). Create the future: Tactics for disruptive thinking ; The innovation handbook. Fast Company Press. ▪ Silberzahn, P. (DL 2018). A manager's guide to disruptive innovation: Why great companies fail in the face of disruption and how to make sure your company doesn't ((B. Alger, Trans.)). Diateino. ▪ Tidd, J. (2020). Digital disruptive innovation. Series on technology management. World Scientific. ▪ Le Merle, M. C., & Davis, A (2017). Corporate innovation in the fifth era: Lessons from Alphabet/Google, Amazon, Apple, Facebook, and Microsoft.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
☑ Recorded Live Sessions	☑ Audio	
	☑ Slides	

Growth Hacking and Conversion Rate Optimization

Module Code: DLMDIMEGHCRO

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Francisco Tigre Moura (Advanced Growth Hacking) / Prof. Dr. Georg Bouché (Project: Conversion Rate Optimization)

Contributing Courses to Module

- Advanced Growth Hacking (DLMGHAGH01)
- Project: Conversion Rate Optimization (DLMGHPCRO01)

Module Exam Type

Module Exam	Split Exam
	Advanced Growth Hacking • Study Format "Distance Learning": Written Assessment: Case Study Project: Conversion Rate Optimization • Study Format "Distance Learning": Oral Project Report

Weight of Module

see curriculum

Module Contents

Advanced Growth Hacking

- Introduction into Growth Hacking (Definition, Historical Background, Origin, and Requirements)
- Product-Market-Fit
- A/B Testing
- Customer Relationship Management
- Data Analysis
- Case Studies

Project: Conversion Rate Optimization

The conversion rate is one of the most important key figures today, especially for digital business models. That is why special attention must be paid to it. This module deals with goals and methods of conversion rate optimization (CRO).

Learning Outcomes

Advanced Growth Hacking

On successful completion, students will be able to

- develop an understanding of the idea behind and learn how to use and apply Growth Hacking.
- deepen their knowledge about the origin and history of Growth Hacking, also through case studies showing how Growth Hacking is applied in real life.
- get familiar with basic conditions like knowing when a product or service is ready for the market (product-market-fit).
- using and applying A/B testing to find out which version of a website or an application leads to the best possible success.
- increase sales turnover through customer relationship management.
- develop awareness of the importance of data analysis to constantly increase a firm's 'performance'.

Project: Conversion Rate Optimization

On successful completion, students will be able to

- create a CRO strategy.
- define main objectives for CRO campaigns.
- select and apply relevant methods for measuring CRO campaigns.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the field of Marketing & Sales	All Master Programs in the Marketing & Communication field

Advanced Growth Hacking

Course Code: DLMGHAGH01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

The course will give an introduction into Growth Hacking, define the term, point out historical background, its origin, and focus on the requirements, tools and methods in order to roll out a Growth Hack. The students will learn when a product or service is ready to be rolled out, the so-called product-market-fit, learn why A/B Testing can be useful as well as connecting with clients, not only through Customer Relationship Management. Equally important is the constant data analysis which will also be covered in detail. A case study serves as the written assignment for this course.

Course Outcomes

On successful completion, students will be able to

- develop an understanding of the idea behind and learn how to use and apply Growth Hacking.
- deepen their knowledge about the origin and history of Growth Hacking, also through case studies showing how Growth Hacking is applied in real life.
- get familiar with basic conditions like knowing when a product or service is ready for the market (product-market-fit).
- using and applying A/B testing to find out which version of a website or an application leads to the best possible success.
- increase sales turnover through customer relationship management.
- develop awareness of the importance of data analysis to constantly increase a firm's 'performance'.

Contents

1. Introduction into Growth Hacking
   - 1.1 Definition
   - 1.2 Historical Background and the Origin of Growth Hacking
   - 1.3 Framework and Conditions
2. Generating Growth
   - 2.1 Understanding the Customer
   - 2.2 Developing a Business Model
   - 2.3 Product-Market-Fit and Positioning

2.4 Sales Channels and Funnel Management
2.5 User Experience

3. Growth Hacking Strategies and Workflow
3.1 Setting up the Right Team
3.2 Processes
3.3 Developing Ideas
3.4 A/B Testing
3.5 SEO and SEA

4. Customer-Relationship-Management and Acquisition
4.1 Building a Relationship with your Clients and Customer Experience
4.2 Content Marketing and Community Management
4.3 Social Media Marketing
4.4 E-Mail Marketing
4.5 Retention and Referrals

5. Data Analysis
5.1 Marketing Controlling
5.2 Monitoring
5.3 Key Performance Indicators (KPIs)

6. Activation and Revenue
6.1 Usability and Psychology
6.2 Digital Business Models
6.3 Freemium and Cross Selling

Literature

Compulsory Reading

Further Reading

- Agrawal, P. & Chaubey, R. (2019). The Growth Hacking Book: Most Guarded Growth Marketing Secrets the Silicon Valley Giants Don't Want You To Know. Growth Media AI.
- Agrawal, P., Chaubey, R. & Goval, S. (2021). The Growth Hacking Book 2: 100 Proven Hacks for Business and Startup Success in the New Decade. Growth Media AI.
- Carnegie, D. (2010). How to Win Friends and Influence People. Pocket Books.
- Ellis, S. & Brown, M. (2017). Hacking Growth, How Today's Fastest-Growing Companies Drive Breakout Success. Crown Business, New York.
- Fitzpatrick, R. (2013). The Mom Test: How to talk to customers and learn if your business is a good idea when everyone is lying to you. CreateSpace Independent Publishing Platform.
- Holiday, R. (2014). Growth Hacker Marketing: A Primer on the Future of PR, Marketing, and Advertising. Penguin Group, New York.
- Olsen, D. (2015). The Lean Product Playbook. The product-market-fit pyramid. John Wiley & Son.
- Sabry, N. (2020). Ready Set Growth Hack – A Beginner's Guide to Growth Hacking Success. Printed by Sabry, N.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Written Assessment: Case Study

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Online Tests
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Guideline
☑ Recorded Live Sessions	☑ Audio	
	☑ Slides	

Project: Conversion Rate Optimization

Course Code: DLMGHPCRO01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

CRO deals with measures that serve to increase sales or closing goals of a website. Increasing the conversion rate leads to more inquiries and/or sales and thus more customers and revenue. This course is about how to increase the conversion rate, especially by implementing a CRO strategy, defining different CRO goals as well as applying different methods to measure CRO campaigns.

Course Outcomes

On successful completion, students will be able to

- create a CRO strategy.
- define main objectives for CRO campaigns.
- select and apply relevant methods for measuring CRO campaigns.

