

# MODULE HANDBOOK

**Bachelor of Science**

**Bachelor Business and IT (FS-WIE-01)**

**180 ECTS**

**Distance Learning and myStudies**



In partnership with



Classification: Undergraduate

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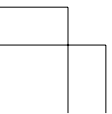
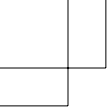
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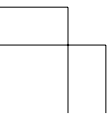
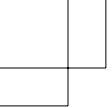
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2021-03-01



# 1. Semester

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# Introduction to Computer Science

Module Code: DLBCSICS

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Carsten Skerra (Introduction to Computer Science)

## Contributing Courses to Module

- Introduction to Computer Science (DLBCSICS01)

## Module Exam Type

<b>Module Exam</b> <u>Study Format: myStudies</u> Exam, 90 Minutes <u>Study Format: Distance Learning</u> Exam, 90 Minutes	<b>Split Exam</b>
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## Weight of Module

see curriculum

## Module Contents

- Information representation
- Algorithms and data structures
- Propositional logic / Boolean algebra
- Hardware
- Networks and the internet
- Software
- Computer science as a discipline

<b>Learning Outcomes</b> <b>Introduction to Computer Science</b> On successful completion, students will be able to <ul style="list-style-type: none"><li>· understand basic algorithms and data structures.</li><li>· apply basic constructs of propositional logic in programming.</li><li>· describe the structure of computer hardware systems.</li><li>· specify the structure and the main services of the internet.</li><li>· discuss professional conduct in computer science.</li></ul>	
<b>Links to other Modules within the Study Program</b> This module is similar to other modules in the field(s) of Computer Science & Software Development.	<b>Links to other Study Programs of the University</b> All Bachelor Programmes in the IT & Technology field(s).

# Introduction to Computer Science

Course Code: DLBCSICS01

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

## Course Description

The goal of this course is to provide an introduction to computer science and its main concepts. It covers basic topics such as information representation and an introduction to algorithms and data structures. Propositional logic and Boolean algebra are also introduced, both of which form an important basis in computer science, e.g., for expressing conditions in programming. Furthermore, the course introduces the three main components of computing infrastructures: hardware, networks, and software. Finally, the course covers the meta level by looking at the role of computer science as a discipline as well as ethics and professional conduct.

## Course Outcomes

On successful completion, students will be able to

- understand basic algorithms and data structures.
- apply basic constructs of propositional logic in programming.
- describe the structure of computer hardware systems.
- specify the structure and the main services of the internet.
- discuss professional conduct in computer science.

## Contents

1. Basic concepts of data processing
  - 11 Data, information and messages
  - 12 Software, firmware and hardware
  - 13 Languages, syntax and semantics
  - 14 Historical overview
2. Information representation
  - 21 Number representation formats
  - 22 Representation of non-numerical information
  - 23 Data types
  - 24 Redundancy and error tolerance

3.	Algorithms and data structures
31	Algorithms and flow diagrams
32	Simple data structures
33	Searching and sorting
34	Quality of algorithms (correctness, termination, efficiency/complexity)
4.	Propositional logic, Boolean algebra and circuit design
41	Propositions and logical conclusions
42	Conjunctive and disjunctive normal form
43	Digital circuit design
5.	Hardware and computer architectures
51	Computer types and their architecture
52	Processors and memory
53	Input and output
54	Interfaces and drivers
55	High-performance computing
6.	Networks and the internet
61	Wired and wireless networks and their topologies
62	The TCP/IP and the ISO/OSI model
63	Internet structure and services
64	The internet of things
7.	Software
71	BIOS and operating systems
72	Application software and information systems
73	Apps
74	Embedded systems
75	Software development
8.	Computer Science as a discipline
81	The role and sub-disciplines of computer science
82	Artificial intelligence, data science and computer science
83	Ethical aspects of computer science
84	The ACM Code of Ethics and Professional Conduct



**Literature****Compulsory Reading****Further Reading**

- Dale, N., & Lewis, J. (2020). Computer science illuminated (7th ed.). Jones & Bartlett Learning.
- Downey, A. B., & Mayfield, C. (2020). Think Java: How to think like a computer scientist. O'Reilly.
- Filho, W. F. (2018). Computer science distilled: Learn the art of solving computational problems. Code Energy LLC.
- Petzold, C. (2000). Code: The hidden language of computer hardware and software. Microsoft Press.
- Whittington, J. (2016). A machine made this book: Ten sketches of computer science. Coherent Press.

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBCSICS01

## Business 101

Module Code: DLBBAB\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Markus Prandini (Business 101)

### Contributing Courses to Module

· Business 101 (DLBBAB01\_E)

### Module Exam Type

#### Module Exam

Study Format: myStudies

Exam or Written Assessment: Written  
Assignment, 90 Minutes

Study Format: Distance Learning

Exam or Written Assessment: Written  
Assignment, 90 Minutes

#### Split Exam

### Weight of Module

see curriculum

<p><b>Module Contents</b></p> <ul style="list-style-type: none"> <li>· Businesses and their environment</li> <li>· Types of business organizations</li> <li>· Management and structure of business</li> <li>· Production of goods and services</li> <li>· Marketing of products and services</li> <li>· Management of labor</li> <li>· Accounting in business</li> </ul>	
<p><b>Learning Outcomes</b></p> <p><b>Business 101</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· apply business and economic thinking and working methods.</li> <li>· explain economic subjects and questioning models of business administration.</li> <li>· classify and formulate corporate goals.</li> <li>· describe and apply a general business decision-making process.</li> <li>· recognize and design the organizational structure and process organization in the company.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Business Administration &amp; Management</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the Business &amp; Management fields</p>

# Business 101

Course Code: DLBBAB01\_E

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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## Course Description

Business 101 deals with the basics of general business administration. It provides students with an understanding of the fundamental questions of doing business. In addition, basic organizational approaches of companies are shown. With the successful completion of the course, the students have gained fundamental knowledge in general business administration. This course lays the foundation for the advanced modules in the further course of their studies.

## Course Outcomes

On successful completion, students will be able to

- apply business and economic thinking and working methods.
- explain economic subjects and questioning models of business administration.
- classify and formulate corporate goals.
- describe and apply a general business decision-making process.
- recognize and design the organizational structure and process organization in the company.

## Contents

1. Businesses and their environment
  - 11 Concepts of business
  - 12 A system of economic relationships
  - 13 Business environment
2. Types of business organizations
  - 21 Companies in production and service
  - 22 Divisions of companies
3. Management and structure of business
  - 31 Basics of Business Management
  - 32 Functions of organizations, managers and control
  - 33 The decision making process
  - 34 Organizational structure of business

4.	Production of goods and services
41	Origin and development of the production process
42	Industrial strategy of business
5.	Marketing of goods and services
51	Goals and types of marketing
52	Marketing mix
6.	Management of labor
61	Process of management of labor
62	Demand in labor
63	Human relations in organizations
7.	Accounting in business
71	Functions and goals of accounting
72	Spheres of accounting
73	Fundamental principles of accounting

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
· Collins, J. (2011). Good to great: Why some companies make the leap...and others don't. Harper Business.
· Covey, S. (1989) The 7 habits of highly effective people: Powerful lessons in personal change. Free Press.
· Miller, J. (2004). QBQ! The question behind the question. Penguin.



## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam or Written Assessment: Written Assignment, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 100 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 25 h	<b>Self Test</b> 25 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam or Written Assessment: Written Assignment, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 100 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 25 h	<b>Self Test</b> 25 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Introduction to Academic Work

Module Code: DLBCSIAW

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Maya Stagge (Introduction to Academic Work)

### Contributing Courses to Module

- Introduction to Academic Work (DLBCSIAW01)

### Module Exam Type

#### Module Exam

Study Format: myStudies

Basic Workbook (passed / not passed)

Study Format: Distance Learning

Basic Workbook (passed / not passed)

#### Split Exam

### Weight of Module

see curriculum

### Module Contents

- Scientific Theoretical Foundations and Research Paradigms
- Application of Good Scientific Practice
- Methodology
- Librarianship: Structure, Use, and Literature Management
- Forms of Scientific Work at IUBH

<p><b>Learning Outcomes</b></p> <p><b>Introduction to Academic Work</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· understand and apply formal criteria of a scientific work.</li> <li>· distinguish basic research methods and identify criteria of good scientific practice.</li> <li>· describe central scientific theoretical basics and research paradigms and their effects on scientific research results.</li> <li>· use literature databases, literature administration programs, and other library structures properly; avoid plagiarism; and apply citation styles correctly.</li> <li>· apply the evidence criteria to scientific texts.</li> <li>· define a research topic and derive a structure for scientific texts.</li> <li>· compile a list of literature, illustrations, tables, and abbreviations for scientific texts.</li> <li>· understand and distinguish between the different forms of scientific work at IU.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the field of Methods</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the Business &amp; Management field</p>

## Introduction to Academic Work

Course Code: DLBCSIAW01

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

### Course Description

The application of good scientific practice is one of the basic academic qualifications that should be acquired while studying. This course deals with the distinction between everyday knowledge and science. This requires a deeper understanding of the theory of science, as well as the knowledge of basic research methods and instruments for writing scientific texts. The students therefore gain initial insight into academic research and are introduced to the basic knowledge that will help them in the future to produce scientific papers. In addition, the students receive an overview of the different IU examination forms and insight into their requirements and implementation.

### Course Outcomes

On successful completion, students will be able to

- understand and apply formal criteria of a scientific work.
- distinguish basic research methods and identify criteria of good scientific practice.
- describe central scientific theoretical basics and research paradigms and their effects on scientific research results.
- use literature databases, literature administration programs, and other library structures properly; avoid plagiarism; and apply citation styles correctly.
- apply the evidence criteria to scientific texts.
- define a research topic and derive a structure for scientific texts.
- compile a list of literature, illustrations, tables, and abbreviations for scientific texts.
- understand and distinguish between the different forms of scientific work at IU.

### Contents

1. Theory of Science
  - 1.1 Introduction to Science and Research
  - 1.2 Research Paradigms
  - 1.3 Fundamental Research Decisions
  - 1.4 Effects of Scientific Paradigms on Research Design

2. Application of Good Scientific Practice
  - 21 Research Ethics
  - 22 Evidence Teaching
  - 23 Data Protection and Affidavit
  - 24 Orthography and Shape
  - 25 Identification and Delimitation of Topics
  - 26 Research Questions and Structure
3. Research Methods
  - 31 Empirical Research
  - 32 Literature and Reviews
  - 33 Quantitative Data Collection
  - 34 Qualitative Data Collection
  - 35 Mix of Methods
  - 36 Critique of Methods and Self-Reflection
4. Librarianship: Structure, Use, and Literature Management
  - 41 Plagiarism Prevention
  - 42 Database Research
  - 43 Literature Administration
  - 44 4.4 Citation and Author Guidelines
  - 45 4.5 Bibliography
5. Scientific Work at the IU - Research Essay
6. Scientific Work at the IU - Project Report
7. Scientific Work at the IU - Case Study
8. Scientific Work at the IU - Bachelor Thesis
9. Scientific Work at the IU - Oral Assignment
10. Scientific Work at the IU - Oral Project Report
11. Scientific Work at the IU - Colloquium
12. Scientific Work at the IU - Portfolio
13. Scientific Work at the IU - Exam

**Literature****Compulsory Reading****Further Reading**

- Bell, J. (2014). Doing your research project. [electronic resource] : a guide for first-time researchers. Berkshire: Open University Press
- Creswell, J. W., & Guetterman, T. C. (2020). Educational research [electronic resource] : planning, conducting, and evaluating quantitative and qualitative research. Harlow, Essex, United Kingdom Pearson Education Limited
- Neuman, W. L. (n.d.). Social Research Methods [electronic resource]: Pearson New International Edition: Qualitative and Quantitative Approaches. Pearson
- Paul Oliver. (2012). Succeeding with Your Literature Review: A Handbook for Students. Open University Press
- Schwaiger, M. [Ed., Taylor, C. R. [Ed., & Sarstedt, M. [Ed. (2011). Measurement and research methods in international marketing. Emerald
- Sonyel Oflazoglu. (2017). Qualitative versus Quantitative Research.
- Taylor, S. J., Bogdan, R., & DeVault, M. L. (2016). Introduction to qualitative research methods [electronic resource]: a guidebook and resource. Hoboken, New Jersey Wiley
- Thornhill, A., Saunders, M., & Lewis, P. (2019). Research methods for business students [electronic resource]. Harlow, England Pearson

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Basic Workbook (passed / not passed)

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Basic Workbook (passed / not passed)

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBCSIAW01

# Mathematics I

Module Code: DLBCSM1

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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<b>Module Coordinator</b> N.N. (Mathematics I)
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<b>Contributing Courses to Module</b>
· Mathematics I (DLBCSM101)

<b>Module Exam Type</b>	
<b>Module Exam</b> <u>Study Format: Distance Learning</u> Exam, 90 Minutes <u>Study Format: myStudies</u> Exam, 90 Minutes	<b>Split Exam</b>
<b>Weight of Module</b> see curriculum	

<b>Module Contents</b>
<ul style="list-style-type: none"> <li>· Basic definitions and terms of discrete mathematics</li> <li>· Sets and propositional logic</li> <li>· Number systems such as decimal and binary systems</li> <li>· Graphs and mappings</li> <li>· Selected topics of elementary number theory</li> <li>· Cryptography</li> </ul>

**Learning Outcomes****Mathematics I**

On successful completion, students will be able to

- understand basic terms of discrete mathematics as well as describe them and distinguish them from each other.
- understand concepts of number theory and their application in IT and technology and be able to solve tasks independently by applying these concepts.

**Links to other Modules within the Study Program**

This module is similar to other modules in the field(s) of Methods.

**Links to other Study Programs of the University**

All Bachelor Programmes in the Business & Management field(s).

# Mathematics I

Course Code: DLBCSM101

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

## Course Description

Many practical concepts in IT and technology are based on the findings of discrete mathematics. For an in-depth understanding of, for example, data structures, the construction of communication networks, or of solutions to algorithmic problems, a basic understanding of their mathematical background is necessary. This course therefore introduces discrete mathematical terms and concepts, with specific areas of number theory also taught.

## Course Outcomes

On successful completion, students will be able to

- understand basic terms of discrete mathematics as well as describe them and distinguish them from each other.
- understand concepts of number theory and their application in IT and technology and be able to solve tasks independently by applying these concepts.

## Contents

1. Mathematical Basics
  - 11 Basic Concepts
  - 12 Proof Techniques
  - 13 Finite Sums
2. Sets
  - 21 Properties and Calculation Rules for Sets
  - 22 Equivalence Relations
3. Propositional Logic
  - 31 Statements and Logical Connections
  - 32 Truth Tables
  - 33 Computational Rules of Propositional Logic
  - 34 Simplification of Expressions in Propositional Logic

4. Number Systems
  - 41 Decimal System
  - 42 Binary System
  - 43 Hexadecimal System
5. Mappings
  - 51 Mappings and Graphs
  - 52 Special Properties of Mappings
6. Basic Algebraic Structures
  - 61 Groups
  - 62 Rings
  - 63 Residual Class Rings
7. Prime Numbers
  - 71 Definition and Properties of Prime Numbers
  - 72 Prime Number Test
8. Modular Arithmetic
  - 81 The Euclidean Algorithm
  - 82 Fundamental Theorem of Arithmetic
9. Applications in Cryptography
  - 91 The Shift Cryptosystem
  - 92 Symmetric vs Asymmetric Cryptosystems
  - 93 The RSA Cryptosystem

**Literature****Compulsory Reading****Further Reading**

- Rosenthal, D., Rosenthal, D., Rosenthal, P. (2018). A Readable Introduction to Real Mathematics (2nd ed.). Springer.
- Vaudenay, S. (2006). A Classical Introduction to Cryptography (1st ed.). Springer.

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input checked="" type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input checked="" type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



# Requirements Engineering

Module Code: DLBCSRE

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Tobias Brückmann (Requirements Engineering)

## Contributing Courses to Module

- Requirements Engineering (DLBCSRE01)

## Module Exam Type

### Module Exam

Study Format: Distance Learning  
Exam, 90 Minutes

Study Format: myStudies  
Exam, 90 Minutes

### Split Exam

## Weight of Module

see curriculum

## Module Contents

- Basics of requirements engineering
- Enterprise modeling
- Requirement determination techniques
- Techniques of requirements documentation
- Testing and coordination of requirements
- Managing requirements

<p><b>Learning Outcomes</b></p> <p><b>Requirements Engineering</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· describe models of enterprise modeling relevant to IT support and have experience in modeling.</li> <li>· understand techniques and methods for determining requirements of IT systems and be able to distinguish them from each other.</li> <li>· understand techniques for the documentation of requirements on IT systems and have experience in their use.</li> <li>· describe techniques for testing, coordinating, and managing the requirements of IT systems and be able to distinguish between them.</li> <li>· independently select suitable techniques and methods of requirements engineering for given project situations.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the field(s) of Computer Science &amp; Software Development.</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the IT &amp; Technology field(s).</p>

# Requirements Engineering

Course Code: DLBCSRE01

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

## Course Description

The early phases of software development are largely characterized by the fact that functional and technical requirements for the IT system have to be determined. The determination of these requirements must be carried out extremely carefully because all of the following activities in the SW development process are planned and executed on the basis of documented requirements. In this course, procedures, methods, and models are covered, which make it possible to have a structured and methodical determination and documentation of requirements for operational information systems.

## Course Outcomes

On successful completion, students will be able to

- describe models of enterprise modeling relevant to IT support and have experience in modeling.
- understand techniques and methods for determining requirements of IT systems and be able to distinguish them from each other.
- understand techniques for the documentation of requirements on IT systems and have experience in their use.
- describe techniques for testing, coordinating, and managing the requirements of IT systems and be able to distinguish between them.
- independently select suitable techniques and methods of requirements engineering for given project situations.

## Contents

1. Fundamentals and Terms of Requirements Engineering
  - 11 Requirements Engineering in the Software Process
  - 12 Core Activities in Requirements Engineering
  - 13 What is a Requirement?
2. Determination of Requirements
  - 21 Determination of the System Context
  - 22 Determination of the Sources of Requirements
  - 23 Selection of the Appropriate Investigative Techniques
  - 24 Determine Requirements Using Techniques

3.	Selected Investigative Techniques
31	Creativity Techniques
32	Interview Techniques
33	Observation Techniques
34	Prototyping
4.	Documentation of Requirements
41	Activities for Documenting Requirements
42	Typical Elements of Requirements Documentation
43	Forms of Documentation
5.	Modeling of Processes
51	Basics and Terms
52	Modeling with the Business Process Model and Notation
53	Modeling with Event Driven Process Chains
6.	Modeling of Systems
61	Fundamentals of Unified Modeling Language
62	UML Use Case Diagram
63	UML Activity Diagram
64	UML Class Diagram
65	UML State Diagram
7.	Checking and Reconciling Requirements
71	Activities for Checking and Reconciling Requirements
72	Test Criteria
73	Test Principles
74	Testing Techniques
75	Coordination of Requirements
8.	Management of Prioritization Requirements and Techniques
81	Managing Requirements
82	Techniques for Prioritizing Requirements

**Literature****Compulsory Reading****Further Reading**

- Dick, J., Hull, E., & Jackson, K. (2017). *Requirements engineering* (4th ed.). Springer.
- Glinz, M., van Loenhoud, H., Staal, S., & Bühne, S. (2020). *Handbook for the CPRE foundation level according to the IREB standard: Education and training for certified professional for requirements engineering (CPRE): Foundation level (Version 1.0.0)*. International Requirements Engineering Board.
- Miles, R., & Hamilton, K. (2006). *Learning UML 2.0: A pragmatic introduction to UML*. O'Reilly.
- Pohl, K., & Rupp, C. (2015). *Requirements engineering fundamentals: A study guide for the certified professional for requirements engineering exam: Foundation level—IREB compliant* (2nd ed.). Rocky Nook.
- Silver, B. (2017). *BPMN quick and easy using method and style: Process mapping guidelines and examples using the business process modeling standard*. Cody-Cassidy Press.

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
------------------------------------------	--------------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
----------------------------------	-------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBCSRE01



## Object-oriented Programming with Java

Module Code: DLBCSOOPJ

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Damir Ismailovic (Object-oriented Programming with Java)

### Contributing Courses to Module

- Object-oriented Programming with Java (DLBCSOOPJ01)

### Module Exam Type

#### Module Exam

Study Format: myStudies

Exam, 90 Minutes

Study Format: Distance Learning

Exam, 90 Minutes

#### Split Exam

### Weight of Module

see curriculum

### Module Contents

- Introduction to the Java language
- Java language constructs
- Introduction to object-oriented system development
- Inheritance
- Object-oriented concepts
- Exception handling
- Interfaces

**Learning Outcomes****Object-oriented Programming with Java**

On successful completion, students will be able to

- describe the basic concepts of object-oriented modeling and programming, distinguishing them from one another.
- describe the basic concepts and elements of the Java programming language and have some experience in their use.
- independently create Java programs to solve concrete problems.

**Links to other Modules within the Study Program**

This module is similar to other modules in the field(s) of Computer Science & Software Development.

**Links to other Study Programs of the University**

All Bachelor Programmes in the IT & Technology field(s).

# Object-oriented Programming with Java

Course Code: DLBCSOOPJ01

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

## Course Description

Operational information systems are usually planned and programmed to be object-oriented. Therefore, this course teaches the basic skills of object-oriented programming. Theoretical concepts are presented and practiced directly with the programming language Java.

## Course Outcomes

On successful completion, students will be able to

- describe the basic concepts of object-oriented modeling and programming, distinguishing them from one another.
- describe the basic concepts and elements of the Java programming language and have some experience in their use.
- independently create Java programs to solve concrete problems.

## Contents

1. Introduction to Object-Oriented System Development
  - 11 Object Orientation as a Way of Looking at Complex Systems
  - 12 The Object as a Basic Concept of Object Orientation
  - 13 Phases in the Object-Oriented Development Process
  - 14 Basic Principle of Object-Oriented System Development
2. Introduction to Object-Oriented Modeling
  - 21 Structuring Problems With Classes
  - 22 Identifying Classes
  - 23 Attributes as Properties of Classes
  - 24 Methods as Functions of Classes
  - 25 Associations between Classes
  - 26 Unified Modeling Language (UML)

3.	Programming Classes in Java
31	Introduction to the Java Programming Language
32	Basic Elements of a Class in Java
33	Attributes in Java
34	Methods in Java
35	Main Method: Starting Point of a Java Program
4.	Java Language Constructs
41	Primitive Data Types
42	Variables
43	Operators and Expressions
44	Control Structures
45	Packages and Visibility Modifiers .
5.	Inheritance
51	Modeling and Inheritance in the Class Diagram
52	Programming Inheritance in Java
6.	Important Object-Oriented Concepts
61	Abstract Classes
62	Polymorphism
63	Static Attributes and Methods
7.	Constructors for Generating Objects
71	The Standard Constructor
72	Overloading Constructors
73	Constructors and Inheritance
8.	Handling Exceptions with Exceptions
81	Typical Scenarios of Exception Handling
82	Standard Exceptions in Java
83	Defining Your Own Exceptions
9.	Programming Interfaces with Interfaces
91	Typical Scenarios of Programming Interfaces
92	Interfaces as Programming Interfaces in Java

**Literature****Compulsory Reading****Further Reading**

- Freeman, E., Robson, E., Bates, B., & Sierra, K. (2014). Head first design patterns (A brain friendly guide). O'Reilly Media.
- Gamma, E., Helm, R., Johnson, R., & Vlissides, J. (1995). Design patterns: Elements of re-usable object-oriented software. Addison-Wesley.
- Liang, Y. D. (2018). Introduction to Java programming and data structures. Pearson Education.
- Liguori, L. & Liguori, P. (2008). Java pocket guide: Instant help for Java. O'Reilly Media.
- Oracle (2017). The Java tutorials. Available online.
- Samoylov, N. (2019). Learn Java 12 programming: A step-by-step guide to learning essential concepts in Java SE 10, 11, and 12. Packt Publishing.
- Weisfeld M. (2019). The object-oriented thought process (5th ed.). Addison-Wesley.

**Study Format myStudies**

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
----------------------------------	-------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input checked="" type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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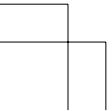
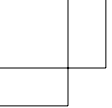
<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

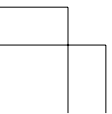
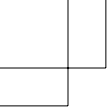
<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input checked="" type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBCSOOPJ01

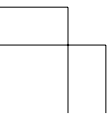
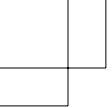






## 2. Semester

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## Collaborative Work

Module Code: DLBCSCW

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Karin Halbritter (Collaborative Work)

### Contributing Courses to Module

- Collaborative Work (DLBCSCW01)

### Module Exam Type

#### Module Exam

Study Format: myStudies

Oral Assignment

Study Format: Distance Learning

Oral Assignment

#### Split Exam

### Weight of Module

see curriculum

### Module Contents

- Self-Directed and Collaborative Learning
- Networking and Cooperation
- Performance in (Virtual) Teams
- Communication, Arguments, and Being Convincing
- Potentials for Conflict and Managing Conflicts
- Self-Management and Personal Skills

**Learning Outcomes****Collaborative Work**

On successful completion, students will be able to

- design their own learning processes both self-directed and collaborative with analog and digital media.
- initiate face-to-face and virtual cooperation and select suitable methods for shaping collaboration even in an intercultural context and across disciplinary boundaries.
- assess different forms of communication in relation to the goals and requirements of different situations and to reflect on their own communication and argumentation behavior in order to be able to shape conducive collaboration also in an interdisciplinary context.
- recognize social diversity including cultural and professional differences as a value, and to name and apply tools to deal with them constructively.
- explain conflict potentials and the role of emotions in conflicts and to describe the use of systemic methods in the target- and solution-oriented handling of conflicts.
- analyze one's own resources, present methods of self-leadership and self-motivation, and derive appropriate strategies.

**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**

All Bachelor Programmes in the Business & Management fields

## Collaborative Work

Course Code: DLBCSCW01

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

### Course Description

The course supports the students in building up and expanding important interdisciplinary competences for our networked world, and in doing so, students can take advantage of the opportunities for constructive cooperation with others. It presents essential forms and design possibilities of collaborative learning and working, imparts basic knowledge and tools for self-managed, flexible, and creative thinking, learning and acting and familiarizes students with the topics of empathy and emotional intelligence. Students are also encouraged to use the course contents. In this way, they promote their autonomous competence to act and their competence in the interactive application of tools and in interacting in heterogeneous groups.

### Course Outcomes

On successful completion, students will be able to

- design their own learning processes both self-directed and collaborative with analog and digital media.
- initiate face-to-face and virtual cooperation and select suitable methods for shaping collaboration even in an intercultural context and across disciplinary boundaries.
- assess different forms of communication in relation to the goals and requirements of different situations and to reflect on their own communication and argumentation behavior in order to be able to shape conducive collaboration also in an interdisciplinary context.
- recognize social diversity including cultural and professional differences as a value, and to name and apply tools to deal with them constructively.
- explain conflict potentials and the role of emotions in conflicts and to describe the use of systemic methods in the target- and solution-oriented handling of conflicts.
- analyze one's own resources, present methods of self-leadership and self-motivation, and derive appropriate strategies.

### Contents

1. Learning for a Networked World in a Networked World
  - 1.1 Requirements and Opportunities of the VUCA World
  - 1.2 Learning, Information, and Dealing with Knowledge and Ignorance
  - 1.3 C-Model: Collective - Collaborative - Continuous - Connected
  - 1.4 Checking Your Own Learning Behaviour

- 2. Networking and Cooperation
  - 21 Finding and Winning Suitable Cooperation Partners
  - 22 Sustainable Relationships: Digital Interaction and Building Trust
  - 23 Collaboration: Organizing Locally and Virtually and Using Media
  - 24 Social Learning: Agile, Collaborative, and Mobile Planning of Learning Processes
- 3. Performance in (Virtual) Teams
  - 31 Goals, Roles, Organization and Performance Measurement
  - 32 Team Building and Team Flow
  - 33 Scrum as a Framework for Agile Project Management
  - 34 Design Thinking, Kanban, Planning Poker, Working-in-Progress-Limits & Co
- 4. Communicate and Convince
  - 41 Communication as Social Interaction
  - 42 Language, Images, Metaphors, and Stories
  - 43 It's the Attitude that Counts: Open, Empathetic, and Appreciative Communication
  - 44 Listen Actively - Argue - Convince - Motivate
  - 45 Analyze Your Own Conversational and Argumentational Skills
- 5. Recognize Conflict Potentials - Handle Conflicts - Negotiate Effectively
  - 51 Respecting Diversity - Seizing Opportunities
  - 52 Developing Empathy for Yourself and Others
  - 53 Systemic Work Solutions and Reframing
  - 54 Negotiate Constructively: Finding Clear Words - Interests Instead of Positions
- 6. Realize Your Own Projects
  - 61 Set Goals Effectively - Focus - Reflect
  - 62 The Agile Use of One's Own Time
  - 63 (Self-)Coaching and Inner Team
  - 64 Strategies and Methods for Self-Management and Self-Motivation
- 7. Mobilize Your Resources
  - 71 Recognizing Resources - Regulating Emotions
  - 72 Reflection and Innovation - Lateral Thinking and Creativity
  - 73 Transfer Strength and Willpower: Analyzing and Controlling Condition Factors



**Literature****Compulsory Reading****Further Reading**

- Baber, A., Waymon, L., Alphonso, A., & Wylde, J. (2015): Strategic connections. The new face of networking in a collaborative world. New York: AMACOM.
- Boulton, J. G., Allen, P. M., & Bowman, C. (2015): Embracing complexity. Strategic perspectives for an age of turbulence. 1. ed. Oxford: Oxford Univ. Press.
- Chang, B., & Kang, H. (2016): Challenges facing group work online. In: Distance Education 37 (1), S. 73-88. DOI: 10.1080/01587919.2016.1154781.
- Duhigg, C. (2013): The power of habit. Why we do what we do and how to change. London: Random House Books.
- Fisher, R., & Ury, W. (2012): Getting to yes. Negotiating an agreement without giving in. Updated and rev., 3. ed. London: Random House Business Books.
- Kaats, E., & Opheij, W. (2014): Creating conditions for promising collaboration. Alliances, networks, chains, strategic partnerships. Berlin, Heidelberg, s.l.: Springer Berlin Heidelberg (SpringerBriefs in Business).
- Martin, S. J., Goldstein, N. J., & Cialdini, R. B. (2015). The small BIG: Small changes that spark BIG influence. London, England: Profile Books.
- Oettingen, G. (2014). Rethinking positive thinking: Inside the new science of motivation. New York, NY: Current.

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Oral Assignment

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Oral Assignment

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBCSCW01

## Corporate Finance and Investment

Module Code: DLBCFIE

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Muhammad Ashfaq (Corporate Finance and Investment)

### Contributing Courses to Module

- Corporate Finance and Investment (DLBCFIE01)

### Module Exam Type

#### Module Exam

Study Format: Distance Learning

Written Assessment: Written Assignment

Study Format: myStudies

Written Assessment: Written Assignment

#### Split Exam

### Weight of Module

see curriculum

### Module Contents

- Introduction to Corporate Finance
- Ownership and Corporate Governance
- Understanding Financial Statements and Key Performance Indicators
- Basic Concepts of Financial Theory
- Types of Capital and Financing
- Short-term Financing Decisions
- Capital Budgeting and Decision-Making Methods in Investment

**Learning Outcomes****Corporate Finance and Investment**

On successful completion, students will be able to

- recognize the targets and scope of corporate finance and the role of financial markets .
- understand agency-problems in corporations and how incentives and institutional and market mechanisms are used to mitigate agency costs .
- interpret financial statements and key performance indicators and draw conclusions about financing alternatives and potentials of a corporation.
- consider the time value of money and calculate the cost of capital used to optimize future project cash flow streams.
- implement a long-term financing strategy and structure for corporations based on an appropriate mix of equity, debt, leasing, and hybrid financial instruments.
- effectively utilize cash management and working capital management to reduce short-term financing needs and costs.
- prepare investment decisions, estimate expected project cash flows and incorporate cash flow related risks into the decision process.
- apply investment decision methodologies to evaluate and select favorable corporate investment projects.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Finance & Tax Accounting

**Links to other Study Programs of the University**

All Bachelor Programmes in the Business & Management fields

## Corporate Finance and Investment

Course Code: DLBCFIE01

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

### Course Description

This course introduces students to the targets and scope of corporate finance and the role of financial markets. The separation of ownership and control is a constituent feature of corporations; students explore the resulting agency problems and the mechanisms available to mitigate the costs of agency relationships. Students will be introduced to fundamentals of theory and practice regarding principles of modern corporate finance. They will learn to read and analyze financial statements from a financing point of view and develop a detailed understanding of concepts such as the time value of money, interest rates, and cost of capital. After introducing basic concepts, equity and debt financing will be discussed at length. The financial leverage effect on rates of return will be explored and leasing and hybrid financial instruments as an alternative to pure equity and debt financing are presented. Students will study how corporations apply short-term measures of financing and how effective cash and working capital management is used to reduce short-term financing needs and costs. This course will conclude with a discussion on the investment processes of corporations with a particular focus on the challenge of estimating expected cash flows. Students will learn how to include risk as a factor in the decision process and be able to analyse applied investment rules and methodologies.

### Course Outcomes

On successful completion, students will be able to

- recognize the targets and scope of corporate finance and the role of financial markets .
- understand agency-problems in corporations and how incentives and institutional and market mechanisms are used to mitigate agency costs .
- interpret financial statements and key performance indicators and draw conclusions about financing alternatives and potentials of a corporation.
- consider the time value of money and calculate the cost of capital used to optimize future project cash flow streams.
- implement a long-term financing strategy and structure for corporations based on an appropriate mix of equity, debt, leasing, and hybrid financial instruments.
- effectively utilize cash management and working capital management to reduce short-term financing needs and costs.
- prepare investment decisions, estimate expected project cash flows and incorporate cash flow related risks into the decision process.
- apply investment decision methodologies to evaluate and select favorable corporate investment projects.

**Contents**

1. Introduction to Corporate Finance
  - 11 The Targets and Scope of Corporate Finance
  - 12 The Role of a Financial Manager
  - 13 The Financial Market Environment
2. Ownership and Corporate Governance
  - 21 Legal Types of Firms
  - 22 Agency Relations and Agency Problems in Corporations
  - 23 Institutional Investors, Incentives, and Market Control Mechanisms
3. Understanding Financial Statements and Key Performance Indicators
  - 31 Balance Sheets
  - 32 Income Statements
  - 33 Cash Flow Statements
  - 34 Measuring Performance: Key Performance Indicators
4. Basic Concepts of Financial Theory
  - 41 Time Value of Money and Cash Flow Streams
  - 42 Interest Rates: Determinants and Quotes
  - 43 Estimating the Cost of Capital
5. Types of Capital and Financing
  - 51 Equity Capital
  - 52 Debt Financing
  - 53 Leasing
  - 54 Financial Leverage and Capital Structure
6. Short-Term Financing Decisions
  - 61 Cash Budgets and Short-Term Financial Plans
  - 62 Treasury and Cash Management
  - 63 Working Capital Management
7. Capital Budgeting and Decision-Making Methods in Investment
  - 71 Capital Budgeting and Investments
  - 72 Incorporating Risk in Capital Budgeting Decisions
  - 73 Investment Rules and Decision-Making Methods



**Literature****Compulsory Reading****Further Reading**

- Brigham, E. F., & Houston, J. F. (2019). Fundamentals of financial management (15th ed.). Southwestern-Cengage.
- Zutter, C. J., & Smart, S. B. (2019). Principles of managerial finance (15th ed.). Pearson .

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Written Assignment

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Written Assignment

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBCFIE01

## Data Structures and Java Class Library

Module Code: DLBCSDSJCL

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Damir Ismailovic (Data Structures and Java Class Library)

### Contributing Courses to Module

- Data Structures and Java Class Library (DLBCSDSJCL01)

### Module Exam Type

<b>Module Exam</b> <u>Study Format: myStudies</u> Exam, 90 Minutes <u>Study Format: Distance Learning</u> Exam, 90 Minutes	<b>Split Exam</b>
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### Weight of Module

see curriculum

### Module Contents

- Programming style
- Working with objects
- External packages and libraries
- Data structures
- Strings and calendar
- File system and data streams

**Learning Outcomes****Data Structures and Java Class Library**

On successful completion, students will be able to

- understand typical data structures and distinguish them from each other.
- independently create solutions in the Java programming language using the data structures.
- understand scenarios and strategies for comparing objects and implement them in Java.
- describe the possible uses and functions of character strings and calendar objects in Java and have experience using them.
- describe the possible uses and functions of streams in Java and have experience using them.

**Links to other Modules within the Study Program**

This module is similar to other modules in the field of Computer Science & Software Development.

**Links to other Study Programs of the University**

All Bachelor Programmes in the IT & Technology fields

# Data Structures and Java Class Library

Course Code: DLBCSDSJCL01

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

## Course Description

Based on the contents of the course "Basics of object-oriented programming with Java", this course deepens the knowledge of object-oriented programming. In particular, data structures, their use cases, and their implementation in the Java language are considered. In addition, strategies and scenarios of object comparisons, the use of functions of the "String" data type, the use of calendar objects, and the use of streams are taught.

## Course Outcomes

On successful completion, students will be able to

- understand typical data structures and distinguish them from each other.
- independently create solutions in the Java programming language using the data structures.
- understand scenarios and strategies for comparing objects and implement them in Java.
- describe the possible uses and functions of character strings and calendar objects in Java and have experience using them.
- describe the possible uses and functions of streams in Java and have experience using them.

## Contents

1. Programming Style
  - 11 Code Documentation
  - 12 Code Annotations
  - 13 Code Conventions
2. Working with Objects
  - 21 String Representation of Objects
  - 22 Compare with ==
  - 23 Compare with Equals()
  - 24 Compare by hashCode()
  - 25 CompareTo()
  - 26 Cloning Objects

3. External Packages and Libraries
  - 31 Importing Packages
  - 32 The Java Class Library
4. Data Structures
  - 41 Arrays
  - 42 Collections
  - 43 Working with Collections
  - 44 Lists
  - 45 Quantities (Sets)
  - 46 Associative Memory (Maps)
  - 47 Stacks (Basement)
  - 48 Queues (Snakes)
5. Strings and Calendar
  - 51 Strings
  - 52 StringBuffer
  - 53 Splitting Character Strings
  - 54 Date and time
  - 55 Calendar
6. File System and Data Streams
  - 61 Working with the File System
  - 62 Working with Files

**Literature****Compulsory Reading****Further Reading**

- Bloch, J. (2017). Effective Java (3rd ed.). Addison-Wesley.
- Oracle. (2018a). Java platform standard edition 10 API specification. (Available online).
- Oracle. (2018b). String (Java platform SE 10). (Available online).
- Oracle. (2018c). Date (Java platform SE 10). (Available online).
- Oracle. (2018d). java.io (Java platform SE 10). (Available online).
- Oracle. (2019). The Java language specification: Java SE 11 edition. (Available online).
- Seidl, M. (2015). UML@Classroom: An introduction to object-oriented modeling. Springer.



## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input checked="" type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input checked="" type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Statistics: Probability and Descriptive Statistics

Module Code: DLBDSSPDS

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Dr. Stefan Stöckl (Statistics: Probability and Descriptive Statistics )

### Contributing Courses to Module

- Statistics: Probability and Descriptive Statistics (DLBDSSPDS01)

### Module Exam Type

<b>Module Exam</b> <u>Study Format: Distance Learning</u> Exam, 90 Minutes <u>Study Format: myStudies</u> Exam, 90 Minutes	<b>Split Exam</b>
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### Weight of Module

see curriculum

### Module Contents

- Probability
- Random variables
- Joint distributions
- Expectation and variance
- Inequalities and limit theorems

<p><b>Learning Outcomes</b></p> <p><b>Statistics: Probability and Descriptive Statistics</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· define probability, random variable, and probability distribution.</li> <li>· understand the concept of Bayesian statistics.</li> <li>· grasp the definition of joint and marginal distributions.</li> <li>· calculate expectation values and higher moments.</li> <li>· comprehend important inequality equations and limit theorems.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the field of Methods</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the Business &amp; Management fields</p>

# Statistics: Probability and Descriptive Statistics

Course Code: DLBDSSPDS01

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

## Course Description

Statistical description and analysis are the foundations for data-driven analysis and prediction methods. This course introduces the fundamentals, beginning with a formal definition of probabilities and introduction to the concepts underlying Bayesian statistics. Random variables and probability density distributions are then discussed, as well as the concept of joint and marginal distributions. The importance of various discrete and continuous distributions and their applications is stressed. Characterizing distributions is an important aspect of describing the behavior of probability distributions. Students are familiarized with expectation values, variance, and covariance. The concepts of algebraic and central moments and moment-generating functions complement the characterization of probability distributions. Finally, this course focuses on important inequalities and limit theorems such as the law of large numbers or the central limit theorem.

## Course Outcomes

On successful completion, students will be able to

- define probability, random variable, and probability distribution.
- understand the concept of Bayesian statistics.
- grasp the definition of joint and marginal distributions.
- calculate expectation values and higher moments.
- comprehend important inequality equations and limit theorems.

## Contents

1. Probability
  - 11 Definitions
  - 12 Independent events
  - 13 Conditional probability
  - 14 Bayesian statistics
2. Random Variables
  - 21 Random Variables
  - 22 Distribution functions and probability mass functions
  - 23 Important discrete probability distributions
  - 24 Important continuous probability distributions

- |    |                                                                   |
|----|-------------------------------------------------------------------|
| 3. | Joint Distributions                                               |
| 31 | Joint distributions                                               |
| 32 | Marginal distributions                                            |
| 33 | Independent random variables                                      |
| 34 | Conditional distributions                                         |
| 4. | Expectation and Variance                                          |
| 41 | Expectation of a random variable, conditional expectations        |
| 42 | Variance and covariance                                           |
| 43 | Expectations and variances of important probability distributions |
| 44 | Algebraic and central moments                                     |
| 45 | Moment-generating functions                                       |
| 5. | Inequalities and Limit Theorems                                   |
| 51 | Probability inequalities                                          |
| 52 | Inequalities for expectations                                     |
| 53 | The law of large numbers                                          |
| 54 | Central limit theorem                                             |

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"><li>Downey, A.B. (2011). Think stats (2nd ed.). Sebastopol, CA: O'Reilly</li><li>Kim, A. (2019). Exponential Distribution—Intuition, Derivation, and Applications. Available online.</li><li>Wasserman, L. (2004). All of Statistics: A concise course in statistical inference. New York, NY: Springer</li></ul>

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input checked="" type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input checked="" type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



## Database Modeling and Database Systems

Module Code: DLBCSDMDS

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Ralf Kneuper (Database Modeling and Database Systems)

### Contributing Courses to Module

- Database Modeling and Database Systems (DLBCSDMDS01)

### Module Exam Type

#### Module Exam

Study Format: myStudies

Exam, 90 Minutes

Study Format: Distance Learning

Exam, 90 Minutes

#### Split Exam

### Weight of Module

see curriculum

### Module Contents

- Fundamentals of relational databases
- Simple database queries
- Entity/Relationship (E/R) Diagrams
- database development
- Complex database queries across multiple tables
- Changing data in databases
- NoSQL database systems

**Learning Outcomes****Database Modeling and Database Systems**

On successful completion, students will be able to

- describe the basic concepts of the relational data model and distinguish them from each other.
- visually model data schemas.
- know SQL queries, read data from databases, change the data stock, and have experience in their use.
- design, create, and modify SQL queries and data schemas for SQL databases, and have experience using them.
- independently design database schemas and create database queries to solve concrete problems.
- know the most important NoSQL concepts and distinguish them from each other.

**Links to other Modules within the Study Program**

This module is similar to other modules in the field(s) of Data Science & Artificial Intelligence

**Links to other Study Programs of the University**

All Bachelor Programmes in the IT & Technology field(s).

# Database Modeling and Database Systems

Course Code: DLBCSDMDS01

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

## Course Description

Stored data form the basis of many value chains of an information and knowledge society. The methodical structuring of data through data schemas therefore forms an important basis for storing information in such a way that it can be retrieved and processed quickly and easily. In addition to the structured storage of data, structured access to large amounts of data must also be possible. This course teaches students how to store data in relational data models and how to access stored data with SQL. In addition to relational database systems, modern DB systems (NoSQL) for storing and accessing data will be presented.

## Course Outcomes

On successful completion, students will be able to

- describe the basic concepts of the relational data model and distinguish them from each other.
- visually model data schemas.
- know SQL queries, read data from databases, change the data stock, and have experience in their use.
- design, create, and modify SQL queries and data schemas for SQL databases, and have experience using them.
- independently design database schemas and create database queries to solve concrete problems.
- know the most important NoSQL concepts and distinguish them from each other.

## Contents

1. Fundamentals of Relational Databases
  - 11 Basic Concepts of the Relational Data Model
  - 12 Find and Delete Records in the Database
  - 13 SQL and Relational Database Systems

2.	Querying Data from a Single Table
21	Query Data (SELECT)
22	Query Data With Condition (WHERE)
23	Sort Query Output (ORDER BY)
24	Queries With Group Formation (GROUP BY)
25	Subqueries With Nested SELECT Statements
3.	Conception and Modeling of Relational Databases
31	The Entity Relationship Model
32	Relationships and Cardinalities in E/R Models
33	Normal Forms of Databases
4.	Creation of Relational Databases
41	Logical Database Design Activities
42	Mapping of the Conceptual Data Model into the Physical Data Model
43	Generation of Tables in SQL Databases from E/R Diagrams
5.	Complex Database Queries on Multiple Tables
51	Composite Quantities (JOIN)
52	Set Operations
53	Data Views With CREATE VIEW
6.	Manipulating Records in Databases
61	Insert New Data Records (INSERT)
62	Change Existing Records
63	Transactions
7.	NoSQL Database Systems
71	Motivation and Basic Idea
72	Selected Groups of NoSQL Systems

**Literature****Compulsory Reading****Further Reading**

- 46th VLDB (2020). Proceedings of the International Conference on Very Large Data Bases (VLDB).
- Date, C.J. (2019). Database design and relational theory: Normal forms and all that jazz (2nd ed.). Apress.
- Documentation of Mondial Database (2010). Mondial Database.
- Elmasri, R., Navathe, S. B. (2016). Fundamentals of database systems. Pearson Education Limited.
- Foster, E., Godbole, S. (2016). Database systems. A pragmatic approach. (2nd ed.). Apress.
- Sumathi, S. et al (2010). Fundamentals of relational database management systems. Springer.
- W3Schools (2020). SQL Tutorial.

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBCSDMDS01



## Introduction to Process Management

Module Code: DLBWIEPM\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Hubert Vogl (Introduction to Process Management)

### Contributing Courses to Module

· Introduction to Process Management (DLBWIEPM01\_E)

### Module Exam Type

#### Module Exam

Study Format: Distance Learning

Exam or Written Assessment: Written  
Assignment, 90 Minutes

Study Format: myStudies

Exam or Written Assessment: Written  
Assignment, 90 Minutes

#### Split Exam

### Weight of Module

see curriculum

<p><b>Module Contents</b></p> <ul style="list-style-type: none"> <li>· Terms and motivation for process management</li> <li>· Fundamentals of enterprise modeling</li> <li>· Modelling of business processes</li> <li>· Process evaluation</li> <li>· Utilization of reference processes</li> <li>· Process changes</li> </ul>	
<p><b>Learning Outcomes</b></p> <p><b>Introduction to Process Management</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· identify the motivation and challenges in process management and describe the phases of process design.</li> <li>· document business processes in a structured way.</li> <li>· analyze and evaluate processes with suitable methods.</li> <li>· explain the use of reference processes and name at least one typical reference process.</li> <li>· identify challenges of process changes and plan risk-oriented process changes by appropriate means.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Computer Science &amp; Software Development</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the IT &amp; Technology fields</p>

# Introduction to Process Management

Course Code: DLBWIEPM01\_E

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

## Course Description

Business processes form the basis of many medium and large organizations. They contain binding rules and agreements that document the interaction of all organizational units and persons involved. This course introduces basics of enterprise modeling and specific forms of documentation for process modeling. An additional focus is given on techniques and methods supporting the evaluation of processes. Since reference models play an important role in practice, this course also presents typical reference processes, going in more detail by introducing the reference framework ITIL. Since organizational change is a critical success factor in process management, this course also addresses challenges in the rollout of processes and issues in the context of change management.

## Course Outcomes

On successful completion, students will be able to

- identify the motivation and challenges in process management and describe the phases of process design.
- document business processes in a structured way.
- analyze and evaluate processes with suitable methods.
- explain the use of reference processes and name at least one typical reference process.
- identify challenges of process changes and plan risk-oriented process changes by appropriate means.

## Contents

1. Terms and Motivation for Process Management
  - 11 Terms: Process, Process Management, Actual Process, Target Process
  - 12 Motivation for Process Management
  - 13 Risks and Challenges of Changing Processes in Organizations
  - 14 Phases of the Process Design
2. Fundamentals of Enterprise Modeling
  - 21 Elements of Enterprise Modelling
  - 22 Forms of Organization
  - 23 Elements in Business Processes

3.	Modelling of Business Processes
31	Business Process and Notation (BPMN)
32	Extended Event-Driven Process Chains (EPC)
4.	Process Evaluation
41	Methods of Process Evaluation
42	Use of KPIs for Process Evaluation
43	IT-Supported Process Evaluation
5.	Use of Reference Processes
51	Motivation and Typical Examples of Reference Processes
52	Example: ITIL as Process Framework for the Operation of IT
6.	Process Changes
61	Analysis of the Effects of Process Changes
62	Rollout of Process Changes
63	Change Management

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"> <li>· Allweyer, T. (2016): BPMN 2.0. Business Process Model and Notation. Introduction the Standard of Business Process Modeling. 2nd, updated and extended edition, Books on Demand, Norderstedt.</li> <li>· Dumas, M./La Rosa M./Mendling, J./Reijers, H. A. (2018): Fundamentals of Business Process Management. 2nd edition, Springer Berlin/Heidelberg .</li> <li>· Mendling, J. (2008): Metrics for Process Models: Empirical Foundations of Verification, Error Prediction, and Guidelines for Correctness. Springer, Berlin/ Heidelberg.</li> </ul>

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam or Written Assessment: Written Assignment, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 100 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 25 h	<b>Self Test</b> 25 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

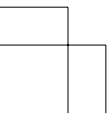
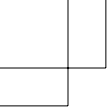
Study Format myStudies

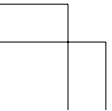
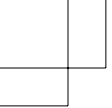
<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam or Written Assessment: Written Assignment, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 100 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 25 h	<b>Self Test</b> 25 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

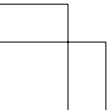
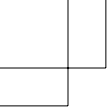






# 3. Semester

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## Fundamentals of IT and ERP systems

Module Code: DLBFMGSYS\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Sebastian Werning (Fundamentals of IT and ERP systems)

### Contributing Courses to Module

- Fundamentals of IT and ERP systems (DLBFMGSYS01\_E)

### Module Exam Type

#### Module Exam

Study Format: Distance Learning  
Exam, 90 Minutes

Study Format: myStudies  
Exam, 90 Minutes

#### Split Exam

### Weight of Module

see curriculum

### Module Contents

- Fundamentals of IT enterprise architecture
- IT Security
- Enterprise Resource Planning (ERP) systems
- The role of open source software and cloud computing for enterprise IT architecture and enterprise resource planning (ERP) systems

<p><b>Learning Outcomes</b></p> <p><b>Fundamentals of IT and ERP systems</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· understand the theoretical foundations of IT enterprise architecture.</li> <li>· explain the components of an effective IT enterprise architecture and apply them as critical success factor.</li> <li>· understand IT security as a management function and analyze possible IT risks.</li> <li>· understand the basics of Enterprise Resource Planning (ERP) and apply its implementation.</li> <li>· understand the role of open source software and cloud computing and evaluate possible areas of application for their own business.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Computer Science &amp; Software Development</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the IT &amp; Technology fields</p>

## Fundamentals of IT and ERP systems

Course Code: DLBFMGSYS01\_E

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

### Course Description

The aim of this course is to give students an understanding of the basics of IT enterprise architecture and to confer knowledge on individual success factors for IT enterprise architecture as well as make visible concepts of IT enterprise architecture as a possible competitive advantage. This course also explains the basics of Enterprise Resource Planning (ERP) systems and shows how these systems can be successfully implemented in the company, which ultimately leads to efficiency advantages. Finally, the role of open source software and cloud computing for IT enterprise architecture and in Enterprise Resource Planning (ERP) is presented and discussed as a possibility of a cost-effective alternative solution for their own business.

### Course Outcomes

On successful completion, students will be able to

- understand the theoretical foundations of IT enterprise architecture.
- explain the components of an effective IT enterprise architecture and apply them as critical success factor.
- understand IT security as a management function and analyze possible IT risks.
- understand the basics of Enterprise Resource Planning (ERP) and apply its implementation.
- understand the role of open source software and cloud computing and evaluate possible areas of application for their own business.

### Contents

1. Fundamentals of IT Enterprise Architecture
  - 11 Structure
  - 12 IT Enterprise Architecture as a Management Function
2. Components of a Successful IT Enterprise Architecture
  - 21 Business IT Alignment
  - 22 Improving Profitability and Cost Management
  - 23 Improvement of Time-To-Market
  - 24 Improving Customer Relationship Management and Customer Satisfaction
  - 25 Reduction of Heterogeneity to Improve Probability of Success in M&A Activities
  - 26 Compliance and Risk Management

3.	Information Security
31	Fundamentals and Protection Goals of Information Security
32	Organization of Information Security
33	Vulnerability Analysis
34	Prevention and Emergency Management
35	Security Measures
4.	Enterprise Resource Planning (ERP)
41	Conceptual Basis of ERP Systems
42	System Architectures of ERP Systems
43	Planning and Control of Operational Resources
44	Planning and Management of Strategic Resources
45	Planning and Control of Cross-Company Resources
5.	Implementation of Enterprise Resource Planning Systems
51	Selection and Introduction of Enterprise Resource Planning Systems
52	Operation of Enterprise Resource Planning Systems
6.	Open Source Software and Cloud Computing
61	Free and Open Source Software
62	Licenses and Communities
63	Cloud Computing

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"><li>· Ahlemann, F., Stettiner, E., Messerschmidt, M., &amp; Legner, C. (Eds.). (2012). Strategic enterprise architecture management: Challenges, best practices, and future developments. Springer.</li><li>· Harwood, S. (2003). ERP: The implementation cycle. CRC.</li><li>· Kurbel, K. (2013). Enterprise resource planning and supply chain management: Functions, business processes, and software for manufacturing companies. Springer.</li></ul>

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format myStudies**

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



# Web Application Development

Module Code: DLBCSWAD

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> DLBCSOOPJ01, DLBCSDSJCL01	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Sebastian Werning (Web Application Development)

## Contributing Courses to Module

- Web Application Development (DLBCSWAD01)

## Module Exam Type

### Module Exam

Study Format: Distance Learning

Advanced Workbook

Study Format: myStudies

Advanced Workbook

### Split Exam

## Weight of Module

see curriculum

## Module Contents

- Architectural Foundations
- Tools of web development
- HTML
- CSS
- Javascript
- Web application testing and security

**Learning Outcomes****Web Application Development**

On successful completion, students will be able to

- identify important elements and describe the structure of current web application architectures.
- write simple static web pages using HTML.
- design simple web pages using CSS.
- store and handle structured information using XML.
- program simple dynamic web content using PHP.

**Links to other Modules within the Study Program**

This module is similar to other modules in the field of Computer Science & Software Development.

**Links to other Study Programs of the University**

All Bachelor Programmes in the IT & Technology field.

# Web Application Development

Course Code: DLBCSWAD01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
BA	English		5	DLBCSOOPJ01, DLBCSDSJCL01

## Course Description

This course aims to empower students to program simple web applications using established technologies. At first, they will gain important insights into the typical structure of current web application architectures. Based on that knowledge, the students will learn the hypertext markup language (HTML) to develop simple web pages. Next, they will familiarize themselves with the most important and common elements of the cascading stylesheet (CSS) standard to layout the content written in HTML. To implement simple dynamic web pages, students learn how to use Javascript and exemplary supporting frameworks. This is combined with the use of relevant tools for the development and source code management of web pages. Finally, they will learn the very basics of the web page testing and security.

## Course Outcomes

On successful completion, students will be able to

- identify important elements and describe the structure of current web application architectures.
- write simple static web pages using HTML.
- design simple web pages using CSS.
- store and handle structured information using XML.
- program simple dynamic web content using PHP.

## Contents

1. Architectural Foundations
  - 11 Structure and History of the Internet
  - 12 Internet protocols and URIs
  - 13 Web application architecture
  - 14 Current trends
2. Tools of web development
  - 21 Development Tools
  - 22 Version management
  - 23 Package Manager
  - 24 Upload/Deployment

3. Static web pages development
  - 31 Fundamentals of HTML5
  - 32 Fundamentals of CSS
4. Advanced design techniques
  - 41 Responsive web design
  - 42 Page layout
  - 43 Media queries
  - 44 CSS Frameworks (Bootstrap)
5. Web page development with JavaScript
  - 51 JavaScript history, ES5/ES6
  - 52 JavaScript fundamentals
  - 53 Use of JSON
  - 54 Common JavaScript Frameworks
6. Web application testing and security
  - 61 Testing of web applications
  - 62 Basic security concepts and principles

**Literature****Compulsory Reading****Further Reading**

- Ferguson, R. (2019). Beginning JavaScript: The ultimate guide to modern JavaScript development (3rd ed.). Apress.
- Sunyaev, A. (2020). Internet computing: Principles of distributed systems and emerging internet based technologies. Springer

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
------------------------------------------	--------------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Advanced Workbook

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format myStudies**

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Advanced Workbook

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Programming Information Systems with Java EE

Module Code: IPWA2-01\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> None	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

N.N. (Programming Information Systems with Java EE)

### Contributing Courses to Module

- Programming Information Systems with Java EE (IPWA02-01\_E)

### Module Exam Type

#### Module Exam

Study Format: Distance Learning  
Exam, 90 Minutes

Study Format: myStudies  
Exam, 90 Minutes

#### Split Exam

### Weight of Module

see curriculum

### Module Contents

- Component-Based Web User Interfaces
- Connecting View and Model
- Component Libraries
- Programming of Business Logic
- Programming of Database Connections

**Learning Outcomes****Programming Information Systems with Java EE**

On successful completion, students will be able to

- describe relevant technologies, standards, and frameworks for building enterprise web applications by using the Java technology stack and distinguish between them.
- use various web technologies for the implementation and integration of
- application interfaces, business logic and data layer.
- independently create suitable web applications to solve specifically described problems.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Computer Science & Software Development

**Links to other Study Programs of the University**

All Bachelor Programs in the IT & Technology fields



# Programming Information Systems with Java EE

Course Code: IPWA02-01\_E

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

## Course Description

Building on the course "Web Application Development", this course focuses on the Java technology stack for building web applications. After an introduction to developing web application interfaces with JSF, functions for validating and converting input and programming error messages are covered. Subsequently, concepts for the implementation of navigation structures are taught. Finally, concepts and technologies for the connection to database systems are presented and applied.

## Course Outcomes

On successful completion, students will be able to

- describe relevant technologies, standards, and frameworks for building enterprise web applications by using the Java technology stack and distinguish between them.
- use various web technologies for the implementation and integration of application interfaces, business logic and data layer.
- independently create suitable web applications to solve specifically described problems.

## Contents

1. Component-Based Web User Interfaces
  - 11 Introduction to Java Server Faces (JSF)
  - 12 JSF Components
2. Connecting View and Model
  - 21 Beans
  - 22 Unified Expression Language (UEL)
3. Component Libraries
  - 31 Component Libraries
  - 32 PrimeFaces

- |    |                                                   |
|----|---------------------------------------------------|
| 4. | Programming of Business Logic                     |
| 41 | Validation of User Input                          |
| 42 | Conversion of Numbers, Currencies and Date Fields |
| 43 | Definition of Error Messages                      |
| 44 | Page Navigation                                   |
| 45 | JSF Lifecycle and Event Handling                  |
| 5. | Programming of Database Connections               |
| 51 | Persistent Storage in Databases                   |
| 52 | Object Relational Mapping                         |
| 53 | JPA and Hibernate as Persistence Provider         |
| 54 | Creating Objects                                  |
| 55 | Associating Objects                               |
| 56 | Deleting Objects                                  |

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"><li>Beernink, J./ Tijms, A. (2019): Pro CDI 2 in Java EE 8: An In-Depth Guide to Context and Dependency Injection. Apress, New York.</li><li>Juneau, Josh (2020): Jakarta EE Recipes: A Problem-Solution Approach. Apress, New York.</li><li>Scholz, B./Tijms, Arjan (2018): The Definitive Guide to JSF in Java EE 8: Building Web Applications with JavaServer Faces. Apress, New York.</li><li>Sutherland, J./Clarke, D. (2013): Java Persistence. (URL: <a href="http://en.wikibooks.org/wiki/Java_Persistence">http://en.wikibooks.org/wiki/Java_Persistence</a> [letzter Zugriff: 22.06.2021]).</li></ul>

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format myStudies**

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Management Accounting

Module Code: DLBMAE

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Muhammad Ashfaq (Management Accounting)

### Contributing Courses to Module

· Management Accounting (DLBMAE01)

### Module Exam Type

#### Module Exam

Study Format: myStudies

Exam or Written Assessment: Written  
Assignment, 90 Minutes

Study Format: Distance Learning

Exam or Written Assessment: Written  
Assignment, 90 Minutes

#### Split Exam

### Weight of Module

see curriculum

<p><b>Module Contents</b></p> <ul style="list-style-type: none"> <li>· Management accounting and control function</li> <li>· Differences between management accounting, and financial accounting</li> <li>· Cost terms, cost categories, and cost behavior</li> <li>· Cost allocation</li> <li>· General and specific cost allocation methods</li> <li>· Break-even analysis</li> <li>· Planning and budgeting</li> </ul>	
<p><b>Learning Outcomes</b></p> <p><b>Management Accounting</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· differentiate the management accounting and control function from the financial accounting and the financial management function.</li> <li>· understand the cost structure and discuss the cost aspects of business operation.</li> <li>· analyze and apply the tools for viewing and differentiating costs and utilize them to ameliorate business decision-making.</li> <li>· discuss how the budgeting process and variance analysis works to implement the management control function.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Finance &amp; Tax Accounting</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the Business &amp; Management fields</p>

# Management Accounting

Course Code: DLBMAE01

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

## Course Description

Management accounting is an important function to operate an organization. Managers need to understand this function in order to be able to run an organization efficiently. In most organizations, decisions, actions and human behavior are directly linked to the feature, use and focus of management accounting information. This course is about understanding the preparation and use of information provided by management accounting. Cost accounting as a central part of the management accounting informs the management about the profitability of its core business. The cost and performance measurement serves the internal decision, control and budgeting process.

## Course Outcomes

On successful completion, students will be able to

- differentiate the management accounting and control function from the financial accounting and the financial management function.
- understand the cost structure and discuss the cost aspects of business operation.
- analyze and apply the tools for viewing and differentiating costs and utilize them to ameliorate business decision-making.
- discuss how the budgeting process and variance analysis works to implement the management control function.

## Contents

1. Introduction to Management Accounting
  - 11 Financial vs. Management/Cost Accounting
  - 12 Definition of Cost
  - 13 Considering the Contemporary Business World Context
  - 14 Cost Behavior: Fixed and Variable Costs
2. Cost-Volume-Profit Analysis
  - 21 Break-Even Analysis
  - 22 Cost Structure and Operating Leverage
  - 23 Cost Structure and Variabilization

3.	Simplistic Methods of Cost Allocation
31	Cost Behavior: Direct and Indirect Costs
32	The Need for Cost Allocation
33	Predetermined Overhead Rate
34	Departmental Overhead Rate
35	Over- and Under-Application of Overhead
4.	Activity-Based Costing
41	The Rationale of Activity-Based Costing
42	Implementing Activity-Based Costing
5.	Overhead Analysis Sheet
51	Departmental Cost Allocation
52	Reciprocal Method
53	Step Method
6.	Relevant Cost Concepts
61	Foundational Cost Concepts
62	Replacement of Equipment
63	Make or Buy
64	Special Order
65	Drop Product Line
7.	Operating Budgets
71	The Budgeting Process
72	Sales Budget
73	Production Budgets
74	Administrative Expense Budget
75	Budgeted Income Statement
8.	Financial Budgets
81	Cash Budget
82	Conflicts and Pitfalls in Budgeting



**Literature****Compulsory Reading****Further Reading**

- Atkinson, A. A., Kaplan, R., Matsumura, E. M., & Young, S. M. (2012). Management accounting: Information for decision-making and strategy execution (6th ed.). Pearson.
- Drury, C. (2019). Management accounting for business (7th ed.). Cengage.

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam or Written Assessment: Written Assignment, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 100 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 25 h	<b>Self Test</b> 25 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam or Written Assessment: Written Assignment, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 100 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 25 h	<b>Self Test</b> 25 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBMAE01

## Intercultural and Ethical Decision-Making

Module Code: DLBCSIDM

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Jürgen Matthias Seeler (Intercultural and Ethical Decision-Making)

### Contributing Courses to Module

- Intercultural and Ethical Decision-Making (DLBCSIDM01)

### Module Exam Type

#### Module Exam

Study Format: myStudies  
Written Assessment: Case Study  
Study Format: Distance Learning  
Written Assessment: Case Study

#### Split Exam

### Weight of Module

see curriculum

### Module Contents

- Basics of Intercultural Competence
- Cultural Concepts
- Culture and Ethics
- Implications of Current Ethical Problems in the Area of Interculturality, Ethics, and Diversity
- Intercultural Learning and Working
- Case Studies for Cultural and Ethical Conflicts

<p><b>Learning Outcomes</b></p> <p><b>Intercultural and Ethical Decision-Making</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· explain the most important terms in the areas of interculturality, diversity, and ethics.</li> <li>· distinguish different explanatory patterns of culture.</li> <li>· understand culture at different levels.</li> <li>· plan processes of intercultural learning and working.</li> <li>· understand the interdependencies of culture and ethics.</li> <li>· independently work on a case study on intercultural competence.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Business Administration &amp; Management</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the Business &amp; Management fields</p>

## Intercultural and Ethical Decision-Making

Course Code: DLBCSIDM01

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

### Course Description

In this course, students acquire the necessary knowledge to understand intercultural competencies and current developments in the fields of diversity and ethics. Students will understand how to systematically plan and implement learning processes for the development of competences important in these areas. First, important terms are clarified and differentiated from each other, and cultural aspects are explained from different perspectives. In addition, students learn that cultural issues are relevant at different levels, for example, within a state, company, or other group. In this context, students also recognize the connection between ethics and culture with different interdependencies. On the basis of this knowledge, students are then familiarized with the different possibilities and potentials of intercultural and ethical learning and working. Practical cases are used to illustrate the importance of the relationships learned for today's work context in many companies. The students then work on a case study in which the acquired knowledge is systematically applied.

### Course Outcomes

On successful completion, students will be able to

- explain the most important terms in the areas of interculturality, diversity, and ethics.
- distinguish different explanatory patterns of culture.
- understand culture at different levels.
- plan processes of intercultural learning and working.
- understand the interdependencies of culture and ethics.
- independently work on a case study on intercultural competence.

### Contents

1. Basics of Intercultural and Ethical Competence to Act
  - 11 Subject Areas, Terms, and Definitions
  - 12 Relevance of Intercultural and Ethical Action
  - 13 Intercultural Action - Diversity, Globalization, Ethics
2. Cultural Concepts
  - 21 Hofstede's Cultural Dimensions
  - 22 Culture Differentiation According to Hall
  - 23 Locus of Control Concept to Rotter

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|----|-----------------------------------------------------------------------|
| 3. | Culture and Ethics                                                    |
| 31 | Ethics - Basic Terms and Concepts                                     |
| 32 | Interdependence of Culture and Ethics                                 |
| 33 | Ethical Concepts in Different Regions of the World                    |
| 4. | Current Topics in the Area of Interculturality, Ethics, and Diversity |
| 41 | Digital Ethics                                                        |
| 42 | Equality and Equal Opportunities                                      |
| 43 | Social Diversity                                                      |
| 5. | Intercultural Learning and Working                                    |
| 51 | Acculturation                                                         |
| 52 | Learning and Working in Intercultural Groups                          |
| 53 | Strategies for Dealing with Cultural Conflicts                        |
| 6. | Case Studies for Cultural and Ethical Conflicts                       |
| 61 | Case Study: Interculturality                                          |
| 62 | Case Study: Diversity                                                 |
| 63 | Case Study: Interculturality and Ethics                               |

<b>Literature</b>
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<b>Compulsory Reading</b>
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<b>Further Reading</b>
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- |                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>· Boylan, M. (Eds.). (2014). Business ethics. (2nd ed.). Wiley-Blackwell.</li> <li>· Thomas, A., Kinast, E. U., Schroll-Machl, S. (Eds.). (2010). Handbook of intercultural communication and cooperation. Basics and areas of application. Vandenhoeck &amp; Ruprecht .</li> </ul> |
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## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Case Study
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Case Study

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Case Study
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Case Study

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

# Software Quality Assurance

Module Code: DLBCSSQA

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Tobias Brückmann (Software Quality Assurance)

## Contributing Courses to Module

- Software Quality Assurance (DLBCSSQA01)

## Module Exam Type

<b>Module Exam</b> <u>Study Format: myStudies</u> Exam, 90 Minutes <u>Study Format: Distance Learning</u> Exam, 90 Minutes	<b>Split Exam</b>
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## Weight of Module

see curriculum

## Module Contents

- Systematic quality assurance of requirements, architectures, and processes
- Systematic testing of software
- Dynamic quality assurance: Testing
- Static quality assurance: Surveying and measuring
- Constructive quality management
- Organization and planning of software quality
- Introduction to software quality assurance

<p><b>Learning Outcomes</b></p> <p><b>Software Quality Assurance</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· understand motivation, use cases, and scenarios for aspects of quality management in the software process.</li> <li>· understand important terms and the basis for the conception and execution of software tests.</li> <li>· understand techniques and methods for constructive quality management and be able to distinguish them from each other.</li> <li>· understand techniques and methods for analytical quality management and be able to distinguish them from one another.</li> <li>· understand the general course of test activities and be able to select suitable methods and techniques for quality assurance for various artefacts and activities in the software process.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the field(s) of Computer Science &amp; Software Development.</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the IT &amp; Technology field(s).</p>

# Software Quality Assurance

Course Code: DLBCSSQA01

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

## Course Description

Quality assurance is one of the accompanying activities of a software process. From the beginning, all created artefacts (documents, models, and program codes) must be quality-assured because the later an error in a system is detected, the more expensive it is to fix it. The course teaches techniques and procedures for accompanying quality assurance, starting with requirements analysis through to specification, architecture and design, and implementation. Even the quality assurance activities must be quality assured so that the software systems can be delivered at a good standard.

## Course Outcomes

On successful completion, students will be able to

- understand motivation, use cases, and scenarios for aspects of quality management in the software process.
- understand important terms and the basis for the conception and execution of software tests.
- understand techniques and methods for constructive quality management and be able to distinguish them from each other.
- understand techniques and methods for analytical quality management and be able to distinguish them from one another.
- understand the general course of test activities and be able to select suitable methods and techniques for quality assurance for various artefacts and activities in the software process.

## Contents

1. Introduction to Software Quality Assurance
  - 11 Motivation and Terms
  - 12 Principles of SW Quality Assurance
  - 13 Principles in Software Testing
  - 14 Cost of Quality

2.	Organization and Planning of Software Quality
21	Overview of the Quality Management Process
22	Quality Planning and Quality Objectives
23	Quality Assurance and Quality Improvement
24	Quality Control
3.	Constructive Quality Management
31	Overview of Constructive Quality Assurance
32	Selected Techniques
4.	Static Quality Assurance: Surveying and Measuring
41	Application and Overview of Static Processes
42	Reviewing with Review Techniques
43	Trade Fairs and Metrics
44	Static Code Analysis
5.	Dynamic Quality Assurance: Testing
51	Deployment and an Overview of Dynamic Processes
52	Use Case Based Test Case Creation
53	Equivalence Class Formation and Limit Value Analysis
54	State Based Test Case Creation
55	Creation of Random Test Data
6.	Systematic Testing of Software
61	Methodological Testing Activities
62	Component Test (Also: Module Test, Unit Test)
63	Integration Tests
64	System Tests
65	Acceptance Tests
7.	Systematic Quality Assurance of Requirements, Architectures, and Processes
71	Quality Assurance of Requirements
72	Quality Assurance of Architectures
73	Quality Assurance of Software Processes

**Literature****Compulsory Reading****Further Reading**

- Balzert, H. (1997): Lehrbuch der Software-Technik. Software-Management, Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum, Heidelberg.
- Liggesmeyer, P. (2009): Software-Qualität. Testen, Analysieren und Verifizieren von Software. 2. Auflage, Spektrum, Heidelberg.
- Pol, M./Koomen, T./Spillner, A. (2002): Management und Optimierung des Testprozesses. Ein praktischer Leitfaden für erfolgreiches Testen von Software mit TPI und TMap. 2. Auflage, dpunkt.verlag, Heidelberg.
- Schneider, K. (2012): Abenteuer Softwarequalität. Grundlagen und Verfahren für Qualitätssicherung und Qualitätsmanagement. 2. Auflage, dpunkt.verlag, Heidelberg.
- Seidl, R./Sneed, H. S./Baumgartner, M. (2006): Der Systemtest. Anforderungsbasiertes Testen von Software-Systemen. Hanser, München.
- Spillner, T. et al. (2011): Praxiswissen Softwaretest. Testmanagement. Aus- und Weiterbildung zum Certified Tester. 3. Auflage, dpunkt.verlag, Heidelberg.
- Spillner, E./Linz, T. (2012): Basiswissen Softwaretest. Aus- und Weiterbildung zum Certified Tester. 5. Auflage, dpunkt.verlag, Heidelberg.
- Wallmüller, E. (1990): Software-Qualitätssicherung in der Praxis. Hanser, München.

**Study Format myStudies**

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



**Study Format Distance Learning**

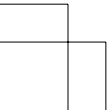
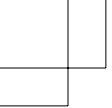
<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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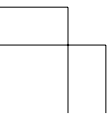
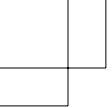
<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

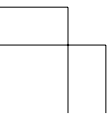
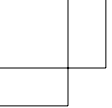
DLBCSSQA01





# 4. Semester

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## Data Analytics and Big Data

Module Code: DLBINGDABD\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

N.N. (Data Analytics and Big Data)

### Contributing Courses to Module

- Data Analytics and Big Data (DLBINGDABD01\_E)

### Module Exam Type

#### Module Exam

Study Format: myStudies  
Written Assessment: Case Study  
Study Format: Distance Learning  
Written Assessment: Case Study

#### Split Exam

### Weight of Module

see curriculum

### Module Contents

- Introduction to Data Analysis
- Statistical Basics
- Data Mining
- Big Data Methods and Technologies
- Legal Aspects of Data Analysis
- Solution Scenarios
- Application of Big Data in the Industry

**Learning Outcomes****Data Analytics and Big Data**

On successful completion, students will be able to

- distinguish between information and data and know the meaning of these terms for decision-making.
- derive the Big Data issue, especially in connection with Internet of Things, and describe it using examples.
- identify basics from statistics, which are necessary for the analysis of large data sets.
- identify the process of data mining and classify different methods in it.
- identify selected methods and technologies that are used in the Big Data context and apply them to simple examples.
- recognize the legal framework for the application of data analysis in Germany and internationally.
- identify the specific prospects and challenges of applying Big Data analyses in industry.

**Links to other Modules within the Study Program**

This module is similar to other modules in the field of Data Science & Artificial Intelligence

**Links to other Study Programs of the University**

All Bachelor Programs in the IT & Technology fields



## Data Analytics and Big Data

Course Code: DLBINGDABD01\_E

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

### Course Description

The aim of the course is to familiarize students with selected methods and techniques of data analysis in the context of continuously increasing, heterogeneous data sets. To this end, the fundamental relevance of Big Data methods is presented by drawing on the historical development of stored data. One decisive factor here is the continuous transmission Internet of Things sensor data to other systems. This is followed by a short introduction to the essential statistical fundamentals before the individual steps of the data mining process are discussed. In distinction to these classical procedures, selected methods are presented with which stored data in the Big Data context can be made analyzable. As data analysis is subject to certain legal frameworks, this course also covers legal aspects such as data protection. The course concludes with an overview of the practical application of Big Data methods and tools. In particular, fields of application in the industrial context are examined.

### Course Outcomes

On successful completion, students will be able to

- distinguish between information and data and know the meaning of these terms for decision-making.
- derive the Big Data issue, especially in connection with Internet of Things, and describe it using examples.
- identify basics from statistics, which are necessary for the analysis of large data sets.
- identify the process of data mining and classify different methods in it.
- identify selected methods and technologies that are used in the Big Data context and apply them to simple examples.
- recognize the legal framework for the application of data analysis in Germany and internationally.
- identify the specific prospects and challenges of applying Big Data analyses in industry.

