MODULE HANDBOOK

Master of Arts

Master Project Management (FS-OI-MAPRE-60)

60 CP

Distance Learning

As of April 23rd, 2024

INTERNATIONAL
UNIVERSITY OF
APPLIED SCIENCES

Classification: Non-Consecutive

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1. Semester

Applied Project Management

Module Code: DLMPRAPM_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. Margit Sarstedt (Applied Project Management)

Contributing Courses to Module

- Applied Project Management (DLMPRAPM01_E)

Module Exam Type

Module Exam	Split Exam
Study Format: Distance Learning Oral Assignment	

Weight of Module

see curriculum

Module Contents

- Applied Project Management
- The Project Management Landscape
- The Project Context
- Standardized Approaches to Project Management
- Agile Approaches to Project/Process Management
- Variations of Standardized and Agile Methods
- Tools for Project Managers

Learning Outcomes

Applied Project Management

On successful completion, students will be able to

- understand and explain the role of project management within organizations.
- give an overview over the project management institutions worldwide.
- explain the different approaches of the most important standardized and agile project management methods.
- critically discuss the advantages and restrictions of each of these methods.
- know and apply the variety of helpful tools supporting a project manager's work.
- select the appropriate project management method for any given situation.

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

Applied Project Management

Course Code: DLMPRAPM01_E

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

Course Description

For many decades now, the approach of project management has played an important role worldwide, both in the private sector as well as in public administration. Over the years, a widespread and commonly used terminology has evolved. National and international project management organizations have developed various methods for managing complex projects in an organized way. These can be divided into two major categories. The traditional standardized methods all have in common that they tackle projects in a planned and well-structured way. The agile methods, on the other hand, feature a systematic but open approach, leaving vast room for changes along the way. In this course, the individual methods are being introduced to some level of detail, explaining the basic idea, and showing the advantages and restrictions of each of these methods. The typical field of application for each method will be described, enabling the student to choose the method fitting best for a given situation. Additionally, a set of practical tools will be taught, which will support a project manager in steering any given project towards the project goal.

Course Outcomes

On successful completion, students will be able to

- understand and explain the role of project management within organizations.
- give an overview over the project management institutions worldwide.
- explain the different approaches of the most important standardized and agile project management methods.
- critically discuss the advantages and restrictions of each of these methods.
- know and apply the variety of helpful tools supporting a project manager's work.
- select the appropriate project management method for any given situation.

Contents

1. The Project Management Landscape
    - 1.1 History of project management
    - 1.2 Definition of projects, programs, and processes
    - 1.3 Scope and examples of projects in today's world
    - 1.4 International project management organizations
    - 1.5 Options for specialization and certification

2. The Project Context
   - 2.1 Analyzing the environment and the project goals
   - 2.2 Distinguishing project types and categories
   - 2.3 Project culture and organization models
   - 2.4 The role of leadership and personnel management
   - 2.5 Finding the right approach – selection criteria

3. Standardized Approaches to Project Management
   - 3.1 Project management according to German DIN
   - 3.2 Project management according to PMBOK 6 by the PMI
   - 3.3 The IPMA system
   - 3.4 Organizing projects with PRINCE2®
   - 3.5 Advantages and restrictions of standardized methods

4. Agile Approaches to Project/Process Management
   - 4.1 The Agile Manifesto
   - 4.2 Fundamentals of Scrum and scaling methods
   - 4.3 Kanban and Design Thinking
   - 4.4 Advantages and restrictions of agile methods

5. Variations of Standardized and Agile Methods
   - 5.1 The critical chain project management
   - 5.2 Prince2® Agile
   - 5.3 The PMBOK 7 by the PMI
   - 5.4 Overview over further variations

6. Tools for Project Managers
   - 6.1 Objectives, milestone planning, and work packages
   - 6.2 Budgeting, resource planning, and scheduling using bar charts
   - 6.3 Analyzing project risks (FMEA) and milestone trends (MTA)
   - 6.4 Taskboards and other little tricks
   - 6.5 Stakeholder management and management reporting

Literature

Compulsory Reading

Further Reading

- AXELOS Limited (2017): Managing Successful Projects with PRINCE2®. 2017 edition, TSO, Norwich, UK.
- Beck, K. et al. (2001): Manifesto for Agile Software Development. https://agilemanifesto.org/, last accessed on July 07, 2021.
- IPMA® International Project Management Association (2018): Individual Competence Baseline for Project Management. Version 4.0, IPMA, Amsterdam, NL.
- Project Management Institute (2017): A Guide to the Project Management Body of Knowledge (PMBOK® Guide). 6th edition, Newtown Square, PA, USA.

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	

Requirements Management

Module Code: DLMPRERM

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

Michael Malik (Requirements Management)

Contributing Courses to Module

- Requirements Management (DLMPRERM01)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

- Basics and Drivers of Requirements Management
- Classification and Terms of Requirements Management
- Tasks of Requirements Management
- Methods and Quality of Requirements Management
- Process and Industry-specific Needs of Requirements Management

Learning Outcomes

Requirements Management

On successful completion, students will be able to

- understand the drivers and the importance of requirements management.
- name the essential tasks and functions of requirements management as well as describe their meaning.
- explain the different methods of requirements management.
- define quality criteria for good requirements management and identify requirements smells.
- explain the process of requirements management and derive industry-specific needs.

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

Requirements Management

Course Code: DLMPRERM01

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

Course Description

Globalization and digitization are the mega-trends of our time. In addition to increasingly global networking, real-time communication and growing product complexity, customer requirements and needs are changing rapidly as well. The flexible, fast and target specific reaction, recording, controlling, monitoring and administration of these changing customer needs must be met by requirements management. This course will explain the internal and external drivers of requirements management as well as address the other mega-trends. The aim is to identify and understand the specific tasks, methods and quality criteria of requirements management. Furthermore, the need for industry-specific adaptation within the basic requirements management process flow is of major importance. Finally, this course will offer critical reflection, taking into consideration the limiting framework conditions when applying requirements management.

Course Outcomes

On successful completion, students will be able to

- understand the drivers and the importance of requirements management.
- name the essential tasks and functions of requirements management as well as describe their meaning.
- explain the different methods of requirements management.
- define quality criteria for good requirements management and identify requirements smells.
- explain the process of requirements management and derive industry-specific needs.

Contents

1. Basics and Drivers of Requirements Management
   - 1.1 Introduction
   - 1.2 Definition of Requirements and Management
   - 1.3 Requirements Management as an Answer to the VUCA World
   - 1.4 External and Internal Drivers for Requirements Management
   - 1.5 Project Management and Requirements Management
2. Classification and Terms of Requirements Management
   - 2.1 Requirements Management in Relation to Requirements Engineering
   - 2.2 Requirements Management in Relation to Business Analytics

2.3 From Customer Needs to the Specification of Requirements
2.4 The Specification Sheet and its Significance
2.5 The Importance of Functional Specifications and Technical Concept

3. Requirements Management Tasks
3.1 Management and Control of Requirements
3.2 Administration of Requirements
3.3 Risk Management
3.4 Implementation Management
3.5 Modification Management

4. Methods and Quality of Requirements Management
4.1 Scoping
4.2 Requirements Analysis and Requirements Specification
4.3 Requirements Modeling and Review
4.4 Quality Criteria of Requirements Management
4.5 Identification of Requirements Smells

5. Process and Industry-Specific Needs of Requirements Management
5.1 Basic Process of Requirements Management
5.2 Specifications for Projects in Mechanical and Plant Engineering
5.3 Specification for Projects in Civil Engineering
5.4 Specifications for Projects in the Social Sector
5.5 Specifications for Projects in the Software Sector

6. Critical Reflection
6.1 Costs/Benefits of Requirements Management
6.2 Requirements Management and Agility—A Contradiction?
6.3 Limits of Requirements Management

Literature

Compulsory Reading

Further Reading

- Akbar, M. A. / Mahmood, S. / Alsanad, A. / Shafiq, M. / Gumaei, A. (2020): Organization Type and Size Based Identification of Requirements Change Management. Challenges in Global Software Development. IEEE Access, 8, p. 94089–94111.
- Ameri, F. / Stecke, K. E. / Cieminski, G. / Kiritsis, D. (2019): Advances in Production Management Systems. Production Management for the Factory of the Future. Bd. 566, Springer International Publishing.
- Papinniemi, J. / Hannola, L. / Maletz, M. (2014): Challenges in integrating requirements management with PLM. International Journal of Production Research, 52(15), p. 4412–4423.
- Wörösch, M. (2014): End-to-end requirements management for multi-projects in the construction industry. 1. Auflage., Report / DCAMM: No. S 162. DTU Mechanical Engineering, DCAMM.
- Zhang, J., Xue / D. & Gu, P. (2014): Robust adaptable design considering changes of requirements and parameters during product operation stage. The International Journal of Advanced Manufacturing Technology, 72(1-4), p. 387–401.

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
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Online Tests
	☑ Audio	☑ Guideline
☑ Recorded Live Sessions	☑ Slides	

Project: Corporate Project with PMBOK

Module Code: DLMPREPCPPMBOK

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. Margit Sarstedt (Project: Corporate Project with PMBOK)

Contributing Courses to Module

- Project: Corporate Project with PMBOK (DLMPREPCPPMBOK01)

Module Exam Type

Module Exam	Split Exam
Study Format: Distance Learning Written Assessment: Project Report	

Weight of Module

see curriculum

Module Contents

As one of several institutions dealing with project management, the US-based Project Management Institute (PMI) serves as owner and publisher of the regularly updated Project Management Body of Knowledge (PMBOK). This course gives the opportunity to learn about the PMBOK and to compare this standard to other standards and models in use.