Contents

- CRO not only targets to increase leads or sales, but also other metrics aimed at efficiency, such as registering for the newsletter or a community, or consuming provided videos or information. Optimization thus contributes positively to the user experience of visitors, which is visibly reflected in rankings and related click prices, and ultimately leads and sales. This course therefore focuses on various CRO measures, in particular landing page optimization, mobile optimization, content optimization, layout and shopping cart.

Literature

Compulsory Reading

Further Reading

- Appelo, J. (2019). Startup, Scaleup, Screwup : 42 Tools to Accelerate Lean and Agile Business Growth. Wiley.
- Szalek, K., & Borzemski, L. (2019). Conversion Rate Gain with Web Performance Optimization. A Case Study (Vol. 852). Springer International Publishing.
- Zimmermann, R., & Auinger, A. (2022). Developing a conversion rate optimization framework for digital retailers—case study. Journal of Marketing Analytics, 1–11.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Oral Project Report

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed ☑ Intensive Live Sessions/Learning Sprint ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

Agile, Social and Creative Methods

Module Code: DLMPROECAM

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Anne-Kristin Langner (Design, Lean and Game: Social and creative methods) / Prof. Dr. Thomas Winkle (Agile Project Management)

Contributing Courses to Module

- Design, Lean and Game: Social and creative methods (DLMOMDLG01_E)
- Agile Project Management (DLMIEEAPM01)

Module Exam Type

Module Exam	Split Exam
	Design, Lean and Game: Social and creative methods • Study Format "Distance Learning": Oral Assignment Agile Project Management • Study Format "Distance Learning": Written Assessment: Case Study

Weight of Module

see curriculum

Module Contents

Design, Lean and Game: Social and creative methods

- Agile Working Environments
- Business Model Innovation
- Design Thinking
- Lean Management
- Lean Startup
- Game Thinking
- Giving Impact to Customers (The Crowd)

Agile Project Management

- Fundamentals of Agile Methods in Project Management
- Traditional and Agile Approaches to Project Management
- Agile Project Management With Scrum
- Agile Project Management With Kanban
- Implementing Agile Within the Organization
- Expanding Agile Across the Organization

Learning Outcomes

Design, Lean and Game: Social and creative methods

On successful completion, students will be able to

- understand and analyze agile and innovative working environments.
- create agile and innovative working environments.
- evaluate and apply social and creative methods.
- evaluate and apply customer-oriented ways of thinking and working.
- build prototypes, work with toolkits and visualize processes.

Agile Project Management

On successful completion, students will be able to

- understand the significance of agile methods to efficiently and effectively manage projects within and across organizations.
- compare the major characteristics of traditional and agile approaches to project management.
- apply the Scrum methodology as a main framework of agile project management.
- apply the Kanban methodology as a main framework of agile project management.
- implement agile value-driven strategies and effective agile product roadmaps into the organization.
- judge the scaling of agile practices across the entire organization.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the fields of Business & Management	All Master Programs in the Methods and Project Management fields

Design, Lean and Game: Social and creative methods

Course Code: DLMOMDLG01_E

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

Design, Lean and Game. Three words that sound so different, but – when it comes to their application as methods – have commonalities. They all can be characterized as social, since they consist of team- and group-oriented ways of collaboration. Furthermore, they redefine companies' views on the customer as the customer becomes part of the process or even the core of the business model. All principles can be called creative, too. Either due to the fact that they imply a hands-on-mentality, like building a prototype or working with a toolkit, or because of the idea that processes and workflows should be visualized. When it comes to agile and innovative working environments, one of these principles is often implemented. That is why the course starts with an introduction to agility and business model innovation in general followed by specific sections on Design Thinking, Lean Management, Lean Startup and Game Thinking as one of the latest concepts. Moving from general to special and back to general, the course closes with a section on the impact of the crowd (and therefore the customers). Principles like Crowdfunding or Crowdsourcing give customers a huge impact on, for instance, funding or product design processes.

Course Outcomes

On successful completion, students will be able to

- understand and analyze agile and innovative working environments.
- create agile and innovative working environments.
- evaluate and apply social and creative methods.
- evaluate and apply customer-oriented ways of thinking and working.
- build prototypes, work with toolkits and visualize processes.

Contents

1. Agility
   - 1.1 Basics
   - 1.2 Dimensions
   - 1.3 Chances and Risks
2. Business Model Innovation
   - 2.1 Basics
   - 2.2 Value Innovation

Literature
Compulsory Reading
Further Reading ▪ Helmhold, M. (2020): Lean Management and Kaizen. Fundamentals From Cases and Examples in Operations and Supply Chain Management. Springer Nature, Cham. ▪ Kim, A. J. (2018): Game Thinking: Innovate smarter & drive deep engagement with design techniques from hit games. gamethinking.io, Burlingame. ▪ Ries, E. (2017): The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. Penguin, London.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Oral Assignment

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Online Tests
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Guideline
	☑ Audio	
	☑ Slides	

Agile Project Management

Course Code: DLMIEEAPM01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

Agile methods accelerate the development and delivery of a product or service by the division of tasks into short phases of work and frequent reassessment and adaptation of plans. While originally used for software programming, the agile methodology has become a widely used approach in many areas of business. When applied to project management situations, agile contributes to a more flexible planning, a faster determining of the requirements and a more effective executing of a project. The concept of agile is based on the Agile Manifesto which includes four key values and twelve main principles to guide an iterative and people-centric managing of projects. In this course, students are introduced to the agile project management framework with an emphasis on the product owner's role. They learn how to develop the product vision and the product roadmap, organize the project team, identify user roles, write user stories and establish an operant project risk management. This way, students shall also develop a mindset for the agile methodology. The course puts a special emphasis on the Scrum and Kanban framework as two main pillars to agilely manage projects within and across organizations.

Course Outcomes

On successful completion, students will be able to

- understand the significance of agile methods to efficiently and effectively manage projects within and across organizations.
- compare the major characteristics of traditional and agile approaches to project management.
- apply the Scrum methodology as a main framework of agile project management.
- apply the Kanban methodology as a main framework of agile project management.
- implement agile value-driven strategies and effective agile product roadmaps into the organization.
- judge the scaling of agile practices across the entire organization.