**Contents**

1. Introduction to Data Analysis
  - 11 Decisions, Information, Data
  - 12 Historical Development of Data Storage and Evaluation
  - 13 Big Data: Features and Examples
  - 14 Data Analysis
  - 15 Internet of Things as Driver for Big Data
2. Statistical Basics
  - 21 Descriptive Data Analysis
  - 22 Inferential Data Analysis
  - 23 Explorative Data Analysis
  - 24 Multivariate Data Analysis
3. Data Mining
  - 31 Knowledge Discovery in Databases
  - 32 Association Analysis
  - 33 Correlation Analysis
  - 34 Forecast
  - 35 Cluster Analysis
  - 36 Classification
4. Big Data Methods and Technologies
  - 41 Technology Building Blocks
  - 42 MapReduce
  - 43 Text- and Semantic Analysis
  - 44 Audio and Video Analysis
  - 45 BASE and NoSQL
  - 46 In-Memory Databases
  - 47 Big Data Success Factors
5. Legal Aspects of Data Analysis
  - 51 Data Protection Principles in Germany
  - 52 Anonymization and Pseudonymization
  - 53 International Data Analysis
  - 54 Performance and Integrity Protection
6. Solution Scenarios

- |    |                                          |
|----|------------------------------------------|
| 7. | Application of Big Data in the Industry  |
| 71 | Production and Logistics                 |
| 72 | Increased Efficiency in the Supply Chain |
| 73 | Key-Factor Data                          |
| 74 | Examples and Conclusion                  |

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"><li>Gandomi, A./Haider, M. (2015): Beyond the hype. Big data concepts, methods, and analytics. In: International Journal of Information Management, 35. Jg., Journal 2, p. 137-144.</li><li>Provost, F./Fawcett, T. (2013): Data science for business. What You Need to Know About Data Mining and Data-Analytic Thinking. O'Reilly, Sebastopol (CA).</li></ul>

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Case Study
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Case Study

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Case Study
------------------------------------------	----------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Case Study

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBINGDABD01\_E

## Purchasing, Procurement and Distribution

Module Code: DLBBWEBD\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
------------------------------------------	------------------------------------------	------------------------------------------	---------------------------------------------------------------

### Module Coordinator

N.N. (Purchasing, Procurement and Distribution)

### Contributing Courses to Module

- Purchasing, Procurement and Distribution (DLBLOISCM102\_E)

### Module Exam Type

#### Module Exam

Study Format: Distance Learning  
Exam, 90 Minutes

Study Format: myStudies  
Exam, 90 Minutes

#### Split Exam

### Weight of Module

see curriculum

### Module Contents

- Purchasing and procurement
- Basics of distribution
- Distribution of industrial goods
- Trends and digitalization in procurement and distribution

<p><b>Learning Outcomes</b></p> <p><b>Purchasing, Procurement and Distribution</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· understand the importance of procurement in achieving superordinate corporate objectives.</li> <li>· describe the major processes of procurement, classify and apply strategies and concepts of procurement.</li> <li>· identify supply management processes and methods.</li> <li>· describe fields of application and types of information and communication systems to support procurement processes.</li> <li>· know tasks, objectives, functions and carriers of distribution.</li> <li>· understand design approaches of distribution logistics systems and classify them with regard to different distribution strategies.</li> <li>· know special features of the distribution of industrial goods in contrast to other groups of goods and describe different types of industrial goods marketing.</li> <li>· differentiate forms of electronic marketplaces in procurement and distribution.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Transportation &amp; Logistics</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the Transport &amp; Logistics fields</p>



## Purchasing, Procurement and Distribution

Course Code: DLBLOISCM102\_E

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

### Course Description

Students learn basic processes and strategies in the procurement and distribution of industrial companies. Various management systems such as supply management and their significance for achieving the procurement and distribution-specific corporate goals are explained in more detail. A specific focus is given on the distribution of industrial goods and characteristics of industrial goods marketing. In addition, the fields of application and potentials of information and communication systems in procurement and distribution processes are discussed and various types of relevant systems are presented.

### Course Outcomes

On successful completion, students will be able to

- understand the importance of procurement in achieving superordinate corporate objectives.
- describe the major processes of procurement, classify and apply strategies and concepts of procurement.
- identify supply management processes and methods.
- describe fields of application and types of information and communication systems to support procurement processes.
- know tasks, objectives, functions and carriers of distribution.
- understand design approaches of distribution logistics systems and classify them with regard to different distribution strategies.
- know special features of the distribution of industrial goods in contrast to other groups of goods and describe different types of industrial goods marketing.
- differentiate forms of electronic marketplaces in procurement and distribution.

## Contents

1. Purchasing and Procurement
  - 11 Definition of "Procurement" and "Procurement Process"
  - 12 Make-or-Buy Decisions
  - 13 In- and Outsourcing Strategies
  - 14 Procurement Concepts and Strategies
  - 15 Market Research in procurement
  - 16 Supply Management
  - 17 Information and Communication Systems in Purchasing and Procurement
  - 18 Organizational Concepts in Procurement
  
2. Basics of Distribution
  - 21 Functions of Distribution
  - 22 Operational Distribution Agencies and Intermediaries
  - 23 Distribution Logistics
  - 24 Distribution Structures
  - 25 Distribution Strategies
  - 26 Operational Distribution Management
  
3. Distribution of Industrial Goods
  - 31 Industrial Goods Marketing
  - 32 Product Business
  - 33 Asset Business
  - 34 Systems Business
  - 35 Supplier Business
  
4. Trends and Digitalization in Procurement and Distribution
  - 41 Electronic Marketplaces
  - 42 Supplier Cooperation: Supplier Relationship Management (SRM)

**Literature****Compulsory Reading****Further Reading**

- Backhaus, K./Muehlfeld, K. (2005): Strategy dynamics in industrial marketing: A business types perspective in: Management Decision 43(1): p. 38-55.
- Baily, P. et al (2015): Procurement Principles and Management, 11<sup>th</sup> edition, Pearson Education Ltd, London.
- Rushton, A./Croucher, P./Baker, P. (2014): The Handbook of Logistics and Distribution Management, 5th edition, Kogan Page Ltd., London, Philadelphia, New Delhi.

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
------------------------------------------	--------------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBLOISCM102\_E

## IT Law

Module Code: DLBCSIITL

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
--------------------------------------	---------------------------------------	--------------------------	----------------	----------------------------------

<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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<b>Module Coordinator</b> N.N. (IT Law)
--------------------------------------------

<b>Contributing Courses to Module</b>
· IT Law (DLBCSIITL01)

<b>Module Exam Type</b>	
<b>Module Exam</b> <u>Study Format: Distance Learning</u> Written Assessment: Case Study <u>Study Format: myStudies</u> Written Assessment: Case Study	<b>Split Exam</b>
<b>Weight of Module</b> see curriculum	

<b>Module Contents</b>
<ul style="list-style-type: none"> <li>· Basic Concepts of Legal Systems</li> <li>· Internet and Domain Law</li> <li>· Contracts</li> <li>· Intellectual Property</li> <li>· Data Protection / Privacy</li> </ul>

**Learning Outcomes****IT Law**

On successful completion, students will be able to

- describe basic concepts of IT law.
- provide examples of different approaches to IT law in different countries.
- identify legal questions as they arise in IT.
- apply the core ideas of data protection and privacy in their work.
- distinguish the different types of contracts and intellectual property as they relate to IT.

**Links to other Modules within the Study Program**

This module is similar to other modules in the field(s) of Computer Science & Software Development.

**Links to other Study Programs of the University**

All Bachelor Programmes in the IT & Technology field(s).



## IT Law

Course Code: DLBCSIITL01

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

### Course Description

The application of IT is embedded in a legal framework which computer scientists need to know and adhere to in their work. This applies to the way their own work is performed which, for example, may be governed by contracts with suppliers and/or customers. Computer scientists create and use intellectual property, and this leads to questions of copyright, software patents, etc. Beyond this, IT strongly influences the social environment and therefore needs to abide by regulations such as data protection. The goal of this module is to provide students with a basic understanding of these legal aspects so they can take them into account, apply them in simple cases, and recognize when more specialised legal knowledge is required. Since IT is a topic that connects different countries and legal frameworks, the course looks at some of the common legal questions as they are handled in the European Union, the USA, and India.

### Course Outcomes

On successful completion, students will be able to

- describe basic concepts of IT law.
- provide examples of different approaches to IT law in different countries.
- identify legal questions as they arise in IT.
- apply the core ideas of data protection and privacy in their work.
- distinguish the different types of contracts and intellectual property as they relate to IT.

### Contents

1. Basic Concepts of Legal Systems
  - 11 The Role of Law in IT
  - 12 Basic Concepts of the Legal System in the European Union
  - 13 Basic Concepts of the Legal System in the USA
  - 14 Basic Concepts of the Legal System in India
2. Internet and Domain Law
  - 21 Web Sites and the Law
  - 22 Net Neutrality
  - 23 Domain Registration
  - 24 Internet Crime

3.	Contracts
31	Types of IT Contracts
32	Electronic Contracts and Electronic Signatures
33	Licences
34	Free and Open Source Software
35	Buying and Selling Off-the-Shelf Software
36	Software Development Contracts
4.	Intellectual Property
41	Brands, Trade Marks and Domain Names
42	Copyright
43	Software Patents
44	Digital and Data Ownership
5.	Data Protection/Privacy
51	Basic Concepts of Data Protection
52	Data Protection in the European Union: the GDPR
53	Data Protection in the USA
54	Data Protection in India
55	Trans-Border Data Flows

#### Literature

##### Compulsory Reading

##### Further Reading

- Hoeren, T., & Pinelli, S. (2018). Agile programming - Introduction and current legal challenges. *Computer Law & Security Review*, 34(5), pp. 1131-1138. Retrieved from [www.uni-muenster.de/Jura.itm/hoeren/itm/wp-content/uploads/Hr.-Hoeren-29.10.pdf](http://www.uni-muenster.de/Jura.itm/hoeren/itm/wp-content/uploads/Hr.-Hoeren-29.10.pdf)
- Lloyd, I. (2018). *Information technology law* (8th ed.). Oxford: Oxford University Press.
- Murray, A. (2019). *Information technology law: The law and society* (4th ed.). Oxford: Oxford University Press.
- Soma, J. T. (2014). *Privacy law in a nutshell*. St. Paul, MN: West Academic.
- Wikia.org. (n.d.). The IT law wiki [web encyclopedia]. Retrieved from [https://itlaw.wikia.org/wiki/The\\_IT\\_Law\\_Wiki#](https://itlaw.wikia.org/wiki/The_IT_Law_Wiki#)

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Case Study
------------------------------------------	----------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Case Study

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format myStudies**

<b>Study Format</b> myStudies	<b>Course Type</b> Case Study
----------------------------------	----------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Case Study

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

# IT Project Management

Module Code: DLBCSEITPAM1

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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<b>Module Coordinator</b> N.N. (IT Project Management)
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<b>Contributing Courses to Module</b>
· IT Project Management (DLBCSEITPAM01)

<b>Module Exam Type</b>	
<b>Module Exam</b> <u>Study Format: Distance Learning</u> Exam, 90 Minutes <u>Study Format: myStudies</u> Exam, 90 Minutes	<b>Split Exam</b>
<b>Weight of Module</b> see curriculum	

<b>Module Contents</b>
<ul style="list-style-type: none"> <li>· Basic terms and foundations of IT project management</li> <li>· Large and small planning techniques</li> <li>· Techniques for prioritization, cost-estimation, and project controlling</li> <li>· Techniques for stakeholder, communication, and risk management</li> <li>· Organization and structure in IT project management</li> <li>· Schools of thought in IT project management</li> </ul>

**Learning Outcomes****IT Project Management**

On successful completion, students will be able to

- explain and differentiate between the basic principles and tasks of IT project management.
- explain the important practical techniques and methods necessary for the implementation of IT project management.
- describe the basic procedural models and explain their advantages and disadvantages as well as their possible applications.
- identify possible project risks on the basis of given practical scenarios and select suitable measures from IT project management in order to minimize them in a targeted manner.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Computer Science & Software Development

**Links to other Study Programs of the University**

All Bachelor Programs in the IT & Technology fields

# IT Project Management

Course Code: DLBCSEITPAM01

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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## Course Description

In this course, typical problems in the management of Software projects are discussed and the methods and techniques used to address challenges conveyed. In addition, standard procedural models for IT project management are explained and their strengths and weaknesses specifically identified.

## Course Outcomes

On successful completion, students will be able to

- explain and differentiate between the basic principles and tasks of IT project management.
- explain the important practical techniques and methods necessary for the implementation of IT project management.
- describe the basic procedural models and explain their advantages and disadvantages as well as their possible applications.
- identify possible project risks on the basis of given practical scenarios and select suitable measures from IT project management in order to minimize them in a targeted manner.

## Contents

1. Basics Terms and Foundations of IT Project Management
  - 11 Definition of a Project and Types of IT Projects
  - 12 IT Project Lifecycle
  - 13 Multi-Project Management - The Project in the Context of the Organization
2. Planning Techniques
  - 21 Large-Scale Planning: Milestones, Sub-tasks, and Work Packages
  - 22 Large-Scale Planning: Gantt Charts
  - 23 Planning and Organization of Work Packages: Kanban Board
3. Prioritization, Estimation of Costs, Project Controlling
  - 31 Prioritization
  - 32 Estimation of Costs
  - 33 Project Controlling

4.	Stakeholder, Communication and Risk Management
41	Stakeholder Management
42	Communication Management
43	Risk Management
5.	Organization and Structure in IT Project Management
51	Overview and Levels of Management from PRINCE2
52	Management Processes in PRINCE2
53	Pragmatic IT Project Management (PITPM)
54	Configuration of an IT Project in PITPM
55	Management of a project in PITPM
6.	Schools of Thought in IT Project Management
61	Agile Software Development
62	Value-Based Software Engineering

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"> <li>· A Guide to the Project Management Body of Knowledge (PMBOK® Guide) Project Management Institute (2017). Newtown Square, PA, USA, 6th Ed., 589 pages.</li> <li>· IPMA Individual Competence Baseline for Project, Programme &amp; Portfolio Management International Project Management Association (2015). 4th Ed., 416 pages.</li> <li>· IPMA Organisational Competence Baseline International Project Management Association (2016). 112 pages.</li> <li>· Nexus™ Guide Schwaber, K. (2015). Scrum.org, Boston, MA, USA, 11 pages.</li> <li>· Phillips, J. (2010): IT Project Management. On Track from Start to Finish. 3. Auflage, McGraw-Hill, New York, NY.</li> <li>· Project Management: A Systems Approach to Planning, Scheduling, and Controlling Kerzner, H. (2017). Wiley &amp; Sons, Hoboken, NJ, USA, 12th Ed., 848 pages.</li> <li>· Project Management: A Managerial Approach Meredith, J.R., Mantel, S.J. (2015). Wiley &amp; Sons, Hoboken, NJ, USA, 9th Ed., 512 pages.</li> <li>· Schwalbe, K. (2010): Information Technology Project Management. 6. Auflage, Course Technology, Independence, KY.</li> <li>· The Scrum Guide™ Schwaber, K., Sutherland (2013). Scrum.org, Boston, MA, USA, 16 pages.</li> </ul>



**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
------------------------------------------	--------------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format myStudies**

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Project: Software Engineering

Module Code: DLBCSPSE

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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<b>Module Coordinator</b> N.N. (Project: Software Engineering)
-------------------------------------------------------------------

<b>Contributing Courses to Module</b>
· Project: Software Engineering (DLBCSPSE01)

<b>Module Exam Type</b>	
<b>Module Exam</b> <u>Study Format: Distance Learning</u> Written Assessment: Project Report <u>Study Format: myStudies</u> Written Assessment: Project Report	<b>Split Exam</b>
<b>Weight of Module</b> see curriculum	

<b>Module Contents</b>
· The knowledge acquired in the computer science modules from study semesters 1-3 is applied in small to medium-sized projects. Implementation is carried out in groups of approximately 3-7 students. Important stages of the software life cycle are covered, and the corresponding artifacts (e.g., specification of requirements, design, implementation, tests, and documentation) are created by the students. The quality assurance of these artefacts is carried out by the tutor and by students from other project groups. The students should learn about both the creation and the quality assurance of artefacts in the SW process.

<b>Learning Outcomes</b> <b>Project: Software Engineering</b> On successful completion, students will be able to <ul style="list-style-type: none"><li>· have experience working on a complex project on a practical scenario of industrial SW development.</li><li>· understand the typical risks and pitfalls of large software projects within the framework of project realization and be able to use targeted strategies to minimize risks.</li></ul>	
<b>Links to other Modules within the Study Program</b> This module is similar to other modules in the field(s) of Computer Science & Software Development.	<b>Links to other Study Programs of the University</b> All Bachelor Programmes in the IT & Technology field(s).

## Project: Software Engineering

Course Code: DLBCSPSE01

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

The knowledge acquired in the computer science modules from study semesters 1-3 is applied in small to medium-sized projects. Implementation is carried out in groups of approximately 3-7 students. Important stages of the software life cycle are covered, and the corresponding artifacts (e.g., specification of requirements, design, implementation, tests, and documentation) are created by the students. The quality assurance of these artefacts is carried out by the tutor and by students from other project groups. Students will learn about the creation and the quality assurance of artefacts in the software process.

### Course Outcomes

On successful completion, students will be able to

- have experience working on a complex project on a practical scenario of industrial SW development.
- understand the typical risks and pitfalls of large software projects within the framework of project realization and be able to use targeted strategies to minimize risks.

### Contents

### Literature

### Compulsory Reading

### Further Reading

- none

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
------------------------------------------	-------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Project
----------------------------------	-------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

DLBCSPSE01



## International Marketing

Module Code: DLBDSEIMB1

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Caterina Fox (International Marketing )

### Contributing Courses to Module

- International Marketing (DLBDSEIMB01)

### Module Exam Type

#### Module Exam

Study Format: myStudies  
Exam, 90 Minutes

Study Format: Distance Learning  
Exam, 90 Minutes

#### Split Exam

### Weight of Module

see curriculum

### Module Contents

- International marketing strategy
- Cultural differences and their significance for marketing
- International marketing mix (product, price, promotion, and distribution decisions in an international environment)
- International market research and consumer behavior
- Ethical aspects in international marketing
- International marketing controlling and six sigma

**Learning Outcomes****International Marketing**

On successful completion, students will be able to

- understand basic aspects of international strategic marketing.
- analyze cultural differences and their impact on international marketing.
- apply selected concepts of the international marketing mix.
- describe the possibilities of international market research and its influence on consumer behavior.
- recognize the necessity of international brand controlling and quality management.
- reproduce theoretical knowledge using case studies.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Marketing & Sales

**Links to other Study Programs of the University**

All Bachelor Programmes in the Marketing & Communication fields

# International Marketing

Course Code: DLBDSEIMB01

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

## Course Description

Students are taught the necessity for strategic marketing in an international context. They will learn about essential cultural differences and their influences on international marketing management. The basic decisions, standardizations, and adaptations in international marketing are experienced by the students on the basis of different concepts in the international marketing mix. The necessity of international market research, strategic planning, and control are taught to the students, along with the ethical aspects in international marketing. The students analyze current topics in international marketing management and reflect on them in connection with the concepts they have learned in this course.

## Course Outcomes

On successful completion, students will be able to

- understand basic aspects of international strategic marketing.
- analyze cultural differences and their impact on international marketing.
- apply selected concepts of the international marketing mix.
- describe the possibilities of international market research and its influence on consumer behavior.
- recognize the necessity of international brand controlling and quality management.
- reproduce theoretical knowledge using case studies.

## Contents

1. Strategic International Marketing
  - 11 Internationalization
  - 12 Theoretical Foundations of International Market Entry Strategies
  - 13 Forms of International Market Entry
2. Cultural Differences as an Aspect of International Marketing
  - 21 Overview of Culture
  - 22 Cultural Model Based on Hofstede
  - 23 Cultural Model Based on Trompenaars

3.	Case Studies in International Market Entry and Marketing Strategies
31	Case Study: Nivea in South Korea
32	Case Study: Bosch and Siemens Hausgeräte GmbH in China
33	Case Study: Siemens Mobile in China
34	Case Study: Siemens in China
4.	International Product Management and Product Development
41	Goals of International Product Management
42	Framework Conditions for International Product Management
43	International Product Decisions
44	International Product Development
5.	Exchange Rate Fluctuations and International Price Calculation
51	Tasks and Objectives of International Price Management
52	Factors Influencing International Price Management
53	Instruments of International Price Management
6.	International Communication and International Sales Policy
61	International Communication Management
62	International Sales Management
7.	International Marketing and Ethics
71	Overview of International Marketing and Ethics
72	Business Ethics in International Companies
73	Case Study: Nestlé
8.	Applied Market Research and Its Influence on Consumer Behavior
81	Scope of International Market Research
82	Requirements for International Market Research Information
83	International Secondary Research
84	International Primary Research
9.	Monitoring and Control in International Marketing
91	Controlling in International Management
10.	Six Sigma, Brand Management, and Rebranding
101	Six Sigma: Basics, Definitions, and Processes
102	Brand Management
103	Rebranding

**Literature****Compulsory Reading****Further Reading**

- Armstrong, G., Kotler, P., & Opresnik, M. O. (2019). *Marketing: An introduction* (14th ed.). Pearson.
- Green, M. C., & Keegan, W. J. (2020). *Global marketing* (10th ed.). Pearson.
- Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations—Software of the mind: Intercultural cooperation and its importance for survival*. McGraw-Hill.
- Hollensen, S. (2020). *Global marketing* (8th ed.). Pearson.
- Mooij, M. (2018). *Global marketing and advertising: Understanding cultural paradoxes* (5th ed.). Sage Publications.

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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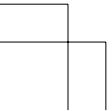
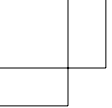
<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

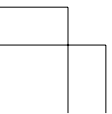
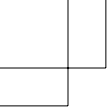
<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBDSEIMB01

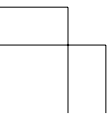
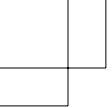






# 5. Semester

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# Principles of Management

Module Code: DLBBAPM\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Markus Prandini (Principles of Management)

## Contributing Courses to Module

- Principles of Management (DLBBAPM01\_E)

## Module Exam Type

### Module Exam

Study Format: myStudies  
Written Assessment: Case Study  
Study Format: Distance Learning  
Written Assessment: Case Study

### Split Exam

## Weight of Module

see curriculum

## Module Contents

- Management Functions
- Managerial Decision-Making
- Planning and Goal-Setting
- Strategic Planning
- Organizing
- Leading
- Controlling

<p><b>Learning Outcomes</b></p> <p><b>Principles of Management</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· understand the functions, roles and influencing-factors of management.</li> <li>· explain the decision-making process.</li> <li>· discuss basic corporate and competitive strategies.</li> <li>· analyze organizational structures and designs.</li> <li>· transfer knowledge about basic principles of management to real-world cases.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Business Administration &amp; Management</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the Business &amp; Management fields</p>

# Principles of Management

Course Code: DLBBAPM01\_E

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

## Course Description

In the fast-changing and complex environment of today's business world the economic survival and success of an organization depends highly on its management. For future managers it is indispensable to be familiar with the fundamental principles of management as the basis for the development of further managerial knowledge and skills. This course introduces necessary functions, roles and skills for managers and their decision-making process. Furthermore, it discusses the basic managerial functions of planning, organizing, leading and controlling in detail.

## Course Outcomes

On successful completion, students will be able to

- understand the functions, roles and influencing-factors of management.
- explain the decision-making process.
- discuss basic corporate and competitive strategies.
- analyze organizational structures and designs.
- transfer knowledge about basic principles of management to real-world cases.

## Contents

1. Introduction to Management
  - 11 Functions, Roles and Skills of Managers
  - 12 Influencing Factors on Managers' Tasks
  - 13 History of Management
2. Managerial Decision-Making
  - 21 Decision-Making Process
  - 22 Approaches to Decision Making
  - 23 Types of Decisions and Decision-Making Conditions
3. Planning and Goal-Setting
  - 31 The Role of Planning
  - 32 Goals and Plans
  - 33 Setting Goals and Developing Plans

4.	Strategic Planning
41	Strategic Management
42	The Strategic Management Process
43	Corporate Strategies
44	Competitive Strategies
5.	Organizing
51	Organizational Structures and Design
52	Organizational Change
53	Managing Change
6.	Leading
61	Interpersonal and Organizational Communication
62	Organizational Behavior
63	Leadership
7.	Controlling
71	The Control Process
72	Tools for Measuring Organizational Performance

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"><li>• Bright, D. S., Cortes, A. H., Hartmann, E., Parboteeah, K. P., Pierce, J. L., Reece, M., Shah, A., Terjesen, S., Weiss, J., White, M. A., Gardner, D. G., Lambert, J., Leduc, L. M., Leopold, J., Muldoon, J., &amp; O'Rourke, J. S. (2019). Principles of management. OpenStax.</li><li>• Robbins, S. P., &amp; Coulter, M. (2018). Management (global ed., 14th ed.). Pearson.</li></ul>



## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Case Study
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Case Study

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Case Study
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Case Study

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

# Digital Business Models

Module Code: DLBLODB\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Mario Boßlau (Digital Business Models)

## Contributing Courses to Module

- Digital Business Models (DLBLODB01\_E)

## Module Exam Type

### Module Exam

Study Format: Distance Learning  
Exam, 90 Minutes

Study Format: myStudies  
Exam, 90 Minutes

### Split Exam

## Weight of Module

see curriculum

## Module Contents

- Meaning, origin and definition of the term "digital business model"
- Basic concepts for the description of business models
- Tools for the description of business models
- Patterns of digital business models
- Digital business models and business plans

**Learning Outcomes****Digital Business Models**

On successful completion, students will be able to

- understand what a business model is and how to describe it systematically.
- outline the basic features of the historical development of business models.
- describe key digital business models and evaluate their advantages and disadvantages.
- establish the relationship between a business model and a business plan to independently derive and analyse the positioning of a company.

**Links to other Modules within the Study Program**

This module is similar to other modules in the Business Administration and Management fields

**Links to other Study Programs of the University**

All Bachelor Programmes in the Business & Management fields

## Digital Business Models

Course Code: DLBLODB01\_E

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

### Course Description

A business model contains the depiction of the logic of how a company generates, delivers and secures value. The progressing digitalization of many processes, products and services has made possible a large number of innovations in the area of business models in recent years. The subject of this course rounds up the presentation, the underlying patterns and the main factors that influence these digital business models. Starting from a general definition of the concept of a business model, a system is developed to describe the essential factors of a business model. An overview of the historical development of important business models and in particular the influence of digitization on newer business models allows a classification of the concept and an understanding of the framework. Then the most important alternative digital business models of recent years are systematically presented, analyzed and evaluated with regard to their respective strengths and weaknesses. Finally, the role of business models in the creation process of a business plan is described. Students learn the central approaches to developing an independent corporate positioning and are enabled to examine and evaluate the central factors influencing corporate success in digital business.

### Course Outcomes

On successful completion, students will be able to

- understand what a business model is and how to describe it systematically.
- outline the basic features of the historical development of business models.
- describe key digital business models and evaluate their advantages and disadvantages.
- establish the relationship between a business model and a business plan to independently derive and analyse the positioning of a company.

### Contents

1. Meaning, Origin and Definition of the Term "Digital Business Model"
  - 11 Goals and Functions of Digital Business Models
  - 12 Business Model - Origin of the Term and its Meaning in the Digital Economy
  - 13 Definition of the terms Business Model and Digital Business Model
  - 14 Differentiation from Other Terminologies of the Digital Economy

2.	Basic Concepts for the Description of Business Models
21	Value Chain by Porter
22	Value-added Chain
23	Dominant Logic
24	Revenue Model
25	Unique Selling Proposition
26	Transaction
27	Product or Service Range
3.	Tools for the Description of Business Models
31	Business Model Canvas
32	St. Gallen Business Model Navigator
33	MIT Framework
4.	Patterns of Digital Business Models
41	Long Tail
42	Multi-Sided Pattern
43	Free and Freemium
44	OPEN API Pattern
5.	Digital Business Models and Business Plans
51	Integration of the Business Model into the Business Plan
52	Company Positioning and the Digital Business Model
53	Digital Business Models as Innovation Drivers for the Development of New Businesses

<b>Literature</b>
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<b>Compulsory Reading</b>
---------------------------

<b>Further Reading</b>
------------------------

- Brynjolfsson, E./Hu, Yu J./Smith, M. D. (2006): From Niches to Riches. Anatomy of the Long Tail. In: MIT Sloan Management Review, volume 47, Magazine 4, p. 67-71.
- Osterwalder, A./Pigneur, Y. (2010): Business Modell Generation. Wiley, Hoboken (NJ).

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
----------------------------------	-------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



## Seminar: Software Engineering

Module Code: ISSE\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

N.N. (Seminar: Software Engineering)

### Contributing Courses to Module

- Seminar: Software Engineering (ISSE01\_E)

### Module Exam Type

#### Module Exam

Study Format: myStudies

Written Assessment: Research Essay

Study Format: Distance Learning

Written Assessment: Research Essay

#### Split Exam

### Weight of Module

see curriculum

### Module Contents

The seminar deals with current topics in software engineering. Participants are required to formulate a research question pertaining to a selected topic and present the findings in the form of a written paper.

**Learning Outcomes****Seminar: Software Engineering**

On successful completion, students will be able to

- independently familiarize themselves with a given topic from the field of "Software Engineering".
- outline important characteristics, connections and findings in the form of a written assignment.
- present the results obtained in their independent work in the form of a written document.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Computer Science & Software Development

**Links to other Study Programs of the University**

All Bachelor Programs in the IT & Technology fields

## Seminar: Software Engineering

Course Code: ISSE01\_E

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

In this seminar, students write a seminar paper on a specific topic and present their results. In this way, students demonstrate the ability to independently familiarize themselves with a software engineering topic and document and present the knowledge gained in a structured manner.

### Course Outcomes

On successful completion, students will be able to

- independently familiarize themselves with a given topic from the field of "Software Engineering".
- outline important characteristics, connections and findings in the form of a written assignment.
- present the results obtained in their independent work in the form of a written document.

### Contents

- The seminar deals with current topics in software engineering. Participants are required to formulate a research question pertaining to a selected topic and present the findings in the form of a written paper.

### Literature

#### Compulsory Reading

#### Further Reading

- Booth, W. C. (2018): *Manual for Writers of Research Papers, Theses, and Dissertations: Chicago Style for Students and Researchers (Chicago Guides to Writing, Editing, and Publishing)*. 9th Edition, University of Chicago Press, Chicago, IL.
- Ford, N. (2020): *Fundamentals of Software Architecture: An Engineering Approach. A Comprehensive Guide to Patterns, Characteristics, and Best Practices*. O'Reilly, Sebastopol, CA.
- Martin, R. C. (2008): *Clean Code: A Handbook of Agile Software Craftsmanship (Robert C. Martin Series)*. 1st Edition, Prentice Hall, Upper Saddle River, NJ.
- Martin, R. C. (2017): *Clean Architecture: A Craftsman's Guide to Software Structure and Design (Robert C. Martin Series)*. 1st Edition, Pearson, London.
- Zobel, J. (2015): *Writing for Computer Science*. 3rd Edition, Springer, Berlin.

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Seminar
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Research Essay

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Seminar
------------------------------------------	-------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Research Essay

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

ISSE01\_E

# Organizational Behavior

Module Code: DLBBWOB\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Katharina Rehfeld (Organizational Behavior)

## Contributing Courses to Module

- Organizational Behavior (DLBBWOB01\_E)

## Module Exam Type

### Module Exam

Study Format: myStudies  
Written Assessment: Case Study  
Study Format: Distance Learning  
Written Assessment: Case Study

### Split Exam

## Weight of Module

see curriculum

## Module Contents

- Relevance and Importance of Organizational Behavior
- Job Performance
- Commitment
- Organisational Mechanisms
- Group-Related Mechanisms
- Individual Mechanisms
- Individual Characteristics

**Learning Outcomes****Organizational Behavior**

On successful completion, students will be able to

- establish commitment and performance as the critical dependent variables.
- explain organizational, group-related and individual mechanisms in Organizational Behavior and describe their relation to commitment and performance.
- explain the influence of individual characteristics on individual mechanisms (such as satisfaction, stress, motivation, trust and decision-making).

**Links to other Modules within the Study Program**

This module is similar to other modules in the field of Human Resources

**Links to other Study Programs of the University**

All Bachelor Programmes in the Human Resources field



# Organizational Behavior

Course Code: DLBBWOB01\_E

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

## Course Description

Many decisions are not made solely on the basis of financial or revenue-based considerations, but due to personal agendas, personal preferences or internal competition. This course consequently aims to provide an accessible, theory-driven comprehension of behaviour, interactions and conflicts in organisations. The course deals intensively with the psychological, sociological and anthropological foundations and dynamics in organizations. Starting from the two most critical behavioral variables in the work context, performance and commitment, units and settings that have a significant influence on them are discussed. In detail, organizational, group-related and individual mechanisms as well as individual characteristics are explored as explanatory objects. The course continues with a discussion on corporate culture and organisational structure within the framework of the organisational mechanisms. In the context of group-related mechanisms, the course aims to identify aspects of leadership styles, power structures, negotiation strategies, group dynamics and heterogeneity. Individual mechanisms include job satisfaction, stress, motivation, fairness, trust and decision-making. The individual characteristics (abilities and personality) in turn have an effect on these aforementioned elements.

## Course Outcomes

On successful completion, students will be able to

- establish commitment and performance as the critical dependent variables.
- explain organizational, group-related and individual mechanisms in Organizational Behavior and describe their relation to commitment and performance.
- explain the influence of individual characteristics on individual mechanisms (such as satisfaction, stress, motivation, trust and decision-making).

## Contents

1. Introduction to Organizational Behavior
  - 11 Attitudes and Behavior as Determinants of Performance and Commitment
  - 12 Organizational Mechanisms
  - 13 Group-related Mechanisms
  - 14 Individual Characteristics
  - 15 Individual Mechanisms

## 2. Target Figures: Performance and Commitment

21 Performance

22 Commitment

## 3. Organizational Mechanisms

31 Corporate Structure

32 Corporate Culture

## 4. Group-Related Mechanisms

41 Management Styles

42 Power Structures

43 Negotiation Strategies

44 Team Dynamics

45 Diversity

## 5. Individual Characteristics

51 Skill and Intellect

52 Personality

## 6. Individual Mechanisms

61 Job Satisfaction

62 Stress

63 Motivation

64 Trust

65 Integrity

66 Learning and Decision-Making

**Literature****Compulsory Reading****Further Reading**

- Colquitt, J., Lepine, J. A., & Wesson, M. J. (2018). *Organizational behavior: Improving performance and commitment in the workplace* (6th ed.). McGraw-Hill Irwin.
- Cross, C., & Carbery, R. (2016). *Organizational behavior: An introduction*. Macmillan Education.
- Luthans, F., Luthans, B. C., & Luthans, K. W. (2015). *Organizational behavior: An evidence-based approach* (13th ed.). Information Age Publishing.
- Robins, S. P., & Judge, T. A. (2016). *Organizational behavior*. Prentice Hall International.

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Case Study
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Case Study

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Case Study
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Case Study

<b>Student Workload</b>					
<b>Self Study</b> 110 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 20 h	<b>Self Test</b> 20 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

# Salesforce Platform Development

Module Code: DLSFPD

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

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

## Contributing Courses to Module

- Salesforce Platform App Builder (DLSFPD01)
- Salesforce Platform Developer (DLSFPD02)

## Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b>  <u>Salesforce Platform App Builder</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Written Assessment: Project Report</li> </ul> <u>Salesforce Platform Developer</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Oral Project Report</li> </ul>
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**Weight of Module**  
see curriculum

<p><b>Module Contents</b></p> <p><b>Salesforce Platform App Builder</b></p> <p>Using the learning platform Trailhead students will learn the fundamentals of Salesforce. At the end of the course, the students will be able to design, build and deploy custom applications. This course prepares them for the Salesforce Platform App Builder Certification.</p> <p><b>Salesforce Platform Developer</b></p> <p>Using the learning platform Trailhead students will learn how to develop own applications, built from various parts of the Salesforce platform. At the end of the course they will be able to use Apex, Visualforce and basic Lightning components. This course prepares the students for the Salesforce Platform Developer I Certification.</p>	
<p><b>Learning Outcomes</b></p> <p><b>Salesforce Platform App Builder</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· define what Salesforce and customer relationship management is,</li> <li>· design the data model, user interface, and business logic for custom applications,</li> <li>· customize applications for mobile use,</li> <li>· design reports and dashboards,</li> <li>· manage application security and deploy custom applications.</li> </ul> <p><b>Salesforce Platform Developer</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· develop own applications using Apex and basic Lightning components,</li> <li>· write SOSL, SOQL and DML statements,</li> <li>· use Visualforce to build custom user interfaces for mobile and web apps,</li> <li>· build reusable, performant components that follow modern web standards,</li> <li>· use the built-in testing framework to test Apex and Visualforce.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the field of Marketing &amp; Sales</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the Marketing &amp; Communication field</p>

# Salesforce Platform App Builder

Course Code: DLSFPD01

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

## Course Description

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

## Course Outcomes

On successful completion, students will be able to

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

## Contents

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

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b> <ul style="list-style-type: none"><li>· Gupta, R. (2019): Salesforce Platform App Builder Certification. A Practical Study Guide. 1st ed., Apress.</li><li>· Weinmeister, P. (2019): Practical Salesforce Development Without Code. Building Declarative Solutions on the Salesforce Platform. 2nd ed., Apress, Berkeley.</li><li>· Shaalan, S. (2020): Salesforce for Beginners. A step-by-step guide to creating, managing, and automating sales and marketing processes. Packt Publishing, Birmingham.</li><li>· Benioff, M./Langley, M. (2019): Trailblazer. The Power of Business as the Greatest Platform for Change. 1st ed.</li></ul>



**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

## Salesforce Platform Developer

Course Code: DLSFPD02

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

### Course Description

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

### Course Outcomes

On successful completion, students will be able to

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

### Contents

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

### Literature

#### Compulsory Reading

#### Further Reading

- Salesforce (2020): Developer Documentation. (URL: <https://developer.salesforce.com/docs/> [accessed: 12.12.2020])

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Oral Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

DLSFPD02

# Mobile Software Engineering

Module Code: DLBCSEMSE

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

N.N. (Mobile Software Engineering I) / N.N. (Mobile Software Engineering II)

## Contributing Courses to Module

- Mobile Software Engineering I (DLBCSEMSE01)
- Mobile Software Engineering II (DLBCSEMSE02)

## Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b> <u>Mobile Software Engineering I</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <u>Mobile Software Engineering II</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Written Assessment: Project Report</li> </ul>
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## Weight of Module

see curriculum

**Module Contents****Mobile Software Engineering I**

- Basics of mobile software development
- Android system architecture
- Development environment
- Core components of an Android app
- Interaction between application components
- Advanced techniques

**Mobile Software Engineering II**

Conception, implementation, and documentation of small, mobile applications on the basis of a concrete task.