Learning Outcomes

Project: Corporate Project with PMBOK

On successful completion, students will be able to

- understand the PMBOK and its application within the context of a project.
- explain the basic assumptions and elements of the PMBOK in detail.
- work with the PMBOK and combine it with other sources to accomplish project tasks.
- discuss critically the benefits and limitations of the PMBOK compared to other standards.

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 Management field

Project: Corporate Project with PMBOK

Course Code: DLMPREPCPPMBOK01

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

Course Description

This course is building on the seventh edition of the PMBOK. Using fictive cases, the theoretical foundation can be transferred into realistic cases. Thus, the student can reflect on the key elements of project management and can experiment with their own approaches to solutions.

Course Outcomes

On successful completion, students will be able to

- understand the PMBOK and its application within the context of a project.
- explain the basic assumptions and elements of the PMBOK in detail.
- work with the PMBOK and combine it with other sources to accomplish project tasks.
- discuss critically the benefits and limitations of the PMBOK compared to other standards.

Contents

- This course is building on the specific knowledge of the PMBOK, on the general knowledge of management know-how, and on the knowledge of classical as well as agile project management. Based on a task to be resolved in either real of fictive cases in the commercial or public arena, the students can gain practical experience working with the PMBOK guidebook as well as additional sources. During their work students will have the opportunity to discuss the selected case and their individual approach with their IU professor. The students will critically reflect on the methods presented in the PMBOK and learn to assess even seemingly contradictory advice and formulate their own paths in the project. Therefore, and to meet scientific criteria, a literature search and a thorough comparison of the different approaches to the practical aspects is strongly encouraged and supported. The students will demonstrate their ability to combine specialist knowledge and transfer of this knowledge. They will also critically reflect on the experienced own work with the PMBOK, as well as on the theoretical concept of the guidebook itself.

Literature
Compulsory Reading
Further Reading ▪ Brown, J. T. (2014). The handbook of program management: how to facilitate project success with optimal program management (2nd ed.). McGraw-Hill. ▪ Kerzner, H. (2022). Project Management : A Systems Approach To Planning, Scheduling, And Controlling. John Wiley & Sons Inc. ▪ Project Management Institute. (2017). A guide to the project management body of knowledge (PMBOK® Guide) (6th ed.). Project Management Institute. ▪ Project Management Institute. (2021). A Guide to the Project Management Body of Knowledge (PMBOK® Guide) (7th ed.). Project Management Institute.

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

Agile Project Management

Module Code: DLMIEEAPM

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

Sandra Reinstädtler (Agile Project Management)

Contributing Courses to Module

- Agile Project Management (DLMIEEAPM01)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

- 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

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 field of Project Management	All Master Programs in the Business & Management field

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	

Seminar: Managing People and Organizations

Module Code: DLMMGSMPO

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. Muhammad Ashfaq (Seminar: Managing People and Organizations)

Contributing Courses to Module

- Seminar: Managing People and Organizations (DLMMGSMPO01)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

This seminar deals with issues in managing people and organizations.

Learning Outcomes	
Seminar: Managing People and Organizations On successful completion, students will be able to ▪ familiarize themselves autonomously with a given topic from the field of "Managing People and Organizations". ▪ independently research subject-specific literature and evaluate it in a targeted manner. ▪ elaborate important characteristics, interrelationships and findings in a written assignment.	
Links to other Modules within the Study Program This module is similar to other modules in the fields of Business Administration & Management	**Links to other Study Programs of the University** Master Programmes in the Business & Management fields

Seminar: Managing People and Organizations

Course Code: DLMMGSMPO01

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

Course Description

In the seminar "Managing People and Organizations" students write a research essay on a specific topic. The students demonstrate that they are able to autonomously familiarize themselves with a topic of the seminar and to document and present the knowledge gained in an organized manner.

Course Outcomes

On successful completion, students will be able to

- familiarize themselves autonomously with a given topic from the field of "Managing People and Organizations".
- independently research subject-specific literature and evaluate it in a targeted manner.
- elaborate important characteristics, interrelationships and findings in a written assignment.

Contents

- The seminar deals with "Managing People and Organizations". Each participant is expected to write a research paper on a topic assigned to them.

Literature

Compulsory Reading

Further Reading

- Bailey, S. (2020). Academic writing for international students of business. New York, NY: Routledge. 3rd Edition.
- Busse, C. and August, E. (2021). How to Write and Publish a Research Paper for a Peer-Reviewed Journal. Journal of Cancer Education 36, 909-913.
- Silvia, P. J. (2019). How to Write a Lot: A Practical Guide to Productive Academic Writing. (2nd Ed). Washington: 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	☑ 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

Advanced Research Methods

Module Code: DLMARM-01

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. Tamara Wehrstein (Advanced Research Methods)

Contributing Courses to Module

- Advanced Research Methods (DLMARM01-01)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

- Principles of Research
- Research Approaches
- The Research Project
- Selected Formal Techniques
- Selected Interpretative Topics
- Scientific Reporting

Learning Outcomes

Advanced Research Methods

On successful completion, students will be able to

- demonstrate an understanding of principles of scientific inquiry and logical reasoning.
- apply formal techniques to modeling and theory generation.
- apply interpretative techniques to intercultural case studies.
- propose, plan, and conduct research projects under ethical constraints.
- evaluate study results to arrive at valuable and ethical conclusions.
- report study results responsibly in an objective and comprehensible form.

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 Programmes in the Business field

Advanced Research Methods

Course Code: DLMARM01-01

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

Course Description

Advanced research methods, specifically business research, is scientific inquiry that attempts to uncover new information which helps a business improve performance, maximizing shareholder value while adhering to ethical and moral compliance standards.Managers seeking to conduct empirical research must maintain validity, reliability, and trustworthiness when utilizing scientific methodologies in order to produce meaningful and actionable results. Research proposals are typically written prior to conducting research, which have a certain structure, enabling the researcher to properly plan, conduct, and analyze case studies and surveys. Different data collection strategies are used to collect both qualitative and quantitative data, depending on the research proposal goals. Managers utilize their understanding of research methodologies to accurately assess the quality of research.

Course Outcomes

On successful completion, students will be able to

- demonstrate an understanding of principles of scientific inquiry and logical reasoning.
- apply formal techniques to modeling and theory generation.
- apply interpretative techniques to intercultural case studies.
- propose, plan, and conduct research projects under ethical constraints.
- evaluate study results to arrive at valuable and ethical conclusions.
- report study results responsibly in an objective and comprehensible form.

Contents

1. Principles of Research
   - 1.1 Scientific Inquiry
   - 1.2 Principles of Reasoning
   - 1.3 From Data to Knowledge
   - 1.4 Models & Theories
   - 1.5 The Research Cycle

2. Research Approaches
   - 2.1 Experimental Design
   - 2.2 Engineering & Development
   - 2.3 Empirical Research & Case Studies

- 2.4 Interpretative Studies

3. The Research Project
   - 3.1 Topic Generation
   - 3.2 Types of Literature Reviews
   - 3.3 Developing a Research Design
   - 3.4 The Research Proposal

4. Selected Formal Techniques
   - 4.1 Foundations of Probability Theory & Inferential Statistics
   - 4.2 Data Acquisition
   - 4.3 Pattern Recognition & Classification
   - 4.4 Modelling & Theory Generation
   - 4.5 Artificial Intelligence in Research

5. Selected Interpretative Topics
   - 5.1 Phenomenology
   - 5.2 Hermeneutics & Discourse Analysis
   - 5.3 Ethnography & Ethnomethodology
   - 5.4 Critical Management Theory

6. Scientific Reporting
   - 6.1 Results Presentation & Visualization
   - 6.2 Interpretation
   - 6.3 Argumentation & Discussion
   - 6.4 Conclusions
   - 6.5 Ethical Considerations

Literature

Compulsory Reading

Further Reading

- Babbie, E. R. (2021). The practice of social research (15th ed.). Cengage Learning.
- Babbie, E. R. (2016). The practice of social research (14th ed.). Cengage Learning.
- Crossman, A. (2019). How to conduct an index for research. https://www.thoughtco.com/index-for-research-3026543
- Eurostat. (n.d.). Beginners: Statistical concept - Index and base year. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Beginners:Statistical_concept_-_Index_and_base_year
- Giles, D. (2004). Advanced research methods in psychology (Reprint). Psychology Press.
- Rea, L.M., & Parker, R.A. (2014). Designing and conducting survey research: A comprehensive guide, (4th ed). Jossey-Bass.
- Saunders, M., Thornhill, A., & Lewis, P. (2019). Research methods for business students (8th ed). Pearson.
- Takahashi, A. R. W., & Araujo, L. (2019). Case study research: Opening up research opportunities. RAUSP Management Journal, 55(1), 100–111.
- Widner, J., Woolcock, M., & Ortega Nieto, D. (Eds.). (2022). The case for case studies: Methods and applications in international development (strategies for social inquiry). Cambridge University Press.