Contents

1. Fundamentals of Agile Methods in Project Management
   - 1.1 Definition and Significance of Agile Methods in Project Management
   - 1.2 The Agile Manifesto
   - 1.3 The Agile Values and Principles
2. Traditional and Agile Approaches to Project Management

2.1 Traditional Approaches to Project Management
2.2 Agile Approaches to Project Management
2.3 Comparison of Traditional versus Agile Project Management

3. Agile Project Management with Scrum
3.1 Scrum Values and Principles
3.2 Scrum Roles, Events and Artifacts
3.3 Application Areas of Scrum

4. Agile Project Management with Kanban
4.1 Kanban Values and Principles
4.2 Kanban Boards and Cards
4.3 Application Areas of Kanban

5. Implementing Agile within the Organization
5.1 Implementing Agile Value-driven Delivery Strategies
5.2 Creating an Effective Agile Product Roadmap
5.3 Coaching an Agile Team

6. Expanding Agile across the Organization
6.1 Agile at Scale Practices across the Organization
6.2 Agile Portfolio Management
6.3 Scaled Agile Framework (SAFe)

Literature

Compulsory Reading

Further Reading

- Schwaber, K., & Sutherland, J. (2020). The 2020 Scrum guide. ScrumGuides.
- Winkle, T. (2022). Product development within artificial intelligence, ethics, and legal risk: Exemplary for safe autonomous vehicles. Springer.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Written Assessment: Case Study

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Online Tests
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Guideline
	☑ Audio	
	☑ Slides	

Salesforce Developer Specialization

Module Code: DLMSFDS

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Thomas Bolz (Salesforce Platform App Builder) / Prof. Dr. Thomas Bolz (Salesforce Platform Developer)

Contributing Courses to Module

- Salesforce Platform App Builder (DLMSFDS01)
- Salesforce Platform Developer (DLMSFDS02)

Module Exam Type

Module Exam	Split Exam
	Salesforce Platform App Builder • Study Format "Distance Learning": Written Assessment: Project Report Salesforce Platform Developer • Study Format "Distance Learning": Oral Project Report

Weight of Module

see curriculum

Module Contents

Salesforce Platform App Builder

Using the learning platform Trailhead students will learn the fundamentals of Salesforce. At the end of the course, the students will be able to design, build and deploy custom applications. This course prepares for the Salesforce Platform App Builder Certification.

Salesforce Platform Developer

Using the learning platform Trailhead students will learn how to develop own applications, built from various parts of the Salesforce platform. At the end of the course the students will be able to use Apex, JavaScript, Visualforce and basic Lightning components. This course prepares for the Salesforce Platform Developer I and JavaScript Developer I Certification.

Learning Outcomes

Salesforce Platform App Builder

On successful completion, students will be able to

- define what Salesforce and customer relationship management is.
- design the data model, user interface and business logic for custom applications.
- customize applications for mobile use.
- design reports and dashboards.
- manage application security and deploy custom applications.

Salesforce Platform Developer

On successful completion, students will be able to

- develop own applications using Apex and basic Lightning components.
- write SOSL, SOQL and DML statements.
- use Visualforce to build custom user interfaces for mobile and web apps.
- build reusable, performant components that follow modern web standards.
- use JavaScript to handle user interactions.
- use the built-in testing framework to test Apex and Visualforce.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the field of Marketing & Sales	All Master Programs in the Marketing & Communication field

Salesforce Platform App Builder

Course Code: DLMSFDS01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

Salesforce is the most used software solution for customer relationship management worldwide. This solution can be customized and personalized for the needs of customers, partners and employees. Using the learning platform Trailhead, students will learn independently the fundamentals of Salesforce and the development of customized application. This course prepares students for the Salesforce Platform App Builder Certification.

Course Outcomes

On successful completion, students will be able to

- define what Salesforce and customer relationship management is.
- design the data model, user interface and business logic for custom applications.
- customize applications for mobile use.
- design reports and dashboards.
- manage application security and deploy custom applications.

Contents

- The content on the learning platform focuses on the features and functionality to design, build and deploy custom applications. The content also provides knowledge to define business logic and process automation declaratively. Furthermore, the design and management of the correct data models and the customization of applications for individual needs is included in this course. Thus, the content of this course enables to automate repetitive tasks and to optimize processes in customer organizations.

Literature

Compulsory Reading

Further Reading

- Benioff, M./Langley, M. (2019): Trailblazer. The Power of Business as the Greatest Platform for Change. 1st ed.
- Shaalan, S. (2020): Salesforce for Beginners. A step-by-step guide to creating, managing, and automating sales and marketing processes. Packt Publishing, Birmingham.
- Weinmeister, P. (2019): Practical Salesforce Development Without Code. Building Declarative Solutions on the Salesforce Platform. 2nd ed., Apress, Berkeley.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
Learning Material	**Exam Preparation**
☑ Slides	☑ Guideline

Salesforce Platform Developer

Course Code: DLMSFDS02

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

The Salesforce platform not only forms the foundation of core Salesforce products like Sales Cloud and Service Cloud, but it is also possible to build own functionality and own applications. Using the learning platform Trailhead, students will learn how to use the programmatic pillars of the Salesforce platform: Lightning components, Apex and Visualforce. This course prepares students for the Salesforce Platform Developer I and JavaScript Developer I Certification.

Course Outcomes

On successful completion, students will be able to

- develop own applications using Apex and basic Lightning components.
- write SOSL, SOQL and DML statements.
- use Visualforce to build custom user interfaces for mobile and web apps.
- build reusable, performant components that follow modern web standards.
- use JavaScript to handle user interactions.
- use the built-in testing framework to test Apex and Visualforce.

Contents

- The content on the learning platform focuses on the development of own functionality and own applications, built from various parts of the Salesforce platform. The content enables to use the programmatic elements Lightning components, Apex and Visualforce. Furthermore, knowledge is provided for data modeling, process automation, user interface design, testing and deployment. Thus, the content of this course enables to extend Salesforce by individual applications to cover the needs in customer organizations.

Literature

Compulsory Reading

Further Reading

- Gupta, R. (2019): Salesforce Platform App Builder Certification. A Practical Study Guide. 1st ed., Apress.
- Salesforce (2020): Developer Documentation. (URL: https://developer.salesforce.com/docs/ [accessed: 12.12.2020]).

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Oral Project Report

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
Learning Material	**Exam Preparation**
☑ Slides	☑ Guideline

Process Management with Scrum

Module Code: DLMPREEPMS

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	▪ none ▪ DLMPREEPMS01	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Nebojsa Radojevic (Process Management with Scrum) / Prof. Dr. Nebojsa Radojevic (Project: Corporate Project with Scrum)

Contributing Courses to Module

- Process Management with Scrum (DLMPREEPMS01)
- Project: Corporate Project with Scrum (DLMPREEPMS02)

Module Exam Type

Module Exam	Split Exam
	Process Management with Scrum • Study Format "Distance Learning": Written Assessment: Case Study Project: Corporate Project with Scrum • Study Format "Distance Learning": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

Process Management with Scrum

- Scrum Origin, Basic Idea and Fields of Application
- Scrum Roles
- Product Backlog and Sprint Planning
- Executing the Scrum Process
- Helpful Tools
- Implementation and Scaling of Scrum

Project: Corporate Project with Scrum

After studying the methods of Scrum and learning about the systematic development approach, this course offers the opportunity to transfer the learned contents to practice. Choosing a real project or task within an organization, the method can be experienced and compared to the theoretical concept.