**Learning Outcomes****Mobile Software Engineering I**

On successful completion, students will be able to

- recognize the differences and peculiarities of software development for mobile systems and explain them.
- differentiate between different activities, roles, and risks in the creation, operation, and maintenance of mobile software systems.
- explain and differentiate between the architecture and technical features of the Android platform.
- independently create mobile software systems to solve concrete problems for the “Android” platform.

**Mobile Software Engineering II**

On successful completion, students will be able to

- independently design and create a prototype of a small mobile application to solve a specific problem.
- recognize typical problems and challenges in the practical implementation of small mobile applications.
- document the conception and implementation of small, independently designed and implemented mobile applications.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Computer Science & Software Development

**Links to other Study Programs of the University**

All Bachelor Programs in the IT & Technology fields

# Mobile Software Engineering I

Course Code: DLBCSEMSE01

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

## Course Description

Using the mobile platform "Android" as an example, it will be demonstrated how the programming of mobile applications (apps) differs from the development of browser-based information systems, which technologies and programming concepts are typically used, and which typical challenges there are in app development for industrial applications.

## Course Outcomes

On successful completion, students will be able to

- recognize the differences and peculiarities of software development for mobile systems and explain them.
- differentiate between different activities, roles, and risks in the creation, operation, and maintenance of mobile software systems.
- explain and differentiate between the architecture and technical features of the Android platform.
- independently create mobile software systems to solve concrete problems for the "Android" platform.

## Contents

1. Basics of Mobile Software Development
  - 11 Special Features of Mobile Devices
  - 12 Special Features of Mobile Software Development
  - 13 Classification of Mobile Devices
  - 14 The Android Platform
2. Android System Architecture
  - 21 The Android System
  - 22 Safety and Security
  - 23 Communication with Networks

- |    |                                              |
|----|----------------------------------------------|
| 3. | Development Environment                      |
| 31 | Android Studio                               |
| 32 | First App and Emulator Test                  |
| 33 | Application Deployment                       |
| 4. | Core Components of an Android App            |
| 41 | Overview of the Components of an Android App |
| 42 | Activities, Layouts, and Views               |
| 43 | Resources                                    |
| 44 | Summary in an App                            |
| 45 | Graphic Design                               |
| 5. | Interaction Between Application Components   |
| 51 | Intents                                      |
| 52 | Services                                     |
| 53 | Broadcast Receiver                           |
| 6. | Advanced Techniques                          |
| 61 | Threading                                    |
| 62 | Application Memory                           |

<b>Literature</b>
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<b>Compulsory Reading</b>
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<b>Further Reading</b>
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| <ul style="list-style-type: none"> <li>• Becker, A./Pant, M. (2015): Android 5. Programmieren für Smartphones und Tablets. 4. Auflage, dpunkt.verlag, Heidelberg.Eason, J. (2014): Android Studio 1.0. (URL: <a href="https://android-developers.googleblog.com/2014/12/android-studio-10.html">https://android-developers.googleblog.com/2014/12/android-studio-10.html</a>)</li> <li>• Eason, J. (2014): Android Studio 1.0. (URL: <a href="https://android-developers.googleblog.com/2014/12/android-studio-10.html">https://android-developers.googleblog.com/2014/12/android-studio-10.html</a> [letzter Zugriff: 12.06.2015]).</li> <li>• Franke, F./Ippen, J. (2012): Apps mit HTML5 und CSS3. Galileo Computing, Bonn.</li> <li>• Google Inc. (Hrsg.) (2015): Android Developer Guide. (URL: <a href="http://developer.android.com/guide">http://developer.android.com/guide</a>) [letzter Zugriff: 12.06.2015]).</li> <li>• Google Inc. (Hrsg.) (2015): App Components. (URL: <a href="http://developer.android.com/guide/components/index.html">http://developer.android.com/guide/components/index.html</a> [letzter Zugriff: 12.06.2015]).</li> <li>• Google Inc. (Hrsg.) (2015): Installing the Android SDK. (URL: <a href="http://developer.android.com/sdk/installing/index.html">http://developer.android.com/sdk/installing/index.html</a>[letzter Zugriff: 13.05.2015]).</li> <li>• Google Inc. (Hrsg.) (2015): Resources Overview. (URL: <a href="http://developer.android.com/guide/topics/resources/overview.html">http://developer.android.com/guide/topics/resources/overview.html</a>[letzter Zugriff: 12.06.2015]).</li> </ul> |
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## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Mobile Software Engineering II

Course Code: DLBCSEMSE02

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

Using the knowledge gained in the course "Mobile Software Engineering using the Android platform as an example", students independently create a mobile application and document its conception and implementation.

### Course Outcomes

On successful completion, students will be able to

- independently design and create a prototype of a small mobile application to solve a specific problem.
- recognize typical problems and challenges in the practical implementation of small mobile applications.
- document the conception and implementation of small, independently designed and implemented mobile applications.

### Contents

- Conception, implementation, and documentation of small, mobile applications on the basis of a concrete task. Possible topics are, for example:
- A radio app to improve the exchange between listeners and stations in general, and listeners and radio presenters in particular.
- An app that allows a group of board game fans to better organize their regular evening game.
- An app that these supervisors at IUBH can use to improve their supervision processes.

**Literature****Compulsory Reading****Further Reading**

- Eason, J. (2014): Android Studio 1.0. (URL: <http://android-developers.blogspot.de/2014/12/android-studio-10.html> [letzter Zugriff: 12.06.2015]).
- Google Inc. (Hrsg.) (2015): Android Developer Guide. (URL: <http://developer.android.com/guide>)
- Google Inc. (Hrsg.) (2015a): App Components. (URL: <http://developer.android.com/guide/components/index.html> [letzter Zugriff: 12.06.2015]).
- Google Inc. (Hrsg.) (2015b): Installing the Android SDK. (URL: <http://developer.android.com/sdk/installing/index.html> [letzter Zugriff: 13.05.2015]).
- Google Inc. (Hrsg.) (2015c): Resources Overview. (URL: <http://developer.android.com/guide/topics/resources/overview.html> [letzter Zugriff: 12.06.2015]).
- Hipp, Wyrick & Company, Inc. (Hrsg.) (2015): SQLite Webseite. (URL: <http://sqlite.org/index.html> [letzter Zugriff: 12.06.2015]).

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

## IT Service Management

Module Code: DLBCSITSM-01

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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<b>Module Coordinator</b> N.N. (IT Service Management)
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<b>Contributing Courses to Module</b>
· IT Service Management (DLBCSITSM01-01)

<b>Module Exam Type</b>	
<b>Module Exam</b> <u>Study Format: myStudies</u> Exam, 90 Minutes <u>Study Format: Distance Learning</u> Exam, 90 Minutes	<b>Split Exam</b>
<b>Weight of Module</b> see curriculum	

<b>Module Contents</b>
<ul style="list-style-type: none"> <li>· IT Service Management Basics and Terms</li> <li>· ITIL 4 - Basics and Four Dimensions</li> <li>· ITIL 4 - Service Value System</li> <li>· ITIL 4 - Principles</li> <li>· ITIL 4 - Practices</li> <li>· Information Security Management with the IT Baseline Protection Framework of the BSI</li> </ul>

<p><b>Learning Outcomes</b></p> <p><b>IT Service Management</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· identify the fundamentals and challenges of IT service management.</li> <li>· describe the motivation and structure of the IT Infrastructure Library (ITIL), distinguish four dimensions, apply the service value system and identify concrete practices.</li> <li>· describe and apply fundamentals of IT security management.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the field of Computer Science &amp; Software Development.</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the IT &amp; Technology field.</p>

# IT Service Management

Course Code: DLBCSITSM01-01

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

## Course Description

IT service management is an approach to align and understand a company's IT as a service provider and supporter of operational and business processes. This course uses the IT Infrastructure Library (ITIL) to teach concepts, procedures and best practices in the area of IT service management (IT operations). In other words, it looks at the management of activities that take place after an IT system has been developed: IT operations as a continuous run of the productive day-to-day business of a company's IT departments.

## Course Outcomes

On successful completion, students will be able to

- identify the fundamentals and challenges of IT service management.
- describe the motivation and structure of the IT Infrastructure Library (ITIL), distinguish four dimensions, apply the service value system and identify concrete practices.
- describe and apply fundamentals of IT security management.

## Contents

1. IT Service Management Basics and Terms
  - 11 IT Services
  - 12 IT Service Management
  - 13 ITSM Frameworks
2. ITIL 4 - Basics and Four Dimensions
  - 21 Stakeholders, Services and Service Management
  - 22 Value Contribution of IT
3. ITIL 4 - Service Value System
  - 31 Basics and Overview
  - 32 Inputs, Outcome and Governance
  - 33 The Service Value Chain
  - 34 Continual Improvement

4.	ITIL 4 - Principles
41	Overview
42	Value Orientation
43	Iterative Procedure and Feedback
44	Establish Collaboration and Visibility
45	Optimize and Automate
5.	ITIL 4 - Practices
51	Overview
52	General Management Practices
53	Service Management Practices
54	Technical Practices
6.	Information Security Management with the IT Basic Protection Framework of the BSI
61	Structure and Elements of BSI Basic Protection Framework
62	Information Security Process

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"> <li>· Berger, D., &amp; Shashidhar, N., &amp; Varol, C. (2020). Using ITIL 4 in Security Management. 2020 8th International Symposium on Digital Forensics and Security (ISDFS), Digital Forensics and Security (ISDFS), 2020 8th International Symposium On, 1-6. <a href="https://doi-org.pxz.iubh.de/8443/10.1109/ISDFS49300.2020.9116257">https://doi-org.pxz.iubh.de/8443/10.1109/ISDFS49300.2020.9116257</a></li> <li>· Limited, A. (2019). ITIL 4 Foundation [electronic resource] : ITIL 4 Edition. London The Stationery Office Ltd, 2019.</li> <li>· Limited, A. (2020). ITIL 4 [electronic resource] : Digital and IT Strategy. London The Stationery Office Ltd, 2020.</li> <li>· Limited, A. (2020). ITIL 4 [electronic resource] : Direct, Plan and Improve. Norwich TSO, 2020.</li> <li>· Limited, A. (2020). ITIL 4 [electronic resource] : High Velocity IT. Norwich TSO, 2020.</li> <li>· Limited, A. (2020). ITIL 4 [electronic resource] : Drive Stakeholder Value. Norwich TSO, 2020.</li> <li>· Limited, A. (2020). ITIL 4 [electronic resource] : Create, Deliver and Support. Norwich TSO, 2020.</li> </ul>



## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Business Intelligence

Module Code: DLBCSEBI

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimaldauer: 1 Semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Sebastian Werning (Business Intelligence ) / Prof. Dr. Sebastian Werning (Project: Business Intelligence)

### Contributing Courses to Module

- Business Intelligence (DLBCSEBI01)
- Project: Business Intelligence (DLBCSEBI02)

### Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b>  <u>Business Intelligence</u> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <u>Project: Business Intelligence</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Written Assessment: Project Report</li> <li>• Study Format "myStudies": Written Assessment: Project Report</li> </ul>
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### Weight of Module

see curriculum

<p><b>Module Contents</b></p> <p><b>Business Intelligence</b></p> <ul style="list-style-type: none"> <li>· Motivation and Conceptualization</li> <li>· Data Provision</li> <li>· Data Warehouse</li> <li>· Modeling of Multidimensional Data Spaces</li> <li>· Analysis Systems</li> <li>· Distribution and Access</li> </ul> <p><b>Project: Business Intelligence</b></p> <p>Possible topics for the BI project include “Management of BI projects”, “Design of multidimensional data models” and “Prototypical implementation of small BI applications”.</p>	
<p><b>Learning Outcomes</b></p> <p><b>Business Intelligence</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· explain the motivation, use cases, and basics of Business Intelligence.</li> <li>· identify and explain techniques and methods for providing and modeling data, as well as types of data relevant to BI, differentiating between them.</li> <li>· explain techniques and methods for the generation and storage of information and independently select suitable methods on the basis of concrete requirements.</li> </ul> <p><b>Project: Business Intelligence</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· independently design a solution to a practical problem in the field of Business Intelligence in order to then implement a prototype and document the results.</li> <li>· identify and explain typical problems and challenges in the design and practical implementation of small BI solutions.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Computer Science &amp; Software Development</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the IT &amp; Technology fields</p>

# Business Intelligence

Course Code: DLBCSEBI01

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

## Course Description

Business Intelligence (BI) is used to obtain information from company data that is relevant for targeted corporate management and the optimization of business activities. This course introduces and discusses techniques, procedures, and models for data provision, information generation, and analysis, as well the distribution of the information obtained. You will then be able to explain the various subject areas of data warehousing and independently select methods and techniques to meet specific requirements.

## Course Outcomes

On successful completion, students will be able to

- explain the motivation, use cases, and basics of Business Intelligence.
- identify and explain techniques and methods for providing and modeling data, as well as types of data relevant to BI, differentiating between them.
- explain techniques and methods for the generation and storage of information and independently select suitable methods on the basis of concrete requirements.

## Contents

1. Motivation and Conceptualization
  - 11 Motivation and Historical Development
  - 12 BI as a Framework
2. Data Provision
  - 21 Operative and Dispositive Systems
  - 22 The Data Warehouse Concept
  - 23 Architectural Variations
3. Data Warehouse
  - 31 ETL Process
  - 32 DWH and Data Mart
  - 33 ODS and Metadata

**4. Modelling of Multidimensional Data Spaces**

- 41 Data Modeling
- 42 OLAP Cubes
- 43 Physical Storage
- 44 Star and Snowflake Scheme
- 45 Historicization

**5. Analysis Systems**

- 51 Free Data Research and OLAP
- 52 Reporting Systems
- 53 Model-Based Analysis Systems
- 54 Concept-Oriented Systems

**6. Distribution and Access**

- 61 Information Distribution
- 62 Information Access

**Literature****Compulsory Reading****Further Reading**

- Grossmann, W., & Rinderle-Ma, S. (2015). Fundamentals of business intelligence. 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.
- Sherman, R. (2014). Business intelligence guidebook: From data integration to analytics. Morgan Kaufmann.
- Vaisman, A., & Zimányi, E. (2016). Data warehouse systems: Design and implementation. Springer.

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>		
<input type="checkbox"/> Learning Sprints®	<input type="checkbox"/> Review Book	<input type="checkbox"/> Sprint
<input checked="" type="checkbox"/> Course Book	<input type="checkbox"/> Creative Lab	<input type="checkbox"/>
<input type="checkbox"/> Vodcast	<input type="checkbox"/> Guideline	
<input checked="" type="checkbox"/> Shortcast	<input type="checkbox"/> Live Tutorium/Course Feed	
<input checked="" type="checkbox"/> Audio	<input type="checkbox"/> Reader	
<input checked="" type="checkbox"/> Exam Template	<input checked="" type="checkbox"/> Slides	

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



## Project: Business Intelligence

Course Code: DLBCSEBI02

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

Using well-known methods and techniques from the field of Business Intelligence, students will work independently on a practical question in this course. At the end of the course you will be able to independently design and prototype Business Intelligence applications based on concrete requirements.

### Course Outcomes

On successful completion, students will be able to

- independently design a solution to a practical problem in the field of Business Intelligence in order to then implement a prototype and document the results.
- identify and explain typical problems and challenges in the design and practical implementation of small BI solutions.

### Contents

- Implementation and documentation of practical questions regarding the use of Business Intelligence applications. Typical scenarios are, for example, “Management of BI projects”, “Design of multidimensional data models” and “Prototypical implementation of small BI applications”.

### Literature

#### Compulsory Reading

#### Further Reading

- Christoph Meinel, Hasso Plattner, Larry Leifer (2011): Design Thinking: Understand - Improve - Apply; Springer Berlin Heidelberg
- Jeanne Liedtka (2018): Why Design Thinking Works. In: Harvard Business Review, Issue: 2018/09, pp.72-79
- Christoph Meinel, Larry J. Leifer (2021): Design Thinking Research: Interrogating the Doing; Springer International Publishing

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>		
<input type="checkbox"/> Learning Sprints®	<input type="checkbox"/> Review Book	<input type="checkbox"/> Sprint
<input type="checkbox"/> Course Book	<input type="checkbox"/> Creative Lab	<input type="checkbox"/>
<input type="checkbox"/> Vodcast	<input checked="" type="checkbox"/> Guideline	
<input type="checkbox"/> Shortcast	<input type="checkbox"/> Live Tutorium/Course Feed	
<input type="checkbox"/> Audio	<input type="checkbox"/> Reader	
<input type="checkbox"/> Exam Template	<input checked="" type="checkbox"/> Slides	

DLBCSEBIO2

## Foundations of Programming with Python

Module Code: DLBBUEFPP

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Dr. Reza Shahbazfar (Introduction to Programming with Python) / Prof. Dr. Max Pumperla (Object oriented and functional programming in Python)

### Contributing Courses to Module

- Introduction to Programming with Python (DLBDSIPWP01)
- Object oriented and functional programming in Python (DLBDSOOFPP01)

### Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b>  <u>Introduction to Programming with Python</u> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <u>Object oriented and functional programming in Python</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Portfolio</li> <li>• Study Format "myStudies": Portfolio</li> </ul>
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### Weight of Module

see curriculum

**Module Contents****Introduction to Programming with Python**

- Introduction
- Variables and Data Types
- Statements
- Functions
- Errors and Exceptions
- Modules and Packages

**Object oriented and functional programming in Python**

This course introduces the students to the advanced programming concepts of object orientation and functional programming and how they are realized in the Python programming language.

**Learning Outcomes****Introduction to Programming with Python**

On successful completion, students will be able to

- use fundamental Python syntax.
- recollect common elementary data types.
- recognize foundational programming concepts and their realization in Python.
- understand error handling and logging.
- create working programs.
- list the most important libraries and packages for data science.

**Object oriented and functional programming in Python**

On successful completion, students will be able to

- explain basic notions in object-oriented programming such as functions and classes.
- understand object-oriented programming concepts and their relation to software design and engineering.
- describe advanced function concepts in Python.
- recognize important ideas from functional programming.
- recall important libraries for functional programming in Python.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Data Science & Artificial Intelligence

**Links to other Study Programs of the University**

All Bachelor Programs in the IT & Technology fields

# Introduction to Programming with Python

Course Code: DLBDSIPWP01

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

## Course Description

This course provides students with a foundational understanding of the Python programming language. Following an introductory exposition to the importance of Python for data science-related programming tasks, students will be acquainted with fundamental programming concepts like variables, data types, and statements. Building on this basis, the important notion of a function is explained and errors, exception handling, and logging are explicated. The course concludes with an overview of the most widely-used library packages for data science.

## Course Outcomes

On successful completion, students will be able to

- use fundamental Python syntax.
- recollect common elementary data types.
- recognize foundational programming concepts and their realization in Python.
- understand error handling and logging.
- create working programs.
- list the most important libraries and packages for data science.

## Contents

1. Introduction
  - 11 Why Python?
  - 12 Obtaining and installing Python
  - 13 The Python interpreter , IPython, and Jupyter
2. Variables and Data Types
  - 21 Variables and value assignment
  - 22 Numbers
  - 23 Strings
  - 24 Collections
  - 25 Files

3.	Statements
31	Assignment, expressions, and print
32	Conditional statements
33	Loops
34	Iterators and comprehensions
4.	Functions
41	Function declaration
42	Scope
43	Arguments
5.	Errors and Exceptions
51	Errors
52	Exception handling
53	Logs
6.	Modules and Packages
61	Usage
62	Namespaces
63	Documentation
64	Popular data science packages

<b>Literature</b>
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<b>Compulsory Reading</b>
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<b>Further Reading</b>
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- Barry, P. (2016). Head first Python: A brain-friendly guide. Sebastopol, CA: O'Reilly Media, Inc.
- Kapil, S. (2019). Clean Python: Elegant coding in Python. Berkeley, CA: Apress.
- Lubanovic, B. (2019). Introducing Python (2nd ed.). Sebastopol, CA: O'Reilly.
- Lutz, M. (2013). Learning Python (5th ed.). Sebastopol, CA: O'Reilly.
- Matthes, E. (2015). Python crash course: A hands-on, project-based introduction to programming. San Fransisco, CA: No Starch Press.
- Müller, A. C., & Guido, S. (2016). Introduction to machine learning with Python: A guide for data scientists. Sebastopol, CA: O'Reilly Media, Inc.
- Ramalho, L. (2015). Fluent Python: Clear, concise, and effective programming. Sebastopol, CA: O'Reilly.



## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Object oriented and functional programming in Python

Course Code: DLBDSOOFPP01

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

### Course Description

This course builds upon basic knowledge of Python programming (Introduction to Programming with Python, DLBDSIPWP) and is concerned with the exposition of advanced Python programming concepts. To this end, important notions of object-oriented programming like classes and objects and pertaining design principles are outlined. Starting from an in-depth discussion of advanced features of Python functions, functional programming concepts and their implementation in Python are conveyed.

### Course Outcomes

On successful completion, students will be able to

- explain basic notions in object-oriented programming such as functions and classes.
- understand object-oriented programming concepts and their relation to software design and engineering.
- describe advanced function concepts in Python.
- recognize important ideas from functional programming.
- recall important libraries for functional programming in Python.

### Contents

- This course provides students with a thorough introduction to important notions and concepts from the domain of object-oriented programming such as classes, objects, abstraction, encapsulation, inheritance, polymorphism, composition, and delegation. Additionally, the functional programming paradigm and pertaining ideas like functions as first class objects, decorators, pure functions, immutability and higher order functions are conveyed. Pursuant to the portfolio course type, the aforementioned concepts and ideas are explored by hands-on programming projects.

**Literature****Compulsory Reading****Further Reading**

- Lott, S. F. (2018): Functional Python programming: Discover the power of functional programming, generator functions, lazy evaluation, the built-in itertools library, and monads. 2nd ed., Packt Publishing, Birmingham.
- Lutz, M. (2013): Learning Python. 5th ed., O'Reilly, Sebastopol, CA.
- Phillips, D. (2018): Python 3 object-oriented programming: Build robust and maintainable software with object-oriented design patterns in Python 3.8. 3rd ed., Packt Publishing, Birmingham.
- Ramalho, L. (2015): Fluent Python: Clear, concise, and effective programming. O'Reilly, Sebastopol, CA.

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
------------------------------------------	-------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Portfolio

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Portfolio

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Big Data and Cloud Technologies

Module Code: DLBCSEBDCT

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> <ul style="list-style-type: none"> <li>· none</li> <li>· DLBCSDMDS01</li> </ul>	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Christian Müller-Kett (Big Data Technologies) / Prof. Dr. Thomas Zöller (Cloud Computing)

### Contributing Courses to Module

- Big Data Technologies (DLBDSBDT01)
- Cloud Computing (DLBDSCC01)

### Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b>  <u>Big Data Technologies</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> <li>• Study Format "myStudies": Exam, 90 Minutes</li> </ul> <u>Cloud Computing</u> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul>
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### Weight of Module

see curriculum

**Module Contents****Big Data Technologies**

- Data types and data sources
- Text-based and binary data formats
- Distributed systems
- Streaming frameworks
- NoSQL approach to data storage

**Cloud Computing**

- Cloud computing fundamentals
- Relevant enabling technologies for cloud computing
- Introduction to serverless computing
- Established cloud platforms
- Cloud offerings for data science and analytics

**Learning Outcomes****Big Data Technologies**

On successful completion, students will be able to

- name types and sources of data.
- understand text-based and binary data formats.
- analyze the requirements and constraints of distributed analysis systems.
- evaluate the applications of streaming frameworks.
- describe the motivation for NoSQL data stores and categorize pertaining established concepts.

**Cloud Computing**

On successful completion, students will be able to

- understand the fundamentals of cloud computing and cloud service models.
- recognize enabling technologies that underlie current cloud offerings.
- cite the principles of serverless computing.
- analyze characteristics of established cloud offerings.
- describe cloud options for data science and machine learning

**Links to other Modules within the Study Program**

This module is similar to other modules in the field(s) of Computer Science & Software Development.

**Links to other Study Programs of the University**

All Bachelor Programmes in the IT & Technology field(s).



# Big Data Technologies

Course Code: DLBDSBDT01

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> DLBCSDMDS01
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## Course Description

Data are often considered the “new oil”, the raw material from which value is created. To harness the power of data, the data need to be stored and processed on a technical level. This course introduces the four “Vs” of data, as well as typical data sources and types. The course discusses the most common data storage formats encountered in modern systems, focusing both on text-based as well as binary data formats. Handling large amounts of data poses significant challenges for the underlying infrastructure. The course discusses the most important distributed and streaming data handling frameworks which are used in leading edge applications.

## Course Outcomes

On successful completion, students will be able to

- name types and sources of data.
- understand text-based and binary data formats.
- analyze the requirements and constraints of distributed analysis systems.
- evaluate the applications of streaming frameworks.
- describe the motivation for NoSQL data stores and categorize pertaining established concepts.

## Contents

1. Data Types and Data Sources
  - 11 The 4Vs of data: volume, velocity, variety, veracity
  - 12 Data sources
  - 13 Data types
2. Text-Based and Binary Data Formats
  - 21 Simple formats: CSV, YAML
  - 22 XML
  - 23 JSON
  - 24 Hierarchical data format 5 (HDF 5)
  - 25 Apache Parquet
  - 26 Apache Arrow

- |    |                                   |
|----|-----------------------------------|
| 3. | NoSQL data stores                 |
| 31 | Introduction and motivation       |
| 32 | Approaches and technical concepts |
| 4. | Distributed Systems               |
| 41 | Hadoop & MapReduce                |
| 42 | Hadoop file system (HDFS)         |
| 43 | Spark                             |
| 44 | DASK                              |
| 5. | Streaming Frameworks              |
| 51 | Spark streaming                   |
| 52 | Kafka                             |

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"><li>• Karau, H., Konwinski, A., Wendell, A., &amp; Zaharia, M. (2015). Learning spark: Lightning-fast data analysis. Sebastopol, CA: O'Reilly.</li><li>• Kleppmann, M. (2017). Designing data-intensive applications: The big ideas behind reliable, scalable, and maintainable systems. Sebastopol, CA: O'Reilly.</li><li>• Narkhede, N., Shapira, G., &amp; Palino, T. (2017). Kafka: The definitive guide: Real-time data and stream processing at scale. Sebastopol, CA: O'Reilly.</li><li>• Psaltis, A. (2017). Streaming data: Understanding the real-time pipeline. Shelter Island, NY: Manning.</li><li>• White, T. (2015). Hadoop: The definitive guide: Storage and analysis at Internet scale. Sebastopol, CA: O'Reilly.</li></ul>

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>		
<input type="checkbox"/> Learning Sprints®	<input type="checkbox"/> Review Book	<input type="checkbox"/> Sprint
<input checked="" type="checkbox"/> Course Book	<input type="checkbox"/> Creative Lab	<input type="checkbox"/>
<input type="checkbox"/> Vodcast	<input type="checkbox"/> Guideline	
<input checked="" type="checkbox"/> Shortcast	<input type="checkbox"/> Live Tutorium/Course Feed	
<input checked="" type="checkbox"/> Audio	<input type="checkbox"/> Reader	
<input checked="" type="checkbox"/> Exam Template	<input checked="" type="checkbox"/> Slides	

# Cloud Computing

Course Code: DLBDSCC01

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

## Course Description

Many of the recent advances in data science, particularly machine learning and artificial intelligence, rely on comprehensive data storage and computing power. Cloud computing is one way of providing that power in a scalable way, without considerable upfront investment in hardware and software resources. This course introduces the area of cloud computing together with its enabling technologies. Moreover, the most cutting-edge advances like serverless computing and storage are illustrated. Finally, a thorough overview on popular cloud offerings, especially in regard to analytics capabilities, is given.

## Course Outcomes

On successful completion, students will be able to

- understand the fundamentals of cloud computing and cloud service models.
- recognize enabling technologies that underlie current cloud offerings.
- cite the principles of serverless computing.
- analyze characteristics of established cloud offerings.
- describe cloud options for data science and machine learning

## Contents

1. Introduction to Cloud Computing
  - 11 Fundamentals of Cloud computing
  - 12 Cloud Service Models
  - 13 Benefits and Risks
2. Enabling Technology
  - 21 Virtualization and Containerization
  - 22 Storage Technology
  - 23 Networks and RESTful Services
3. Serverless Computing
  - 31 Introduction to Serverless Computing
  - 32 Benefits
  - 33 Limitations

4.	Established Cloud Platforms
41	General Overview
42	Google Cloud Platform
43	Amazon Web Services
44	Microsoft Azure
45	Platform Comparison
5.	Data Science in the Cloud
51	Provider-independent services and tools
52	Google Data Science and Machine Learning Services
53	Amazon Web Services Data Science and Machine Learning Services
54	Microsoft Azure Data Science and Machine Learning Services

#### Literature

#### Compulsory Reading

#### Further Reading

- Chapin, J., & Roberts, M. (2017). What is serverless? Sebastopol, CA: O'Reilly Media.
- Goessling, S., & Jackson, K. L. (2018). Architecting cloud computing solutions. Birmingham: Packt Publishing.
- Kavis, M. J. (2014). Architecting the cloud: Design decisions for cloud computing service models (SaaS, PaaS, and IaaS). Hoboken, NJ: Wiley.
- Mahmood, Z., Puttini, R., & Erl, T. (2013). Cloud computing: Concepts, technology & architecture. Boston, MA: Prentice Hall.
- Rafaels, R. (2018). Cloud computing (2nd ed.). Scotts Valley, CA: CreateSpace Independent Publishing Platform.
- Sehgal, N. K., & Bhatt, P. C. P. (2018). Cloud computing: Concepts and practices. Cham: Springer.
- Zonooz, P. Farr, E., Arora, K., & Laszewski, T. (2018). Cloud native architectures. Birmingham: Packt Publishing.

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



# IT Security

Module Code: DLBROEITS\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Ralf Kneuper (Introduction to Data Protection and Cyber Security) / N.N. (Cryptography)

## Contributing Courses to Module

- Introduction to Data Protection and Cyber Security (DLBCSIDPITS01)
- Cryptography (DLBCSCT01)

## Module Exam Type

### Module Exam

### Split Exam

#### Introduction to Data Protection and Cyber Security

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

#### Cryptography

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

## Weight of Module

see curriculum

**Module Contents****Introduction to Data Protection and Cyber Security**

- Fundamentals of IT Security
- Data Protection
- IT Security Management
- Network and Communication Security

**Cryptography**

- Protection targets, vulnerabilities, and threats
- Foundations of cryptology and its core components
- Basic cryptographic applications
- Authentication
- Single computer security
- Security communication network
- Security E-Commerce
- Secure software development

**Learning Outcomes****Introduction to Data Protection and Cyber Security**

On successful completion, students will be able to

- explain the terms and concepts of IT security and know the typical procedures and techniques which exist in each area.
- cite the legal regulations on data protection and explain their implementation.
- discuss in-depth IT security management and suitable measures for implementation.
- use their overview knowledge of activities and strategies for IT security in software and system development.

**Cryptography**

On successful completion, students will be able to

- give an overview of different classes of cryptographic systems.
- give a basic description of symmetric cryptographic methods, in particular One-Time Pad, DES, and AES, and describe their operating principles by means of simple, concrete examples.
- describe the basic hash functions.
- describe basic asymmetric cryptographic methods, especially RSA, and their operating principles by means of simple, concrete examples.
- describe the areas of application of cryptographic procedures and their application scenarios.

<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Computer Science &amp; Software Development</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the IT &amp; Technology fields</p>
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## Introduction to Data Protection and Cyber Security

Course Code: DLBCSIDPITS01

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

In this course, the students are familiarized with important concepts from the field of IT security. Basic terms are introduced and discussed, and typical application fields, areas of IT security application, and typical procedures and techniques are introduced and described.

### Course Outcomes

On successful completion, students will be able to

- explain the terms and concepts of IT security and know the typical procedures and techniques which exist in each area.
- cite the legal regulations on data protection and explain their implementation.
- discuss in-depth IT security management and suitable measures for implementation.
- use their overview knowledge of activities and strategies for IT security in software and system development.

### Contents

1. Fundamentals of Data Protection and Cyber Security
  - 11 Conceptual Bases, Protection Goals
  - 12 Attacks and Threats
  - 13 Security Strategy
  - 14 Legal Regulations
2. Data Protection
  - 21 Data Protection as a Personal Right
  - 22 Basic Principles of Data Protection
  - 23 EU General Data Protection Regulation
  - 24 Further International Regulations on Data Protection
  - 25 Cross-Border Data Flow
  - 26 Data Protection in Everyday Life

3.	Basic Functions of Cyber Security and Their Implementation
31	Identification and Authentication
32	Rights Management
33	Rights Check
34	Preservation of Evidence
4.	Cyber Security Management
41	Basic Concepts and Standards in Cyber Security Management
42	Series of Standards ISO 2700x
5.	Cyber Security Management in Everyday Life
51	Password Management
52	Data Backup
53	Email Security
54	Protection Against Viruses and Other Malware
55	Protection Against Social Engineering Attacks
6.	Network and Communication Security
61	Firewall Technology
62	Network Separation
63	Security in WLAN, Mobile Networks, Bluetooth, and NFC
7.	Cyber Security in the Development of Software and Systems
71	Protection of the Development Environment
72	Secure Development
73	Common Criteria

#### Literature

#### Compulsory Reading

#### Further Reading

- Arnold, R. (2017). Cybersecurity: A business solution. An executive perspective on managing cyber risk. Threat Sketch.
- Mattord, H., & Whitman, M. (2017). Management of information security. Cengage.
- European Parliament and Council of the European Union. (2016). EU General Data Protection Regulation (GDPR): Regulation 2016/679 of the European Parliament and of the council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation). Official Journal of the European Union. Chapters 1–3

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
------------------------------------------	--------------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

# Cryptography

Course Code: DLBCSCT01

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

## Course Description

This course covers basic and targeted in-depth knowledge of cryptographic processes and the practical use of cryptographic systems. After an overview of cryptographic methods, hash functions, symmetric methods, and asymmetric methods are presented. The theoretical basics of selected procedures are taught and practically explained using simple examples. In addition, areas of application and application scenarios for cryptographic procedures are presented.

## Course Outcomes

On successful completion, students will be able to

- give an overview of different classes of cryptographic systems.
- give a basic description of symmetric cryptographic methods, in particular One-Time Pad, DES, and AES, and describe their operating principles by means of simple, concrete examples.
- describe the basic hash functions.
- describe basic asymmetric cryptographic methods, especially RSA, and their operating principles by means of simple, concrete examples.
- describe the areas of application of cryptographic procedures and their application scenarios.

## Contents

1. Protection Goals, Vulnerabilities, and Threats
  - 11 Protection Goals
  - 12 Vulnerabilities and Threats
2. Foundations of Cryptology and its Core Components
  - 21 Encoding
  - 22 Symmetrical Encryption
  - 23 Asymmetric Encryption
  - 24 One-way Functions and Cryptographic Hash Functions



3. Basic Cryptographic Applications
  - 31 Key exchange and Hybrid Processes
  - 32 Digital Signature
  - 33 Message Authentication Code
  - 34 Steganographic Methods
4. Authentication
  - 41 Passwords and Public-Key-Certificates
  - 42 Challenge-Response-Procedure and Zero-Knowledge-Procedure
  - 43 Biometric Methods
  - 44 Authentication in Distributed Systems
  - 45 Identities Through Smartcards
5. Security of Single Computers
  - 51 Malware and Cookies
  - 52 Some Special Features of Operating Systems
  - 53 Web Server Security
6. Security in Communication Networks
  - 61 Security Problems and Defense Concepts
  - 62 Internet Standards for Communication Security
  - 63 Identity and Anonymity
  - 64 Security in Mobile and Wireless Communications
7. Security in E-Commerce
  - 71 Email Security
  - 72 Online Banking and Online Payments
  - 73 Electronic Money
8. Secure Software Development
  - 81 Threat Modeling
  - 82 Secure Software Design
  - 83 Techniques for Safe Programming

**Literature****Compulsory Reading****Further Reading**

- Baumann, U./Franz, E./Pfitzmann, A. (2014): Kryptographische Systeme. Springer Vieweg, Wiesbaden.
- Beutelspacher, A. (2014): Kryptologie. Eine Einführung in die Wissenschaft vom Verschlüsseln, Verbergen und Verheimlichen. 10. Auflage, Springer Spektrum, Wiesbaden.
- Eckert, C. (2014): IT-Sicherheit. Konzepte - Verfahren - Protokolle. 9. Auflage, De Gruyter Oldenbourg, München.
- Ertel, W. (2010): Angewandte Kryptographie. 4. Auflage, Hanser, München.
- Spitz, S./Pramateftakis, M./Swoboda, J. (2011): Kryptographie und IT-Sicherheit. Grundlagen und Anwendungen. 2. Auflage, Vieweg+Teubner; Wiesbaden.

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

# Logic and Artificial Intelligence

Module Code: DLBBUELAI

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

N. N. (Theoretical Computer Science and Mathematical Logic) / Prof. Dr. Ulrich Kerzel (Artificial Intelligence)

## Contributing Courses to Module

- Theoretical Computer Science and Mathematical Logic (DLBCSTCSML01)
- Artificial Intelligence (DLBDSEAIS01)

## Module Exam Type

<b>Module Exam</b>	<p><b>Split Exam</b></p> <p><u>Theoretical Computer Science and Mathematical Logic</u></p> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <p><u>Artificial Intelligence</u></p> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul>
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## Weight of Module

see curriculum

<p><b>Module Contents</b></p> <p><b>Theoretical Computer Science and Mathematical Logic</b></p> <ul style="list-style-type: none"> <li>· Proposition and predicate logic</li> <li>· Finite automata</li> <li>· Formal languages</li> <li>· Computability and Turing machines</li> <li>· Complexity theory</li> <li>· Petri nets</li> </ul> <p><b>Artificial Intelligence</b></p> <ul style="list-style-type: none"> <li>· chart the historical developments in artificial intelligence.</li> <li>· understand the approach of contemporary AI systems.</li> <li>· comprehend the concepts behind reinforcement learning.</li> <li>· analyze natural language using basic NLP techniques.</li> <li>· scrutinize images and their contents.</li> </ul>	
<p><b>Learning Outcomes</b></p> <p><b>Theoretical Computer Science and Mathematical Logic</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· formulate and translate predicate logical relationships into programming languages.</li> <li>· use finite automata and regular expressions to describe technical facts.</li> <li>· explain the Chomsky hierarchy.</li> <li>· identify the limits of provability and predictability.</li> <li>· explain the meaning and relevance of the P=NP problem.</li> <li>· apply Petri nets for the description of technical facts.</li> </ul> <p><b>Artificial Intelligence</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· chart the historical developments in artificial intelligence.</li> <li>· understand the approach of contemporary AI systems.</li> <li>· comprehend the concepts behind reinforcement learning.</li> <li>· analyze natural language using basic NLP techniques.</li> <li>· scrutinize images and their contents.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Computer Science &amp; Software Development and Data Science &amp; Artificial Intelligence</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the IT &amp; Technology fields</p>

# Theoretical Computer Science and Mathematical Logic

Course Code: DLBCSTCSML01

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

## Course Description

Theoretical computer science and mathematical logic form the theoretical basics of computer science. However, this is not "pure theory", as these fundamentals are applied in many areas of computer science. These include, for example, the formulation of conditions in SQL queries or other programs based on statement and predicate logic, the use of finite state machines to specify systems with state transition diagrams, and the modeling of business and other processes with Petri nets. In addition, theoretical computer science and mathematical logic analyze the limits of computer science and computability, which cannot be exceeded irrespective of the technologies and algorithms used.