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	☑ Course Book	☑ Online Tests
☑ Intensive Live Sessions/Learning Sprint	☑ Video	☑ Guideline
☑ Recorded Live Sessions	☑ 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	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	☑ Slides	

2. Semester

Conversation Management and Communication Techniques

Module Code: DLMWPGUK_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. Caroline Trautwein (Conversation Management and Communication Techniques)

Contributing Courses to Module

- Conversation Management and Communication Techniques (DLMWPGUK01_E)

Module Exam Type

Module Exam	Split Exam
Study Format: Distance Learning Oral Assignment	

Weight of Module

see curriculum

Module Contents

- Forms of Communication
- Means of Communication Techniques of Communication
- Communication with Specific Groups Conversation Management
- Means in Conversation
- Dealing with Difficult Conversation Situations

Learning Outcomes

Conversation Management and Communication Techniques

On successful completion, students will be able to

- place the importance of the areas of communication techniques and interviewing in the overall context of business psychology,
- identify goals and forms of communication and interviewing in the context of business psychology,
- use and apply means, methods and instruments of communication and conversation in the context of business psychology,
- identify and understand purposeful communication and conversation management techniques against the backdrop of difficult and deadlocked situations,
- explain and develop appropriate measures of communication and conversation,
- discuss and uncover problems of communication and conversation and suggest alternative 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 field of Social Work	All Master Programs in the Social Sciences field

Conversation Management and Communication Techniques

Course Code: DLMWPGUK01_E

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

Course Description

Good communication skills are the key to professional success. To achieve professional goals, you have to be convincing in conversations. Only those who really understand their conversation partners and are also understood by them, will achieve a good result more quickly. To achieve this, it is essential to be prepared, especially for difficult conversations, and to have a toolbox of different conversation techniques at your disposal, so that can be used in a targeted manner to make constructive communication possible. In addition to certain means of communication, this also requires special techniques and methods. Knowledge and understanding of the psychological and human aspects of the use of communication techniques and the conduct of discussions are an important basis for the success of discussions in the context of business psychology.
The course also addresses difficult and critical discussion situations as well as communication with specific target groups. Students learn about different communication styles, communication techniques as well as the phases of conducting discussions in order to specifically prepare for and conduct discussions with other team members as well as external partners. You will learn how to better adapt to your conversation partners and act accordingly in order to achieve good results for both sides.

Course Outcomes

On successful completion, students will be able to

- place the importance of the areas of communication techniques and interviewing in the overall context of business psychology,
- identify goals and forms of communication and interviewing in the context of business psychology,
- use and apply means, methods and instruments of communication and conversation in the context of business psychology,
- identify and understand purposeful communication and conversation management techniques against the backdrop of difficult and deadlocked situations,
- explain and develop appropriate measures of communication and conversation,
- discuss and uncover problems of communication and conversation and suggest alternative approaches.

Contents

1. Basics of Communication
   - 1.1 Defining and Characterizing Communication
   - 1.2 Modeling Communication
   - 1.3 Functions of Communication
   - 1.4 Communication Competence

2. Forms of Communication
   - 2.1 Types of Communication
   - 2.2 Modalities of Communication
   - 2.3 Verbal Communication
   - 2.4 Nonverbal Communication

3. Perception in the Communication Process
   - 3.1 Perception Process
   - 3.2 Perceiving Others
   - 3.3 Perceiving and Presenting Self
   - 3.4 Communicative Styles

4. Communication Techniques
   - 4.1 Listening
   - 4.2 Perspective Taking
   - 4.3 Questioning
   - 4.4 I-language
   - 4.5 Complete Messages
   - 4.6 Metacommunication
   - 4.7 Neuro Linguistic Programming Techniques

5. Communication at Work
   - 5.1 Communication in Dyads
   - 5.2 Communication in Teams
   - 5.3 Organizational Communication
   - 5.4 Communication with the Public

6. Conversation Strategies
   - 6.1 Shaping Relationships
   - 6.2 Handling Self-Disclosure
   - 6.3 Presenting Content

6.4 Employing Influence
6.5 Planning and Structuring Conversations
6.6 Problem-solving in groups

7. Difficult Conversations
   7.1 Conveying Difficult Content
   7.2 Difficult Interaction Partners
   7.3 Conflicts
   7.4 Feedback Rules

8. Public Communication
   8.1 Types
   8.2 Rhetorics
   8.3 Preparing
   8.4 Delivering
   8.5 The influence of social media

Literature

Compulsory Reading

Further Reading

- Adler, R. B., Rodman, G. R., & du Pré, A. (2017). Understanding human communication (13thed.). Oxford University Press.
- Communication in the real world: An introduction to communication studies. (2016). University of Minnesota Libraries Publishing.
- Hargie, O. (2017). Skilled interpersonal communication: Research, theory and practice (6thed.). 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	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	

Process Management with Scrum

Module Code: DLMPREEPMS

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum		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

2.1 The Development Team
2.2 The Product Owner
2.3 The Scrum Master
2.4 The Customer Involvement
2.5 The Organization

3. Product Backlog and Sprint Planning
3.1 Principles of a Product Backlog
3.2 Refinement Process
3.3 Definition of Ready
3.4 Determining Capacity
3.5 Selecting Items and Defining the Sprint Goal

4. Executing the Scrum Process
4.1 The Scrum Process
4.2 Sprint Cycle
4.3 Daily Scrum
4.4 Sprint Review
4.5 Sprint Retrospective

5. Helpful Tools
5.1 Requirements and User Stories
5.2 Planning Poker
5.3 Communication Tools (e. g. Task Board)
5.4 Tracking Tools (e. g. Burn-down Chart)
5.5 Available Software Tools

6. Implementation and Scaling of Scrum
6.1 Implementation of Scrum in a Company
6.2 Chances, Risks, and Limitations of Scrum
6.3 Scrum of Scrums
6.4 The Nexus Framework for Scaling Scrum
6.5 Other Approaches

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		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

1.4 The Project Management Team – Structure and Roles
1.5 Management Products and Specialist Products

2. The Seven Themes
2.1 Introduction to Themes
2.2 Business Case
2.3 Organization
2.4 Quality
2.5 Plans
2.6 Risk
2.7 Change
2.8 Progress

3. The Seven Processes
3.1 Overview and Interaction of the Processes
3.2 Starting up a Project
3.3 Initiating a Project
3.4 Directing a Project
3.5 Controlling a Stage
3.6 Managing Product Delivery
3.7 Managing Stage Boundaries
3.8 Closing a Project

4. Creation of Results
4.1 Creation of Management Products
4.2 Creation of Specialist Products

5. Tailoring
5.1 Tailoring of PRINCE2® to the Organization
5.2 Scaling of PRINCE2® by Combining Roles
5.3 Combining PRINCE2® with other Project Management Methods

6. PRINCE2® Agile
6.1 Goal of PRINCE2® Agile
6.2 Overview of PRINCE2® Agile
6.3 Similarities and Differences to the Original PRINCE2®

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

Project Management within Operations

Module Code: DLMPREEPMO

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	None	MBA 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. Sebastian Stütz (Operations and Information Management) / Prof. Dr. Margit Sarstedt (Project: Operations Projects)

Contributing Courses to Module

- Operations and Information Management (DLMBAEOIM01)
- Project: Operations Projects (DLMPREEPMO02)

Module Exam Type

Module Exam	Split Exam
	Operations and Information Management • Study Format "myStudies": Written Assessment: Case Study • Study Format "Distance Learning": Written Assessment: Case Study Project: Operations Projects • Study Format "Distance Learning": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

Operations and Information Management

- Preparation of Reliable Demand Forecasts
- Site Planning
- Process Design and Process Planning
- Inventory Management and Production Control
- Information Systems in the Supply Chain
- Behavioral Operations Management

Project: Operations Projects

The course is building on the basic knowledge of operations and information management as well as on general project management know-how. The students apply a selection of the learned methods in a project for improvement or change within the Operations unit of a company.
The special challenges of running a project in the context of existing day-to-day routines is experienced.

Learning Outcomes

Operations and Information Management

On successful completion, students will be able to

- apply selected and practice-oriented concepts of operations management in various tasks and draw appropriate conclusions for verifiable performance improvements.
- critically evaluate the benefits and limitations of modern and process-oriented software solutions in operations management.
- consider current and future developments in connection with the megatrends of digitization and climate protection in operations management.
- support the analysis, planning, and design of value-adding processes in supply chains through modern information systems.
- understand and anticipate the behavior of decision-makers and their individual preferences in order to better predict the actual behavior of the supply chain partners and optimize the achievement of own objectives.

Project: Operations Projects

On successful completion, students will be able to

- describe and explain the real-life operational work of a company.
- understand the implications of information management.
- analyze needs and opportunities for improvement of specific operational processes.
- define and set up a project within the operational environment.
- implement an improvement or change in operational processes.

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

Operations and Information Management

Course Code: DLMBAEOIM01

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

Course Description

Operations management comprises the planning, control, execution, and monitoring of all internal company resources and capacities for the manufacture of products and services. This course provides students with the knowledge and skills to apply theoretically-sound and practice-relevant concepts of operations management in the context of different problems and tasks (taking into account central megatrends) and draw process-relevant conclusions for verifiable performance improvements. The consideration of powerful software solutions plays an important role here. Starting from the creation of reliable demand forecasts, different scenarios for the optimal location decisions of companies are considered. The process design defines the basic framework for processes, decision rules, and process performance analyses. This then shows in the subsequent process planning how optimal sequences for orders are calculated under certain priority rules. In inventory management, various models for inventory optimization are considered in order to apply practice-relevant methods for calculating capacities and production plans, taking into account various restrictions. Supply chain management investigates how independent companies can optimally coordinate their activities and promote cross-company communication through the use of sustainable information systems. Concluding the course is an examination of human decision heuristics and preferences and their anticipation of decision behavior within the framework of behavioral operations management.

Course Outcomes

On successful completion, students will be able to

- apply selected and practice-oriented concepts of operations management in various tasks and draw appropriate conclusions for verifiable performance improvements.
- critically evaluate the benefits and limitations of modern and process-oriented software solutions in operations management.
- consider current and future developments in connection with the megatrends of digitization and climate protection in operations management.
- support the analysis, planning, and design of value-adding processes in supply chains through modern information systems.
- understand and anticipate the behavior of decision-makers and their individual preferences in order to better predict the actual behavior of the supply chain partners and optimize the achievement of own objectives.