Learning Outcomes

Process Management with Scrum

On successful completion, students will be able to

- understand and explain the contents of the agile manifest.
- understand Scrum as a framework for developing, delivering, and sustaining products in a complex environment.
- describe each of the roles within a Scrum team and explain each item and each step within the Scrum process.
- handle the refinement process of the product backlog and discuss the interaction within the team and to the outside world during and after a sprint.
- understand the concept of user stories and apply the method to simple cases.
- understand and describe possibilities for the scaling of Scrum.

Project: Corporate Project with Scrum

On successful completion, students will be able to

- understand Scrum and its roles within the context of a corporate organization.
- explain the elements and processes of Scrum in detail and out of practical experience.
- create user stories, refine the product backlog and select items for a sprint.
- collaborate in the daily scrum and apply the little tools within the development team.
- discuss critically the benefits and limitations of the Scrum framework.

Links to other Modules within the Study Program	**Links to other Study Programs of the University**
This module is similar to other moduls in the field of Project Management	All Master Programs in the Business & Management field

Process Management with Scrum

Course Code: DLMPREEPMS01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

Within the broad field of project management, Scrum falls into the category of agile methods. As such, Scrum is more of a process management framework than a project management method. In this course the Scrum framework will be described and discussed in detail. The Agile Manifesto will be introduced, and the basic idea of iterative and incremental development will be discussed, leading up to the methodology of Scrum. A thorough review will be done on the different roles within the Scrum team. The terms product backlog, refinement and increment are defined and explained. As core feature of Scrum, the execution of sprints and daily scrums will be detailed. For the practical application of Scrum, the handling of requirements and creation of user stories will be introduced. The student also gets to know the little tools for communication and task-tracking used within development teams. Furthermore, the student will learn when and how a Scrum process should be implemented and what kind of benefits and risks can be expected from it.

Course Outcomes

On successful completion, students will be able to

- understand and explain the contents of the agile manifest.
- understand Scrum as a framework for developing, delivering, and sustaining products in a complex environment.
- describe each of the roles within a Scrum team and explain each item and each step within the Scrum process.
- handle the refinement process of the product backlog and discuss the interaction within the team and to the outside world during and after a sprint.
- understand the concept of user stories and apply the method to simple cases.
- understand and describe possibilities for the scaling of Scrum.

Contents

1. Scrum Origin, Basic Idea and Fields of Application
   - 1.1 The Birth of Scrum – How and Why it All Began
   - 1.2 The Agile Manifesto and a Change in Perspective
   - 1.3 The Approach of Iterative and Incremental Development
   - 1.4 Defining Fields for Scrum and Fields for Not Scrum
2. Scrum Roles

Literature
Compulsory Reading
Further Reading ▪ Highsmith, J. (2002). Agile software development ecosystems. Addison-Wesley Professional. ▪ Schwaber, K. (2004). Agile project management with Scrum. Microsoft Press.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Written Assessment: Case Study

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Online Tests
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Guideline
	☑ Audio	
	☑ Slides	

Project: Corporate Project with Scrum

Course Code: DLMPREEPMS02

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	DLMPREEPMS01

Course Description

The course „Project: Corporate Project with Scrum" is building on the basic knowledge of the Scrum Framework acquired in the previous course. The theoretical foundations of Scrum can be applied within a real company environment. The student experiences the advantages of agile work and can reflect on the Scrum roles in practice. The student is also confronted with the hurdles that arise in applying the methodology in a real situation and can experiment with own approaches to solutions.

Course Outcomes

On successful completion, students will be able to

- understand Scrum and its roles within the context of a corporate organization.
- explain the elements and processes of Scrum in detail and out of practical experience.
- create user stories, refine the product backlog and select items for a sprint.
- collaborate in the daily scrum and apply the little tools within the development team.
- discuss critically the benefits and limitations of the Scrum framework.

Contents

- The course „Project: Corporate Project with Scrum" is building on the basic knowledge of the Scrum Framework acquired in the previous course and on the general knowledge of management know-how and classical project management acquired during the previous semesters. Based on a real task to be resolved within an organization (commercial enterprise, public administration, or the like), the students can gain practical experience working with agile methods utilizing the Scrum Framework.
- The students will reflect critically on the similarities and differences they observed and, if applicable, also compare the experienced agile methods with classical methods of project management. To meet scientific criteria, a literature search and a thorough comparison of the scientific and methodological foundation to the practical aspects experienced in the project is strongly encouraged and supported. The business aspect (costs, gain, time, quality, strategic relevance, etc.) of the project should be recognized and analyzed based on scientific methods. The students will demonstrate their ability to combine specialist knowledge and transfer of this knowledge to a specific project in a professional environment. They will also critically reflect on the experienced own work with Scrum, as well as on the theoretical concept of the Scrum Framework itself.

Literature
Compulsory Reading
Further Reading ▪ Anon. (2001): Manifesto for Agile Software Development. (URL: https://agilemanifesto.org [Retrieved: 20.03.20201]). ▪ Ockerman, S./ Reindl, S. (2019): Mastering Professional Scrum: Coaches' Notes for Busting Myths, Solving Challenges, and Growing Agility. Addison Wesley Longman, Boston. ▪ Rubin, K. S. (2013): Essential Scrum: A Practical Guide to the Most Popular Agile Process. Addison-Wesley Professional, Boston. ▪ Schwaber, K. / Sutherland, J. V. (2012): Software in 30 days: How Agile Managers Beat the Odds, Delight their Customers and Leave Competitors in the Dust. Wiley, New Jersey. ▪ Sutherland, J. (2015): Scrum: The art of Doing Twice the Work in Half the Time. Random House UK, London. ▪ Verheyen, G. (2019): Scrum: A Pocket Guide: a Smart Travel Companion. 2nd edition, Van Haren Publishing, VW 's-Hertogenbosch.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed ☑ Intensive Live Sessions/Learning Sprint	☑ Slides	☑ Guideline

Project Management with PRINCE2®

Module Code: DLMPREEPMPR

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	▪ DLMPREEPMPR01 ▪ none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Nebojsa Radojevic (Project Management with PRINCE2®) / Prof. Dr. Nebojsa Radojevic (Project: Corporate Project with PRINCE2®)

Contributing Courses to Module

- Project Management with PRINCE2® (DLMPREEPMPR01)
- Project: Corporate Project with PRINCE2® (DLMPREEPMPR02)

Module Exam Type

Module Exam	Split Exam
	Project Management with PRINCE2® • Study Format "Distance Learning": Written Assessment: Case Study Project: Corporate Project with PRINCE2® • Study Format "Distance Learning": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

Project Management with PRINCE2®

- Introduction to the PRINCE2® Method
- The Seven Themes
- The Seven Processes
- Creation of Results
- Tailoring
- PRINCE2® Agile

Project: Corporate Project with PRINCE2®

After studying the methods of the structured project management approach of PRINCE2®, this course offers the opportunity to transfer the learned contents to practice. Choosing a real project or task within an organization, the method can be experienced and compared to the theoretical concept.