## Course Outcomes

On successful completion, students will be able to

- formulate and translate predicate logical relationships into programming languages.
- use finite automata and regular expressions to describe technical facts.
- explain the Chomsky hierarchy.
- identify the limits of provability and predictability.
- explain the meaning and relevance of the P=NP problem.
- apply Petri nets for the description of technical facts.

## Contents

1. Propositional Logic
  - 11 Basic Concepts
  - 12 Calculation Rules and Normal Forms
  - 13 Interpretation and Satisfiability
  - 14 Proof by Contradiction and Resolution
  - 15 Soundness and Completeness
2. Predicate Logic
  - 21 Basic Concepts
  - 22 Resolution in Predicate Logic
  - 23 Completeness and Incompleteness
  - 24 Logic Programming with Prolog

3. Finite Automata and Regular Expressions
  - 31 Basic Concepts of Finite Automata
  - 32 Regular Expressions and Languages
  - 33 Practical Applications
4. Formal Languages and Grammars
  - 41 Basic Concepts
  - 42 The Chomsky Hierarchy
  - 43 Context Free Languages (Type-2 Grammars)
  - 44 Context Sensitive Languages (Type-1 Grammars)
5. Computability and Turing Machines
  - 51 Models of Computability
  - 52 Turing Machines
  - 53 More Models of Computability
  - 54 Computability and Decidability and the Halting Problem
6. Complexity Theory
  - 61 Landau's Big O Notation
  - 62 Basic Concepts of Complexity Theory
  - 63 P=NP?
  - 64 NP-Complete Problems
7. Petri Nets
  - 71 Basic Concepts of Graphs and Petri Nets
  - 72 Modeling Properties of Concurrent Systems
  - 73 Reachability in Petri Nets
  - 74 Invariants in Petri Nets
8. Applications of Mathematical Logic and Theoretical Computer Science
  - 81 Parser and Compiler
  - 82 Program Verification
  - 83 Artificial Intelligence
  - 84 Cryptology



**Literature****Compulsory Reading****Further Reading**

- Dewdney, A.K. (1995): Der Turing Omnibus. Eine Reise durch die Informatik mit 66 Stationen. Springer, Berlin/Heidelberg/New York.
- Erk, K./Priese, L. (2008): Theoretische Informatik. 3. Auflage. Springer eXamen.press, Berlin/Heidelberg.
- Priese, L./Wimmerl, H. (2008): Petri-Netze. 2. Auflage. Springer eXamen.press, Berlin/Heidelberg.
- Schöning, U. (2000): Logik für Informatiker. 5. Auflage. Spektrum Verlag, Heidelberg/ Berlin.
- Schöning, U. (2008): Ideen der Informatik. Grundlegende Modelle und Konzepte der Theoretischen Informatik, 3. Auflage. Oldenbourg, München.

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

# Artificial Intelligence

Course Code: DLBDSEAIS01

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

## Course Description

The quest for artificial intelligence (AI) 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 modern approaches in the development of artificial intelligence. This course gives an introduction to reinforcement learning, a process similar to how humans and animals experience the world: exploring the environment and inferring the best course of action. This course also covers the principles of natural language processing and computer vision, both of which are key ingredients for an artificial intelligence to be able to interact with its environment.

## Course Outcomes

On successful completion, students will be able to

- chart the historical developments in artificial intelligence.
- understand the approach of contemporary AI systems.
- comprehend the concepts behind reinforcement learning.
- analyze natural language using basic NLP techniques.
- scrutinize images and their contents.

## Contents

1. History of AI
  - 11 Historical Developments
  - 12 AI Winter
  - 13 Expert Systems
  - 14 Notable Advances
2. Modern AI Systems
  - 21 Narrow versus General AI
  - 22 Application Areas

3. Reinforcement Learning
  - 31 What is Reinforcement Learning?
  - 32 Markov Chains and Value Function
  - 33 Time-Difference and Q Learning
4. Natural Language Processing (NLP)
  - 41 Introduction to NLP and Application Areas
  - 42 Basic NLP Techniques
  - 43 Vectorizing Data
5. Computer Vision
  - 51 Introduction to Computer Vision
  - 52 Image Representation and Geometry
  - 53 Feature Detection
  - 54 Semantic Segmentation

**Literature****Compulsory Reading****Further Reading**

- Bear, F./Barry, W./Paradiso, M. (2006): Neuroscience: Exploring the brain. 3rd ed., Lippincott Williams and Wilkins, Baltimore, MD:
- Bird S./Klein, E./Loper, E. (2009): Natural language processing with Python. 2nd ed., O'Reilly, Sebastopol, CA.
- Chollet, F. (2017): Deep learning with Python. Manning, Shelter Island, NY.
- Fisher, R. B., et al. (2016) : Dictionary of computer vision and image processing. John Wiley & Sons, Chichester.
- Geron, A. (2017): Hands-on machine learning with Scikit-Learn and TensorFlow. O'Reilly, Boston, MA.
- Goodfellow, I./Bengio, Y./Courville, A. (2016): Deep learning. MIT Press, Boston, MA.
- Grus, J. (2019): Data science from scratch: First principles with Python. O'Reilley, Sebastopol, CA.
- Jurafsky, D./Martin, J. H. (2008): Speech and language processing. Prentice Hall, Upper Saddle River, NJ.
- Nilsson, N. (2009): The quest for artificial intelligence. Cambridge University Press, Cambridge.
- Russell, S./Norvig, P. (2009): Artificial intelligence: A modern approach. 3rd ed., Pearson, Essex.
- Sutton, R./Barto, A. (2018): Reinforcement learning: An introduction. 2nd ed., MIT Press, Boston, MA.
- Szelski, R. (2011): Computer vision: Algorithms and applications. 2nd ed., Springer VS, Wiesbaden.
- Szepesvári, C. (2010): Algorithms for reinforcement learning. Morgan & Claypool, San Rafael, CA.
- Wiering, M./Otterlo, M. (2012): Reinforcement learning: State of the art. Springer, Berlin.

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



# Data Engineer

Module Code: DLBSEDE

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimaldauer: 1 Semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

N.N. (Data Engineering ) / N.N. (Project: Data Engineering)

## Contributing Courses to Module

- Data Engineering (DLBSEDE01)
- Project: Data Engineering (DLBSEDE02)

## Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b> <u>Data Engineering</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <u>Project: Data Engineering</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Portfolio</li> </ul>
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## Weight of Module

see curriculum

**Module Contents****Data Engineering**

- understand important foundational concepts in data engineering.
- recognize established and commonly-employed NoSQL datastores and their salient characteristics.
- comprehend common architectural patterns for data processing at scale.
- explain the concept of containerization as a virtualization approach.
- analyze operational challenges in the set-up and maintenance of data pipelines.
- demonstrate familiarity with concepts relating to data security and protection.

**Project: Data Engineering**

- formulate and implement a real-world data engineering use case.
- select appropriate resources for the task at hand.
- transfer acquired specialized knowledge in data engineering to a real-world use case.
- derive relevant design choices from the given project setting.
- analyze the suitability of different solution options with respect to the project task.
- make apposite choices with respect to implementation alternatives.

**Learning Outcomes****Data Engineering**

On successful completion, students will be able to

- understand important foundational concepts in data engineering.
- recognize established and commonly-employed NoSQL datastores and their salient characteristics.
- comprehend common architectural patterns for data processing at scale.
- explain the concept of containerization as a virtualization approach.
- analyze operational challenges in the set-up and maintenance of data pipelines.
- demonstrate familiarity with concepts relating to data security and protection.

**Project: Data Engineering**

On successful completion, students will be able to

- formulate and implement a real-world data engineering use case.
- select appropriate resources for the task at hand.
- transfer acquired specialized knowledge in data engineering to a real-world use case.
- derive relevant design choices from the given project setting.
- analyze the suitability of different solution options with respect to the project task.
- make apposite choices with respect to implementation alternatives.

**Links to other Modules within the Study Program**

This module is similar to other modules in the field(s) of Data Science & Artificial Intelligence.

**Links to other Study Programs of the University**

All Bachelor Programmes in the IT & Technology field(s).

# Data Engineering

Course Code: DLBDESE01

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

## Course Description

This course explores concepts of data engineering. Data engineering is concerned with the infrastructure aspects of data science such as data storage and provision, as well as the provisioning of suitable operational environments. After laying out foundational notions and concepts of the discipline, this course addresses important developments in storage technology; aspects of systems architecture for processing data at scale; containerization as a modern take on virtualization; and the logic of data pipelines and associated operational aspects. Important issues pertaining to data security and protection are also given appropriate attention.

## Course Outcomes

On successful completion, students will be able to

- understand important foundational concepts in data engineering.
- recognize established and commonly-employed NoSQL datastores and their salient characteristics.
- comprehend common architectural patterns for data processing at scale.
- explain the concept of containerization as a virtualization approach.
- analyze operational challenges in the set-up and maintenance of data pipelines.
- demonstrate familiarity with concepts relating to data security and protection.

## Contents

1. Foundations of Data Engineering
  - 11 Reliability
  - 12 Scalability
  - 13 Maintainability
2. NoSQL In Depth
  - 21 Fundamentals of NoSQL
  - 22 Established NoSQL solutions
3. Architectures for Data Processing at Scale
  - 31 Batch processing architectures
  - 32 Architectures for stream and complex event processing
  - 33 Lambda architecture

- |    |                                         |
|----|-----------------------------------------|
| 4. | Containerization In Depth               |
| 41 | Docker containers                       |
| 42 | Container management                    |
| 5. | Governance & Security                   |
| 51 | Data protection                         |
| 52 | Data security                           |
| 53 | Data governance                         |
| 6. | Operational Aspects                     |
| 61 | Defining principles of DataOps          |
| 62 | Building and maintaining data pipelines |
| 63 | Metrics and monitoring                  |

<b>Literature</b>
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<b>Compulsory Reading</b>
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<b>Further Reading</b>
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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>▪ Kleppmann, M. (2017). <i>Designing data-intensive applications: The big ideas behind reliable, scalable, and maintainable systems</i>. Sebastopol, CA: O'Reilly.</li> <li>▪ Marz, N., &amp; Warren, J. (2015). <i>Big data: Principles and best practices of scalable realtime data systems</i>. Shelter Island, NY: Manning Publications.</li> <li>▪ Matthias, K., &amp; Kane, S. P. (2018). <i>Docker: Up &amp; running (2nd ed.)</i>. Sebastopol, CA: O'Reilly.</li> <li>▪ Miell, I., &amp; Sayers, A. (2019). <i>Docker in practice (2nd ed.)</i>. Shelter Island, NY: Manning Publications.</li> <li>▪ Muhammad, S., &amp; Akhtar, F. (2018). <i>Big data architect's handbook</i>. Birmingham: Packt Publishing.</li> <li>▪ Schenker, G. N. (2018). <i>Learn Docker - Fundamentals of Docker 18.x: Get up and running with the concepts of Docker</i>. Birmingham: Packt Publishing.</li> <li>▪ Wilson, J., Redmond, E., &amp; Perkins, L. (2018). <i>Seven databases in seven weeks (2nd ed.)</i>. Raleigh, NC: Pragmatic Bookshelf.</li> </ul> |
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**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Project: Data Engineering

Course Code: DLBDESE02

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

The focus of this course is the implementation of a real-world data engineering use case in the form of a student portfolio. To this end, students choose a project subject from the various sub-domains of data engineering. Examples include setting up a Docker container environment or dockerized service; implementing a data pipeline according to DataOps principles; and setting up an NoSQL data store. The goal is for students to demonstrate they can transfer theoretical knowledge to an implementation scenario that closely mimics practical work in a professional data engineering setting.

### Course Outcomes

On successful completion, students will be able to

- formulate and implement a real-world data engineering use case.
- select appropriate resources for the task at hand.
- transfer acquired specialized knowledge in data engineering to a real-world use case.
- derive relevant design choices from the given project setting.
- analyze the suitability of different solution options with respect to the project task.
- make apposite choices with respect to implementation alternatives.

### Contents

- This course covers the practical implementation of approaches and techniques covered in the preceding methodological course in a project-oriented setting. Each participant must produce a portfolio detailing and documenting the work. Portfolio themes are chosen from a list, or suggested by the students in accord with the tutor.

**Literature****Compulsory Reading****Further Reading**

- Kleppmann, M. (2017). *Designing data-intensive applications: The big ideas behind reliable, scalable, and maintainable systems*. Sebastopol, CA: O'Reilly.
- Marz, N., & Warren, J. (2015). *Big data: Principles and best practices of scalable realtime data systems*. Shelter Island, NY: Manning Publications.
- Matthias, K., & Kane, S. P. (2018). *Docker: Up & running (2nd ed.)*. Sebastopol, CA: O'Reilly.
- Miell, I., & Sayers, A. (2019). *Docker in practice (2nd ed.)*. Shelter Island, NY: Manning Publications.
- Muhammad, S., & Akhtar, F. (2018). *Big data architect's handbook*. Birmingham: Packt Publishing.
- Schenker, G. N. (2018). *Learn Docker - Fundamentals of Docker 18.x: Get up and running with the concepts of Docker*. Birmingham: Packt Publishing.
- Wilson, J., Redmond, E., & Perkins, L. (2018). *Seven databases in seven weeks (2nd ed.)*. Raleigh, NC: Pragmatic Bookshelf.

Study Format Distance Learning

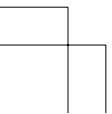
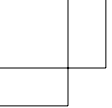
<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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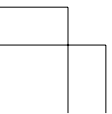
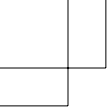
<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Portfolio

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

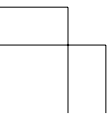
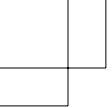






# 6. Semester

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## Applied Sales

Module Code: DLBDSEAS

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Patrick Geus (Applied Sales I) / Prof. Dr. Patrick Geus (Applied Sales II)

### Contributing Courses to Module

- Applied Sales I (DLBDSEAS01)
- Applied Sales II (DLBDSEAS02)

### Module Exam Type

<b>Module Exam</b>	<p><b>Split Exam</b></p> <p><u>Applied Sales I</u></p> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> <li>• Study Format "myStudies": Exam, 90 Minutes</li> </ul> <p><u>Applied Sales II</u></p> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> <li>• Study Format "myStudies": Exam, 90 Minutes</li> </ul>
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### Weight of Module

see curriculum

### Module Contents

#### Applied Sales I

- Fundamentals of Applied Sales
- The Distribution System
- Personal Sales
- Sales Plans
- New Customer Acquisition
- A Sales Visit
- Conversational Tactics
- Conducting Negotiations
- Other Sales Channels

#### Applied Sales II

- Marketing and Sales
- Customer Satisfaction as a Success Factor
- Personalities in Sales
- Customer-Oriented Communication
- Presentation and Rhetoric
- Customer Loyalty
- Networking
- Case Study

**Learning Outcomes****Applied Sales I**

On successful completion, students will be able to

- understand the fundamentals of applied sales and place them in the context of the company.
- understand the interaction of the individual facets of applied sales.
- differentiate between and evaluate individual sales systems.
- describe current sales types and sales characteristics.
- oversee and classify the entire sales process from customer acquisition to customer retention.
- understand the basics of sales and negotiation management and apply them.
- name the usual sales instruments, recognize their advantages and disadvantages, and reflect on essential fields of application and possibilities.

**Applied Sales II**

On successful completion, students will be able to

- understand the interaction and the respective areas of responsibility of marketing and sales.
- reflect on and classify the goals and measures within the framework of the applied sales system.
- assess the relevance of customer satisfaction and retention. In addition, the students will be familiar with the central design elements of CRM.
- reflect on and assess alternative approaches to customer loyalty and relationship management and apply them in business practice.
- understand the meaning of the terms customer life cycle and customer value, and develop approaches to manage them in the sense of the respective sales targets.
- use descriptive presentation techniques in order to convince customers and other sales partners.
- understand the relevance of networking and develop strategies to broaden the contact base.
- develop and evaluate their own market analyses and sales concepts on the basis of practical experience within the framework of the case study.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Marketing & Sales

**Links to other Study Programs of the University**

All Bachelor Programmes in the Marketing & Communication fields

## Applied Sales I

Course Code: DLBDSEAS01

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

The demands on sales thinking are growing every day. Globalized demand combined with high competition is making it increasingly difficult for companies to compete for customers. At the same time, customers are becoming better informed, while traditional supply markets are saturated and at overcapacity. In order to be successful in such an environment, sales thinking and action are required along with a new type of salesperson. Within the course Applied Sales I (Introduction), the participants are familiarized with the basic concepts of applied sales. You will learn about sales organization, dealing with alternative sales channels, and get to know the dedicated sales planning process. The contents of the module are complemented by the successful acquisition of new customers, whereby particular attention is paid to the organization and implementation of customer visits and the conduct of discussions and negotiations.

### Course Outcomes

On successful completion, students will be able to

- understand the fundamentals of applied sales and place them in the context of the company.
- understand the interaction of the individual facets of applied sales.
- differentiate between and evaluate individual sales systems.
- describe current sales types and sales characteristics.
- oversee and classify the entire sales process from customer acquisition to customer retention.
- understand the basics of sales and negotiation management and apply them.
- name the usual sales instruments, recognize their advantages and disadvantages, and reflect on essential fields of application and possibilities.

### Contents

1. Fundamentals of Applied Sales and Distribution
  - 11 Tasks and Forms of Applied Distribution
  - 12 Marketing as the Basis of Sales
  - 13 Distribution, Sales, and Other Terms
  - 14 Sales in Different Economic Sectors



2. The Distribution System
  - 21 Forms of Sales
  - 22 Sales Organisation
  - 23 Key Account Management
  - 24 Multi-Channel Distribution
3. Personal Sales
  - 31 The "New Sellers"
  - 32 Requirements for Sales Personalities
  - 33 The Key Account Manager
  - 34 Task of Sales Managers
4. Sales Plan
  - 41 Tasks and Objectives of Sales Management
  - 42 Observation of Competition in the Context of Sales Management
  - 43 Potential Analyses and Sales Planning
  - 44 Sales Control and Visit Strategies
5. New Customer Acquisition
  - 51 Identification of New Customer Potential
  - 52 Customer Relationship Management and Customer Acquisition
  - 53 Trade Fairs and Events
  - 54 Networking
6. The Sales Visit
  - 61 Frequency and Preparation of Visits
  - 62 Conduct of a Visit
  - 63 Visit Reports and Follow-Up
  - 64 Aftercare and Follow-Up
7. Conversational Tactics
  - 71 Structured Conversation Preparation
  - 72 Goal-Oriented Conversation: The D.A.L.A.S Model
  - 73 Questioning Techniques

- 8. Conducting Negotiations
  - 81 Psychology of Negotiation
  - 82 Negotiation Structure
  - 83 Objection Handling
  - 84 Price Negotiations
  
- 9. Other Sales Channels
  - 91 Telemarketing
  - 92 Catalogue and Brochure Sales
  - 93 Internet and E-Commerce

**Literature**

**Compulsory Reading**

**Further Reading**

- Bloomfield, J. (2020). NeuroSelling: Mastering the customer conversation using the surprising science of decision making. Axon Publishing.
- Jobber, D., Lancaster, G., & Le Meunier-FitzHugh, K. (2019). Selling and sales management (10th ed.). Pearson.
- Peppers, D., & Rogers, M. (2016). Managing customer experience and relationships: A strategic framework (3rd ed.). Wiley.
- Pink, D. H. (2012). To sell is human: The surprising truth about moving others. Riverhead Books.

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Applied Sales II

Course Code: DLBDSEAS02

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

### Course Description

The course Applied Sales II builds on the basics taught in the course "Applied Sales I" and broadens and deepens them. First, the tension between marketing and sales is examined in more detail. Based on this, essential backgrounds and central target figures for successful sales management (e.g., customer satisfaction and loyalty as well as the customer life cycle) are derived and operationalized in order to create the basis for efficient and effective customer relationship management. As the process progresses, attention will also be paid to mental processes and consumer behavior in general. In addition, strategies and paths to successful negotiation are deepened and supplemented by convincing communication techniques. The course concludes with a case study in the course of which the students have the opportunity to apply what they have learned in a practice-oriented manner.

### Course Outcomes

On successful completion, students will be able to

- understand the interaction and the respective areas of responsibility of marketing and sales.
- reflect on and classify the goals and measures within the framework of the applied sales system.
- assess the relevance of customer satisfaction and retention. In addition, the students will be familiar with the central design elements of CRM.
- reflect on and assess alternative approaches to customer loyalty and relationship management and apply them in business practice.
- understand the meaning of the terms customer life cycle and customer value, and develop approaches to manage them in the sense of the respective sales targets.
- use descriptive presentation techniques in order to convince customers and other sales partners.
- understand the relevance of networking and develop strategies to broaden the contact base.
- develop and evaluate their own market analyses and sales concepts on the basis of practical experience within the framework of the case study.

**Contents**

1. Marketing and Sales
  - 11 Marketing Tasks and Functions
  - 12 Sales Marketing in Different Economic Sectors
  - 13 Relationship Marketing
  - 14 International Marketing and Sales Cooperations
  
2. Customer Satisfaction as a Success Factor
  - 21 Customer Relationship Management (CRM)
  - 22 The CRM Success Chain
  - 23 Customer Relationship Strategies
  
3. Personalities in Sales
  - 31 Sales Personalities and Differentiation
  - 32 Selling in Teams
  - 33 Negotiating With Committees
  
4. Customer-Oriented Communication
  - 41 Communication Tasks in Sales
  - 42 Sales Promotion by Sales Staff
  - 43 Team Sales Promotion
  - 44 Sales Promotion by the Company
  
5. Presentation and Rhetoric
  - 51 Rhetoric in Sales
  - 52 Presentation Techniques
  - 53 Nonverbal Communication
  
6. Customer Loyalty
  - 61 Customer Retention Management
  - 62 Customer Programs and Other Customer Loyalty Tools
  - 63 Complaint Management
  
7. Networking
  - 71 Network Competencies in the Company
  - 72 Building and Shaping Relationships
  - 73 Networking via Social Media

- |                                                      |
|------------------------------------------------------|
| 8. Case Study in IQ Media Marketing                  |
| 81 The Market Situation                              |
| 82 The Marketing Situation                           |
| 83 IQ Media Marketing and IQ Digital Media Marketing |

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"><li>· Jobber, D./Lancaster, G./Le Meunier-Fitzhugh, K. (2019): <i>Selling and Sales Management</i>, 11th Ed.; Pearson</li><li>· Johnston, M.W./Marshall (2021): <i>Sales Force Management: Leadership, Innovation, Technology</i>; Routledge</li><li>· Jordan, J./Vazzana, M. (2011): <i>Cracking the Sales Management Code: The Secrets to Measuring and Managing Sales Performance</i>; 13th Ed.; McGraw Hill</li><li>· Kumar, V./Reinartz, W. (2018): <i>Customer Relationship Management: Concept, Strategy, and Tools</i>; 3rd Ed.; Springer Texts in Business and Economics</li><li>· Marcos, J./Davies, M. (2019): <i>Implementing Key Account Management: Designing Customer-Centric Processes for Mutual Growth</i>; KoganPage</li><li>· Peppers, D./Rogers, M. (2011): <i>Managing Customer Relationships : A Strategic Framework</i>; 2nd Ed.; Wiley</li></ul>

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBDSEAS02

# Supply Chain Management

Module Code: DLBDESCM

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Hubert Vogl (Supply Chain Management I ) / Sebastian Stütz (Supply Chain Management II)

## Contributing Courses to Module

- Supply Chain Management I (DLBDESCM01)
- Supply Chain Management II (DLBDESCM02)

## Module Exam Type

<b>Module Exam</b>	<p><b>Split Exam</b></p> <p><u>Supply Chain Management I</u></p> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <p><u>Supply Chain Management II</u></p> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul>
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## Weight of Module

see curriculum

### Module Contents

#### Supply Chain Management I

- Historical and terminological aspects of the SCM concept
- Motives for the creation of cross-company value creation networks
- Design principles and effects of value creation networks
- Logistical core processes and SCM
- Information technology aspects of the SCM concept
- Coordination and collaboration of the network partners
- Industry-specific solutions of the SCM

#### Supply Chain Management II

- Strategic aspects of SCM
- SCM Practice: Tasks and Activities in the Core Planning Process
- SCM Practice: Tasks and Activities in the Core Process of Procurement
- SCM Practice: Tasks and Activities in the Core Process Production
- SCM Practice: Tasks and Activities in the Core Distribution Process

**Learning Outcomes****Supply Chain Management I**

On successful completion, students will be able to

- explain the importance of cross-company value creation processes.
- understand common concepts for modeling cross-company value creation processes.
- understand dynamic effects in supply chains and can systematize their causes and effects.
- explain important theoretical concepts for describing the characteristics and challenges of cross-company value creation processes.
- explain the approaches and problem categories commonly used in the context of supply chain management.
- understand important reference and/or management models for the concretization of supply chain systems.
- name and detail important roles and tasks in the SCM network.
- deal with the coordination problem of SCM and describe the common solution approaches.

**Supply Chain Management II**

On successful completion, students will be able to

- systematically explain the strategic relevance of enterprise-wide value creation processes.
- understand the most important tasks and problems in the SCM core process planning.
- systematize the elements and interrelationships in the CPFR model in a differentiated way.
- be familiar with the characteristics and peculiarities of contract logistics.
- understand the most important tasks and problems in the SCM core process procurement.
- explain central elements and characteristics of a procurement strategy.
- understand the most important tasks and problems in the SCM core process production.
- explain central elements and characteristics of a modern production strategy.
- understand the most important tasks and problems in the SCM core process distribution.
- explain central elements and characteristics of the so-called ECR concept.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Logistics & Transportation

**Links to other Study Programs of the University**

All Bachelor Programmes in the Transport & Logistics fields

# Supply Chain Management I

Course Code: DLBDESECM01

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

## Course Description

SCM proves to be an extremely multi-faceted construct from both a theoretical and a practical point of view. An adequate understanding of the problem dimensions and modes of action of (global) cross-company value creation networks requires a multidimensional approach. It starts by considering logistical processes, with modern process, flow, and network standards forming an important basis for SCM. On the basis of such an approach, students should gain a fundamental understanding of SCM. From the point of view of a holistic approach, it also makes sense to also examine a number of other typical problem areas in addition to the logistical challenges of this concept. This includes IT aspects of SCM (e.g., APS systems), and questions to do with the collaboration and coordination of network partners. This course also considers selected industry specific SCM solutions (ECR or VMI).

## Course Outcomes

On successful completion, students will be able to

- explain the importance of cross-company value creation processes.
- understand common concepts for modeling cross-company value creation processes.
- understand dynamic effects in supply chains and can systematize their causes and effects.
- explain important theoretical concepts for describing the characteristics and challenges of cross-company value creation processes.
- explain the approaches and problem categories commonly used in the context of supply chain management.
- understand important reference and/or management models for the concretization of supply chain systems.
- name and detail important roles and tasks in the SCM network.
- deal with the coordination problem of SCM and describe the common solution approaches.

## Contents

1. Fundamentals of the Supply Chain Concept
  - 11 Terminological and Conceptual Fundamentals
  - 12 Supply Chain Typology According to Otto
  - 13 Supply Chain Typology According to Bechtel/Jayaram
  - 14 Dynamic Aspects of Supply Chains

- |    |                                                              |
|----|--------------------------------------------------------------|
| 2. | Selected Theoretical Concepts for the Supply Chain Concept   |
| 21 | New Institutional Economics                                  |
| 22 | Game Theory                                                  |
| 23 | Network Approach                                             |
| 24 | Other Theoretical Additions                                  |
| 3. | Supply Chain Management                                      |
| 31 | Basic Information on the Goals and Scope of SCM              |
| 32 | Popular Problem Areas of the SCM                             |
| 33 | Supply Chain Management as an Evolutionary Step in Logistics |
| 34 | Supply Chain Management as Cooperation Management            |
| 4. | SCM Model                                                    |
| 41 | Basic Information on the Term SCM Models                     |
| 42 | SCOR Model                                                   |
| 43 | SCM Task Model                                               |
| 5. | SCM as a Coordination Problem                                |
| 51 | Basic Information on the Concept of Coordination             |
| 52 | Coordination Concepts, Context, and Perspectives of SCM      |
| 53 | Coordination Instruments                                     |

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"> <li>· Bolstorff, P., &amp; Rosenbaum, R. (2011). Supply chain excellence: A handbook for dramatic improvement using the SCOR model. AMACOM.</li> <li>· Bowersox, J., Closs, D., &amp; Cooper, M. B. (2020). Supply chain logistics management (5th ed.). McGraw Hill Education.</li> <li>· Chopra, S., &amp; Meindl, P. (2019). Supply chain management: Strategy, planning, and operation (7th ed., Global ed.). Pearson Education.</li> <li>· Kurbel, K. E. (2013). Enterprise resource planning and supply chain management: Functions, business processes and software for manufacturing companies. Springer.</li> </ul>

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Supply Chain Management II

Course Code: DLBDESCM02

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

### Course Description

From the perspective of strategic management research and practice, the activities covered by the term SCM are closely related to efforts to build and/or maintain a stable operational competitive advantage. A fundamental discussion of this relationship forms the starting point for the course. On this basis, a differentiated analysis of strategy-relevant activities and instruments in the Plan, Source, Make, Deliver, and Return process categories is then carried out using the SCOR model. Special attention is given to the practice-relevant areas of SCM, e.g., order-promising (plan), supplier-relation-management (source), postponement (make), and the ECR-concept (deliver).

### Course Outcomes

On successful completion, students will be able to

- systematically explain the strategic relevance of enterprise-wide value creation processes.
- understand the most important tasks and problems in the SCM core process planning.
- systematize the elements and interrelationships in the CPFR model in a differentiated way.
- be familiar with the characteristics and peculiarities of contract logistics.
- understand the most important tasks and problems in the SCM core process procurement.
- explain central elements and characteristics of a procurement strategy.
- understand the most important tasks and problems in the SCM core process production.
- explain central elements and characteristics of a modern production strategy.
- understand the most important tasks and problems in the SCM core process distribution.
- explain central elements and characteristics of the so-called ECR concept.

### Contents

1. Strategic Aspects of SCM
  - 11 Strategic Thinking and Action: General Information
  - 12 Competition Focus and SCM
  - 13 Competition Location and SCM
  - 14 Competition Rules and SCM

2. SCM Practice: Core Process Planning
  - 21 General Preliminary Considerations
  - 22 Collaborative Planning, Forecasting, and Replenishment
  - 23 Order Promoting
  - 24 Kanban
  - 25 Integration of X-PL Logistics Service Providers
3. SCM Practice: Core Process Procurement
  - 31 General Preliminary Considerations
  - 32 Production Synchronous Procurement
  - 33 Sourcing Concepts
  - 34 Supplier Relations Management
4. SCM Practice: Core Process Production
  - 41 Selected Aspects of the Problem Background
  - 42 Collaborative Engineering
  - 43 Postponement Strategies
  - 44 Value Added Partnership
5. SCM Practice: Core Process Distribution
  - 51 Basic Information on the Distribution Problem
  - 52 Efficient Consumer Response (ECR)
  - 53 Consignment Warehouse

**Literature****Compulsory Reading****Further Reading**

- Bookbinder, J. H. (2013). Handbook of global logistics: Transportation in international supply chains. International series in operations research & management science: Bd. 181. Springer.
- Chopra, S (2019). Supply Chain Management: Strategy, Planning, and Operation, EBook, Global Edition, Pearson Education, Limited. ProQuest Ebook Central.
- Chopra, S. & Meindl, P. (2016). Supply chain management: Strategy, planning, and operation. Always learning. Pearson.
- Christopher, M. (2016). Logistics & supply chain management (Fifth edition). Pearson.
- Ganesan, R. (2015). The profitable supply chain: A practitioner's guide. Apress.
- Grant, D. B. (2012). Logistics management. Pearson.
- Kurbel, K. (2013). Enterprise resource planning and supply chain management: Functions, business processes and software for manufacturing companies. Progress in IS. Springer.
- Pawar, K. S., Rogers, H., Potter, A. & Naim, M. (2015). Developments in Logistics and Supply Chain Management: Past, Present and Future. Palgrave Macmillan.
- Piotrowicz, W. & Cuthbertson, R. (Hrsg.). (2015). Supply chain design and management for emerging markets: Learning from countries and regions. Springer International Publishing.
- Scott, C., Lundgren, H. & Thompson, P. (2018). Guide to Supply Chain Management: An end to end perspective. Management for professionals. Springer.
- Sindi, S. & Roe, M. (2017). Strategic supply chain management: The development of a diagnostic model. Palgrave Macmillan.

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Smart Services

Module Code: DLBINGSS\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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<b>Module Coordinator</b> N.N. (Smart Services I) / N.N. (Smart Services II)
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<b>Contributing Courses to Module</b>
<ul style="list-style-type: none"> <li>• Smart Services I (DLBINGSS01_E)</li> <li>• Smart Services II (DLBINGSS02_E)</li> </ul>

<b>Module Exam Type</b>	
<b>Module Exam</b>	<b>Split Exam</b> <u>Smart Services I</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <u>Smart Services II</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Written Assessment: Project Report</li> </ul>
<b>Weight of Module</b> see curriculum	

<p><b>Module Contents</b></p> <p><b>Smart Services I</b></p> <ul style="list-style-type: none"> <li>· Digitization and disruption</li> <li>· Potential of Smart Services</li> <li>· Development and specification of Smart Services</li> <li>· Service architectures</li> <li>· Integration platforms</li> <li>· Technologies for Smart Services</li> <li>· Quality and operation of Smart Services</li> </ul> <p><b>Smart Services II</b></p> <p>Analysis of a selected topic of Smart Services and design of a self-chosen assignment in a prototyping environment.</p>	
<p><b>Learning Outcomes</b></p> <p><b>Smart Services I</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· recognize the relevance of Smart Services in the context of digitization in general and Industry 4.0 in particular.</li> <li>· identify special features of digital business models and demonstrate them using the example of digital intermediaries.</li> <li>· apply methods to uncover digitization potentials and use the Business Model Canvas to classify them in a business model.</li> <li>· know and use models for the multi-perspective specification of services.</li> <li>· know selected architectures for the design and integration of services.</li> <li>· distinguish different technologies that are required for the development of services.</li> <li>· define the quality of services by means of Service Level Agreements.</li> </ul> <p><b>Smart Services II</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· have an in-depth understanding of the technologies and standards in the context of Smart Services.</li> <li>· apply technologies in the context of smart services using a simple practical example.</li> <li>· design a hardware or software prototype for a selected technical task.</li> <li>· document design and development activities in the form of a project report.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Computer Science &amp; Software Development</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the IT &amp; Technology fields</p>



# Smart Services I

Course Code: DLBINGSS01\_E

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

## Course Description

In this course, students study concepts and methods for the development of Smart Services. For this purpose, an introduction of the term in the context of digitization and Industry 4.0 will be given. Based on this, this course shows how innovative services can have a disruptive effect on existing business models or even markets using the example of digital intermediaries.

Subsequently, students will be taught selected methods and techniques with which digitization potentials can be recognized and modelled. In addition, selected architectures and platforms for the integration of services are presented. Finally, relevant technologies for the implementation of smart services are taught and it is briefly described how the quality of services can be agreed upon.

## Course Outcomes

On successful completion, students will be able to

- recognize the relevance of Smart Services in the context of digitization in general and Industry 4.0 in particular.
- identify special features of digital business models and demonstrate them using the example of digital intermediaries.
- apply methods to uncover digitization potentials and use the Business Model Canvas to classify them in a business model.
- know and use models for the multi-perspective specification of services.
- know selected architectures for the design and integration of services.
- distinguish different technologies that are required for the development of services.
- define the quality of services by means of Service Level Agreements.

## Contents

1. Introduction and Motivation
  - 11 Digitization and Cyber-Physical Production Systems
  - 12 Smart Services in Industry 4.0
  - 13 Examples of Smart Services

2.	Digitization and Disruption
21	Definition: Digital Business Models
22	Strategies for Change and Innovation
23	Digital Intermediaries
24	Examples of Disruptive Business Models
3.	Recognizing Potential for Smart Services
31	Business Model Canvas
32	Personas
33	Customer Journeys
34	Domain-Driven Design
4.	Development and Specification of Smart Services
41	Modelling of the System Context
42	Modelling of Business Processes
43	Modelling of Technical Interfaces
44	Tools for API Specification
5.	Service Architectures
51	Infrastructure/Platform/Software-as-a-Service
52	Everything-as-a-Service
53	Service-oriented Architectures
54	Micro Services
6.	Integration Platforms
61	Features and Purpose of Integration Platforms
62	Enterprise Integration Patterns
63	External Integration with Zapier, IFTTT & Others
7.	Technologies for Smart Services
71	Formats for Data Exchange
72	Internet Communication Protocols
73	Semantic Descriptions
74	Complex Event Processing
75	Security

- |                                                 |
|-------------------------------------------------|
| 8. Quality and Operation of Smart Services      |
| 81 Quality Characteristics and Maturity of APIs |
| 82 Service Level Agreements                     |
| 83 Service Level Management                     |

<b>Literature</b>
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<b>Compulsory Reading</b>
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<b>Further Reading</b>
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- Chignell, M. et al. (Hrsg.) (2010): The Smart Internet. Current Research and Future Applications. Springer, Berlin.
- Evans, E. (2003): Domain-Driven Design. Tackling Complexity in the Heart of Software. Addison-Wesley, Upper Saddle River, NJ.
- Hohpe, G./Woolf, B./Brown, K. (2012): Enterprise Integration Patterns. Designing, Building, and Deploying Messaging Solutions. 16th edition, Addison-Wesley, Boston, MA.
- Nielsen, L. (2013): Personas - User Focused Design. Springer, London.
- Osterwalder, A/Pigneur, Y. (2010): Business Model Generation: A Handbook for Visionaries, Game Changers, John Wiley & Sons Inc., Hoboken, NJ.

Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Smart Services II

Course Code: DLBINGSS02\_E

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

### Course Description

In this course, the students select a concrete technical task from the provided topic catalogue in consultation with the seminar leader. They work on the task with the help of a prototyping environment that is suitable for the subject of the task. The environments can be hardware (e.g. prototyping boards) or software (e.g. technology-specific development environments). To complete the task, students apply the concepts, methods and tools taught in the Smart Services I course. They document their results in a project report.

### Course Outcomes

On successful completion, students will be able to

- have an in-depth understanding of the technologies and standards in the context of Smart Services.
- apply technologies in the context of smart services using a simple practical example.
- design a hardware or software prototype for a selected technical task.
- document design and development activities in the form of a project report.

### Contents

- A catalogue with currently available assignments is provided on the online learning platform. It provides the content basis of the module and can be supplemented or updated by the tutor.

### Literature

### Compulsory Reading

### Further Reading

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

## Smart Factory

Module Code: DLBDESEF

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Mario Boßlau (Smart Factory I) / Prof. Dr. Mario Boßlau (Smart Factory II)

### Contributing Courses to Module

- Smart Factory I (DLBDESEF01)
- Smart Factory II (DLBDESEF02)

### Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b> <u>Smart Factory I</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <u>Smart Factory II</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Written Assessment: Project Report</li> </ul>
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### Weight of Module

see curriculum

**Module Contents****Smart Factory I**

- Motivation and Definition of Terms
- Development of Automation
- Technological Basics and Standards
- Basic concepts of a Smart Factory
- Reference Architectures
- Smart Factory Engineering
- Safety and Security

**Smart Factory II**

A catalogue with the currently provided tasks is provided on the online platform of the module. It provides the content basis of the module and can be supplemented or updated by the seminar leader.

**Learning Outcomes****Smart Factory I**

On successful completion, students will be able to

- understand the term Smart Factory in the context of Industry 4.0.
- be able to trace the development of automation to a fully autonomous, non-centrally organized production plant.
- understand the basic technologies and standards used to design and operate a Smart Factory.
- understand the essential concepts of a Smart Factory.
- identify and differentiate between the individual elements of a Smart Factory using different reference architectures.
- understand the special engineering challenges in the Smart Energy context.
- understand the special safety risks of digitized and networked production plants and assign concrete recommendations for action.

**Smart Factory II**

On successful completion, students will be able to

- have a deeper understanding of the technologies and standards in the context of Smart Factory.
- apply technologies in the context of Smart Factory to a simple practical example.
- design a hardware or software prototype for a selected task.
- document, design, and develop activities in the form of a project report.



<b>Links to other Modules within the Study Program</b> This module is similar to other modules in the fields of Computer Science & Software Development	<b>Links to other Study Programs of the University</b> All Bachelor Programmes in the IT & Technology fields
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## Smart Factory I

Course Code: DLBDESEF01

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

### Course Description

In this course, students will gain a deeper insight into the networking and digitization of production facilities by examining a Smart Factory. For this purpose, they will be familiarized with the basic goals of a Smart Factory in the context of the research complex Industry 4.0. After a brief introduction to the history of automation, students will learn the technical basics and standards required to design and operate a Smart Factory. Building on this, they will learn how these individual technologies are used to implement the central concepts of a Smart Factory. In order to understand which components a Smart Factory consists of, different reference architectures are presented and compared. The course concludes with the special engineering challenges of an autonomously acting and decentralized production plant. Above all, this includes IT security, which is particularly relevant due to the digital networking of production facilities and products.

### Course Outcomes

On successful completion, students will be able to

- understand the term Smart Factory in the context of Industry 4.0.
- be able to trace the development of automation to a fully autonomous, non-centrally organized production plant.
- understand the basic technologies and standards used to design and operate a Smart Factory.
- understand the essential concepts of a Smart Factory.
- identify and differentiate between the individual elements of a Smart Factory using different reference architectures.
- understand the special engineering challenges in the Smart Energy context.
- understand the special safety risks of digitized and networked production plants and assign concrete recommendations for action.

### Contents

1. Motivation and Definition of Terms
  - 11 Goals of Smart Factory
  - 12 Internet of Things
  - 13 Cyber-Physical Systems
  - 14 Cyber-Physical Production Systems
  - 15 Smart Factory as a Cyber-Physical (Production) System

2. Development of Automation
  - 21 Automation Pyramid
  - 22 Networked, Decentralized Organization of Production
  - 23 Future Challenges
  
3. Technological Basics and Standards
  - 31 Identification of Physical Objects
  - 32 Formal Description Languages and Ontologies
  - 33 Digital Object Memory
  - 34 Physical Situation Recognition
  - 35 (Partially) Autonomous Action and Cooperation
  - 36 Human-Machine Interaction
  - 37 Machine to Machine Communication
  
4. Basic Concepts of a Smart Factory
  - 41 Order-Controlled Production
  - 42 Bundling of Machine and Production Data
  - 43 Supporting People in Production
  - 44 Intelligent Products and Resources
  - 45 Smart Services
  
5. Reference Architectures
  - 51 Purpose and Properties of Reference Architectures
  - 52 Overview of Standardization Initiatives
  - 53 CyProS Reference Architecture
  - 54 RAMI 4.0 (DIN SPEC 91345)
  
6. Smart Factory Engineering
  - 61 Classification of Different Engineering Tools
  - 62 Virtual Engineering
  - 63 User-Centered Design
  - 64 Requirements Engineering
  - 65 Modelling
  - 66 Integration of Classic and Smart Components

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b> <ul style="list-style-type: none"><li>· Butun, I. (2020). <i>Industrial IoT: Challenges, design principles, applications, and security</i>. Springer.</li><li>· Drossel, W. G., Ihlenfeldt, S., Lanzger, T., &amp; Dumitrescu, R. (2019). Cyber-physical systems. In R. Neugebauer (Ed.), <i>Digital transformation</i> (pp. 189–213). Springer.</li><li>· Durakbasa, N. M., &amp; Gençyılmaz, M. G. (Eds.). (2021). <i>Digital conversion on the way to Industry 4.0</i>. Springer.</li><li>· Ustundag, A., &amp; Cevikcan, E. (2018). <i>Industry 4.0: Managing the digital transformation</i>. Springer.</li></ul>

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Smart Factory II

Course Code: DLBDESEF02

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

In this course, students select a concrete task from the catalog of topics provided in consultation with the seminar leader. They will work on the task in a prototyping environment suited to the task, which can be either a hardware (e.g., prototyping boards) or software (e.g., technology-specific development environments) environment. To complete the task, students apply the concepts, methods, and tools taught in the Smart Factory I course. They document their results with a project report.

### Course Outcomes

On successful completion, students will be able to

- have a deeper understanding of the technologies and standards in the context of Smart Factory.
- apply technologies in the context of Smart Factory to a simple practical example.
- design a hardware or software prototype for a selected task.
- document, design, and develop activities in the form of a project report.

### Contents

- A catalogue with the currently provided tasks is provided on the online platform of the module. It provides the content basis of the module and can be supplemented or updated by the seminar leader.

### Literature

### Compulsory Reading

### Further Reading

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

DLBDESEF02



# Salesforce Platform Management

Module Code: DLSFPM

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Thomas Bolz (Salesforce Fundamentals) / Prof. Dr. Thomas Bolz (CRM with Salesforce Service Cloud )

## Contributing Courses to Module

- Salesforce Fundamentals (DLSFPM01)
- CRM with Salesforce Service Cloud (DLSFPM02)

## Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b>  <u>Salesforce Fundamentals</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Written Assessment: Project Report</li> </ul> <u>CRM with Salesforce Service Cloud</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Oral Project Report</li> </ul>
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**Weight of Module**  
see curriculum

**Module Contents****Salesforce Fundamentals**

Using the learning platform trailhead students will learn the fundamentals of Salesforce. At the end of the course students will be able to administer the Salesforce platform. This module prepares them for the Salesforce administrator certification.

**CRM with Salesforce Service Cloud**

Using the learning platform trailhead students will learn how to manage customer relationships with Salesforce platform. At the end of the course they will be able to manage the Salesforce service cloud. This module prepares students for the Salesforce service cloud certification.

**Learning Outcomes****Salesforce Fundamentals**

On successful completion, students will be able to

- define what Salesforce and customer relationship management is.
- describe and compare the different options for importing and exporting data in Salesforce.
- create reports and visualize key business metrics in real-time in Salesforce.
- create a simple Salesforce app.
- control access to data using security tools in Salesforce.

**CRM with Salesforce Service Cloud**

On successful completion, students will be able to

- set up customer service with Salesforce service cloud.
- lead a customer service team in the digital era.
- create digital engagement on multiple channels.
- define service cloud goals and metrics.
- automate case management.
- improve customer service using artificial intelligence.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Marketing & Sales

**Links to other Study Programs of the University**

All Bachelor Programmes in the Marketing fields

# Salesforce Fundamentals

Course Code: DLSFPM01

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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## Course Description

Salesforce is the most used software solution for customer relationship management worldwide. Using the learning platform trailhead students will learn independently the fundamentals of Salesforce. The course introduces Salesforce and explains how to administrate it. Additionally, it presents essentials of the Salesforce platform.

## Course Outcomes

On successful completion, students will be able to

- define what Salesforce and customer relationship management is.
- describe and compare the different options for importing and exporting data in Salesforce.
- create reports and visualize key business metrics in real-time in Salesforce.
- create a simple Salesforce app.
- control access to data using security tools in Salesforce.

## Contents

- The content on the learning platform focuses on the features and the functionality used to maintain a Salesforce implementation. It provides general knowledge of the features available to end users and the configuration options available to a Salesforce administrator. Furthermore, the content enables to maintain a Salesforce organization, respond to common business requirements, and perform administrative functions using current Salesforce features.

## Literature

### Compulsory Reading

### Further Reading

- Eason, J. (2014): Android Studio 1.0. (URL: <http://android-developers.blogspot.de/2014/12/android-studio-10.html> [accessed: 22.04.2016]).

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>
Project Work

## CRM with Salesforce Service Cloud

Course Code: DLSFPM02

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

### Course Description

This course facilitates key aspects of setting up customer service with Salesforce service cloud on the learning platform trailhead. The course describes how to implement Salesforce service cloud and manage it. It enables to make better business decisions based on customer service data and to create a service metrics strategy. The course shows how to create processes to help support teams become more efficient and manage large data volumes within Salesforce and prepares students for the Salesforce service cloud certification.

### Course Outcomes

On successful completion, students will be able to

- set up customer service with Salesforce service cloud.
- lead a customer service team in the digital era.
- create digital engagement on multiple channels.
- define service cloud goals and metrics.
- automate case management.
- improve customer service using artificial intelligence.

### Contents

- The content on the learning platform focuses on designing and deploying solutions that support customer business processes and requirements using Salesforce applications. The content enables to design solutions using the Service Cloud functionality and to lead the implementation of these solutions within a customer organization.

### Literature

#### Compulsory Reading

#### Further Reading

- Eason, J. (2014): Android Studio 1.0. (URL: <http://android-developers.blogspot.de/2014/12/android-studio-10.html> [accessed: 22.04.2016]).

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
------------------------------------------	-------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Oral Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>
Project Work

# Salesforce Platform Development

Module Code: DLSFPD

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

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

## Contributing Courses to Module

- Salesforce Platform App Builder (DLSFPD01)
- Salesforce Platform Developer (DLSFPD02)

## Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b>  <u>Salesforce Platform App Builder</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Written Assessment: Project Report</li> </ul> <u>Salesforce Platform Developer</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Oral Project Report</li> </ul>
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**Weight of Module**  
see curriculum

<p><b>Module Contents</b></p> <p><b>Salesforce Platform App Builder</b></p> <p>Using the learning platform Trailhead students will learn the fundamentals of Salesforce. At the end of the course, the students will be able to design, build and deploy custom applications. This course prepares them for the Salesforce Platform App Builder Certification.</p> <p><b>Salesforce Platform Developer</b></p> <p>Using the learning platform Trailhead students will learn how to develop own applications, built from various parts of the Salesforce platform. At the end of the course they will be able to use Apex, Visualforce and basic Lightning components. This course prepares the students for the Salesforce Platform Developer I Certification.</p>	
<p><b>Learning Outcomes</b></p> <p><b>Salesforce Platform App Builder</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· define what Salesforce and customer relationship management is,</li> <li>· design the data model, user interface, and business logic for custom applications,</li> <li>· customize applications for mobile use,</li> <li>· design reports and dashboards,</li> <li>· manage application security and deploy custom applications.</li> </ul> <p><b>Salesforce Platform Developer</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· develop own applications using Apex and basic Lightning components,</li> <li>· write SOSL, SOQL and DML statements,</li> <li>· use Visualforce to build custom user interfaces for mobile and web apps,</li> <li>· build reusable, performant components that follow modern web standards,</li> <li>· use the built-in testing framework to test Apex and Visualforce.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the field of Marketing &amp; Sales</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the Marketing &amp; Communication field</p>



# Salesforce Platform App Builder

Course Code: DLSFPD01

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

## Course Description

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

## Course Outcomes

On successful completion, students will be able to

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

## Contents

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

**Literature****Compulsory Reading****Further Reading**

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

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

# Salesforce Platform Developer

Course Code: DLSFPD02

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

## Course Description

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

## Course Outcomes

On successful completion, students will be able to

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

## Contents

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

## Literature

### Compulsory Reading

### Further Reading

- Salesforce (2020): Developer Documentation. (URL: <https://developer.salesforce.com/docs/> [accessed: 12.12.2020])

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Oral Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

DLSFPD02

# Mobile Software Engineering

Module Code: DLBCSEMSE

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

N.N. (Mobile Software Engineering I) / N.N. (Mobile Software Engineering II)

## Contributing Courses to Module

- Mobile Software Engineering I (DLBCSEMSE01)
- Mobile Software Engineering II (DLBCSEMSE02)

## Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b> <u>Mobile Software Engineering I</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <u>Mobile Software Engineering II</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Written Assessment: Project Report</li> </ul>
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## Weight of Module

see curriculum

<p><b>Module Contents</b></p> <p><b>Mobile Software Engineering I</b></p> <ul style="list-style-type: none"> <li>· Basics of mobile software development</li> <li>· Android system architecture</li> <li>· Development environment</li> <li>· Core components of an Android app</li> <li>· Interaction between application components</li> <li>· Advanced techniques</li> </ul> <p><b>Mobile Software Engineering II</b></p> <p>Conception, implementation, and documentation of small, mobile applications on the basis of a concrete task.</p>	
<p><b>Learning Outcomes</b></p> <p><b>Mobile Software Engineering I</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· recognize the differences and peculiarities of software development for mobile systems and explain them.</li> <li>· differentiate between different activities, roles, and risks in the creation, operation, and maintenance of mobile software systems.</li> <li>· explain and differentiate between the architecture and technical features of the Android platform.</li> <li>· independently create mobile software systems to solve concrete problems for the “Android” platform.</li> </ul> <p><b>Mobile Software Engineering II</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· independently design and create a prototype of a small mobile application to solve a specific problem.</li> <li>· recognize typical problems and challenges in the practical implementation of small mobile applications.</li> <li>· document the conception and implementation of small, independently designed and implemented mobile applications.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Computer Science &amp; Software Development</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the IT &amp; Technology fields</p>



# Mobile Software Engineering I

Course Code: DLBCSEMSE01

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

## Course Description

Using the mobile platform "Android" as an example, it will be demonstrated how the programming of mobile applications (apps) differs from the development of browser-based information systems, which technologies and programming concepts are typically used, and which typical challenges there are in app development for industrial applications.

## Course Outcomes

On successful completion, students will be able to

- recognize the differences and peculiarities of software development for mobile systems and explain them.
- differentiate between different activities, roles, and risks in the creation, operation, and maintenance of mobile software systems.
- explain and differentiate between the architecture and technical features of the Android platform.
- independently create mobile software systems to solve concrete problems for the "Android" platform.

## Contents

1. Basics of Mobile Software Development
  - 11 Special Features of Mobile Devices
  - 12 Special Features of Mobile Software Development
  - 13 Classification of Mobile Devices
  - 14 The Android Platform
2. Android System Architecture
  - 21 The Android System
  - 22 Safety and Security
  - 23 Communication with Networks

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|----|----------------------------------------------|
| 3. | Development Environment                      |
| 31 | Android Studio                               |
| 32 | First App and Emulator Test                  |
| 33 | Application Deployment                       |
| 4. | Core Components of an Android App            |
| 41 | Overview of the Components of an Android App |
| 42 | Activities, Layouts, and Views               |
| 43 | Resources                                    |
| 44 | Summary in an App                            |
| 45 | Graphic Design                               |
| 5. | Interaction Between Application Components   |
| 51 | Intents                                      |
| 52 | Services                                     |
| 53 | Broadcast Receiver                           |
| 6. | Advanced Techniques                          |
| 61 | Threading                                    |
| 62 | Application Memory                           |

<b>Literature</b>
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<b>Compulsory Reading</b>
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<b>Further Reading</b>
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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>· Becker, A./Pant, M. (2015): Android 5. Programmieren für Smartphones und Tablets. 4. Auflage, dpunkt.verlag, Heidelberg.Eason, J. (2014): Android Studio 1.0. (URL: <a href="https://android-developers.googleblog.com/2014/12/android-studio-10.html">https://android-developers.googleblog.com/2014/12/android-studio-10.html</a>)</li> <li>· Eason, J. (2014): Android Studio 1.0. (URL: <a href="https://android-developers.googleblog.com/2014/12/android-studio-10.html">https://android-developers.googleblog.com/2014/12/android-studio-10.html</a> [letzter Zugriff: 12.06.2015]).</li> <li>· Franke, F./Ippen, J. (2012): Apps mit HTML5 und CSS3. Galileo Computing, Bonn.</li> <li>· Google Inc. (Hrsg.) (2015): Android Developer Guide. (URL: <a href="http://developer.android.com/guide">http://developer.android.com/guide</a>) [letzter Zugriff: 12.06.2015]).</li> <li>· Google Inc. (Hrsg.) (2015): App Components. (URL: <a href="http://developer.android.com/guide/components/index.html">http://developer.android.com/guide/components/index.html</a> [letzter Zugriff: 12.06.2015]).</li> <li>· Google Inc. (Hrsg.) (2015): Installing the Android SDK. (URL: <a href="http://developer.android.com/sdk/installing/index.html">http://developer.android.com/sdk/installing/index.html</a>[letzter Zugriff: 13.05.2015]).</li> <li>· Google Inc. (Hrsg.) (2015): Resources Overview. (URL: <a href="http://developer.android.com/guide/topics/resources/overview.html">http://developer.android.com/guide/topics/resources/overview.html</a>[letzter Zugriff: 12.06.2015]).</li> </ul> |
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**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Mobile Software Engineering II

Course Code: DLBCSEMSE02

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

Using the knowledge gained in the course "Mobile Software Engineering using the Android platform as an example", students independently create a mobile application and document its conception and implementation.

### Course Outcomes

On successful completion, students will be able to

- independently design and create a prototype of a small mobile application to solve a specific problem.
- recognize typical problems and challenges in the practical implementation of small mobile applications.
- document the conception and implementation of small, independently designed and implemented mobile applications.

### Contents

- Conception, implementation, and documentation of small, mobile applications on the basis of a concrete task. Possible topics are, for example:
- A radio app to improve the exchange between listeners and stations in general, and listeners and radio presenters in particular.
- An app that allows a group of board game fans to better organize their regular evening game.
- An app that these supervisors at IUBH can use to improve their supervision processes.

**Literature****Compulsory Reading****Further Reading**

- Eason, J. (2014): Android Studio 1.0. (URL: <http://android-developers.blogspot.de/2014/12/android-studio-10.html> [letzter Zugriff: 12.06.2015]).
- Google Inc. (Hrsg.) (2015): Android Developer Guide. (URL: <http://developer.android.com/guide>)
- Google Inc. (Hrsg.) (2015a): App Components. (URL: <http://developer.android.com/guide/components/index.html> [letzter Zugriff: 12.06.2015]).
- Google Inc. (Hrsg.) (2015b): Installing the Android SDK. (URL: <http://developer.android.com/sdk/installing/index.html> [letzter Zugriff: 13.05.2015]).
- Google Inc. (Hrsg.) (2015c): Resources Overview. (URL: <http://developer.android.com/guide/topics/resources/overview.html> [letzter Zugriff: 12.06.2015]).
- Hipp, Wyrick & Company, Inc. (Hrsg.) (2015): SQLite Webseite. (URL: <http://sqlite.org/index.html> [letzter Zugriff: 12.06.2015]).

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

# IT Service Management

Module Code: DLBCSITSM-01

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 5	<b>Student Workload</b> 150 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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<b>Module Coordinator</b> N.N. (IT Service Management)
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<b>Contributing Courses to Module</b>
· IT Service Management (DLBCSITSM01-01)

<b>Module Exam Type</b>	
<b>Module Exam</b> <u>Study Format: myStudies</u> Exam, 90 Minutes <u>Study Format: Distance Learning</u> Exam, 90 Minutes	<b>Split Exam</b>
<b>Weight of Module</b> see curriculum	

<b>Module Contents</b>
<ul style="list-style-type: none"> <li>· IT Service Management Basics and Terms</li> <li>· ITIL 4 - Basics and Four Dimensions</li> <li>· ITIL 4 - Service Value System</li> <li>· ITIL 4 - Principles</li> <li>· ITIL 4 - Practices</li> <li>· Information Security Management with the IT Baseline Protection Framework of the BSI</li> </ul>

<p><b>Learning Outcomes</b></p> <p><b>IT Service Management</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· identify the fundamentals and challenges of IT service management.</li> <li>· describe the motivation and structure of the IT Infrastructure Library (ITIL), distinguish four dimensions, apply the service value system and identify concrete practices.</li> <li>· describe and apply fundamentals of IT security management.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the field of Computer Science &amp; Software Development.</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the IT &amp; Technology field.</p>



# IT Service Management

Course Code: DLBCSITSM01-01

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

## Course Description

IT service management is an approach to align and understand a company's IT as a service provider and supporter of operational and business processes. This course uses the IT Infrastructure Library (ITIL) to teach concepts, procedures and best practices in the area of IT service management (IT operations). In other words, it looks at the management of activities that take place after an IT system has been developed: IT operations as a continuous run of the productive day-to-day business of a company's IT departments.

## Course Outcomes

On successful completion, students will be able to

- identify the fundamentals and challenges of IT service management.
- describe the motivation and structure of the IT Infrastructure Library (ITIL), distinguish four dimensions, apply the service value system and identify concrete practices.
- describe and apply fundamentals of IT security management.

## Contents

1. IT Service Management Basics and Terms
  - 11 IT Services
  - 12 IT Service Management
  - 13 ITSM Frameworks
2. ITIL 4 - Basics and Four Dimensions
  - 21 Stakeholders, Services and Service Management
  - 22 Value Contribution of IT
3. ITIL 4 - Service Value System
  - 31 Basics and Overview
  - 32 Inputs, Outcome and Governance
  - 33 The Service Value Chain
  - 34 Continual Improvement

4.	ITIL 4 - Principles
41	Overview
42	Value Orientation
43	Iterative Procedure and Feedback
44	Establish Collaboration and Visibility
45	Optimize and Automate
5.	ITIL 4 - Practices
51	Overview
52	General Management Practices
53	Service Management Practices
54	Technical Practices
6.	Information Security Management with the IT Basic Protection Framework of the BSI
61	Structure and Elements of BSI Basic Protection Framework
62	Information Security Process

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"> <li>· Berger, D., &amp; Shashidhar, N., &amp; Varol, C. (2020). Using ITIL 4 in Security Management. 2020 8th International Symposium on Digital Forensics and Security (ISDFS), Digital Forensics and Security (ISDFS), 2020 8th International Symposium On, 1-6. <a href="https://doi-org.pxz.iubh.de/8443/10.1109/ISDFS49300.2020.9116257">https://doi-org.pxz.iubh.de/8443/10.1109/ISDFS49300.2020.9116257</a></li> <li>· Limited, A. (2019). ITIL 4 Foundation [electronic resource] : ITIL 4 Edition. London The Stationery Office Ltd, 2019.</li> <li>· Limited, A. (2020). ITIL 4 [electronic resource] : Digital and IT Strategy. London The Stationery Office Ltd, 2020.</li> <li>· Limited, A. (2020). ITIL 4 [electronic resource] : Direct, Plan and Improve. Norwich TSO, 2020.</li> <li>· Limited, A. (2020). ITIL 4 [electronic resource] : High Velocity IT. Norwich TSO, 2020.</li> <li>· Limited, A. (2020). ITIL 4 [electronic resource] : Drive Stakeholder Value. Norwich TSO, 2020.</li> <li>· Limited, A. (2020). ITIL 4 [electronic resource] : Create, Deliver and Support. Norwich TSO, 2020.</li> </ul>

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Business Intelligence

Module Code: DLBCSEBI

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimaldauer: 1 Semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Sebastian Werning (Business Intelligence ) / Prof. Dr. Sebastian Werning (Project: Business Intelligence)

### Contributing Courses to Module

- Business Intelligence (DLBCSEBI01)
- Project: Business Intelligence (DLBCSEBI02)

### Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b>  <u>Business Intelligence</u> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <u>Project: Business Intelligence</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Written Assessment: Project Report</li> <li>• Study Format "myStudies": Written Assessment: Project Report</li> </ul>
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### Weight of Module

see curriculum

<p><b>Module Contents</b></p> <p><b>Business Intelligence</b></p> <ul style="list-style-type: none"> <li>· Motivation and Conceptualization</li> <li>· Data Provision</li> <li>· Data Warehouse</li> <li>· Modeling of Multidimensional Data Spaces</li> <li>· Analysis Systems</li> <li>· Distribution and Access</li> </ul> <p><b>Project: Business Intelligence</b></p> <p>Possible topics for the BI project include “Management of BI projects”, “Design of multidimensional data models” and “Prototypical implementation of small BI applications”.</p>	
<p><b>Learning Outcomes</b></p> <p><b>Business Intelligence</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· explain the motivation, use cases, and basics of Business Intelligence.</li> <li>· identify and explain techniques and methods for providing and modeling data, as well as types of data relevant to BI, differentiating between them.</li> <li>· explain techniques and methods for the generation and storage of information and independently select suitable methods on the basis of concrete requirements.</li> </ul> <p><b>Project: Business Intelligence</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· independently design a solution to a practical problem in the field of Business Intelligence in order to then implement a prototype and document the results.</li> <li>· identify and explain typical problems and challenges in the design and practical implementation of small BI solutions.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Computer Science &amp; Software Development</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the IT &amp; Technology fields</p>

# Business Intelligence

Course Code: DLBCSEBI01

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

## Course Description

Business Intelligence (BI) is used to obtain information from company data that is relevant for targeted corporate management and the optimization of business activities. This course introduces and discusses techniques, procedures, and models for data provision, information generation, and analysis, as well the distribution of the information obtained. You will then be able to explain the various subject areas of data warehousing and independently select methods and techniques to meet specific requirements.

## Course Outcomes

On successful completion, students will be able to

- explain the motivation, use cases, and basics of Business Intelligence.
- identify and explain techniques and methods for providing and modeling data, as well as types of data relevant to BI, differentiating between them.
- explain techniques and methods for the generation and storage of information and independently select suitable methods on the basis of concrete requirements.

## Contents

1. Motivation and Conceptualization
  - 11 Motivation and Historical Development
  - 12 BI as a Framework
2. Data Provision
  - 21 Operative and Dispositive Systems
  - 22 The Data Warehouse Concept
  - 23 Architectural Variations
3. Data Warehouse
  - 31 ETL Process
  - 32 DWH and Data Mart
  - 33 ODS and Metadata

**4. Modelling of Multidimensional Data Spaces**

- 41 Data Modeling
- 42 OLAP Cubes
- 43 Physical Storage
- 44 Star and Snowflake Scheme
- 45 Historicization

**5. Analysis Systems**

- 51 Free Data Research and OLAP
- 52 Reporting Systems
- 53 Model-Based Analysis Systems
- 54 Concept-Oriented Systems

**6. Distribution and Access**

- 61 Information Distribution
- 62 Information Access

**Literature****Compulsory Reading****Further Reading**

- Grossmann, W., & Rinderle-Ma, S. (2015). *Fundamentals of business intelligence*. 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.
- Sherman, R. (2014). *Business intelligence guidebook: From data integration to analytics*. Morgan Kaufmann.
- Vaisman, A., & Zimányi, E. (2016). *Data warehouse systems: Design and implementation*. Springer.



## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>		
<input type="checkbox"/> Learning Sprints®	<input type="checkbox"/> Review Book	<input type="checkbox"/> Sprint
<input checked="" type="checkbox"/> Course Book	<input type="checkbox"/> Creative Lab	<input type="checkbox"/>
<input type="checkbox"/> Vodcast	<input type="checkbox"/> Guideline	
<input checked="" type="checkbox"/> Shortcast	<input type="checkbox"/> Live Tutorium/Course Feed	
<input checked="" type="checkbox"/> Audio	<input type="checkbox"/> Reader	
<input checked="" type="checkbox"/> Exam Template	<input checked="" type="checkbox"/> Slides	

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Project: Business Intelligence

Course Code: DLBCSEBI02

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

Using well-known methods and techniques from the field of Business Intelligence, students will work independently on a practical question in this course. At the end of the course you will be able to independently design and prototype Business Intelligence applications based on concrete requirements.

### Course Outcomes

On successful completion, students will be able to

- independently design a solution to a practical problem in the field of Business Intelligence in order to then implement a prototype and document the results.
- identify and explain typical problems and challenges in the design and practical implementation of small BI solutions.

### Contents

- Implementation and documentation of practical questions regarding the use of Business Intelligence applications. Typical scenarios are, for example, “Management of BI projects”, “Design of multidimensional data models” and “Prototypical implementation of small BI applications”.

### Literature

#### Compulsory Reading

#### Further Reading

- Christoph Meinel, Hasso Plattner, Larry Leifer (2011): Design Thinking: Understand - Improve - Apply; Springer Berlin Heidelberg
- Jeanne Liedtka (2018): Why Design Thinking Works. In: Harvard Business Review, Issue: 2018/09, pp.72-79
- Christoph Meinel, Larry J. Leifer (2021): Design Thinking Research: Interrogating the Doing; Springer International Publishing

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>		
<input type="checkbox"/> Learning Sprints®	<input type="checkbox"/> Review Book	<input type="checkbox"/> Sprint
<input type="checkbox"/> Course Book	<input type="checkbox"/> Creative Lab	<input type="checkbox"/>
<input type="checkbox"/> Vodcast	<input checked="" type="checkbox"/> Guideline	
<input type="checkbox"/> Shortcast	<input type="checkbox"/> Live Tutorium/Course Feed	
<input type="checkbox"/> Audio	<input type="checkbox"/> Reader	
<input type="checkbox"/> Exam Template	<input checked="" type="checkbox"/> Slides	

DLBCSEBIO2

## Foundations of Programming with Python

Module Code: DLBBUEFPP

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Dr. Reza Shahbazfar (Introduction to Programming with Python) / Prof. Dr. Max Pumperla (Object oriented and functional programming in Python)

### Contributing Courses to Module

- Introduction to Programming with Python (DLBDSIPWP01)
- Object oriented and functional programming in Python (DLBDSOOFPP01)

### Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b>  <u>Introduction to Programming with Python</u> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <u>Object oriented and functional programming in Python</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Portfolio</li> <li>• Study Format "myStudies": Portfolio</li> </ul>
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### Weight of Module

see curriculum

**Module Contents****Introduction to Programming with Python**

- Introduction
- Variables and Data Types
- Statements
- Functions
- Errors and Exceptions
- Modules and Packages

**Object oriented and functional programming in Python**

This course introduces the students to the advanced programming concepts of object orientation and functional programming and how they are realized in the Python programming language.

**Learning Outcomes****Introduction to Programming with Python**

On successful completion, students will be able to

- use fundamental Python syntax.
- recollect common elementary data types.
- recognize foundational programming concepts and their realization in Python.
- understand error handling and logging.
- create working programs.
- list the most important libraries and packages for data science.

**Object oriented and functional programming in Python**

On successful completion, students will be able to

- explain basic notions in object-oriented programming such as functions and classes.
- understand object-oriented programming concepts and their relation to software design and engineering.
- describe advanced function concepts in Python.
- recognize important ideas from functional programming.
- recall important libraries for functional programming in Python.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Data Science & Artificial Intelligence

**Links to other Study Programs of the University**

All Bachelor Programs in the IT & Technology fields



# Introduction to Programming with Python

Course Code: DLBDSIPWP01

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

## Course Description

This course provides students with a foundational understanding of the Python programming language. Following an introductory exposition to the importance of Python for data science-related programming tasks, students will be acquainted with fundamental programming concepts like variables, data types, and statements. Building on this basis, the important notion of a function is explained and errors, exception handling, and logging are explicated. The course concludes with an overview of the most widely-used library packages for data science.

## Course Outcomes

On successful completion, students will be able to

- use fundamental Python syntax.
- recollect common elementary data types.
- recognize foundational programming concepts and their realization in Python.
- understand error handling and logging.
- create working programs.
- list the most important libraries and packages for data science.

## Contents

1. Introduction
  - 11 Why Python?
  - 12 Obtaining and installing Python
  - 13 The Python interpreter , IPython, and Jupyter
2. Variables and Data Types
  - 21 Variables and value assignment
  - 22 Numbers
  - 23 Strings
  - 24 Collections
  - 25 Files

3.	Statements
31	Assignment, expressions, and print
32	Conditional statements
33	Loops
34	Iterators and comprehensions
4.	Functions
41	Function declaration
42	Scope
43	Arguments
5.	Errors and Exceptions
51	Errors
52	Exception handling
53	Logs
6.	Modules and Packages
61	Usage
62	Namespaces
63	Documentation
64	Popular data science packages

## Literature

### Compulsory Reading

### Further Reading

- Barry, P. (2016). Head first Python: A brain-friendly guide. Sebastopol, CA: O'Reilly Media, Inc.
- Kapil, S. (2019). Clean Python: Elegant coding in Python. Berkeley, CA: Apress.
- Lubanovic, B. (2019). Introducing Python (2nd ed.). Sebastopol, CA: O'Reilly.
- Lutz, M. (2013). Learning Python (5th ed.). Sebastopol, CA: O'Reilly.
- Matthes, E. (2015). Python crash course: A hands-on, project-based introduction to programming. San Fransisco, CA: No Starch Press.
- Müller, A. C., & Guido, S. (2016). Introduction to machine learning with Python: A guide for data scientists. Sebastopol, CA: O'Reilly Media, Inc.
- Ramalho, L. (2015). Fluent Python: Clear, concise, and effective programming. Sebastopol, CA: O'Reilly.

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Object oriented and functional programming in Python

Course Code: DLBDSOOFPP01

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

### Course Description

This course builds upon basic knowledge of Python programming (Introduction to Programming with Python, DLBDSIPWP) and is concerned with the exposition of advanced Python programming concepts. To this end, important notions of object-oriented programming like classes and objects and pertaining design principles are outlined. Starting from an in-depth discussion of advanced features of Python functions, functional programming concepts and their implementation in Python are conveyed.

### Course Outcomes

On successful completion, students will be able to

- explain basic notions in object-oriented programming such as functions and classes.
- understand object-oriented programming concepts and their relation to software design and engineering.
- describe advanced function concepts in Python.
- recognize important ideas from functional programming.
- recall important libraries for functional programming in Python.

### Contents

- This course provides students with a thorough introduction to important notions and concepts from the domain of object-oriented programming such as classes, objects, abstraction, encapsulation, inheritance, polymorphism, composition, and delegation. Additionally, the functional programming paradigm and pertaining ideas like functions as first class objects, decorators, pure functions, immutability and higher order functions are conveyed. Pursuant to the portfolio course type, the aforementioned concepts and ideas are explored by hands-on programming projects.

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b> <ul style="list-style-type: none"><li>· Lott, S. F. (2018): Functional Python programming: Discover the power of functional programming, generator functions, lazy evaluation, the built-in itertools library, and monads. 2nd ed., Packt Publishing, Birmingham.</li><li>· Lutz, M. (2013): Learning Python. 5th ed., O'Reilly, Sebastopol, CA.</li><li>· Phillips, D. (2018): Python 3 object-oriented programming: Build robust and maintainable software with object-oriented design patterns in Python 3.8. 3rd ed., Packt Publishing, Birmingham.</li><li>· Ramalho, L. (2015): Fluent Python: Clear, concise, and effective programming. O'Reilly, Sebastopol, CA.</li></ul>

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: no</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Portfolio

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Portfolio

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



## Big Data and Cloud Technologies

Module Code: DLBCSEBDCT

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> <ul style="list-style-type: none"> <li>· none</li> <li>· DLBCSDMDS01</li> </ul>	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Christian Müller-Kett (Big Data Technologies) / Prof. Dr. Thomas Zöller (Cloud Computing)

### Contributing Courses to Module

- Big Data Technologies (DLBDSBDT01)
- Cloud Computing (DLBDSCC01)

### Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b>  <u>Big Data Technologies</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> <li>• Study Format "myStudies": Exam, 90 Minutes</li> </ul> <u>Cloud Computing</u> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul>
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### Weight of Module

see curriculum

<p><b>Module Contents</b></p> <p><b>Big Data Technologies</b></p> <ul style="list-style-type: none"> <li>· Data types and data sources</li> <li>· Text-based and binary data formats</li> <li>· Distributed systems</li> <li>· Streaming frameworks</li> <li>· NoSQL approach to data storage</li> </ul> <p><b>Cloud Computing</b></p> <ul style="list-style-type: none"> <li>· Cloud computing fundamentals</li> <li>· Relevant enabling technologies for cloud computing</li> <li>· Introduction to serverless computing</li> <li>· Established cloud platforms</li> <li>· Cloud offerings for data science and analytics</li> </ul>	
<p><b>Learning Outcomes</b></p> <p><b>Big Data Technologies</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· name types and sources of data.</li> <li>· understand text-based and binary data formats.</li> <li>· analyze the requirements and constraints of distributed analysis systems.</li> <li>· evaluate the applications of streaming frameworks.</li> <li>· describe the motivation for NoSQL data stores and categorize pertaining established concepts.</li> </ul> <p><b>Cloud Computing</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· understand the fundamentals of cloud computing and cloud service models.</li> <li>· recognize enabling technologies that underlie current cloud offerings.</li> <li>· cite the principles of serverless computing.</li> <li>· analyze characteristics of established cloud offerings.</li> <li>· describe cloud options for data science and machine learning</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the field(s) of Computer Science &amp; Software Development.</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the IT &amp; Technology field(s).</p>

# Big Data Technologies

Course Code: DLBDSBDT01

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> DLBCSDMDS01
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## Course Description

Data are often considered the “new oil”, the raw material from which value is created. To harness the power of data, the data need to be stored and processed on a technical level. This course introduces the four “Vs” of data, as well as typical data sources and types. The course discusses the most common data storage formats encountered in modern systems, focusing both on text-based as well as binary data formats. Handling large amounts of data poses significant challenges for the underlying infrastructure. The course discusses the most important distributed and streaming data handling frameworks which are used in leading edge applications.