Contents

1. Introduction to operations management
   - 1.1 Definition, subjects, and tools of operations management
   - 1.2 Operations management under circumstances of conflicting demands

2. Preparation of reliable demand forecasts
   - 2.1 The Forecast Problem
   - 2.2 Qualitative forecasting methods
   - 2.3 Causal and time series forecasts
   - 2.4 Assessment of forecast quality

3. Site planning
   - 3.1 Central problem aspects
   - 3.2 Arbitrary locations and transport costs
   - 3.3 Optimization with pre-determined locations
   - 3.4 Site selection and response times

4. Process design and process planning
   - 4.1 Process types
   - 4.2 Process structure
   - 4.3 Process performance
   - 4.4 Priority rules for planning and controlling processes

5. Inventory management and production control
   - 5.1 Models for optimizing stocks
   - 5.2 Continuous inventory management
   - 5.3 Function and application areas of MRP II and Just in Time
   - 5.4 Methods for optimal planning of capacities and production plans

6. Information systems in the supply chain
   - 6.1 Increased performance through product and process design
   - 6.2 Order policy, demand forecasts, and demand planning
   - 6.3 Hellingrath and Kuhn's three-pillar approach
   - 6.4 Requirements for supply chain information systems
   - 6.5 Market analysis of selected IT systems

7. Behavioral operations management
   - 7.1 Decision heuristics for solving complex problems
   - 7.2 Decision behavior and decision prognosis

7.3 Decision influencing

Literature
Compulsory Reading
Further Reading ▪ Bozarth, C. C. & Handfield, R. B. (2019). Introduction to operations and supply chain management (5th ed.). Pearson Education Limited. ▪ Das, A. (2015). An introduction to operations management: The joy of operations. Routledge. ▪ Hill, A., & Hill, T. (2018). Essential operations management (2nd ed.). Red Globe Press. ▪ Slack, N. & Brandon-Jones, A. (2018). Operations and process management: Principles and practice for strategic impact. Pearson.

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: 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	

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: Operations Projects

Course Code: DLMPREEPMO02

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

Course Description

Operational processes have the characteristics of running an operation in steady state, without allowing changes to the work processes in place. Any project in the Operations arena must therefore be either an improvement or a change project. After analyzing needs for improvement in specific operational processes using methods of operations and information management, project management can be applied to initiate changes. The project definition and execution must consider the specifics of daily business in an operational environment.

Course Outcomes

On successful completion, students will be able to

- describe and explain the real-life operational work of a company.
- understand the implications of information management.
- analyze needs and opportunities for improvement of specific operational processes.
- define and set up a project within the operational environment.
- implement an improvement or change in operational processes.

Contents

- The course is building on the basic knowledge of operations and information management and on general project management know-how. As operational processes have the characteristics of running an operation in steady state, any project within Operations must address either an improvement or a change to the existing processes. After analyzing possible needs for improvement in specific operational processes – applying the structured analytical methodologies commonly used in operations management – appropriate project management methods can be applied to initiate the identified changes. The project definition and execution must consider the specifics of daily business in an operational environment. The students can gain practical experience in setting up and running a project without noticeably interrupting the ongoing operational processes.
- During their work, the students will have the opportunity to compare their real-life experience with the theoretical concepts. The students will reflect critically on the similarities and differences they observed. 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.) as outcome of the analysis and as

project result should be recognized and discussed 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

Literature

Compulsory Reading

Further Reading

- Bozarth, C. C./Handfield, R. B. (2019): Introduction to operations and supply chain management. Pearson, Harlow, England.
- Carvalho, A. M./Sampaio, P./Rebentisch, E. (2019): On Agile Metrics for Operations Management: Measuring and Aligning Agility with Operational Excellence. In: 2019 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM), 1601–1605.
- Project Management Institute (2017): PMBOK Guide. A guide to the project management body of knowledge. Sixth edition, PA: Project Management Institute, Newtown Square.
- Slack, N./Brandon-Jones, A. (2018): Operations and process management. Principles and practice for strategic impact. Harlow, England Pearson Education Limited, 2018.

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

Advanced Robotics 4.0

Module Code: DLMAIEAR

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. Leonardo Riccardi (Industrial and Mobile Robots) / Jacko Nudzor (Project: Collaborative Robotics)

Contributing Courses to Module

- Industrial and Mobile Robots (DLMAIEAR01)
- Project: Collaborative Robotics (DLMAIEAR02)

Module Exam Type

Module Exam	Split Exam
	Industrial and Mobile Robots • Study Format "Distance Learning": Exam, 90 Minutes • Study Format "myStudies": Exam, 90 Minutes Project: Collaborative Robotics • Study Format "Distance Learning": Written Assessment: Project Report • Study Format "myStudies": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

Industrial and Mobile Robots

- Architectural components of mobile and industrial robots
- Mathematical description
- Design of interactions and control

Project: Collaborative Robotics

- Human-robot interaction
- Safety operation
- Human-friendly robot design

Learning Outcomes

Industrial and Mobile Robots

On successful completion, students will be able to

- identify the main challenges of robotics in the era of Industry 4.0.
- understand the working principles of industrial and mobile robots.
- model a robotic system and design a motion control algorithm.
- use software platforms to command the execution of tasks and retrieve the execution status.

Project: Collaborative Robotics

On successful completion, students will be able to

- classify interactions between robots and humans.
- identify safety and risk scenarios.
- understand the principles of human-friendly robot design.
- apply algorithms for safe interaction.

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 Engineering.	All Master Programs in the IT & Technology field.

Industrial and Mobile Robots

Course Code: DLMAIEAR01

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

Course Description

The focus of this course is the theoretical foundation of mobile and industrial robotics. First, the basic concepts, architectural components (e.g., actuators and sensors), and challenges related to mobile and industrial robotics in the era of Industry 4.0 are presented. Next, the mathematical aspects concerning robot kinematics and trajectory planning are considered. These are necessary in order to define the operative task that a robot (mobile or industrial) must execute. The dynamics of a robotic system provides a mathematical model of the robot which can be exploited for simulation, design, and to control the task execution. There are various control architectures and approaches for robotic systems. This course focuses on the centralized and de-centralized architectures, as well as simple control design (e.g., proportional-integral-derivative control approaches).Finally, this course introduces the main software platforms and architectures used to control and exchange data with robots in a multi-agent environment, for instance, a manufacturing facility where many robots execute different tasks or must cooperate. The main patterns of such architectures and their uses are discussed. The adoption of model-based sensing/perception and control approaches yields intelligent systems which interact with the environment. This course concludes with an overview of behavior-based robotics, where robots are able to dynamically react to and learn from the real world.

Course Outcomes

On successful completion, students will be able to

- identify the main challenges of robotics in the era of Industry 4.0.
- understand the working principles of industrial and mobile robots.
- model a robotic system and design a motion control algorithm.
- use software platforms to command the execution of tasks and retrieve the execution status.

Contents

1. Introduction
    - 1.1 Robots and manufacturing
    - 1.2 Industrial robots
    - 1.3 Mobile robots
    - 1.4 Actuators for robotics
    - 1.5 Trends in robotics

2. Kinematics
   - 2.1 Position and orientation of a rigid body
   - 2.2 Joint kinematics
   - 2.3 Forward kinematics
   - 2.4 Inverse kinematics
   - 2.5 Differential kinematics
   - 2.6 Kinematics of mobile robots

3. Trajectory Planning
   - 3.1 Basic concepts
   - 3.2 Trajectories in the joints space
   - 3.3 Trajectories in the workspace
   - 3.4 Trajectory planning for mobile robots

4. Sensing and Perception
   - 4.1 Position
   - 4.2 Velocity
   - 4.3 Force
   - 4.4 Distance
   - 4.5 Visual

5. Fundamentals of Robot Dynamics
   - 5.1 Rigid body dynamics
   - 5.2 Lagrange formulation
   - 5.3 Newton formulation
   - 5.4 Direct and inverse dynamics
   - 5.5 Dynamics of mobile robots

6. Control of Robots
   - 6.1 Basic concepts
   - 6.2 Decentralized motion control
   - 6.3 Centralized motion control
   - 6.4 Force control

7. Architecture of Robotic Systems
   - 7.1 Architectural components
   - 7.2 Open Robot Control Software (OROCOS)
   - 7.3 Yet Another Robotic System Platform (YARP)

7.4 Robot Operating System (ROS) 7.5 Behavior-based robotics

Literature
Compulsory Reading
Further Reading ▪ Ben-Ari, M., & Mondada, F. (2017). Elements of robotics. Springer International Publishing. ▪ Siciliano, B., Sciavicco, L., Villani, L., & Oriolo, G. (2009). Robotics. Springer. ▪ Siciliano, B., & Khatib, O. (Eds.). (2016). Springer handbook of robotics (2nd ed.). 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	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	☑ 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	☑ Slides	

Project: Collaborative Robotics

Course Code: DLMAIEAR02

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

Course Description

A collaborative robot is a robot which is used in collaborative operation, where humans and robots share the same workspace. This course focuses on the basic concepts of collaborative robotics, such as classification of human-robot interaction, definition of safe interaction, soft robotics and human-friendly robot design, and algorithms to guarantee such a safe interaction. The students will receive a hands-on introduction to the topic, with the goal of being able to autonomously design, simulate and test collaborative robotic systems.

Course Outcomes

On successful completion, students will be able to

- classify interactions between robots and humans.
- identify safety and risk scenarios.
- understand the principles of human-friendly robot design.
- apply algorithms for safe interaction.

Contents

- Each participant must create a project report on a topic related to collaborative robotics, focusing on design and/or implementation aspects.