Learning Outcomes

Project Management with PRINCE2®

On successful completion, students will be able to

- understand and explain the contents of the PRINCE2® framework.
- explain the seven Principles, seven Themes, seven Processes and Tailoring of the project environment.
- describe each of the roles within a PRINCE2® management team.
- explain, how the stages are connected by the defined processes.
- define reporting cycles according to the PRINCE2® guidelines.
- understand and describe how PRINCE2® can be combined with other project management methods and what additional options PRINCE2® Agile is offering.

Project: Corporate Project with PRINCE2®

On successful completion, students will be able to

- understand PRINCE2® and its principles within the context of a corporate organization.
- explain the PRINCE2® Project Management structure as well as the themes and processes of PRINCE2® in detail and out of practical experience.
- set up a Project Management Team with its associated roles.
- start and initiate a project and plan a project stage.
- work with and create management products and specialized products.
- discuss critically the benefits and limitations of the PRINCE2® framework.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the field of Project Management	All Master Programs in the Business & Management field

Project Management with PRINCE2®

Course Code: DLMPREEPMPR01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

Within the broad field of project management methods, the original PRINCE2® method falls into the category of classical (non-agile) methods. It is one of the leading classical project management methods. PRINCE2® is process-oriented and primarily concerned with the actions of the project management team, putting emphasis on the management aspect of a project rather than the execution side. In this course the PRINCE2® framework will be systematically described and discussed in detail. A thorough review will be done on the seven Principles, the seven Themes, the seven Processes, and on Tailoring of the project to the environment. This will be put in relation to the defined roles within the PRINCE2® project management team structure. In this course, in addition to the actions and processes handled by the project management team, the work of the task managers will be reviewed, some of the most important tools for execution of tasks will be introduced and a possible combination with the PMBOK from the PMI will be discussed. The student will learn about the well-structured interaction between project management level and project execution level including the reporting cycles. At the end of the course an outlook on the features of PRINCE2® Agile will be given. The student will gain a thorough understanding of the advantages and disadvantages of the PRINCE2® method and its derivatives.

Course Outcomes

On successful completion, students will be able to

- understand and explain the contents of the PRINCE2® framework.
- explain the seven Principles, seven Themes, seven Processes and Tailoring of the project environment.
- describe each of the roles within a PRINCE2® management team.
- explain, how the stages are connected by the defined processes.
- define reporting cycles according to the PRINCE2® guidelines.
- understand and describe how PRINCE2® can be combined with other project management methods and what additional options PRINCE2® Agile is offering.

Contents

1. Introduction to the PRINCE2® Method
   - 1.1 History of PRINCE2®
   - 1.2 Project Definition
   - 1.3 The Seven Principles

Literature
Compulsory Reading
Further Reading ▪ AXELOS Limited. (2017). Managing successful projects with PRINCE2® (6th ed.). The Stationery Office. ▪ Cooke, J. L. (2016). PRINCE2 Agile. An implementation pocket guide: Step-by-step advice for every project type. IT Governance Publishing. ▪ International Conference on Electronics, Computers, and Artificial Intelligence, Universitatea din Piteşti, Institute of Electrical and Electronics Engineers, IEEE Industry Applications Society, & ECAI. (2017, June 29–July 1). Proceedings of the 9th International Conference on Electronics, Computers and Artificial Intelligence, New Jersey. ▪ Mathis, B. (2014). Prince2 for beginners: Prince2 study guide for certification and project management. CreateSpace Independent Publishing Platform.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Written Assessment: Case Study

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Online Tests
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Guideline
	☑ Audio	
	☑ Slides	

Project: Corporate Project with PRINCE2®

Course Code: DLMPREEPMPR02

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	DLMPREEPMPR01

Course Description

The course „Project: Corporate Project with PRINCE2®" is building on the basic knowledge of the PRINCE2® framework acquired in the previous course. The studied theoretical concept can be applied within a real company environment. The student experiences the advantages of project management in stages and can reflect on the relation between project management and task execution. The student is also confronted with the hurdles that arise in applying the methodology in a real situation and can experiment with own approaches to solutions.

Course Outcomes

On successful completion, students will be able to

- understand PRINCE2® and its principles within the context of a corporate organization.
- explain the PRINCE2® Project Management structure as well as the themes and processes of PRINCE2® in detail and out of practical experience.
- set up a Project Management Team with its associated roles.
- start and initiate a project and plan a project stage.
- work with and create management products and specialized products.
- discuss critically the benefits and limitations of the PRINCE2® framework.

Contents

- The course „Project: Corporate Project with PRINCE2®" is building on the basic knowledge of the PRINCE2® framework acquired in the previous course and on the general knowledge of management know-how and classical project management acquired during the previous semesters. Based on a real task to be resolved within an organization (commercial enterprise, public administration, or the like), the students can gain practical experience in setting up a project management team according to PRINCE2®.
- The students will reflect critically on the similarities and differences they observed, and, if applicable, also compare the experienced classical methods with agile methods of project management. To meet scientific criteria, a literature search and a thorough comparison of the scientific and methodological foundation to the practical aspects experienced in the project is strongly encouraged and supported. The business aspect (costs, gain, time, quality, strategic relevance, etc.) of the project should be recognized and analyzed based on scientific methods. The students will demonstrate their ability to combine specialist

knowledge and transfer of this knowledge to a specific project in a professional environment. They will also critically reflect on the experienced own work with PRINCE2®, as well as on the theoretical concept of the PRINCE2® framework itself.

Literature

Compulsory Reading

Further Reading

- AXELOS Limited (2017): Managing Successful Projects with Prince2. TSO, London.
- Bentley, C. (2019): The Concise PRINCE2®: Principles and Essential Themes. 3rd ed., IT Governance Publishing, Cambridgeshire.
- Cooke, J. L. (2016): PRINCE2 Agile An Implementation Pocket Guide: Step-by-Step Advice for Every Project Type. IT GOVERNANCE PUBLISHING, New York.
- International Conference on Electronics, Computers and Artificial Intelligence; Universitatea din Piteşti; Institute of Electrical and Electronics Engineers; IEEE Industry Applications Society; ECAI (2017). Proceedings of the 9th International Conference on Electronics, Computers and Artificial Intelligence - ECAI-2017: 29 June - 01 July 2017, IEEE: New Jersey.
- Mathis, B. (2014): Prince2 for Beginners: Prince2 Study Guide for certification & project management. N.p.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
Learning Material	**Exam Preparation**
☑ Slides	☑ Guideline

Manufacturing Methods Industry 4.0 and Internet of Things

Module Code: DLMBMMIIT

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Rachel John Robinson (Internet of Things) / Radiah Rivu (Manufacturing Methods Industry 4.0)