## Course Outcomes

On successful completion, students will be able to

- name types and sources of data.
- understand text-based and binary data formats.
- analyze the requirements and constraints of distributed analysis systems.
- evaluate the applications of streaming frameworks.
- describe the motivation for NoSQL data stores and categorize pertaining established concepts.

## Contents

1. Data Types and Data Sources
  - 11 The 4Vs of data: volume, velocity, variety, veracity
  - 12 Data sources
  - 13 Data types
2. Text-Based and Binary Data Formats
  - 21 Simple formats: CSV, YAML
  - 22 XML
  - 23 JSON
  - 24 Hierarchical data format 5 (HDF 5)
  - 25 Apache Parquet
  - 26 Apache Arrow

- |    |                                   |
|----|-----------------------------------|
| 3. | NoSQL data stores                 |
| 31 | Introduction and motivation       |
| 32 | Approaches and technical concepts |
| 4. | Distributed Systems               |
| 41 | Hadoop & MapReduce                |
| 42 | Hadoop file system (HDFS)         |
| 43 | Spark                             |
| 44 | DASK                              |
| 5. | Streaming Frameworks              |
| 51 | Spark streaming                   |
| 52 | Kafka                             |

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"><li>• Karau, H., Konwinski, A., Wendell, A., &amp; Zaharia, M. (2015). Learning spark: Lightning-fast data analysis. Sebastopol, CA: O'Reilly.</li><li>• Kleppmann, M. (2017). Designing data-intensive applications: The big ideas behind reliable, scalable, and maintainable systems. Sebastopol, CA: O'Reilly.</li><li>• Narkhede, N., Shapira, G., &amp; Palino, T. (2017). Kafka: The definitive guide: Real-time data and stream processing at scale. Sebastopol, CA: O'Reilly.</li><li>• Psaltis, A. (2017). Streaming data: Understanding the real-time pipeline. Shelter Island, NY: Manning.</li><li>• White, T. (2015). Hadoop: The definitive guide: Storage and analysis at Internet scale. Sebastopol, CA: O'Reilly.</li></ul>

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

Study Format myStudies

Study Format myStudies	Course Type Lecture
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Information about the examination	
Examination Admission Requirements	BOLK: yes Course Evaluation: no
Type of Exam	Exam, 90 Minutes

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

Instructional Methods		
<input type="checkbox"/> Learning Sprints®	<input type="checkbox"/> Review Book	<input type="checkbox"/> Sprint
<input checked="" type="checkbox"/> Course Book	<input type="checkbox"/> Creative Lab	<input type="checkbox"/>
<input type="checkbox"/> Vodcast	<input type="checkbox"/> Guideline	
<input checked="" type="checkbox"/> Shortcast	<input type="checkbox"/> Live Tutorium/Course Feed	
<input checked="" type="checkbox"/> Audio	<input type="checkbox"/> Reader	
<input checked="" type="checkbox"/> Exam Template	<input checked="" type="checkbox"/> Slides	

# Cloud Computing

Course Code: DLBDSCC01

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

## Course Description

Many of the recent advances in data science, particularly machine learning and artificial intelligence, rely on comprehensive data storage and computing power. Cloud computing is one way of providing that power in a scalable way, without considerable upfront investment in hardware and software resources. This course introduces the area of cloud computing together with its enabling technologies. Moreover, the most cutting-edge advances like serverless computing and storage are illustrated. Finally, a thorough overview on popular cloud offerings, especially in regard to analytics capabilities, is given.

## Course Outcomes

On successful completion, students will be able to

- understand the fundamentals of cloud computing and cloud service models.
- recognize enabling technologies that underlie current cloud offerings.
- cite the principles of serverless computing.
- analyze characteristics of established cloud offerings.
- describe cloud options for data science and machine learning

## Contents

1. Introduction to Cloud Computing
  - 11 Fundamentals of Cloud computing
  - 12 Cloud Service Models
  - 13 Benefits and Risks
2. Enabling Technology
  - 21 Virtualization and Containerization
  - 22 Storage Technology
  - 23 Networks and RESTful Services
3. Serverless Computing
  - 31 Introduction to Serverless Computing
  - 32 Benefits
  - 33 Limitations

4.	Established Cloud Platforms
41	General Overview
42	Google Cloud Platform
43	Amazon Web Services
44	Microsoft Azure
45	Platform Comparison
5.	Data Science in the Cloud
51	Provider-independent services and tools
52	Google Data Science and Machine Learning Services
53	Amazon Web Services Data Science and Machine Learning Services
54	Microsoft Azure Data Science and Machine Learning Services

## Literature

### Compulsory Reading

### Further Reading

- Chapin, J., & Roberts, M. (2017). What is serverless? Sebastopol, CA: O'Reilly Media.
- Goessling, S., & Jackson, K. L. (2018). Architecting cloud computing solutions. Birmingham: Packt Publishing.
- Kavis, M. J. (2014). Architecting the cloud: Design decisions for cloud computing service models (SaaS, PaaS, and IaaS). Hoboken, NJ: Wiley.
- Mahmood, Z., Puttini, R., & Erl, T. (2013). Cloud computing: Concepts, technology & architecture. Boston, MA: Prentice Hall.
- Rafaels, R. (2018). Cloud computing (2nd ed.). Scotts Valley, CA: CreateSpace Independent Publishing Platform.
- Sehgal, N. K., & Bhatt, P. C. P. (2018). Cloud computing: Concepts and practices. Cham: Springer.
- Zonooz, P. Farr, E., Arora, K., & Laszewski, T. (2018). Cloud native architectures. Birmingham: Packt Publishing.



## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

# IT Security

Module Code: DLBROEITS\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Ralf Kneuper (Introduction to Data Protection and Cyber Security) / N.N. (Cryptography)

## Contributing Courses to Module

- Introduction to Data Protection and Cyber Security (DLBCSIDPITS01)
- Cryptography (DLBCSCT01)

## Module Exam Type

### Module Exam

### Split Exam

#### Introduction to Data Protection and Cyber Security

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

#### Cryptography

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

## Weight of Module

see curriculum

**Module Contents****Introduction to Data Protection and Cyber Security**

- Fundamentals of IT Security
- Data Protection
- IT Security Management
- Network and Communication Security

**Cryptography**

- Protection targets, vulnerabilities, and threats
- Foundations of cryptology and its core components
- Basic cryptographic applications
- Authentication
- Single computer security
- Security communication network
- Security E-Commerce
- Secure software development

**Learning Outcomes****Introduction to Data Protection and Cyber Security**

On successful completion, students will be able to

- explain the terms and concepts of IT security and know the typical procedures and techniques which exist in each area.
- cite the legal regulations on data protection and explain their implementation.
- discuss in-depth IT security management and suitable measures for implementation.
- use their overview knowledge of activities and strategies for IT security in software and system development.

**Cryptography**

On successful completion, students will be able to

- give an overview of different classes of cryptographic systems.
- give a basic description of symmetric cryptographic methods, in particular One-Time Pad, DES, and AES, and describe their operating principles by means of simple, concrete examples.
- describe the basic hash functions.
- describe basic asymmetric cryptographic methods, especially RSA, and their operating principles by means of simple, concrete examples.
- describe the areas of application of cryptographic procedures and their application scenarios.

<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Computer Science &amp; Software Development</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the IT &amp; Technology fields</p>
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## Introduction to Data Protection and Cyber Security

Course Code: DLBCSIDPITS01

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

In this course, the students are familiarized with important concepts from the field of IT security. Basic terms are introduced and discussed, and typical application fields, areas of IT security application, and typical procedures and techniques are introduced and described.

### Course Outcomes

On successful completion, students will be able to

- explain the terms and concepts of IT security and know the typical procedures and techniques which exist in each area.
- cite the legal regulations on data protection and explain their implementation.
- discuss in-depth IT security management and suitable measures for implementation.
- use their overview knowledge of activities and strategies for IT security in software and system development.

### Contents

1. Fundamentals of Data Protection and Cyber Security
  - 11 Conceptual Bases, Protection Goals
  - 12 Attacks and Threats
  - 13 Security Strategy
  - 14 Legal Regulations
2. Data Protection
  - 21 Data Protection as a Personal Right
  - 22 Basic Principles of Data Protection
  - 23 EU General Data Protection Regulation
  - 24 Further International Regulations on Data Protection
  - 25 Cross-Border Data Flow
  - 26 Data Protection in Everyday Life

- |    |                                                            |
|----|------------------------------------------------------------|
| 3. | Basic Functions of Cyber Security and Their Implementation |
| 31 | Identification and Authentication                          |
| 32 | Rights Management                                          |
| 33 | Rights Check                                               |
| 34 | Preservation of Evidence                                   |
| 4. | Cyber Security Management                                  |
| 41 | Basic Concepts and Standards in Cyber Security Management  |
| 42 | Series of Standards ISO 2700x                              |
| 5. | Cyber Security Management in Everyday Life                 |
| 51 | Password Management                                        |
| 52 | Data Backup                                                |
| 53 | Email Security                                             |
| 54 | Protection Against Viruses and Other Malware               |
| 55 | Protection Against Social Engineering Attacks              |
| 6. | Network and Communication Security                         |
| 61 | Firewall Technology                                        |
| 62 | Network Separation                                         |
| 63 | Security in WLAN, Mobile Networks, Bluetooth, and NFC      |
| 7. | Cyber Security in the Development of Software and Systems  |
| 71 | Protection of the Development Environment                  |
| 72 | Secure Development                                         |
| 73 | Common Criteria                                            |

<b>Literature</b>
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<b>Compulsory Reading</b>
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<b>Further Reading</b>
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- Arnold, R. (2017). Cybersecurity: A business solution. An executive perspective on managing cyber risk. Threat Sketch.
- Mattord, H., & Whitman, M. (2017). Management of information security. Cengage.
- European Parliament and Council of the European Union. (2016). EU General Data Protection Regulation (GDPR): Regulation 2016/679 of the European Parliament and of the council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation). Official Journal of the European Union. Chapters 1–3

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides



## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

# Cryptography

Course Code: DLBCSCT01

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

## Course Description

This course covers basic and targeted in-depth knowledge of cryptographic processes and the practical use of cryptographic systems. After an overview of cryptographic methods, hash functions, symmetric methods, and asymmetric methods are presented. The theoretical basics of selected procedures are taught and practically explained using simple examples. In addition, areas of application and application scenarios for cryptographic procedures are presented.

## Course Outcomes

On successful completion, students will be able to

- give an overview of different classes of cryptographic systems.
- give a basic description of symmetric cryptographic methods, in particular One-Time Pad, DES, and AES, and describe their operating principles by means of simple, concrete examples.
- describe the basic hash functions.
- describe basic asymmetric cryptographic methods, especially RSA, and their operating principles by means of simple, concrete examples.
- describe the areas of application of cryptographic procedures and their application scenarios.

## Contents

1. Protection Goals, Vulnerabilities, and Threats
  - 11 Protection Goals
  - 12 Vulnerabilities and Threats
2. Foundations of Cryptology and its Core Components
  - 21 Encoding
  - 22 Symmetrical Encryption
  - 23 Asymmetric Encryption
  - 24 One-way Functions and Cryptographic Hash Functions

3. Basic Cryptographic Applications
  - 31 Key exchange and Hybrid Processes
  - 32 Digital Signature
  - 33 Message Authentication Code
  - 34 Steganographic Methods
4. Authentication
  - 41 Passwords and Public-Key-Certificates
  - 42 Challenge-Response-Procedure and Zero-Knowledge-Procedure
  - 43 Biometric Methods
  - 44 Authentication in Distributed Systems
  - 45 Identities Through Smartcards
5. Security of Single Computers
  - 51 Malware and Cookies
  - 52 Some Special Features of Operating Systems
  - 53 Web Server Security
6. Security in Communication Networks
  - 61 Security Problems and Defense Concepts
  - 62 Internet Standards for Communication Security
  - 63 Identity and Anonymity
  - 64 Security in Mobile and Wireless Communications
7. Security in E-Commerce
  - 71 Email Security
  - 72 Online Banking and Online Payments
  - 73 Electronic Money
8. Secure Software Development
  - 81 Threat Modeling
  - 82 Secure Software Design
  - 83 Techniques for Safe Programming

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b> <ul style="list-style-type: none"><li>· Baumann, U./Franz, E./Pfitzmann, A. (2014): Kryptographische Systeme. Springer Vieweg, Wiesbaden.</li><li>· Beutelspacher, A. (2014): Kryptologie. Eine Einführung in die Wissenschaft vom Verschlüsseln, Verbergen und Verheimlichen. 10. Auflage, Springer Spektrum, Wiesbaden.</li><li>· Eckert, C. (2014): IT-Sicherheit. Konzepte - Verfahren - Protokolle. 9. Auflage, De Gruyter Oldenbourg, München.</li><li>· Ertel, W. (2010): Angewandte Kryptographie. 4. Auflage, Hanser, München.</li><li>· Spitz, S./Pramateftakis, M./Swoboda, J. (2011): Kryptographie und IT-Sicherheit. Grundlagen und Anwendungen. 2. Auflage, Vieweg+Teubner; Wiesbaden.</li></ul>

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

# Logic and Artificial Intelligence

Module Code: DLBBUELAI

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

N. N. (Theoretical Computer Science and Mathematical Logic) / Prof. Dr. Ulrich Kerzel (Artificial Intelligence)

## Contributing Courses to Module

- Theoretical Computer Science and Mathematical Logic (DLBCSTCSML01)
- Artificial Intelligence (DLBDSEAIS01)

## Module Exam Type

<b>Module Exam</b>	<p><b>Split Exam</b></p> <p><u>Theoretical Computer Science and Mathematical Logic</u></p> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <p><u>Artificial Intelligence</u></p> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul>
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## Weight of Module

see curriculum

<p><b>Module Contents</b></p> <p><b>Theoretical Computer Science and Mathematical Logic</b></p> <ul style="list-style-type: none"> <li>· Proposition and predicate logic</li> <li>· Finite automata</li> <li>· Formal languages</li> <li>· Computability and Turing machines</li> <li>· Complexity theory</li> <li>· Petri nets</li> </ul> <p><b>Artificial Intelligence</b></p> <ul style="list-style-type: none"> <li>· chart the historical developments in artificial intelligence.</li> <li>· understand the approach of contemporary AI systems.</li> <li>· comprehend the concepts behind reinforcement learning.</li> <li>· analyze natural language using basic NLP techniques.</li> <li>· scrutinize images and their contents.</li> </ul>	
<p><b>Learning Outcomes</b></p> <p><b>Theoretical Computer Science and Mathematical Logic</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· formulate and translate predicate logical relationships into programming languages.</li> <li>· use finite automata and regular expressions to describe technical facts.</li> <li>· explain the Chomsky hierarchy.</li> <li>· identify the limits of provability and predictability.</li> <li>· explain the meaning and relevance of the P=NP problem.</li> <li>· apply Petri nets for the description of technical facts.</li> </ul> <p><b>Artificial Intelligence</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· chart the historical developments in artificial intelligence.</li> <li>· understand the approach of contemporary AI systems.</li> <li>· comprehend the concepts behind reinforcement learning.</li> <li>· analyze natural language using basic NLP techniques.</li> <li>· scrutinize images and their contents.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Computer Science &amp; Software Development and Data Science &amp; Artificial Intelligence</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the IT &amp; Technology fields</p>



# Theoretical Computer Science and Mathematical Logic

Course Code: DLBCSTCSML01

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

## Course Description

Theoretical computer science and mathematical logic form the theoretical basics of computer science. However, this is not "pure theory", as these fundamentals are applied in many areas of computer science. These include, for example, the formulation of conditions in SQL queries or other programs based on statement and predicate logic, the use of finite state machines to specify systems with state transition diagrams, and the modeling of business and other processes with Petri nets. In addition, theoretical computer science and mathematical logic analyze the limits of computer science and computability, which cannot be exceeded irrespective of the technologies and algorithms used.

## Course Outcomes

On successful completion, students will be able to

- formulate and translate predicate logical relationships into programming languages.
- use finite automata and regular expressions to describe technical facts.
- explain the Chomsky hierarchy.
- identify the limits of provability and predictability.
- explain the meaning and relevance of the P=NP problem.
- apply Petri nets for the description of technical facts.

## Contents

1. Propositional Logic
  - 11 Basic Concepts
  - 12 Calculation Rules and Normal Forms
  - 13 Interpretation and Satisfiability
  - 14 Proof by Contradiction and Resolution
  - 15 Soundness and Completeness
2. Predicate Logic
  - 21 Basic Concepts
  - 22 Resolution in Predicate Logic
  - 23 Completeness and Incompleteness
  - 24 Logic Programming with Prolog

3. Finite Automata and Regular Expressions
  - 31 Basic Concepts of Finite Automata
  - 32 Regular Expressions and Languages
  - 33 Practical Applications
4. Formal Languages and Grammars
  - 41 Basic Concepts
  - 42 The Chomsky Hierarchy
  - 43 Context Free Languages (Type-2 Grammars)
  - 44 Context Sensitive Languages (Type-1 Grammars)
5. Computability and Turing Machines
  - 51 Models of Computability
  - 52 Turing Machines
  - 53 More Models of Computability
  - 54 Computability and Decidability and the Halting Problem
6. Complexity Theory
  - 61 Landau's Big O Notation
  - 62 Basic Concepts of Complexity Theory
  - 63 P=NP?
  - 64 NP-Complete Problems
7. Petri Nets
  - 71 Basic Concepts of Graphs and Petri Nets
  - 72 Modeling Properties of Concurrent Systems
  - 73 Reachability in Petri Nets
  - 74 Invariants in Petri Nets
8. Applications of Mathematical Logic and Theoretical Computer Science
  - 81 Parser and Compiler
  - 82 Program Verification
  - 83 Artificial Intelligence
  - 84 Cryptology

**Literature****Compulsory Reading****Further Reading**

- Dewdney, A.K. (1995): Der Turing Omnibus. Eine Reise durch die Informatik mit 66 Stationen. Springer, Berlin/Heidelberg/New York.
- Erk, K./Priese, L. (2008): Theoretische Informatik. 3. Auflage. Springer eXamen.press, Berlin/Heidelberg.
- Priese, L./Wimmerl, H. (2008): Petri-Netze. 2. Auflage. Springer eXamen.press, Berlin/Heidelberg.
- Schöning, U. (2000): Logik für Informatiker. 5. Auflage. Spektrum Verlag, Heidelberg/ Berlin.
- Schöning, U. (2008): Ideen der Informatik. Grundlegende Modelle und Konzepte der Theoretischen Informatik, 3. Auflage. Oldenbourg, München.

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
------------------------------------------	--------------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

# Artificial Intelligence

Course Code: DLBDSEAIS01

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

## Course Description

The quest for artificial intelligence (AI) 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 modern approaches in the development of artificial intelligence. This course gives an introduction to reinforcement learning, a process similar to how humans and animals experience the world: exploring the environment and inferring the best course of action. This course also covers the principles of natural language processing and computer vision, both of which are key ingredients for an artificial intelligence to be able to interact with its environment.

## Course Outcomes

On successful completion, students will be able to

- chart the historical developments in artificial intelligence.
- understand the approach of contemporary AI systems.
- comprehend the concepts behind reinforcement learning.
- analyze natural language using basic NLP techniques.
- scrutinize images and their contents.

## Contents

1. History of AI
  - 11 Historical Developments
  - 12 AI Winter
  - 13 Expert Systems
  - 14 Notable Advances
2. Modern AI Systems
  - 21 Narrow versus General AI
  - 22 Application Areas

3. Reinforcement Learning
  - 31 What is Reinforcement Learning?
  - 32 Markov Chains and Value Function
  - 33 Time-Difference and Q Learning
4. Natural Language Processing (NLP)
  - 41 Introduction to NLP and Application Areas
  - 42 Basic NLP Techniques
  - 43 Vectorizing Data
5. Computer Vision
  - 51 Introduction to Computer Vision
  - 52 Image Representation and Geometry
  - 53 Feature Detection
  - 54 Semantic Segmentation

**Literature****Compulsory Reading****Further Reading**

- Bear, F./Barry, W./Paradiso, M. (2006): Neuroscience: Exploring the brain. 3rd ed., Lippincott Williams and Wilkins, Baltimore, MD:
- Bird S./Klein, E./Loper, E. (2009): Natural language processing with Python. 2nd ed., O'Reilly, Sebastopol, CA.
- Chollet, F. (2017): Deep learning with Python. Manning, Shelter Island, NY.
- Fisher, R. B., et al. (2016) : Dictionary of computer vision and image processing. John Wiley & Sons, Chichester.
- Geron, A. (2017): Hands-on machine learning with Scikit-Learn and TensorFlow. O'Reilly, Boston, MA.
- Goodfellow, I./Bengio, Y./Courville, A. (2016): Deep learning. MIT Press, Boston, MA.
- Grus, J. (2019): Data science from scratch: First principles with Python. O'Reilley, Sebastopol, CA.
- Jurafsky, D./Martin, J. H. (2008): Speech and language processing. Prentice Hall, Upper Saddle River, NJ.
- Nilsson, N. (2009): The quest for artificial intelligence. Cambridge University Press, Cambridge.
- Russell, S./Norvig, P. (2009): Artificial intelligence: A modern approach. 3rd ed., Pearson, Essex.
- Sutton, R./Barto, A. (2018): Reinforcement learning: An introduction. 2nd ed., MIT Press, Boston, MA.
- Szelski, R. (2011): Computer vision: Algorithms and applications. 2nd ed., Springer VS, Wiesbaden.
- Szepesvári, C. (2010): Algorithms for reinforcement learning. Morgan & Claypool, San Rafael, CA.
- Wiering, M./Otterlo, M. (2012): Reinforcement learning: State of the art. Springer, Berlin.



## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
------------------------------------------	--------------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

# Data Engineer

Module Code: DLBDESEDE

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimaldauer: 1 Semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

N.N. (Data Engineering ) / N.N. (Project: Data Engineering)

## Contributing Courses to Module

- Data Engineering (DLBDESEDE01)
- Project: Data Engineering (DLBDESEDE02)

## Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b> <u>Data Engineering</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <u>Project: Data Engineering</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Portfolio</li> </ul>
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## Weight of Module

see curriculum

**Module Contents****Data Engineering**

- understand important foundational concepts in data engineering.
- recognize established and commonly-employed NoSQL datastores and their salient characteristics.
- comprehend common architectural patterns for data processing at scale.
- explain the concept of containerization as a virtualization approach.
- analyze operational challenges in the set-up and maintenance of data pipelines.
- demonstrate familiarity with concepts relating to data security and protection.

**Project: Data Engineering**

- formulate and implement a real-world data engineering use case.
- select appropriate resources for the task at hand.
- transfer acquired specialized knowledge in data engineering to a real-world use case.
- derive relevant design choices from the given project setting.
- analyze the suitability of different solution options with respect to the project task.
- make apposite choices with respect to implementation alternatives.

**Learning Outcomes****Data Engineering**

On successful completion, students will be able to

- understand important foundational concepts in data engineering.
- recognize established and commonly-employed NoSQL datastores and their salient characteristics.
- comprehend common architectural patterns for data processing at scale.
- explain the concept of containerization as a virtualization approach.
- analyze operational challenges in the set-up and maintenance of data pipelines.
- demonstrate familiarity with concepts relating to data security and protection.

**Project: Data Engineering**

On successful completion, students will be able to

- formulate and implement a real-world data engineering use case.
- select appropriate resources for the task at hand.
- transfer acquired specialized knowledge in data engineering to a real-world use case.
- derive relevant design choices from the given project setting.
- analyze the suitability of different solution options with respect to the project task.
- make apposite choices with respect to implementation alternatives.

**Links to other Modules within the Study Program**

This module is similar to other modules in the field(s) of Data Science & Artificial Intelligence.

**Links to other Study Programs of the University**

All Bachelor Programmes in the IT & Technology field(s).

# Data Engineering

Course Code: DLBDESE01

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

## Course Description

This course explores concepts of data engineering. Data engineering is concerned with the infrastructure aspects of data science such as data storage and provision, as well as the provisioning of suitable operational environments. After laying out foundational notions and concepts of the discipline, this course addresses important developments in storage technology; aspects of systems architecture for processing data at scale; containerization as a modern take on virtualization; and the logic of data pipelines and associated operational aspects. Important issues pertaining to data security and protection are also given appropriate attention.

## Course Outcomes

On successful completion, students will be able to

- understand important foundational concepts in data engineering.
- recognize established and commonly-employed NoSQL datastores and their salient characteristics.
- comprehend common architectural patterns for data processing at scale.
- explain the concept of containerization as a virtualization approach.
- analyze operational challenges in the set-up and maintenance of data pipelines.
- demonstrate familiarity with concepts relating to data security and protection.

## Contents

1. Foundations of Data Engineering
  - 11 Reliability
  - 12 Scalability
  - 13 Maintainability
2. NoSQL In Depth
  - 21 Fundamentals of NoSQL
  - 22 Established NoSQL solutions
3. Architectures for Data Processing at Scale
  - 31 Batch processing architectures
  - 32 Architectures for stream and complex event processing
  - 33 Lambda architecture

- |    |                                         |
|----|-----------------------------------------|
| 4. | Containerization In Depth               |
| 41 | Docker containers                       |
| 42 | Container management                    |
| 5. | Governance & Security                   |
| 51 | Data protection                         |
| 52 | Data security                           |
| 53 | Data governance                         |
| 6. | Operational Aspects                     |
| 61 | Defining principles of DataOps          |
| 62 | Building and maintaining data pipelines |
| 63 | Metrics and monitoring                  |

<b>Literature</b>
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<b>Compulsory Reading</b>
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<b>Further Reading</b>
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- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>· Kleppmann, M. (2017). <i>Designing data-intensive applications: The big ideas behind reliable, scalable, and maintainable systems</i>. Sebastopol, CA: O'Reilly.</li> <li>· Marz, N., &amp; Warren, J. (2015). <i>Big data: Principles and best practices of scalable realtime data systems</i>. Shelter Island, NY: Manning Publications.</li> <li>· Matthias, K., &amp; Kane, S. P. (2018). <i>Docker: Up &amp; running (2nd ed.)</i>. Sebastopol, CA: O'Reilly.</li> <li>· Miell, I., &amp; Sayers, A. (2019). <i>Docker in practice (2nd ed.)</i>. Shelter Island, NY: Manning Publications.</li> <li>· Muhammad, S., &amp; Akhtar, F. (2018). <i>Big data architect's handbook</i>. Birmingham: Packt Publishing.</li> <li>· Schenker, G. N. (2018). <i>Learn Docker - Fundamentals of Docker 18.x: Get up and running with the concepts of Docker</i>. Birmingham: Packt Publishing.</li> <li>· Wilson, J., Redmond, E., &amp; Perkins, L. (2018). <i>Seven databases in seven weeks (2nd ed.)</i>. Raleigh, NC: Pragmatic Bookshelf.</li> </ul> |
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## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Project: Data Engineering

Course Code: DLBDESE02

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

The focus of this course is the implementation of a real-world data engineering use case in the form of a student portfolio. To this end, students choose a project subject from the various sub-domains of data engineering. Examples include setting up a Docker container environment or dockerized service; implementing a data pipeline according to DataOps principles; and setting up an NoSQL data store. The goal is for students to demonstrate they can transfer theoretical knowledge to an implementation scenario that closely mimics practical work in a professional data engineering setting.

### Course Outcomes

On successful completion, students will be able to

- formulate and implement a real-world data engineering use case.
- select appropriate resources for the task at hand.
- transfer acquired specialized knowledge in data engineering to a real-world use case.
- derive relevant design choices from the given project setting.
- analyze the suitability of different solution options with respect to the project task.
- make apposite choices with respect to implementation alternatives.

### Contents

- This course covers the practical implementation of approaches and techniques covered in the preceding methodological course in a project-oriented setting. Each participant must produce a portfolio detailing and documenting the work. Portfolio themes are chosen from a list, or suggested by the students in accord with the tutor.



**Literature****Compulsory Reading****Further Reading**

- Kleppmann, M. (2017). *Designing data-intensive applications: The big ideas behind reliable, scalable, and maintainable systems*. Sebastopol, CA: O'Reilly.
- Marz, N., & Warren, J. (2015). *Big data: Principles and best practices of scalable realtime data systems*. Shelter Island, NY: Manning Publications.
- Matthias, K., & Kane, S. P. (2018). *Docker: Up & running (2nd ed.)*. Sebastopol, CA: O'Reilly.
- Miell, I., & Sayers, A. (2019). *Docker in practice (2nd ed.)*. Shelter Island, NY: Manning Publications.
- Muhammad, S., & Akhtar, F. (2018). *Big data architect's handbook*. Birmingham: Packt Publishing.
- Schenker, G. N. (2018). *Learn Docker - Fundamentals of Docker 18.x: Get up and running with the concepts of Docker*. Birmingham: Packt Publishing.
- Wilson, J., Redmond, E., & Perkins, L. (2018). *Seven databases in seven weeks (2nd ed.)*. Raleigh, NC: Pragmatic Bookshelf.

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: no</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Portfolio

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

## Applied Sales

Module Code: DLBDSEAS

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Patrick Geus (Applied Sales I) / Prof. Dr. Patrick Geus (Applied Sales II)

### Contributing Courses to Module

- Applied Sales I (DLBDSEAS01)
- Applied Sales II (DLBDSEAS02)

### Module Exam Type

<b>Module Exam</b>	<p><b>Split Exam</b></p> <p><u>Applied Sales I</u></p> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> <li>• Study Format "myStudies": Exam, 90 Minutes</li> </ul> <p><u>Applied Sales II</u></p> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> <li>• Study Format "myStudies": Exam, 90 Minutes</li> </ul>
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### Weight of Module

see curriculum

**Module Contents**

**Applied Sales I**

- Fundamentals of Applied Sales
- The Distribution System
- Personal Sales
- Sales Plans
- New Customer Acquisition
- A Sales Visit
- Conversational Tactics
- Conducting Negotiations
- Other Sales Channels

**Applied Sales II**

- Marketing and Sales
- Customer Satisfaction as a Success Factor
- Personalities in Sales
- Customer-Oriented Communication
- Presentation and Rhetoric
- Customer Loyalty
- Networking
- Case Study

**Learning Outcomes****Applied Sales I**

On successful completion, students will be able to

- understand the fundamentals of applied sales and place them in the context of the company.
- understand the interaction of the individual facets of applied sales.
- differentiate between and evaluate individual sales systems.
- describe current sales types and sales characteristics.
- oversee and classify the entire sales process from customer acquisition to customer retention.
- understand the basics of sales and negotiation management and apply them.
- name the usual sales instruments, recognize their advantages and disadvantages, and reflect on essential fields of application and possibilities.

**Applied Sales II**

On successful completion, students will be able to

- understand the interaction and the respective areas of responsibility of marketing and sales.
- reflect on and classify the goals and measures within the framework of the applied sales system.
- assess the relevance of customer satisfaction and retention. In addition, the students will be familiar with the central design elements of CRM.
- reflect on and assess alternative approaches to customer loyalty and relationship management and apply them in business practice.
- understand the meaning of the terms customer life cycle and customer value, and develop approaches to manage them in the sense of the respective sales targets.
- use descriptive presentation techniques in order to convince customers and other sales partners.
- understand the relevance of networking and develop strategies to broaden the contact base.
- develop and evaluate their own market analyses and sales concepts on the basis of practical experience within the framework of the case study.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Marketing & Sales

**Links to other Study Programs of the University**

All Bachelor Programmes in the Marketing & Communication fields

## Applied Sales I

Course Code: DLBDSEAS01

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

The demands on sales thinking are growing every day. Globalized demand combined with high competition is making it increasingly difficult for companies to compete for customers. At the same time, customers are becoming better informed, while traditional supply markets are saturated and at overcapacity. In order to be successful in such an environment, sales thinking and action are required along with a new type of salesperson. Within the course Applied Sales I (Introduction), the participants are familiarized with the basic concepts of applied sales. You will learn about sales organization, dealing with alternative sales channels, and get to know the dedicated sales planning process. The contents of the module are complemented by the successful acquisition of new customers, whereby particular attention is paid to the organization and implementation of customer visits and the conduct of discussions and negotiations.

### Course Outcomes

On successful completion, students will be able to

- understand the fundamentals of applied sales and place them in the context of the company.
- understand the interaction of the individual facets of applied sales.
- differentiate between and evaluate individual sales systems.
- describe current sales types and sales characteristics.
- oversee and classify the entire sales process from customer acquisition to customer retention.
- understand the basics of sales and negotiation management and apply them.
- name the usual sales instruments, recognize their advantages and disadvantages, and reflect on essential fields of application and possibilities.

### Contents

1. Fundamentals of Applied Sales and Distribution
  - 11 Tasks and Forms of Applied Distribution
  - 12 Marketing as the Basis of Sales
  - 13 Distribution, Sales, and Other Terms
  - 14 Sales in Different Economic Sectors

2. The Distribution System
  - 21 Forms of Sales
  - 22 Sales Organisation
  - 23 Key Account Management
  - 24 Multi-Channel Distribution
3. Personal Sales
  - 31 The "New Sellers"
  - 32 Requirements for Sales Personalities
  - 33 The Key Account Manager
  - 34 Task of Sales Managers
4. Sales Plan
  - 41 Tasks and Objectives of Sales Management
  - 42 Observation of Competition in the Context of Sales Management
  - 43 Potential Analyses and Sales Planning
  - 44 Sales Control and Visit Strategies
5. New Customer Acquisition
  - 51 Identification of New Customer Potential
  - 52 Customer Relationship Management and Customer Acquisition
  - 53 Trade Fairs and Events
  - 54 Networking
6. The Sales Visit
  - 61 Frequency and Preparation of Visits
  - 62 Conduct of a Visit
  - 63 Visit Reports and Follow-Up
  - 64 Aftercare and Follow-Up
7. Conversational Tactics
  - 71 Structured Conversation Preparation
  - 72 Goal-Oriented Conversation: The D.A.L.A.S Model
  - 73 Questioning Techniques

- 8. Conducting Negotiations
  - 81 Psychology of Negotiation
  - 82 Negotiation Structure
  - 83 Objection Handling
  - 84 Price Negotiations
  
- 9. Other Sales Channels
  - 91 Telemarketing
  - 92 Catalogue and Brochure Sales
  - 93 Internet and E-Commerce

**Literature**

**Compulsory Reading**

**Further Reading**

- Bloomfield, J. (2020). *NeuroSelling: Mastering the customer conversation using the surprising science of decision making*. Axon Publishing.
- Jobber, D., Lancaster, G., & Le Meunier-FitzHugh, K. (2019). *Selling and sales management* (10th ed.). Pearson.
- Peppers, D., & Rogers, M. (2016). *Managing customer experience and relationships: A strategic framework* (3rd ed.). Wiley.
- Pink, D. H. (2012). *To sell is human: The surprising truth about moving others*. Riverhead Books.



## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

Study Format myStudies

Study Format myStudies	Course Type Lecture
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Information about the examination	
Examination Admission Requirements	BOLK: yes Course Evaluation: no
Type of Exam	Exam, 90 Minutes

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

Instructional Methods	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Applied Sales II

Course Code: DLBDSEAS02

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

### Course Description

The course Applied Sales II builds on the basics taught in the course "Applied Sales I" and broadens and deepens them. First, the tension between marketing and sales is examined in more detail. Based on this, essential backgrounds and central target figures for successful sales management (e.g., customer satisfaction and loyalty as well as the customer life cycle) are derived and operationalized in order to create the basis for efficient and effective customer relationship management. As the process progresses, attention will also be paid to mental processes and consumer behavior in general. In addition, strategies and paths to successful negotiation are deepened and supplemented by convincing communication techniques. The course concludes with a case study in the course of which the students have the opportunity to apply what they have learned in a practice-oriented manner.

### Course Outcomes

On successful completion, students will be able to

- understand the interaction and the respective areas of responsibility of marketing and sales.
- reflect on and classify the goals and measures within the framework of the applied sales system.
- assess the relevance of customer satisfaction and retention. In addition, the students will be familiar with the central design elements of CRM.
- reflect on and assess alternative approaches to customer loyalty and relationship management and apply them in business practice.
- understand the meaning of the terms customer life cycle and customer value, and develop approaches to manage them in the sense of the respective sales targets.
- use descriptive presentation techniques in order to convince customers and other sales partners.
- understand the relevance of networking and develop strategies to broaden the contact base.
- develop and evaluate their own market analyses and sales concepts on the basis of practical experience within the framework of the case study.