Literature

Compulsory Reading

Further Reading

- Ben-Ari, M., & Mondada, F. (2018). Elements of robotics. Springer.
- Corke, P. (2017). Robotics, vision and control (2nd ed.). Springer.
- Mihelj, M., Bajd, T., Ude, A., Lenarčič, J., Stanovnik, A., Munih, M., … Šlajpah, S. (2019). Robotics (2nd ed.). Springer.
- Siciliano, B., & Khatib, O. (Eds.). (2016). Springer handbook of robotics (2nd ed.). Springer.
- Teixeira, J. V. S., Reis, A. M., Mendes, F. B., & Vergara, L. G. L. (2019). Collaborative robots. In P. Arezes (Ed.), Occupational and environmental safety and health: Studies in systems, decision and control (pp. 791–796). 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		
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	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 ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

Business Analyst

Module Code: DLMDSEBA

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum		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. Silke Vaas (Business Intelligence I) / Prof. Dr. Silke Vaas (Project: Business Intelligence)

Contributing Courses to Module

- Business Intelligence I (DLMDSEBA01)
- Project: Business Intelligence (DLMDSEBA02)

Module Exam Type

Module Exam	Split Exam
	Business Intelligence I • Study Format "Distance Learning": Written Assessment: Case Study • Study Format "myStudies": Written Assessment: Case Study Project: Business Intelligence • Study Format "Distance Learning": Portfolio • Study Format "myStudies": Portfolio

Weight of Module

see curriculum

Module Contents

Business Intelligence I

- Data acquisition and dissemination
- Data warehouse and multidimensional modeling
- Analytical systems
- Future Business Intelligence Application Areas

Project: Business Intelligence

Implementation of a business intelligence use case.

Learning Outcomes

Business Intelligence I

On successful completion, students will be able to

- understand the motivations and use cases for, as well as fundamentals of, business intelligence.
- explain relevant types of data.
- know and disambiguate techniques and methods for modeling and dissemination of data.
- expound upon the techniques and methods for the generation and storage of information.
- select apposite business intelligence methods for given requirements.
- explain current and future business intelligence application areas.

Project: Business Intelligence

On successful completion, students will be able to

- transfer knowledge of business intelligence methodology to real-world use cases.
- analyze the suitability of different approaches with respect to the project task.
- critically reason about relevant design choices.
- make apposite architectural choices.
- formulate and implement a business intelligence use case.

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 Computer Science & Software Development and Data Science & Artificial Intelligence	All Master Programs in the IT & Technology fields

Business Intelligence I

Course Code: DLMDSEBA01

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

Course Description

Business Intelligence is about the generation of information based on operational data. It is used to enable goal-oriented management practices as well as the optimization of relevant business activities. This course introduces and discusses techniques, methods, and models for data provisioning and the generation, analysis, and dissemination of information.

Course Outcomes

On successful completion, students will be able to

- understand the motivations and use cases for, as well as fundamentals of, business intelligence.
- explain relevant types of data.
- know and disambiguate techniques and methods for modeling and dissemination of data.
- expound upon the techniques and methods for the generation and storage of information.
- select apposite business intelligence methods for given requirements.
- explain current and future business intelligence application areas.

Contents

1. Motivation and Introduction
   - 1.1 Motivation and Historical Development of the Field
   - 1.2 Business Intelligence as a Framework
2. Data Provisioning
   - 2.1 Operative and Dispositive Systems
   - 2.2 The Data Warehouse Concept
   - 2.3 Architecture Variants
3. Data Warehouse
   - 3.1 The ETL-Process
   - 3.2 DWH and Data-Mart Concepts
   - 3.3 ODS and Meta-Data
4. Modeling Multidimensional Dataspaces

- 4.1 Data Modeling
- 4.2 OLAP-Cubes
- 4.3 Physical Storage Concepts
- 4.4 Star-Schema and Snowflake-Schema
- 4.5 Historization

5. Analytical Systems
   - 5.1 Freeform Data Analysis and OLAP
   - 5.2 Reporting Systems
   - 5.3 Model-Based Analytical Systems
   - 5.4 Concept-Oriented Systems

6. Distribution and Access
   - 6.1 Information Distribution
   - 6.2 Information Access

7. Current and Future Business Intelligence Application Areas
   - 7.1 Mobile Business Intelligence
   - 7.2 Predictive and Prescriptive Analytics
   - 7.3 Artificial Intelligence
   - 7.4 Agile Business Intelligence

Literature

Compulsory Reading

Further Reading

- Grossmann, W., Rinderle-Ma, S. (2015). Fundamentals of Business Intelligence. Berlin/ Heidelberg: Springer.
- Kolb, J. (2013). Business intelligence in plain language: A practical guide to data mining and business analytics. Createspace.
- Sharda, R., Delen, D., & Turban, E. (2014). Business intelligence and analytics: Systems for decision support. Pearson.
- Sharda, R., Delen, D., & Turban, E. (2017). Business intelligence, analytics, and data science: A managerial perspective. Pearson.
- Sherman, R. (2014). Business intelligence guidebook: From data integration to analytics. Morgan Kaufmann.
- Turban, E., Sharda, R., Aronson, J., & King, D. (2010). Business intelligence. A managerial approach (2nd ed.). Prentice Hall.
- Vaisman, A., & Zimányi, E. (2016). Data warehouse systems: Design and implementation. 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	

Study Format myStudies

Study Format	**Course Type**
myStudies	Theory Course

Information about the examination	
Examination Admission Requirements	**Online Tests:** no
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 ☑ Course Feed ☑ Intensive Live Sessions/Learning Sprint ☑ Recorded Live Sessions

Project: Business Intelligence

Course Code: DLMDSEBA02

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	DLMDSEBA01

Course Description

In this course the students will transfer knowledge of business intelligence approaches and methods to the implementation of a real-world business analytical use case. To accomplish this goal, students must look closely at the given task and find an apposite approach by analyzing, evaluating, and comparing different solution strategies and their constituent parts. The found solution then has to be implemented in order to arrive at a running business analytical system.

Course Outcomes

On successful completion, students will be able to

- transfer knowledge of business intelligence methodology to real-world use cases.
- analyze the suitability of different approaches with respect to the project task.
- critically reason about relevant design choices.
- make apposite architectural choices.
- formulate and implement a business intelligence use case.

Contents

- This second course in the Business Analyst specialization aims at the practical implementation of a business intelligence project. Students can choose from a list of project topics or contribute their own ideas.

Literature

Compulsory Reading

Further Reading

- Kimball, R. (2013). The data warehouse toolkit: The definitive guide to dimensional modeling (3rd ed.). Indianapolis, IN: Wiley.
- Linstedt, D., & Olschimke, M. (2015). Building a scalable data warehouse with Data Vault 2.0. Waltham, MA: Morgan Kaufmann.
- Provost, F. (2013). Data science for business: What you need to know about data mining and data-analytic thinking. Sebastopol, CA: O'Reilly.
- Sherman, R. (2014). Business intelligence guidebook: From data integration to analytics. Waltham, MA: Morgan Kaufmann.

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

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

Cyber Criminality

Module Code: DLMIMWCK_E

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum		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

Dr. Jetzabel Maritza Serna- Olvera (Attack Scenarios and Incident Response) / Dr. Jetzabel Maritza Serna- Olvera (Project: Cyber Forensics)

Contributing Courses to Module

- Attack Scenarios and Incident Response (DLMIMWCK01_E)
- Project: Cyber Forensics (DLMIMWCK02_E)

Module Exam Type

Module Exam	Split Exam
	Attack Scenarios and Incident Response • Study Format "Distance Learning": Exam, 90 Minutes Project: Cyber Forensics • Study Format "Distance Learning": Portfolio

Weight of Module

see curriculum

Module Contents

Attack Scenarios and Incident Response

- Threat scenarios
- attack vectors
- Preventive measures
- Reactive measures
- Current situation of IT security

Project: Cyber Forensics

The project is concerned with the question of which procedure is suitable to react to computer-criminal incidents in a company. It deals with forensic procedures for the collection of evidence that can be used in court as well as recommendations for risk minimization, communication and prevention of such incidents. A current list of topics can be found in the Learning Management System.

Learning Outcomes

Attack Scenarios and Incident Response

On successful completion, students will be able to

- assess threat scenarios and their effects.
- name attack vectors and select adequate countermeasures.
- apply electronic evidence procedures to selected attack scenarios.
- develop preventive measures.
- identify reactive measures and assess their effectiveness.
- collect and evaluate information on the current threat situation.

Project: Cyber Forensics

On successful completion, students will be able to

- name basic methods and techniques of computer forensics and their limitations.
- identify the systems and business processes affected by a computer crime and carry out a risk assessment.
- recommend measures to secure electronic evidence and evaluate its usability in court.
- develop recommendations for incident communication, response and prevention.

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 Computer Science & Software Development	All Master Programs in the IT & Technology fields

Attack Scenarios and Incident Response

Course Code: DLMIMWCK01_E

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

Course Description

This course provides students with knowledge for identification and action planning in dealing with criminal offences in the digital environment. It describes how weaknesses in hardware and software and their application can be exploited for criminal activities. In addition, the course introduces typical threat scenarios and the ways in which attacking systems can penetrate a computer system. The course also introduces methods of electronic evidence and shows how legally usable information can be obtained in case of an attack. This is followed by a discussion of the development of preventive measures and the possibilities for reacting in the event of a concrete threat. The course concludes with a discussion of how information on the current security situation can be obtained from reports by security authorities (such as BSI, Europol, NCA, FBI).

Course Outcomes

On successful completion, students will be able to

- assess threat scenarios and their effects.
- name attack vectors and select adequate countermeasures.
- apply electronic evidence procedures to selected attack scenarios.
- develop preventive measures.
- identify reactive measures and assess their effectiveness.
- collect and evaluate information on the current threat situation.