Contributing Courses to Module

- Internet of Things (DLMBMMIIT01)
- Manufacturing Methods Industry 4.0 (DLMBMMIIT02)

Module Exam Type

Module Exam

Split Exam

Internet of Things

- Study Format "Distance Learning": Exam, 90 Minutes
- Study Format "myStudies": Exam, 90 Minutes

Manufacturing Methods Industry 4.0

- Study Format "myStudies": Exam, 90 Minutes
- Study Format "Distance Learning": Exam, 90 Minutes

Weight of Module

see curriculum

Module Contents

Internet of Things

- Consumer use cases and risks
- Business use cases and risks
- Social-economic issues
- Enabling technologies and networking fundamentals

Manufacturing Methods Industry 4.0

- Forming
- Cutting
- Rapid prototyping
- Rapid tooling
- Direct manufacturing

Learning Outcomes

Internet of Things

On successful completion, students will be able to

- distinguish and discuss a broad range of use cases for the internet of things (IoT).
- understand and reflect upon the different perspectives on IoT.
- apply distinct techniques to engineer internet-of-things products.
- evaluate and identify appropriate IoT communication technology and standards according to given IoT product requirements.
- reflect on the respective theoretical foundation, evaluate different approaches, and apply appropriate approaches to practical questions and cases.

Manufacturing Methods Industry 4.0

On successful completion, students will be able to

- evaluate different manufacturing methods against given product and process requirements.
- define and design modern additive techniques in contrast to traditional manufacturing.
- assess and estimate the impact of current trends on manufacturing like cyber-physical systems to given manufacturing challenges and practical problems.
- apply modern processes like rapid prototyping, rapid tooling, and direct manufacturing.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the field(s) of Computer Science & Software Development	All Master Programmes in the IT & Technology field(s)

Internet of Things

Course Code: DLMBMMIIT01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

The Internet of Things (IoT), once a rough vision, has become reality today in a broad manner. There is a plethora of devices and services available to both consumers and businesses.
From smart homes to smart cities, from smart devices to smart factories – internet-of-things technologies impact on our lives and environments. This course follows a top-down approach, discussing a broad set of aspects connected with the internet of things. It starts with use cases and risks from the perspectives of customers and businesses and winds up with a technical foundation of the internet of things. To address the engineering perspective, a set of techniques is proposed.

Course Outcomes

On successful completion, students will be able to

- distinguish and discuss a broad range of use cases for the internet of things (IoT).
- understand and reflect upon the different perspectives on IoT.
- apply distinct techniques to engineer internet-of-things products.
- evaluate and identify appropriate IoT communication technology and standards according to given IoT product requirements.
- reflect on the respective theoretical foundation, evaluate different approaches, and apply appropriate approaches to practical questions and cases.

Contents

1. Introduction into the Internet of Things
   - 1.1 Foundations and Motivations
   - 1.2 Potential and Challenges
2. Social and Business Relevance
   - 2.1 Innovations for Consumers and Industry
   - 2.2 Impact on Human and Work Environment
   - 2.3 Privacy and Security
3. Architectures of Internet of Things and Industrial Internet of Things
   - 3.1 Elements of IoTs and IIoTs
   - 3.2 Sensors and Nodes

3.3 Power Systems
3.4 Fog Processors
3.5 Platforms

4. Communication Standards and Technologies
   4.1 Network Topologies
   4.2 Network Protocols
   4.3 Communication Technologies

5. Data Storage and Processing
   5.1 NoSQL and MapReduce
   5.2 Linked Data and RDF(S)
   5.3 Semantic Reasoning
   5.4 Complex Event Processing
   5.5 Machine Learning
   5.6 Overview of Existing Data Storage and Processing Platforms

6. Fields of Application
   6.1 Smart Home/Living
   6.2 Smart Buildings
   6.3 Ambient Assisted Living
   6.4 Smart Energy/Grid
   6.5 Smart Factory
   6.6 Smart Logistics
   6.7 Smart Healthcare
   6.8 Smart Agriculture

Literature

Compulsory Reading

Further Reading

- Lea, P. (2018). Internet of things for architects: Architecting IoT solutions by implementing sensors, communication infrastructure, edge computing, analytics, and security. Birmingham: Packt Publishing Ltd. (Database: Dawson).
- McEwen, A., & Cassimally, H. (2013). Designing the internet of things. Chichester: John Wiley & Sons. (Database: ProQuest).
- Raj, P., & Raman, A. C. (2017). The Internet of Things: Enabling technologies, platforms, and use cases. Boca Raton, FL: Auerbach Publications. (Database: ProQuest).
- Weber, R. H., & Weber, R. (2010). Internet of Things. Heidelberg: Springer. (Database: Dawson).

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	
☑ Recorded Live Sessions	☑ Slides	

Study Format myStudies

Study Format	Course Type
myStudies	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	
	☑ Slides	

Manufacturing Methods Industry 4.0

Course Code: DLMBMMIIT02

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

The aim of the course is to enable students to evaluate and identify appropriate manufacturing methods in the context of Industry 4.0. For that purpose, the course provides a comprehensive introduction of such processes based on traditional, standardized manufacturing techniques that have influenced and are still influencing production processes through technological developments under the generic term Industry 4.0. These include technological advances in additive manufacturing processes that enable applications such as rapid prototyping, rapid tooling, and direct manufacturing. Finally, the course deals with the consequences of the digitization and networking of production facilities and their elements in terms of a cyber-physical system.

Course Outcomes

On successful completion, students will be able to

- evaluate different manufacturing methods against given product and process requirements.
- define and design modern additive techniques in contrast to traditional manufacturing.
- assess and estimate the impact of current trends on manufacturing like cyber-physical systems to given manufacturing challenges and practical problems.
- apply modern processes like rapid prototyping, rapid tooling, and direct manufacturing.

Contents

1. Introduction to Manufacturing Methods
   - 1.1 Basic Concepts
   - 1.2 Historical Development of Manufacturing
   - 1.3 About the Long Tail
2. Manufacturing Methods
   - 2.1 Casting and Molding
   - 2.2 Shaping
   - 2.3 Machining
   - 2.4 Joining
   - 2.5 Coating
3. Additive Manufacturing and 3D printing

- 3.1 Basics and Legal Aspects
- 3.2 Material Extrusion
- 3.3 Vat Polymerization
- 3.4 Powder Bed Fusion
- 3.5 Material Jetting
- 3.6 Binder Jetting
- 3.7 Direct Energy Deposition
- 3.8 Sheet Lamination

4. Rapid Prototyping
   - 4.1 Definitions
   - 4.2 Strategical and Operative Aspects
   - 4.3 Application Scenarios

5. Rapid Tooling
   - 5.1 Definitions
   - 5.2 Direct and Indirect Methods
   - 5.3 Application Scenarios

6. Direct/Rapid Manufacturing
   - 6.1 Potentials and Requirements
   - 6.2 Implementation Examples

7. Cyber-Physical Production Systems
   - 7.1 Introduction
   - 7.2 Cyber-Physical Production Systems
   - 7.3 Impact on Design and Maintenance of Plants
   - 7.4 Dynamic Reconfiguration of Plants
   - 7.5 Application Examples

Literature

Compulsory Reading

Further Reading

- Anderson, C. (2012). Makers. The new industrial revolution. New York, NY: Crown Business.
- Gebhardt, A. (2012). Understanding additive manufacturing. Rapid prototyping – Rapid tooling – Rapid manufacturing. Munich: Hanser.