Contents

1. Introduction
   - 1.1 Computer crime as distinct from other offences
   - 1.2 Vulnerabilities in computers and mobile devices
   - 1.3 An overview of malware
   - 1.4 Social engineering and the human factor
2. Criminal basis
   - 2.1 Identity abuse
   - 2.2 Theft of intellectual property
   - 2.3 Falsification of evidentiary data
   - 2.4 Computer fraud

3. Specific offences
   - 3.1 Data Theft
   - 3.2 Digital blackmailing
   - 3.3 Computer sabotage
   - 3.4 Industrial espionage

4. Attack vectors
   - 4.1 Attacks on Chip and Firmware Level
   - 4.2 Attacks at operating system level
   - 4.3 Attacks at network and server level
   - 4.4 Attacks at application level
   - 4.5 Attacks at the organizational level

5. IT forensics and electronic evidence
   - 5.1 Identification, localization and handling of polymorphisms
   - 5.2 Detection mechanisms
   - 5.3 Finding electronic evidence
   - 5.4 Data recovery and evidence recovery
   - 5.5 Legal limits and predictive policing

6. Preventive measures
   - 6.1 Measures on hardware level
   - 6.2 Access permission, authorization and authentication
   - 6.3 Awareness & Training
   - 6.4 Incident Response Planning

7. Reactive measures
   - 7.1 Initial assessment and extent of damage
   - 7.2 Prevention of persistent damage
   - 7.3 Collection, exchange and distribution of information
   - 7.4 Cooperation with security authorities and cooperation partners
   - 7.5 Recommended actions for companies

8. The current security situation
   - 8.1 Current reports of the safety authorities
   - 8.2 Evaluation of the recommendations of the safety authorities
   - 8.3 Current topics of the Europol Awareness Campaign

Literature
Compulsory Reading
Further Reading ▪ Sherman, A. T., DeLatte, D., Neary, M., Oliva, L., Phatak, D., Scheponik, T., Herman, G. L., & Thompson, J. (2018). Cybersecurity: Exploring core concepts through six scenarios. Cryptologia, 42(4), 337—377. ▪ Breitinger, F., & Baggili, I. (2019). Digital Forensics and Cyber Crime: 10th International EAI Conference, ICDF2C 2018, New Orleans, LA, USA, September 10—12, 2018, Proceedings (1st ed.). ▪ Lewis, J., & Baker, S. (2013). The economic impact of cybercrime and cyber espionage. McAfee. ▪ Forshaw, J. (2018). Attacking network protocols: A hacker's guide to capturing, analysis, and exploitation. No Starch Press.Chapter 2.

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	

Project: Cyber Forensics

Course Code: DLMIMWCK02_E

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	DLMIMWCK01_E

Course Description

This project aims to create an action plan for digital investigation and incident handling for a given threat scenario. Starting with a concrete suspicion of a computer-criminal act (e.g. a suspected server attack, loss of customer data or manipulation of business data) the students plan to conduct a digital investigation for electronic evidence and to secure evidence that can be used in court. The data obtained will be used to evaluate risks for affected business processes and to make recommendations for incident treatment and prevention.

Course Outcomes

On successful completion, students will be able to

- name basic methods and techniques of computer forensics and their limitations.
- identify the systems and business processes affected by a computer crime and carry out a risk assessment.
- recommend measures to secure electronic evidence and evaluate its usability in court.
- develop recommendations for incident communication, response and prevention.

Contents

- The project aims to develop an action plan for conducting a digital investigation and incident management for a given threat scenario. Beginning with the concrete suspicion of a computer crime*, the students develop a plan of action that covers the following measures:
  - Localization of the affected systems (hardware and software)
  - Identification of the affected business processes
  - Risk assessment for the impact on affected business processes
  - Communication with internal departments, cooperation partners, customers and the public
  - Identification and preservation of relevant data
  - Examination of the data
  - Securing electronic evidence and its usability in court
  - Recommendations for prevention
  - The action plan should be written in such a way that it serves as a process template for continuous incident handling.

- Examples of suspicious cases are a suspected server attack, loss of customer data, manipulation of business data, publication of internal company data, suspicion of product piracy, inconsistency of electronic signatures in company documents, digital blackmailing of a decision maker or suspicion of industrial espionage.

Literature

Compulsory Reading

Further Reading

- ISO/IEC 27001 (2022): Information Security Management. Tech. rep.
- ISO/IEC 27001:2022.ISO/IEC 27002 (2022): Information Technology - Security Techniques - Code of Practice for Information Security Management. Tech. rep. ISO/IEC 27002:2022.
- NIST (2020): Security Controls for Federal Information Systems. Tech. rep. NIST SP-800-53 Rev. 5.
- CSA (Cloud Security Alliance) (2021): "Cloud Controls Matrix v4."
- CSA (Cloud Security Alliance): "The Consensus Assessments Initiative Questionnaire v4."
- Luna, J., Langenberg, R., Suri, N. (2012): "Benchmarking cloud security level agreements using quantitative policy trees.", Proc. of ACM Workshop on Cloud computing security workshop, pp. 103–112.
- NIST Cloud Computing Reference Architecture and Taxonomy Working Group (2008): "Performance and Measurements Guide for Information Technology." In: NIST 800-55 Revision 1.
- NIST Cloud Computing Reference Architecture and Taxonomy Working Group (2020): "Performance and Measurements Guide for Information Technology." In: NIST 800-55 Revision 2.
- NIST (2013): "Security Controls for Federal Information Systems." Tech. rep. NIST SP-800-53. 2013.
- CIS (2014): "Cloud Service Level Agreement Standardisation Guidelines." Tech. rep. C-SIG SLA 2014. European Commission, C-SIG SLA.
- Pannetrat, A. et al (2013): "D2.1 Security-Aware SLA Specification Language and Cloud Security Dependency model."

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

Data Engineer

Module Code: DLMDSEDE

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum		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

Georgi Dimchev (Data Engineering) / Prof. Dr. Max Pumperla (Project: Data Engineering)

Contributing Courses to Module

- Data Engineering (DLMDSEDE01)
- Project: Data Engineering (DLMDSEDE02)

Module Exam Type

Module Exam	Split Exam
	Data Engineering • Study Format "Distance Learning": Oral Assignment • Study Format "myStudies": Oral Assignment Project: Data Engineering • Study Format "Distance Learning": Portfolio • Study Format "myStudies": Portfolio

Weight of Module

see curriculum

Module Contents

Data Engineering

- Principles of data engineering
- Paradigms for data processing at scale
- Overview on data governance, security, and protection
- Common cloud platforms
- DataOps approach

Project: Data Engineering

- Knowledge transfer and application to practical problems
- Implementation of a data infrastructure building block

Learning Outcomes

Data Engineering

On successful completion, students will be able to

- understand the foundational concepts in data engineering.
- categorize important data-processing classes.
- summarize common approaches to data governance and security and contribute to the broader societal discussion on an academic level.
- compare different common public cloud offerings.
- recognize current approaches to data operations (DataOps) including productivity tools to facilitate working in interdisciplinary teams.

Project: Data Engineering

On successful completion, students will be able to

- apply the principles of data engineering to a practical application.
- analyze data engineering approaches with respect to a given project task.
- reason about the benefits and drawbacks of solution alternatives for a given implementation task.
- make apposite architectural choices.
- implement aspects of a modern data pipeline abiding by strict data protection principles.

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 Engineering

Course Code: DLMDSEDE01

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

Course Description

The focus of this first course in the Data Engineering elective module is to introduce students to important principles, concepts, methods and approaches in this subject domain. In order to achieve this goal, the course moves from an exposition of the foundational principles of data engineering to a thorough treatment of the core data processing classes. Modern architectural paradigms such as Microservices are explained, and important factors in data governance and protection are addressed. In this context, students are enabled to reflect on modern data protection principles and their societal implications and implement these principles into large-scale data-intensive systems. Aspects of cloud computing are introduced via an overview of the most common offerings on the market. Finally, a state-of-the-art agile perspective on the operation of data pipelines is given by an exposition to the emerging notion of DataOps and the productivity tools around it to facilitate working in interdisciplinary teams.

Course Outcomes

On successful completion, students will be able to

- understand the foundational concepts in data engineering.
- categorize important data-processing classes.
- summarize common approaches to data governance and security and contribute to the broader societal discussion on an academic level.
- compare different common public cloud offerings.
- recognize current approaches to data operations (DataOps) including productivity tools to facilitate working in interdisciplinary teams.

Contents

1. Foundations of Data Systems
   - 1.1 Reliability
   - 1.2 Scalability
   - 1.3 Maintainability
2. Data Processing at Scale
   - 2.1 Batch Processing
   - 2.2 Stream and Complex Event Processing

3. Microservices
   - 3.1 Introduction to Microservices
   - 3.2 Implementing Microservices

4. Governance & Security
   - 4.1 Data Protection
   - 4.2 Data Security
   - 4.3 Data Governance

5. Common Cloud Platforms & Services
   - 5.1 Amazon AWS
   - 5.2 Google Cloud
   - 5.3 Microsoft Azure

6. Data Ops
   - 6.1 Defining Principles
   - 6.2 Containerization
   - 6.3 Building Data Pipelines

Literature

Compulsory Reading

Further Reading

- Andrade, H., Gedik, B., & Turaga, D. (2014). Fundamentals of stream processing: Application design, systems, and analytics. Cambridge University Press.
- Axelrod, C. W. (2013). Engineering safe and secure software systems. Artech House.
- Kleppmann, M. (2017). Designing data-intensive applications: The big ideas behind reliable, scalable, and maintainable systems. O'Reilly.
- Newman, S. (2015). Building microservices: Designing fine-grained systems. O'Reilly.

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
☑ 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	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		

Project: Data Engineering

Course Code: DLMDSEDE02

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	DLMDSEDE01

Course Description

The second course of the Data Engineering elective module builds upon theoretical and methodological insights from the first course. It provides opportunities for students to put their newly-acquired knowledge into practical application by completing a data engineering project.In order to find an appropriate and viable approach, students will have to reason about and evaluate the benefits and drawbacks of possible architectural choices. Once an informed decision has been met, the chosen approach is implemented as a running piece of data infrastructure.

Course Outcomes

On successful completion, students will be able to

- apply the principles of data engineering to a practical application.
- analyze data engineering approaches with respect to a given project task.
- reason about the benefits and drawbacks of solution alternatives for a given implementation task.
- make apposite architectural choices.
- implement aspects of a modern data pipeline abiding by strict data protection principles.

Contents

- The second course of the Data Engineering elective revolves around the implementation of a data engineering project chosen from a set of project suggestions. Students can also contribute their own project ideas.

Literature
Compulsory Reading
Further Reading ▪ Farcic, V. (2016). The DevOps 2.0 toolkit: Automating the continuous deployment pipeline with containerized microservices. CreateSpace Independent Publishing Platform. ▪ Karau, H., Konwinski, A., Wendell, P., & Zaharia, M. (2015). Learning Spark: Lightning fast data analysis. O'Reilly Media. ▪ Kleppmann, M. (2017). Designing data intensive applications: The big ideas behind reliable, scalable, and maintainable systems. O'Reilly Media. ▪ Narkhede, N., Shapira, G., & Palino, T. (2017). Kafka: The definitive guide: Real-time data and stream processing at scale. O'Reilly Media. ▪ White, T. (2015). Hadoop: The definitive guide: Storage and analysis at Internet scale (4th ed.). O'Reilly Media.

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 ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

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

International Marketing Projects

Module Code: DLMPREEIMP

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

Caterina Fox (International Marketing) / Prof. Dr. Carolin Egger (Marketing Project)

Contributing Courses to Module

- International Marketing (DLMMARE01)
- Marketing Project (DLMMFS01_E)

Module Exam Type

Module Exam	Split Exam
	International Marketing • Study Format "Distance Learning": Exam, 90 Minutes • Study Format "myStudies": Exam, 90 Minutes Marketing Project • Study Format "Distance Learning": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

International Marketing

- Introduction to International Marketing
- The International Context of Corporations
- International Marketing Strategies
- Features of the Marketing-mix Specific to the International Context
- Trends in International Marketing

Marketing Project

- Independent Work on a Realistic Marketing Project
- Familiarity with Research, Methodology and Analysis
- Writing a Project Report
- Providing a Cohesive Business Project

Learning Outcomes

International Marketing

On successful completion, students will be able to

- transfer well-known marketing management concepts to an international context, recognize limitations of their transferability, and continually develop these concepts.
- perform a structural analysis of the context surrounding specific internationalizing decisions, recognize the various contexts in these scenarios, and formulate alternative decisions.
- assess different strategic and political marketing alternatives in specific scenarios using relevant criteria and develop a decision template for developing marketing plans.
- combine actual issues from industry with the most recent scientific insights into successful marketing approaches in order to develop the skills and knowledge required to manage international marketing in a corporate setting.

Marketing Project

On successful completion, students will be able to

- transfer their knowledge of marketing to a practical example.
- know how to develop a marketing plan.
- create and develop a marketing plan independently using available data.

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

International Marketing

Course Code: DLMMARE01

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

Course Description

The most important task of international marketing is recognizing which international markets and business-related dependencies should be targeted for the marketing of products and services. The course begins with defining key terms and concepts associated with the field of marketing management and then extrapolates these to the international context. The first section of the course equips students with an understanding of how to perform a structured analysis of international markets, using elements of the "PEST Analysis" (political, legal, economical, socio-cultural, and technological frameworks). Strategical aspects of marketing as well as instruments used to analyze the marketing mix are discussed as they relate to the international context. Inadequate consideration of marketing orientation as well as underestimating the impact of cultural differences both present serious threats to the success of any corporation. This course shall therefore analyze and discuss contemporary case studies involving multinational corporations to elucidate these potential threats. Industry-based case studies also offer students the opportunity to put into practice the knowledge and tools acquired in this course to address some of the specific challenges of international marketing.

Course Outcomes

On successful completion, students will be able to

- transfer well-known marketing management concepts to an international context, recognize limitations of their transferability, and continually develop these concepts.
- perform a structural analysis of the context surrounding specific internationalizing decisions, recognize the various contexts in these scenarios, and formulate alternative decisions.
- assess different strategic and political marketing alternatives in specific scenarios using relevant criteria and develop a decision template for developing marketing plans.
- combine actual issues from industry with the most recent scientific insights into successful marketing approaches in order to develop the skills and knowledge required to manage international marketing in a corporate setting.

Contents

1. Introduction to International Marketing
    - 1.1 Issues Related to International Marketing
    - 1.2 Environmental Factors in International Market Development
    - 1.3 Features of Buying Behavior in International Marketing

2. International Marketing Strategies
   - 2.1 Marketing Segmentation and Market Selection
   - 2.2 Market Entry Strategy
   - 2.3 Market Exit Strategy

3. International Market Research
   - 3.1 Qualitative and Quantitative Primary Research
   - 3.2 International Survey and Observations

4. International Marketing for Specific Sectors
   - 4.1 Industrial Goods Sector
   - 4.2 Consumer Goods Sector
   - 4.3 Wholesale and Retail Sector
   - 4.4 Service Sector

5. International Products
   - 5.1 Product Policy
   - 5.2 Product Mix and Degree of Standardization
   - 5.3 Brand Policy

6. International Pricing and Terms and Sales Policies
   - 6.1 Pricing on International Markets
   - 6.2 Types of Price Discrimination
   - 6.3 Credit and Discount Policy

7. International Promotion
   - 7.1 International Promotion
   - 7.2 International Promotion Mix
   - 7.3 Optimal Standardization

8. International Distribution
   - 8.1 Distribution Channels, Intermediaries, and Distribution Schemes
   - 8.2 Organizational Forms for International Market Development
   - 8.3 Potential for Standardization

9. International Marketing Mix
   - 9.1 Home Country Orientation
   - 9.2 Global Orientation
   - 9.3 Multinational Orientation

Literature
Compulsory Reading
Further Reading ▪ Cateora, P.R., Money, B., Gilly, M.C. & Graham, J.L. (2019) International Marketing, 18th Edition, McGraw-Hill.

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
☑ Recorded Live Sessions	☑ Audio	
	☑ Slides	

Marketing Project

Course Code: DLMMFS01_E

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

Course Description

The module "Marketing Project" focuses on topics of operative marketing. In this seminar, students are familiarized with the methodology of developing a marketing project. Areas dealt with are research, methodology and analysis. Students learn how to introduce a product or service to the market by researching and defining all areas of the classic marketing mix. They define a target group, research the market, describe the product or service, develop a pricing strategy, create a communication and a distribution plan. Students are required to perform both primary and secondary research. In this seminar, students acquire basic practical knowledge by applying the theoretical approaches of the marketing mix to a real project. They collect data on the market and the target group and, based on this, work out a marketing plan including a rough business plan.

Course Outcomes

On successful completion, students will be able to

- transfer their knowledge of marketing to a practical example.
- know how to develop a marketing plan.
- create and develop a marketing plan independently using available data.

Contents

1. Choice of topics: Development of creative product or service ideas
2. Target group definition: Who is your client? How large is this market segment?
3. Market research: How big is the market for this product or service? What is the market trend?
4. Product definition: What is the core product or service you offer? What additional elements are part of this offer?
5. Pricing: How much will you sell the product or service for? What does the competition charge? What are your approximate costs? What is your target group willing to pay?
6. Communication: How do you communicate your offer to the target group? Through which communication channels?
7. Distribution: Which distribution channels are available?

Literature

Compulsory Reading

Further Reading

- Bughin, J./Doogan, J./Vetvik, O. J. (2010): A new way to measure word-of-mouth marketing. In: McKinsey Quarterly, no 2, S. 113–116.
- Dinner, I./ Heerde, H. J. v./Neslin, S. A. (2014): Driving Online and Offline Sales. The Cross-Channel Effects of Traditional, Online Display, and Paid Search. In: Journal of Marketing Research (JMR), 51. Jg., no 5, S. 527–545.
- Kotler, P. et al. (2012): Marketing Management. 2. Auflage, Pearson, Harlow et al.
- McWilliams, G. (2004): Analyzing Customers, Best Buy Decides Not All Are Welcome. In: The Wall Street Journal, 08 November 2004.
- o. V. (2010): Selling becomes sociable. In: The Economist, Heft 8699, S. 76–78. (URL: http://www.economist.com/node/16994870 [Retrieved on: 01.03.2017]).
- Rust, R./Moorman, C./Bhalla G. (2010): Rethinking Marketing. In: Harvard Business Review, 88. Jg., no 1/2, S. 94–101.

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 ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

Product Development and Design Thinking

Module Code: DLMBPDDT

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. Dorian Mora (Product Development) / Prof. Dr. Dorian Mora (Project: Design Thinking)

Contributing Courses to Module

- Product Development (DLMBPDDT01)
- Project: Design Thinking (DLMBPDDT02)

Module Exam Type

Module Exam	Split Exam
	Product Development • Study Format "myStudies": Exam, 90 Minutes • Study Format "Distance Learning": Exam, 90 Minutes Project: Design Thinking • Study Format "myStudies": Written Assessment: Project Report • Study Format "Distance Learning": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

Product Development

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

Project: Design Thinking

This course will put students in the mindset of Design Thinking. Students will be introduced to phases and distinct methods for inspiration, as well as the ideation and implementation of products. A current list of topics is located in the Learning Management System.

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.