Study Format myStudies

Study Format	Course Type
myStudies	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	
	☑ Slides	

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
☑ Recorded Live Sessions	☑ Audio	
	☑ Slides	

AI and Mastering AI Prompting

Module Code: DLMEAIMAIP

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	MA	10	300 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Claudia Heß (Artificial Intelligence) / Prof. Dr. Gissel Velarde Perez (Project: AI Excellence with Creative Prompting Techniques)

Contributing Courses to Module

- Artificial Intelligence (DLMAIAI01)
- Project: AI Excellence with Creative Prompting Techniques (DLMPAIECPT01)

Module Exam Type

Module Exam	Split Exam
	Artificial Intelligence • Study Format "Distance Learning": Exam, 90 Minutes • Study Format "myStudies": Exam, 90 Minutes Project: AI Excellence with Creative Prompting Techniques • Study Format "Distance Learning": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

Artificial Intelligence

- History of AI
- Expert Systems
- Neuroscience
- Modern AI Systems
- AI Application Areas

Project: AI Excellence with Creative Prompting Techniques

In this module, students delve into the world of generative AI applications, creating AI-generated content such as text, images, and videos. They learn to design, analyze, and evaluate different prompting techniques in these systems and apply them within their respective fields of study.

Learning Outcomes

Artificial Intelligence

On successful completion, students will be able to

- remember the historical developments in the field of artificial intelligence.
- analyze the different application areas of artificial intelligence.
- comprehend expert systems.
- apply Prolog to simple expert systems.
- comprehend the brain and cognitive processes from a neuro-scientific point of view.
- understand modern developments in artificial intelligence.

Project: AI Excellence with Creative Prompting Techniques

On successful completion, students will be able to

- comprehend and implement various prompting techniques in generative AI applications.
- analyze, assess, and combine different prompt techniques for various expected AI outputs.
- implement ethical considerations into the design and execution of various generative AI applications.
- design, implement, and refine effective prompts and their combinations for real-world scenarios through various hands-on exercises.
- showcase creative and innovative thinking and reasoning in the application of advanced prompting techniques to solve multidimensional problems in their specialized area of study.

Links to other Modules within the Study Program	Links to other Study Programs of the University
This module is similar to other modules in the field of Data Science & Artificial Intelligence	All Master Programs in the IT & Technology field

Artificial Intelligence

Course Code: DLMAIAI01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

The quest for artificial intelligence has captured humanity's interest for many decades and has been an active research area since the 1960s. This course will give a detailed overview of the historical developments, successes, and set-backs in AI, as well as the development and use of expert systems in early AI systems.In order to understand cognitive processes, the course will give a brief overview of the biological brain and (human) cognitive processes and then focus on the development of modern AI systems fueled by recent developments in hard- and software. Particular focus will be given to discussion of the development of "narrow AI" systems for specific use cases vs. the creation of general artificial intelligence.The course will give an overview of a wide range of potential application areas in artificial intelligence, including industry sectors such as autonomous driving and mobility, medicine, finance, retail, and manufacturing.

Course Outcomes

On successful completion, students will be able to

- remember the historical developments in the field of artificial intelligence.
- analyze the different application areas of artificial intelligence.
- comprehend expert systems.
- apply Prolog to simple expert systems.
- comprehend the brain and cognitive processes from a neuro-scientific point of view.
- understand modern developments in artificial intelligence.

Contents

1. History of AI
   - 1.1 Historical Developments
   - 1.2 AI Winter
   - 1.3 Notable Advances in AI
2. Expert Systems
   - 2.1 Overview Over Expert Systems
   - 2.2 Introduction to Prolog
3. Neuroscience
   - 3.1 The (Human) Brain

3.2 Cognitive Processes

4. Modern AI Systems
   - 4.1 Recent Developments in Hard- and Software
   - 4.2 Narrow vs General AI
   - 4.3 NLP and Computer Vision

5. AI Application Areas
   - 5.1 Autonomous Vehicles & Mobility
   - 5.2 Personalized Medicine
   - 5.3 FinTech
   - 5.4 Retail & Industry

Literature

Compulsory Reading

Further Reading

- Chowdhary, K. R. (2020). Fundamentals of Artificial Intelligence. Springer India.
- Russell, S. & Norvig, P. (2022). Artificial intelligence. A modern approach (4th ed.). Pearson Education.
- Ward, J. (2020). The student's guide to cognitive neuroscience. (4th ed.). Taylor & Francis Group.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
☑ Recorded Live Sessions	☑ Audio	
	☑ Slides	

Study Format myStudies

Study Format	Course Type
myStudies	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Course Feed	☑ Course Book	☑ Practice Exam
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
☑ Recorded Live Sessions	☑ Audio	
	☑ Slides	

Project: AI Excellence with Creative Prompting Techniques

Course Code: DLMPAIECPT01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	none

Course Description

In this course, students explore the exciting world of prompting in various generative AI applications. They involve themselves in hands-on exercises that combine various prompting techniques to create new AI-generated content, including text, images, and videos. Through these exercises, students learn how to effectively use, analyze, combine, and assess these systems within their specialized fields of study.

Course Outcomes

On successful completion, students will be able to

- comprehend and implement various prompting techniques in generative AI applications.
- analyze, assess, and combine different prompt techniques for various expected AI outputs.
- implement ethical considerations into the design and execution of various generative AI applications.
- design, implement, and refine effective prompts and their combinations for real-world scenarios through various hands-on exercises.
- showcase creative and innovative thinking and reasoning in the application of advanced prompting techniques to solve multidimensional problems in their specialized area of study.

Contents

- In this course, students engage in a practical application of a generative AI use case by choosing from the options provided in the extensive supplementary guide. The course presents practical examples as study materials and exercises with both individual and combined prompting techniques for open-source text, image, and video generation use cases. The exercises are crafted to inspire and lead students in executing their distinct generative AI use case work and provide guidance on describing the use case and selecting a mixture of prompting techniques. Additionally, students are led to critically evaluate the design, implementation, and the outcomes from both technical and ethical perspectives.