Project: Design Thinking

On successful completion, students will be able to

- comprehend, critically reflect on, and adopt the Design Thinking mindset.
- understand the inspiration, ideation, and implementation phases.
- evaluate and identify appropriate methods from the toolbox of human-centered design for given design tasks and challenges.

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 fields

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	

Project: Design Thinking

Course Code: DLMBPDDT02

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

Course Description

In this course, students will receive a hands-on introduction to human-centered design via the Design Thinking method. Beyond conveying the individual basic principles, the procedures in Design Thinking are examined in detail. In order to fully understand Design Thinking in terms of important aspects in practice, selected methods for the individual process steps are presented in theory and application. Students will learn to improve their design process by reflecting on and adapting their activities.

Course Outcomes

On successful completion, students will be able to

- comprehend, critically reflect on, and adopt the Design Thinking mindset.
- understand the inspiration, ideation, and implementation phases.
- evaluate and identify appropriate methods from the toolbox of human-centered design for given design tasks and challenges.

Contents

- The course covers current topics and trends in Design Thinking, illustrating some methods and techniques as well as case studies. Each participant must create a project report on a chosen project, where he/she describes the application of the Design Thinking approach to a real product development scenario.

Literature
Compulsory Reading
Further Reading ▪ IDEO.org. (2015). The Field Guide to Human-Centered Design. A step-by-step guide that will get you solving prob-lems like a designer. Retrieved from http://www.designkit.org/resources/1 ▪ Pressman, Andy (2019): Design Thinking. A Guide to Creative Problem Solving for Everyone, New York : Routledge. ▪ Lockwood, T., & Papke, E. (n.d.). Innovation by design : how any organization can leverage design thinking to pro-duce change, drive new ideas, and deliver meaningful solutions. ▪ Lewrick, M., Link, P., Leifer, L. J., & Langensand, N. (2018). The design thinking playbook : mindful digital transfor-mation of teams, products, services, businesses and ecosystems. John Wiley & Sons.

Study Format myStudies

Study Format	Course Type
myStudies	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

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 ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

Industrial Automation Projects

Module Code: DLMPREEIAP

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum		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

Dr. Sahar Qaadan (Industrial Automation) / Prof. Dr. Dorian Mora (Project: Technical Project Planning)

Contributing Courses to Module

- Industrial Automation (DLMDSINDA01)
- Project: Technical Project Planning (DLMDSETPL01)

Module Exam Type

Module Exam	Split Exam
	Industrial Automation • Study Format "Distance Learning": Exam, 90 Minutes • Study Format "myStudies": Exam, 90 Minutes Project: Technical Project Planning • Study Format "Distance Learning": Portfolio • Study Format "myStudies": Portfolio

Weight of Module

see curriculum

Module Contents

Industrial Automation

- Mathematical Frameworks for the Formal Description of Discrete Event Systems
- Analysis and Evaluation Methods
- Simulation of Discrete Event Systems
- Supervisory Control
- Advanced Issues (Fault Diagnosis, Adaptive Supervision, Optimization)

Project: Technical Project Planning

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

Learning Outcomes

Industrial Automation

On successful completion, students will be able to

- identify the main issues related to industrial automation and Industry 4.0 automation in particular.
- describe a discrete event system in a formal way by means of different mathematical models.
- analyze the performance of a system using formalisms and numerical simulation approaches.
- choose the best formalism for a given design scenario and formulate requirements.
- design and implement a supervisory controller to fulfill requirements.
- understand advanced topics related to Industry 4.0 industrial automation.

Project: Technical Project Planning

On successful completion, students will be able to

- apply the concepts of project management to real-world tasks and problems.
- translate the learned theories into the practice of project management.
- analyze a real-world problem and define and implement a project to resolve it.
- appraise the results of a project performed and identify what worked well and what did not.
- explain the work they perform, give its scientific background, and produce adequate documentation.

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 Engineering and Data Science & Artificial Intelligence	All Master Programs in the IT & Technology field

Industrial Automation

Course Code: DLMDSINDA01

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

Course Description

Production systems can be described as discrete event systems where the evolution is characterized by the occurrence of events. In the era of Industry 4.0 and highly-flexible manufacturing, there is the need to provide adequate means for the modeling, analysis, design, and control of flexible production environments.This course introduces several modeling approaches for the mathematical description of discrete event systems, such as Automata, Petri Nets, and Markov processes. Each approach is presented in both theory and practice with examples taken from the industry. The approaches are grouped into logic—where only the logic sequence of events determines the evolution—and timed, where the time schedule of the events also plays an important role. Although simple discrete event systems can be analyzed mathematically, complex systems need the support of computer simulation. The main issues concerning the simulation of discrete event systems are addressed.The final part of this course introduces the concept of supervisory control, which aims at changing the properties of a given system to improve specified behaviors and fulfill defined design specifications. Supervisory control is addressed both from the theoretical practical sides, describing how it can be implemented in a modern industrial environment.The course wraps up with discussion of interesting applications for modeling and design approaches, e.g., in the modeling and analysis of an industrial production unit. Additional conversation on topics like fault-diagnosis, decentralized and distributed supervision, optimization, and adaptive supervision provide a contingent connection between classical industrial automation and the recent, (big) data-driven, flexible, Industry 4.0 advanced industrial automation.

Course Outcomes

On successful completion, students will be able to

- identify the main issues related to industrial automation and Industry 4.0 automation in particular.
- describe a discrete event system in a formal way by means of different mathematical models.
- analyze the performance of a system using formalisms and numerical simulation approaches.
- choose the best formalism for a given design scenario and formulate requirements.
- design and implement a supervisory controller to fulfill requirements.
- understand advanced topics related to Industry 4.0 industrial automation.

Contents

1. Introduction to Production Systems
   - 1.1 Basic concepts and definitions
   - 1.2 Industrial supervision and control
   - 1.3 Challenges
   - 1.4 Trends

2. Automata
   - 2.1 Preliminaries
   - 2.2 Deterministic finite automata
   - 2.3 Non-deterministic finite automata
   - 2.4 Properties

3. Petri nets
   - 3.1 Preliminaries
   - 3.2 Modeling systems
   - 3.3 Properties
   - 3.4 Analysis methods

4. Timed models
   - 4.1 Timed automata
   - 4.2 Markov processes
   - 4.3 Queuing theory
   - 4.4 Timed Petri Nets

5. Simulation of discrete event systems
   - 5.1 Basic concepts
   - 5.2 Working principles
   - 5.3 Performance analysis
   - 5.4 Software tools

6. Supervisory control
   - 6.1 Basic concepts
   - 6.2 Specifications
   - 6.3 Synthesis
   - 6.4 Performance analysis
   - 6.5 Implementation

7. Applications

7.1	Production system supervision
7.2	Monitoring and diagnosis of faults
7.3	Distributed and de-centralized supervision
7.4	Model-based optimization of production systems
7.5	Adaptive supervisory control

Literature

Compulsory Reading

Further Reading

- Cassandras, C. G., & Lafortune, S. (2021). Introduction to discrete event systems. Springer.
- Hooley, G., Nicoulaud, B., Rudd, J. M., & Piercy, N. (2020). Marketing strategy and competitive positioning. (7th ed.). Pearson.
- Kaplan, R. and McMillan, D. (2021), . Harvard Business Review Digital Articles.
- Linz, P. (2017). An introduction to formal languages and automata. (6th ed.). Jones & Bartlett Learning.
- Reisig, W. (2013). Understanding Petri nets: Modeling techniques, analysis methods, case studies. 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	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	☑ 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	☑ Slides	

Project: Technical Project Planning

Course Code: DLMDSETPL01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
MA	English		5	DLMBITPAM01

Course Description

The focus of this course is to apply the project management knowledge gained previously in a practical portfolio project and reflect on the results. Students engage in this portfolio project and document the results, reflecting on the project management concepts they apply and the influence of these concepts on the success of the project.

Course Outcomes

On successful completion, students will be able to

- apply the concepts of project management to real-world tasks and problems.
- translate the learned theories into the practice of project management.
- analyze a real-world problem and define and implement a project to resolve it.
- appraise the results of a project performed and identify what worked well and what did not.
- explain the work they perform, give its scientific background, and produce adequate documentation.

Contents

- In this course, students perform and document a portfolio project in which they apply the project management topics covered in previous modules.

Literature

Compulsory Reading

Further Reading

- Hinde, D. (2012). PRINCE2 Study Guide. John Wiley & Sons.
- Kneuper, R. (2018). Software processes and lifecycle models. Springer Nature Switzerland.
- Phillips, J. (2010). IT project management: On track from start to finish (3rd ed.). McGraw-Hill.
- Project Management Institute. (2013). A guide to the project management body of knowledge: PMBOK guide.
- Schwaber, K. (2004). Agile project management with Scrum. Microsoft Press.

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 ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

Study Format myStudies

Study Format	Course Type
myStudies	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 ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

UI/UX Expert

Module Code: DLMAIEUIUX

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum		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
☑ 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		

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. ▪ Cooper, A., Reimann, R., Cronin, D., & Noessel, C. (2014). About face: The essentials of interaction design. Wiley. ▪ Johnson, J. (2010). Designing with the mind in mind. Elsevier. ▪ Microsoft Windows Dev Center. (2018). Guidelines. Retrieved from https://docs.microsoft.com/en-us/windows/desktop/uxguide/guidelines ▪ Preece, J., Sharp, H., & Rogers, Y. (2015). Interaction design: Beyond human-computer interaction. Wiley. ▪ Unger, R., & Chandler, C. (2012). A project guide to UX design. 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	**Learning Material**	**Exam Preparation**
☑ Course Feed ☑ Intensive Live Sessions/Learning Sprint ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

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 ☑ Recorded Live Sessions	☑ Slides	☑ Guideline

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
	☑ 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
☑ 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