Literature
Compulsory Reading
Further Reading ▪ Dang, H., Mecke, L., Lehmann, F., Goller, S., & Buschek, D. (2022). How to prompt? Opportunities and challenges of zero- and few-shot learning for human-AI interaction in creative applications of generative models. arXiv. https://arxiv.org/pdf/2209.01390.pdf ▪ Epstein, Z., Hertzmann, A., Herman, L., Mahari, R., Frank, M. R., Groh, M., Schroeder, H., Smith, A., Akten, M., Fjeld, J., Farid, H., Leach, N., Pentland, A. S., & Russakovsky, O. (2023). Art and the science of generative AI: A deeper dive. arXiv. https://arxiv.org/pdf/2306.04141.pdf ▪ Gozalo-Brizuela, R., & Garrido-Merchán, E. C. (2023). A survey of generative AI applications. arXiv. https://arxiv.org/pdf/2306.02781.pdf ▪ Wei, J., Wang, X., Schuurmans, D., Bosma, M. Ichter, B., Xia, F., Chi, E. H., Le., Q. V., & Zhou, D. (2023). Chain-of-though prompting elicit reasoning in large language models. arXiv. https://arxiv.org/pdf/2201.11903.pdf

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
Tutorial Support ☑ Course Feed ☑ Intensive Live Sessions/Learning Sprint ☑ Recorded Live Sessions	**Exam Preparation** ☑ Guideline

Master Thesis

Module Code: DLMMTHES

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	See current study and exam regulations (SPO)	MA	15	450 h

Semester / Term	Duration	Regularly offered in	Language of Instruction and Examination
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Tianxiang Lu (Master Thesis) / Prof. Dr. Tianxiang Lu (Colloquium)

Contributing Courses to Module

- Master Thesis (DLMMTHES01)
- Colloquium (DLMMTHES02)

Module Exam Type

Module Exam	Split Exam
	Master Thesis • Study Format "Distance Learning": Master Thesis (90) • Study Format "myStudies": Master Thesis (90) Colloquium • Study Format "myStudies": Colloquium (10) • Study Format "Distance Learning": Colloquium (10)

Weight of Module

see curriculum

Module Contents

Master Thesis

- Written Master Thesis

Colloquium

- Thesis Defense

Learning Outcomes

Master Thesis

On successful completion, students will be able to

- work on a problem from their major field of study by applying the specialist and methodological skills they have acquired during their studies.
- analyse selected tasks with scientific methods, critically evaluate them and develop appropriate solutions under the guidance of an academic supervisor.
- record and analyse existing (research) literature appropriate to the topic of the Master's thesis.
- prepare a detailed written elaboration in compliance with scientific methods.

Colloquium

On successful completion, students will be able to

- present a problem from their field of study under consideration of academic presentation and communication techniques.
- reflect on the scientific and methodological approach chosen in the Master's thesis.
- actively answer subject-related questions from subject experts (experts of the Master's thesis).

Links to other Modules within the Study Program	**Links to other Study Programs of the University**
All modules in the Master Program	All Master Programs

Master Thesis

Course Code: DLMMTHES01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		13.5	See current study and exam regulations (SPO)

Course Description

The aim and purpose of the Master's thesis is to successfully apply the subject-specific and methodological competencies acquired during the course of study in the form of an academic dissertation with a thematic reference to the major field of study. The content of the Master's thesis can be a practical-empirical or theoretical-scientific problem. Students should prove that they can independently analyse a selected problem with scientific methods, critically evaluate it and work out proposed solutions under the subject-methodological guidance of an academic supervisor. The topic to be chosen by the student from the respective field of study should not only prove the acquired scientific competences, but should also deepen and round off the academic knowledge of the student in order to optimally align his professional abilities and skills with the needs of the future field of activity.

Course Outcomes

On successful completion, students will be able to

- work on a problem from their major field of study by applying the specialist and methodological skills they have acquired during their studies.
- analyse selected tasks with scientific methods, critically evaluate them and develop appropriate solutions under the guidance of an academic supervisor.
- record and analyse existing (research) literature appropriate to the topic of the Master's thesis.
- prepare a detailed written elaboration in compliance with scientific methods.

Contents

- Within the framework of the Master's thesis, the problem as well as the scientific research goal must be clearly emphasized. The work must reflect the current state of knowledge of the topic to be examined by means of an appropriate literature analysis. The student must prove his ability to use the acquired knowledge theoretically and/or empirically in the form of an independent and problem-solution-oriented application.

Literature
Compulsory Reading
Further Reading ▪ Bui, Y. N. (2013). How to Write a Master's Thesis (2nd ed.). SAGE Publications, Incorporated. ▪ Turabian, K. L. (2013). A Manual for Writers of Research Papers, theses, and dissertations (8th ed.). University of Chicago Press. ▪ Further subject specific literature

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Thesis Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Master Thesis

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
405 h	0 h	0 h	0 h	0 h	405 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Intensive Live Sessions/Learning Sprint ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

Study Format myStudies

Study Format	Course Type
myStudies	Thesis Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Master Thesis

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
405 h	0 h	0 h	0 h	0 h	405 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Intensive Live Sessions/Learning Sprint ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

Colloquium

Course Code: DLMMTHES02

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		1.5	See current study and exam regulations (SPO)

Course Description

The colloquium will take place after submission of the Master's thesis. This is done at the invitation of the experts. During the colloquium, the students must prove that they have fully independently produced the content and results of the written work. The content of the colloquium is a presentation of the most important work contents and research results by the student, and the answering of questions by the experts.

Course Outcomes

On successful completion, students will be able to

- present a problem from their field of study under consideration of academic presentation and communication techniques.
- reflect on the scientific and methodological approach chosen in the Master's thesis.
- actively answer subject-related questions from subject experts (experts of the Master's thesis).

Contents

- The colloquium includes a presentation of the most important results of the Master's thesis, followed by the student answering the reviewers' technical questions.

Literature

Compulsory Reading

Further Reading

- Renz, K.-C. (2016): The 1 x 1 of the presentation. For school, study and work. 2nd edition, Springer Gabler, Wiesbaden.

Study Format myStudies

Study Format	Course Type
myStudies	Thesis Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Colloquium

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
45 h	0 h	0 h	0 h	0 h	45 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Intensive Live Sessions/Learning Sprint ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Thesis Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
Type of Exam	Colloquium

Student Workload					
Self Study	**Contact Hours**	**Tutorial/Tutorial Support**	**Self Test**	**Independent Study**	**Hours Total**
45 h	0 h	0 h	0 h	0 h	45 h

Instructional Methods		
Tutorial Support	**Learning Material**	**Exam Preparation**
☑ Intensive Live Sessions/Learning Sprint ☑ Recorded Live Sessions	☑ Slides	☑ Guideline