## Contents

1. Marketing and Sales
  - 11 Marketing Tasks and Functions
  - 12 Sales Marketing in Different Economic Sectors
  - 13 Relationship Marketing
  - 14 International Marketing and Sales Cooperations
2. Customer Satisfaction as a Success Factor
  - 21 Customer Relationship Management (CRM)
  - 22 The CRM Success Chain
  - 23 Customer Relationship Strategies
3. Personalities in Sales
  - 31 Sales Personalities and Differentiation
  - 32 Selling in Teams
  - 33 Negotiating With Committees
4. Customer-Oriented Communication
  - 41 Communication Tasks in Sales
  - 42 Sales Promotion by Sales Staff
  - 43 Team Sales Promotion
  - 44 Sales Promotion by the Company
5. Presentation and Rhetoric
  - 51 Rhetoric in Sales
  - 52 Presentation Techniques
  - 53 Nonverbal Communication
6. Customer Loyalty
  - 61 Customer Retention Management
  - 62 Customer Programs and Other Customer Loyalty Tools
  - 63 Complaint Management
7. Networking
  - 71 Network Competencies in the Company
  - 72 Building and Shaping Relationships
  - 73 Networking via Social Media

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|------------------------------------------------------|
| 8. Case Study in IQ Media Marketing                  |
| 81 The Market Situation                              |
| 82 The Marketing Situation                           |
| 83 IQ Media Marketing and IQ Digital Media Marketing |

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"><li>· Jobber, D./Lancaster, G./Le Meunier-Fitzhugh, K. (2019): Selling and Sales Management, 11th Ed.; Pearson</li><li>· Johnston, M.W./Marshall (2021): Sales Force Management: Leadership, Innovation, Technology; Routledge</li><li>· Jordan, J./Vazzana, M. (2011): Cracking the Sales Management Code: The Secrets to Measuring and Managing Sales Performance; 13th Ed.; McGraw Hill</li><li>· Kumar, V./Reinartz, W. (2018): Customer Relationship Management: Concept, Strategy, and Tools; 3rd Ed.; Springer Texts in Business and Economics</li><li>· Marcos, J./Davies, M. (2019): Implementing Key Account Management: Designing Customer-Centric Processes for Mutual Growth; KoganPage</li><li>· Peppers, D./Rogers, M. (2011): Managing Customer Relationships : A Strategic Framework; 2nd Ed.; Wiley</li></ul>

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

DLBDSEAS02



# Supply Chain Management

Module Code: DLBDESCM

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Hubert Vogl (Supply Chain Management I ) / Sebastian Stütz (Supply Chain Management II)

## Contributing Courses to Module

- Supply Chain Management I (DLBDESCM01)
- Supply Chain Management II (DLBDESCM02)

## Module Exam Type

<b>Module Exam</b>	<p><b>Split Exam</b></p> <p><u>Supply Chain Management I</u></p> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <p><u>Supply Chain Management II</u></p> <ul style="list-style-type: none"> <li>• Study Format "myStudies": Exam, 90 Minutes</li> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul>
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## Weight of Module

see curriculum

### Module Contents

#### Supply Chain Management I

- Historical and terminological aspects of the SCM concept
- Motives for the creation of cross-company value creation networks
- Design principles and effects of value creation networks
- Logistical core processes and SCM
- Information technology aspects of the SCM concept
- Coordination and collaboration of the network partners
- Industry-specific solutions of the SCM

#### Supply Chain Management II

- Strategic aspects of SCM
- SCM Practice: Tasks and Activities in the Core Planning Process
- SCM Practice: Tasks and Activities in the Core Process of Procurement
- SCM Practice: Tasks and Activities in the Core Process Production
- SCM Practice: Tasks and Activities in the Core Distribution Process

**Learning Outcomes****Supply Chain Management I**

On successful completion, students will be able to

- explain the importance of cross-company value creation processes.
- understand common concepts for modeling cross-company value creation processes.
- understand dynamic effects in supply chains and can systematize their causes and effects.
- explain important theoretical concepts for describing the characteristics and challenges of cross-company value creation processes.
- explain the approaches and problem categories commonly used in the context of supply chain management.
- understand important reference and/or management models for the concretization of supply chain systems.
- name and detail important roles and tasks in the SCM network.
- deal with the coordination problem of SCM and describe the common solution approaches.

**Supply Chain Management II**

On successful completion, students will be able to

- systematically explain the strategic relevance of enterprise-wide value creation processes.
- understand the most important tasks and problems in the SCM core process planning.
- systematize the elements and interrelationships in the CPFR model in a differentiated way.
- be familiar with the characteristics and peculiarities of contract logistics.
- understand the most important tasks and problems in the SCM core process procurement.
- explain central elements and characteristics of a procurement strategy.
- understand the most important tasks and problems in the SCM core process production.
- explain central elements and characteristics of a modern production strategy.
- understand the most important tasks and problems in the SCM core process distribution.
- explain central elements and characteristics of the so-called ECR concept.

**Links to other Modules within the Study Program**

This module is similar to other modules in the fields of Logistics & Transportation

**Links to other Study Programs of the University**

All Bachelor Programmes in the Transport & Logistics fields

# Supply Chain Management I

Course Code: DLBDESECM01

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

## Course Description

SCM proves to be an extremely multi-faceted construct from both a theoretical and a practical point of view. An adequate understanding of the problem dimensions and modes of action of (global) cross-company value creation networks requires a multidimensional approach. It starts by considering logistical processes, with modern process, flow, and network standards forming an important basis for SCM. On the basis of such an approach, students should gain a fundamental understanding of SCM. From the point of view of a holistic approach, it also makes sense to also examine a number of other typical problem areas in addition to the logistical challenges of this concept. This includes IT aspects of SCM (e.g., APS systems), and questions to do with the collaboration and coordination of network partners. This course also considers selected industry specific SCM solutions (ECR or VMI).

## Course Outcomes

On successful completion, students will be able to

- explain the importance of cross-company value creation processes.
- understand common concepts for modeling cross-company value creation processes.
- understand dynamic effects in supply chains and can systematize their causes and effects.
- explain important theoretical concepts for describing the characteristics and challenges of cross-company value creation processes.
- explain the approaches and problem categories commonly used in the context of supply chain management.
- understand important reference and/or management models for the concretization of supply chain systems.
- name and detail important roles and tasks in the SCM network.
- deal with the coordination problem of SCM and describe the common solution approaches.

## Contents

1. Fundamentals of the Supply Chain Concept
  - 11 Terminological and Conceptual Fundamentals
  - 12 Supply Chain Typology According to Otto
  - 13 Supply Chain Typology According to Bechtel/Jayaram
  - 14 Dynamic Aspects of Supply Chains

2.	Selected Theoretical Concepts for the Supply Chain Concept
21	New Institutional Economics
22	Game Theory
23	Network Approach
24	Other Theoretical Additions
3.	Supply Chain Management
31	Basic Information on the Goals and Scope of SCM
32	Popular Problem Areas of the SCM
33	Supply Chain Management as an Evolutionary Step in Logistics
34	Supply Chain Management as Cooperation Management
4.	SCM Model
41	Basic Information on the Term SCM Models
42	SCOR Model
43	SCM Task Model
5.	SCM as a Coordination Problem
51	Basic Information on the Concept of Coordination
52	Coordination Concepts, Context, and Perspectives of SCM
53	Coordination Instruments

<b>Literature</b>
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<b>Compulsory Reading</b>
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<b>Further Reading</b>
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- Bolstorff, P., & Rosenbaum, R. (2011). Supply chain excellence: A handbook for dramatic improvement using the SCOR model. AMACOM.
- Bowersox, J., Closs, D., & Cooper, M. B. (2020). Supply chain logistics management (5th ed.). McGraw Hill Education.
- Chopra, S., & Meindl, P. (2019). Supply chain management: Strategy, planning, and operation (7th ed., Global ed.). Pearson Education.
- Kurbel, K. E. (2013). Enterprise resource planning and supply chain management: Functions, business processes and software for manufacturing companies. Springer.

Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Supply Chain Management II

Course Code: DLBDESCM02

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

### Course Description

From the perspective of strategic management research and practice, the activities covered by the term SCM are closely related to efforts to build and/or maintain a stable operational competitive advantage. A fundamental discussion of this relationship forms the starting point for the course. On this basis, a differentiated analysis of strategy-relevant activities and instruments in the Plan, Source, Make, Deliver, and Return process categories is then carried out using the SCOR model. Special attention is given to the practice-relevant areas of SCM, e.g., order-promising (plan), supplier-relation-management (source), postponement (make), and the ECR-concept (deliver).

### Course Outcomes

On successful completion, students will be able to

- systematically explain the strategic relevance of enterprise-wide value creation processes.
- understand the most important tasks and problems in the SCM core process planning.
- systematize the elements and interrelationships in the CPFR model in a differentiated way.
- be familiar with the characteristics and peculiarities of contract logistics.
- understand the most important tasks and problems in the SCM core process procurement.
- explain central elements and characteristics of a procurement strategy.
- understand the most important tasks and problems in the SCM core process production.
- explain central elements and characteristics of a modern production strategy.
- understand the most important tasks and problems in the SCM core process distribution.
- explain central elements and characteristics of the so-called ECR concept.

### Contents

1. Strategic Aspects of SCM
  - 11 Strategic Thinking and Action: General Information
  - 12 Competition Focus and SCM
  - 13 Competition Location and SCM
  - 14 Competition Rules and SCM



2. SCM Practice: Core Process Planning
  - 21 General Preliminary Considerations
  - 22 Collaborative Planning, Forecasting, and Replenishment
  - 23 Order Promoting
  - 24 Kanban
  - 25 Integration of X-PL Logistics Service Providers
3. SCM Practice: Core Process Procurement
  - 31 General Preliminary Considerations
  - 32 Production Synchronous Procurement
  - 33 Sourcing Concepts
  - 34 Supplier Relations Management
4. SCM Practice: Core Process Production
  - 41 Selected Aspects of the Problem Background
  - 42 Collaborative Engineering
  - 43 Postponement Strategies
  - 44 Value Added Partnership
5. SCM Practice: Core Process Distribution
  - 51 Basic Information on the Distribution Problem
  - 52 Efficient Consumer Response (ECR)
  - 53 Consignment Warehouse

**Literature****Compulsory Reading****Further Reading**

- Bookbinder, J. H. (2013). Handbook of global logistics: Transportation in international supply chains. International series in operations research & management science: Bd. 181. Springer.
- Chopra, S (2019). Supply Chain Management: Strategy, Planning, and Operation, EBook, Global Edition, Pearson Education, Limited. ProQuest Ebook Central.
- Chopra, S. & Meindl, P. (2016). Supply chain management: Strategy, planning, and operation. Always learning. Pearson.
- Christopher, M. (2016). Logistics & supply chain management (Fifth edition). Pearson.
- Ganesan, R. (2015). The profitable supply chain: A practitioner's guide. Apress.
- Grant, D. B. (2012). Logistics management. Pearson.
- Kurbel, K. (2013). Enterprise resource planning and supply chain management: Functions, business processes and software for manufacturing companies. Progress in IS. Springer.
- Pawar, K. S., Rogers, H., Potter, A. & Naim, M. (2015). Developments in Logistics and Supply Chain Management: Past, Present and Future. Palgrave Macmillan.
- Piotrowicz, W. & Cuthbertson, R. (Hrsg.). (2015). Supply chain design and management for emerging markets: Learning from countries and regions. Springer International Publishing.
- Scott, C., Lundgren, H. & Thompson, P. (2018). Guide to Supply Chain Management: An end to end perspective. Management for professionals. Springer.
- Sindi, S. & Roe, M. (2017). Strategic supply chain management: The development of a diagnostic model. Palgrave Macmillan.

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Smart Services

Module Code: DLBINGSS\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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<b>Module Coordinator</b> N.N. (Smart Services I) / N.N. (Smart Services II)
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<b>Contributing Courses to Module</b>
<ul style="list-style-type: none"> <li>• Smart Services I (DLBINGSS01_E)</li> <li>• Smart Services II (DLBINGSS02_E)</li> </ul>

<b>Module Exam Type</b>	
<b>Module Exam</b>	<b>Split Exam</b> <u>Smart Services I</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Exam, 90 Minutes</li> </ul> <u>Smart Services II</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Written Assessment: Project Report</li> </ul>
<b>Weight of Module</b> see curriculum	

<p><b>Module Contents</b></p> <p><b>Smart Services I</b></p> <ul style="list-style-type: none"> <li>· Digitization and disruption</li> <li>· Potential of Smart Services</li> <li>· Development and specification of Smart Services</li> <li>· Service architectures</li> <li>· Integration platforms</li> <li>· Technologies for Smart Services</li> <li>· Quality and operation of Smart Services</li> </ul> <p><b>Smart Services II</b></p> <p>Analysis of a selected topic of Smart Services and design of a self-chosen assignment in a prototyping environment.</p>	
<p><b>Learning Outcomes</b></p> <p><b>Smart Services I</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· recognize the relevance of Smart Services in the context of digitization in general and Industry 4.0 in particular.</li> <li>· identify special features of digital business models and demonstrate them using the example of digital intermediaries.</li> <li>· apply methods to uncover digitization potentials and use the Business Model Canvas to classify them in a business model.</li> <li>· know and use models for the multi-perspective specification of services.</li> <li>· know selected architectures for the design and integration of services.</li> <li>· distinguish different technologies that are required for the development of services.</li> <li>· define the quality of services by means of Service Level Agreements.</li> </ul> <p><b>Smart Services II</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· have an in-depth understanding of the technologies and standards in the context of Smart Services.</li> <li>· apply technologies in the context of smart services using a simple practical example.</li> <li>· design a hardware or software prototype for a selected technical task.</li> <li>· document design and development activities in the form of a project report.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Computer Science &amp; Software Development</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programs in the IT &amp; Technology fields</p>

## Smart Services I

Course Code: DLBINGSS01\_E

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

### Course Description

In this course, students study concepts and methods for the development of Smart Services. For this purpose, an introduction of the term in the context of digitization and Industry 4.0 will be given. Based on this, this course shows how innovative services can have a disruptive effect on existing business models or even markets using the example of digital intermediaries.

Subsequently, students will be taught selected methods and techniques with which digitization potentials can be recognized and modelled. In addition, selected architectures and platforms for the integration of services are presented. Finally, relevant technologies for the implementation of smart services are taught and it is briefly described how the quality of services can be agreed upon.

### Course Outcomes

On successful completion, students will be able to

- recognize the relevance of Smart Services in the context of digitization in general and Industry 4.0 in particular.
- identify special features of digital business models and demonstrate them using the example of digital intermediaries.
- apply methods to uncover digitization potentials and use the Business Model Canvas to classify them in a business model.
- know and use models for the multi-perspective specification of services.
- know selected architectures for the design and integration of services.
- distinguish different technologies that are required for the development of services.
- define the quality of services by means of Service Level Agreements.

### Contents

1. Introduction and Motivation
  - 11 Digitization and Cyber-Physical Production Systems
  - 12 Smart Services in Industry 4.0
  - 13 Examples of Smart Services

2.	Digitization and Disruption
21	Definition: Digital Business Models
22	Strategies for Change and Innovation
23	Digital Intermediaries
24	Examples of Disruptive Business Models
3.	Recognizing Potential for Smart Services
31	Business Model Canvas
32	Personas
33	Customer Journeys
34	Domain-Driven Design
4.	Development and Specification of Smart Services
41	Modelling of the System Context
42	Modelling of Business Processes
43	Modelling of Technical Interfaces
44	Tools for API Specification
5.	Service Architectures
51	Infrastructure/Platform/Software-as-a-Service
52	Everything-as-a-Service
53	Service-oriented Architectures
54	Micro Services
6.	Integration Platforms
61	Features and Purpose of Integration Platforms
62	Enterprise Integration Patterns
63	External Integration with Zapier, IFTTT & Others
7.	Technologies for Smart Services
71	Formats for Data Exchange
72	Internet Communication Protocols
73	Semantic Descriptions
74	Complex Event Processing
75	Security



- |                                                 |
|-------------------------------------------------|
| 8. Quality and Operation of Smart Services      |
| 81 Quality Characteristics and Maturity of APIs |
| 82 Service Level Agreements                     |
| 83 Service Level Management                     |

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b>
<ul style="list-style-type: none"><li>Chignell, M. et al. (Hrsg.) (2010): The Smart Internet. Current Research and Future Applications. Springer, Berlin.</li><li>Evans, E. (2003): Domain-Driven Design. Tackling Complexity in the Heart of Software. Addison-Wesley, Upper Saddle River, NJ.</li><li>Hohpe, G./Woolf, B./Brown, K. (2012): Enterprise Integration Patterns. Designing, Building, and Deploying Messaging Solutions. 16th edition, Addison-Wesley, Boston, MA.</li><li>Nielsen, L. (2013): Personas - User Focused Design. Springer, London.</li><li>Osterwalder, A/Pigneur, Y. (2010): Business Model Generation: A Handbook for Visionaries, Game Changers, John Wiley &amp; Sons Inc., Hoboken, NJ.</li></ul>

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK: yes</b> <b>Course Evaluation: no</b>
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b> 90 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 30 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Smart Services II

Course Code: DLBINGSS02\_E

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

### Course Description

In this course, the students select a concrete technical task from the provided topic catalogue in consultation with the seminar leader. They work on the task with the help of a prototyping environment that is suitable for the subject of the task. The environments can be hardware (e.g. prototyping boards) or software (e.g. technology-specific development environments). To complete the task, students apply the concepts, methods and tools taught in the Smart Services I course. They document their results in a project report.

### Course Outcomes

On successful completion, students will be able to

- have an in-depth understanding of the technologies and standards in the context of Smart Services.
- apply technologies in the context of smart services using a simple practical example.
- design a hardware or software prototype for a selected technical task.
- document design and development activities in the form of a project report.

### Contents

- A catalogue with currently available assignments is provided on the online learning platform. It provides the content basis of the module and can be supplemented or updated by the tutor.

### Literature

### Compulsory Reading

### Further Reading

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

## Smart Factory

Module Code: DLBDESEF

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Prof. Dr. Mario Boßlau (Smart Factory I) / Prof. Dr. Mario Boßlau (Smart Factory II)

### Contributing Courses to Module

- Smart Factory I (DLBDESEF01)
- Smart Factory II (DLBDESEF02)

### Module Exam Type

#### Module Exam

#### Split Exam

##### Smart Factory I

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

##### Smart Factory II

- Study Format "Distance Learning": Written Assessment: Project Report

### Weight of Module

see curriculum

**Module Contents****Smart Factory I**

- Motivation and Definition of Terms
- Development of Automation
- Technological Basics and Standards
- Basic concepts of a Smart Factory
- Reference Architectures
- Smart Factory Engineering
- Safety and Security

**Smart Factory II**

A catalogue with the currently provided tasks is provided on the online platform of the module. It provides the content basis of the module and can be supplemented or updated by the seminar leader.

**Learning Outcomes****Smart Factory I**

On successful completion, students will be able to

- understand the term Smart Factory in the context of Industry 4.0.
- be able to trace the development of automation to a fully autonomous, non-centrally organized production plant.
- understand the basic technologies and standards used to design and operate a Smart Factory.
- understand the essential concepts of a Smart Factory.
- identify and differentiate between the individual elements of a Smart Factory using different reference architectures.
- understand the special engineering challenges in the Smart Energy context.
- understand the special safety risks of digitized and networked production plants and assign concrete recommendations for action.

**Smart Factory II**

On successful completion, students will be able to

- have a deeper understanding of the technologies and standards in the context of Smart Factory.
- apply technologies in the context of Smart Factory to a simple practical example.
- design a hardware or software prototype for a selected task.
- document, design, and develop activities in the form of a project report.

<b>Links to other Modules within the Study Program</b> This module is similar to other modules in the fields of Computer Science & Software Development	<b>Links to other Study Programs of the University</b> All Bachelor Programmes in the IT & Technology fields
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## Smart Factory I

Course Code: DLBDESEF01

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

### Course Description

In this course, students will gain a deeper insight into the networking and digitization of production facilities by examining a Smart Factory. For this purpose, they will be familiarized with the basic goals of a Smart Factory in the context of the research complex Industry 4.0. After a brief introduction to the history of automation, students will learn the technical basics and standards required to design and operate a Smart Factory. Building on this, they will learn how these individual technologies are used to implement the central concepts of a Smart Factory. In order to understand which components a Smart Factory consists of, different reference architectures are presented and compared. The course concludes with the special engineering challenges of an autonomously acting and decentralized production plant. Above all, this includes IT security, which is particularly relevant due to the digital networking of production facilities and products.

### Course Outcomes

On successful completion, students will be able to

- understand the term Smart Factory in the context of Industry 4.0.
- be able to trace the development of automation to a fully autonomous, non-centrally organized production plant.
- understand the basic technologies and standards used to design and operate a Smart Factory.
- understand the essential concepts of a Smart Factory.
- identify and differentiate between the individual elements of a Smart Factory using different reference architectures.
- understand the special engineering challenges in the Smart Energy context.
- understand the special safety risks of digitized and networked production plants and assign concrete recommendations for action.

### Contents

1. Motivation and Definition of Terms
  - 11 Goals of Smart Factory
  - 12 Internet of Things
  - 13 Cyber-Physical Systems
  - 14 Cyber-Physical Production Systems
  - 15 Smart Factory as a Cyber-Physical (Production) System



2. Development of Automation
  - 21 Automation Pyramid
  - 22 Networked, Decentralized Organization of Production
  - 23 Future Challenges
3. Technological Basics and Standards
  - 31 Identification of Physical Objects
  - 32 Formal Description Languages and Ontologies
  - 33 Digital Object Memory
  - 34 Physical Situation Recognition
  - 35 (Partially) Autonomous Action and Cooperation
  - 36 Human-Machine Interaction
  - 37 Machine to Machine Communication
4. Basic Concepts of a Smart Factory
  - 41 Order-Controlled Production
  - 42 Bundling of Machine and Production Data
  - 43 Supporting People in Production
  - 44 Intelligent Products and Resources
  - 45 Smart Services
5. Reference Architectures
  - 51 Purpose and Properties of Reference Architectures
  - 52 Overview of Standardization Initiatives
  - 53 CyProS Reference Architecture
  - 54 RAMI 4.0 (DIN SPEC 91345)
6. Smart Factory Engineering
  - 61 Classification of Different Engineering Tools
  - 62 Virtual Engineering
  - 63 User-Centered Design
  - 64 Requirements Engineering
  - 65 Modelling
  - 66 Integration of Classic and Smart Components

<b>Literature</b>
<b>Compulsory Reading</b>
<b>Further Reading</b> <ul style="list-style-type: none"><li>· Butun, I. (2020). <i>Industrial IoT: Challenges, design principles, applications, and security</i>. Springer.</li><li>· Drossel, W. G., Ihlenfeldt, S., Lanzger, T., &amp; Dumitrescu, R. (2019). <i>Cyber-physical systems</i>. In R. Neugebauer (Ed.), <i>Digital transformation</i> (pp. 189–213). Springer.</li><li>· Durakbasa, N. M., &amp; Gençyılmaz, M. G. (Eds.). (2021). <i>Digital conversion on the way to Industry 4.0</i>. Springer.</li><li>· Ustundag, A., &amp; Cevikcan, E. (2018). <i>Industry 4.0: Managing the digital transformation</i>. Springer.</li></ul>

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Online Lecture
------------------------------------------	--------------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> yes <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Exam, 90 Minutes

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
90 h	0 h	30 h	30 h	0 h	150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input type="checkbox"/> Reader <input checked="" type="checkbox"/> Slides

## Smart Factory II

Course Code: DLBDESEF02

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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### Course Description

In this course, students select a concrete task from the catalog of topics provided in consultation with the seminar leader. They will work on the task in a prototyping environment suited to the task, which can be either a hardware (e.g., prototyping boards) or software (e.g., technology-specific development environments) environment. To complete the task, students apply the concepts, methods, and tools taught in the Smart Factory I course. They document their results with a project report.

### Course Outcomes

On successful completion, students will be able to

- have a deeper understanding of the technologies and standards in the context of Smart Factory.
- apply technologies in the context of Smart Factory to a simple practical example.
- design a hardware or software prototype for a selected task.
- document, design, and develop activities in the form of a project report.

### Contents

- A catalogue with the currently provided tasks is provided on the online platform of the module. It provides the content basis of the module and can be supplemented or updated by the seminar leader.

### Literature

### Compulsory Reading

### Further Reading

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input checked="" type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

DLBDESEF02

## Internship

Module Code: OPTINTER1

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> On campus offer only	<b>Study Level</b>	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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**Module Coordinator**  
see MyCampus (Internship)

### Contributing Courses to Module

· Internship (OPTINTER110)

### Module Exam Type

<b>Module Exam</b> <u>Study Format: On Campus</u> Reflection (of Practical Work) / Group Reflection	<b>Split Exam</b>
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**Weight of Module**  
see curriculum

### Module Contents

Internship according to the “Internship Regulations” of the IU.

**Learning Outcomes****Internship**

On successful completion, students will be able to

- apply skills and knowledge they have obtained during the first three semesters of the programme in an entrepreneurial environment.
- develop his / her practical and analytical skills in order to improve his / her employability.
- have practical knowledge and learn to work within an organization.
- acquire a first deep insight into organisational structures and communication procedures.
- apply communication skills, social skills, problem solving, time and project management which will shape their general management skills.
- shape their personality with the help of the interdisciplinary nature of the course especially in the area of the key qualifications like interpersonal skills or intercultural skills.

**Links to other Modules within the Study Program**

Builds on modules of the chosen degree program

**Links to other Study Programs of the University**

All on campus offered programs



## Internship

Course Code: OPTINTER110

<b>Study Level</b>	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 10	<b>Admission Requirements</b> On campus offer only
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### Course Description

This module consists of three parts: preparation tutorials. During these tutorials, students will learn about the intention of the internship and about the intellectual as well as social requirements of the working environment. the internship itself, and Workshops that accompany the internship by presentations and give an insight into different companies and working environments by the students.

### Course Outcomes

On successful completion, students will be able to

- apply skills and knowledge they have obtained during the first three semesters of the programme in an entrepreneurial environment.
- develop his / her practical and analytical skills in order to improve his / her employability.
- have practical knowledge and learn to work within an organization.
- acquire a first deep insight into organisational structures and communication procedures.
- apply communication skills, social skills, problem solving, time and project management which will shape their general management skills.
- shape their personality with the help of the interdisciplinary nature of the course especially in the area of the key qualifications like interpersonal skills or intercultural skills.

### Contents

- Internship according to the “Internship Regulation” of the IU.

### Literature

#### Compulsory Reading

- Sweitzer, F. H. & King, M. A. (2009). *The Successful Internship: Personal, Professional, and Civic Development*. 3rd ed.. Cengage. ISBN: 0-495-59642-6.
- Kaser, K., Brooks, J. R. & Brooks, K. (2007). *Making the Most of your Internship*. Thomson. ISBN: 0-538-44432-0.
- Myers Kiser, P. (2008). *The Human Services Internship: Getting the Most from your Experience*. 2nd ed.. Cengage. ISBN: 0-495-09226-6.

#### Further Reading

**Study Format On Campus**

<b>Study Format</b> On Campus	<b>Course Type</b> Practical work
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Reflection (of Practical Work) / Group Reflection

<b>Student Workload</b>					
<b>Self Study</b> 13 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 7 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 280 h	<b>Hours Total</b> 300 h

<b>Instructional Methods</b>
In order to prepare students for their internship, a preparatory lecturing seminar will be held. During their internship, students will report about their progress by writing reports (start up report or mid-term report).

## Studium Generale

Module Code: DLBSG\_E

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> None	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

N.N. (Studium Generale I) / N.N. (Studium Generale II)

### Contributing Courses to Module

- Studium Generale I (DLBSG01\_E)
- Studium Generale II (DLBSG02\_E)

### Module Exam Type

#### Module Exam

#### Split Exam

##### Studium Generale I

- Study Format "Distance Learning": See Selected Course

##### Studium Generale II

- Study Format "Distance Learning": See Selected Course

### Weight of Module

see curriculum

<p><b>Module Contents</b></p> <p><b>Studium Generale I</b></p> <p>In principle, all IU bachelor courses can be selected as courses for the "Studium Generale", so that the content can be chosen from the entire breadth of the IU distance learning program.</p> <p><b>Studium Generale II</b></p> <p>In principle, all IU bachelor courses can be selected as courses for the "Studium Generale", so that the content can be chosen from the entire breadth of the IU distance learning program.</p>	
<p><b>Learning Outcomes</b></p> <p><b>Studium Generale I</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· apply acquired key competencies to issues in their field of study and/or in their professional environment.</li> <li>· to deepen one's own skills and abilities in a self-directed manner.</li> <li>· to look beyond the boundaries of their own area of expertise.</li> </ul> <p><b>Studium Generale II</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· apply acquired key competencies to issues in their field of study and/or in their professional environment.</li> <li>· to deepen one's own skills and abilities in a self-directed manner.</li> <li>· to look beyond the boundaries of their own area of expertise.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>It is a stand-alone offering with possible references to various required and elective modules</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All IU Distance Learning Bachelor Programs</p>

## Studium Generale I

Course Code: DLBSG01\_E

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

### Course Description

In the course "Studium Generale I", students deepen their knowledge in a self-selected subject area by completing an IU course outside their applicable curriculum. This gives them the opportunity to look beyond their own subject area and acquire further competencies. The associated option enables students to self-determine their study content to focus even more on issues relevant to them and/or to strengthen or develop selected competencies.

### Course Outcomes

On successful completion, students will be able to

- apply acquired key competencies to issues in their field of study and/or in their professional environment.
- to deepen one's own skills and abilities in a self-directed manner.
- to look beyond the boundaries of their own area of expertise.

### Contents

- The course "Studium Generale I" offers students the opportunity to take courses outside of their curriculum and the result can be credited as an elective subject. In principle, all IU bachelor courses that fulfill the following requirements can be chosen for this purpose:
  - They are not part of an integral part of the applicable mandatory curriculum.
  - They do not have admission requirements or students can prove that they have met the admission requirement.
- The examination of the selected courses must be taken in full and finally passed in order to be credited as part of the 'Studium Generale' .

### Literature

#### Compulsory Reading

#### Further Reading

- See course description of the selected course

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> See Selected Course
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	See Selected Course

<b>Student Workload</b>					
<b>Self Study</b> 100 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 25 h	<b>Self Test</b> 25 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>
See Selected Course

## Studium Generale II

Course Code: DLBSG02\_E

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b>	<b>Admission Requirements</b> None
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### Course Description

In the course "Studium Generale II", students deepen their knowledge in a self-selected subject area by completing an IU course outside their applicable curriculum. This gives them the opportunity to look beyond their own subject area and acquire further competencies. The associated option enables students to self-determine their study content to focus even more on issues relevant to them and/or to strengthen or develop selected competencies.

### Course Outcomes

On successful completion, students will be able to

- apply acquired key competencies to issues in their field of study and/or in their professional environment.
- to deepen one's own skills and abilities in a self-directed manner.
- to look beyond the boundaries of their own area of expertise.

### Contents

- The course "Studium Generale II" offers students the opportunity to take courses outside of their curriculum and the result can be credited as an elective subject. In principle, all IU bachelor courses that fulfill the following requirements can be chosen for this purpose:
  - They are not part of an integral part of the applicable mandatory curriculum.
  - They do not have admission requirements or students can prove that they have met the admission requirement.
- The examination of the selected courses must be taken in full and finally passed in order to be credited as part of the 'Studium Generale' .

### Literature

#### Compulsory Reading

#### Further Reading

- See course description of the selected course

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> See Selected Course
------------------------------------------	-------------------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	See Selected Course

<b>Student Workload</b>					
<b>Self Study</b> 100 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 25 h	<b>Self Test</b> 25 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>
See Selected Course



# Salesforce Platform Management

Module Code: DLSFPM

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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## Module Coordinator

Prof. Dr. Thomas Bolz (Salesforce Fundamentals) / Prof. Dr. Thomas Bolz (CRM with Salesforce Service Cloud )

## Contributing Courses to Module

- Salesforce Fundamentals (DLSFPM01)
- CRM with Salesforce Service Cloud (DLSFPM02)

## Module Exam Type

<b>Module Exam</b>	<b>Split Exam</b>  <u>Salesforce Fundamentals</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Written Assessment: Project Report</li> </ul> <u>CRM with Salesforce Service Cloud</u> <ul style="list-style-type: none"> <li>• Study Format "Distance Learning": Oral Project Report</li> </ul>
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**Weight of Module**  
see curriculum

<p><b>Module Contents</b></p> <p><b>Salesforce Fundamentals</b></p> <p>Using the learning platform trailhead students will learn the fundamentals of Salesforce. At the end of the course students will be able to administer the Salesforce platform. This module prepares them for the Salesforce administrator certification.</p> <p><b>CRM with Salesforce Service Cloud</b></p> <p>Using the learning platform trailhead students will learn how to manage customer relationships with Salesforce platform. At the end of the course they will be able to manage the Salesforce service cloud. This module prepares students for the Salesforce service cloud certification.</p>	
<p><b>Learning Outcomes</b></p> <p><b>Salesforce Fundamentals</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· define what Salesforce and customer relationship management is.</li> <li>· describe and compare the different options for importing and exporting data in Salesforce.</li> <li>· create reports and visualize key business metrics in real-time in Salesforce.</li> <li>· create a simple Salesforce app.</li> <li>· control access to data using security tools in Salesforce.</li> </ul> <p><b>CRM with Salesforce Service Cloud</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· set up customer service with Salesforce service cloud.</li> <li>· lead a customer service team in the digital era.</li> <li>· create digital engagement on multiple channels.</li> <li>· define service cloud goals and metrics.</li> <li>· automate case management.</li> <li>· improve customer service using artificial intelligence.</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>This module is similar to other modules in the fields of Marketing &amp; Sales</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All Bachelor Programmes in the Marketing fields</p>

# Salesforce Fundamentals

Course Code: DLSFPM01

<b>Study Level</b> BA	<b>Language of Instruction and Examination</b> English	<b>Contact Hours</b>	<b>CP</b> 5	<b>Admission Requirements</b> none
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## Course Description

Salesforce is the most used software solution for customer relationship management worldwide. Using the learning platform trailhead students will learn independently the fundamentals of Salesforce. The course introduces Salesforce and explains how to administrate it. Additionally, it presents essentials of the Salesforce platform.

## Course Outcomes

On successful completion, students will be able to

- define what Salesforce and customer relationship management is.
- describe and compare the different options for importing and exporting data in Salesforce.
- create reports and visualize key business metrics in real-time in Salesforce.
- create a simple Salesforce app.
- control access to data using security tools in Salesforce.

## Contents

- The content on the learning platform focuses on the features and the functionality used to maintain a Salesforce implementation. It provides general knowledge of the features available to end users and the configuration options available to a Salesforce administrator. Furthermore, the content enables to maintain a Salesforce organization, respond to common business requirements, and perform administrative functions using current Salesforce features.

## Literature

### Compulsory Reading

### Further Reading

- Eason, J. (2014): Android Studio 1.0. (URL: <http://android-developers.blogspot.de/2014/12/android-studio-10.html> [accessed: 22.04.2016]).

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Project Report

<b>Student Workload</b>					
<b>Self Study</b> 120 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 30 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 150 h

<b>Instructional Methods</b>
Project Work

# CRM with Salesforce Service Cloud

Course Code: DLSFPM02

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

## Course Description

This course facilitates key aspects of setting up customer service with Salesforce service cloud on the learning platform trailhead. The course describes how to implement Salesforce service cloud and manage it. It enables to make better business decisions based on customer service data and to create a service metrics strategy. The course shows how to create processes to help support teams become more efficient and manage large data volumes within Salesforce and prepares students for the Salesforce service cloud certification.

## Course Outcomes

On successful completion, students will be able to

- set up customer service with Salesforce service cloud.
- lead a customer service team in the digital era.
- create digital engagement on multiple channels.
- define service cloud goals and metrics.
- automate case management.
- improve customer service using artificial intelligence.

## Contents

- The content on the learning platform focuses on designing and deploying solutions that support customer business processes and requirements using Salesforce applications. The content enables to design solutions using the Service Cloud functionality and to lead the implementation of these solutions within a customer organization.

## Literature

### Compulsory Reading

### Further Reading

- Eason, J. (2014): Android Studio 1.0. (URL: <http://android-developers.blogspot.de/2014/12/android-studio-10.html> [accessed: 22.04.2016]).

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Project
------------------------------------------	-------------------------------

<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Oral Project Report

<b>Student Workload</b>					
<b>Self Study</b>	<b>Contact Hours</b>	<b>Tutorial</b>	<b>Self Test</b>	<b>Independent Study</b>	<b>Hours Total</b>
120 h	0 h	30 h	0 h	0 h	150 h

<b>Instructional Methods</b>
Project Work

## Bachelor Thesis

Module Code: DLBBT

<b>Module Type</b> see curriculum	<b>Admission Requirements</b> none	<b>Study Level</b> BA	<b>CP</b> 10	<b>Student Workload</b> 300 h
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<b>Semester / Term</b> see curriculum	<b>Duration</b> Minimum 1 semester	<b>Regularly offered in</b> WiSe/SoSe	<b>Language of Instruction and Examination</b> English
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### Module Coordinator

Degree Program Advisor (SGL) (Bachelor Thesis) / Degree Program Advisor (SGL) (Colloquium)

### Contributing Courses to Module

- Bachelor Thesis (DLBBT01)
- Colloquium (DLBBT02)

### Module Exam Type

#### Module Exam

#### Split Exam

##### Bachelor Thesis

- Study Format "myStudies": Written Assessment: Bachelor Thesis
- Study Format "Distance Learning": Written Assessment: Bachelor Thesis

##### Colloquium

- Study Format "myStudies": Presentation: Colloquium
- Study Format "Distance Learning": Presentation: Colloquium

### Weight of Module

see curriculum

<p><b>Module Contents</b></p> <p><b>Bachelor Thesis</b></p> <ul style="list-style-type: none"> <li>· Bachelor's thesis</li> <li>· Colloquium on the bachelor's thesis</li> </ul> <p><b>Colloquium</b></p>	
<p><b>Learning Outcomes</b></p> <p><b>Bachelor Thesis</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· work on a problem from their major field of study by applying the specialist and methodological skills they have acquired during their studies.</li> <li>· independently analyze selected tasks with scientific methods, critically evaluate them, and develop appropriate solutions under the guidance of an academic supervisor.</li> <li>· record and analyze existing (research) literature appropriate to the topic of their bachelor's thesis.</li> <li>· prepare a detailed written elaboration in compliance with scientific methods.</li> </ul> <p><b>Colloquium</b></p> <p>On successful completion, students will be able to</p> <ul style="list-style-type: none"> <li>· present a problem from their field of study using academic presentation and communication techniques.</li> <li>· reflect on the scientific and methodological approach chosen in their bachelor's thesis.</li> <li>· demonstrate that they can actively answer subject-related questions from the subject experts (reviewers of the bachelor's thesis).</li> </ul>	
<p><b>Links to other Modules within the Study Program</b></p> <p>All modules in the bachelor program</p>	<p><b>Links to other Study Programs of the University</b></p> <p>All bachelor programs in distance learning</p>



## Bachelor Thesis

Course Code: DLBBT01

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
BA	English		9	none

### Course Description

The aim and purpose of the bachelor'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 bachelor's thesis can be a practical-empirical or theoretical-scientific problem. Students should prove that they can independently analyze 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 chosen by the student from their respective field of study should meet the acquired scientific competences, deepening their academic knowledge and skills in order to meet the future needs of the field.

### 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.
- independently analyze selected tasks with scientific methods, critically evaluate them, and develop appropriate solutions under the guidance of an academic supervisor.
- record and analyze existing (research) literature appropriate to the topic of their bachelor's thesis.
- prepare a detailed written elaboration in compliance with scientific methods.

### Contents

- The bachelor's thesis must be written on a topic that relates to the content of the respective major field of study. In the context of the bachelor'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 their 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**

- Turabian, K. L. (2013). A Manual for Writers of Research Papers, theses, and dissertations (8th ed.). University of Chicago Press.
- Lipson, C. (2018). How to write a BA thesis. A practical guide from your first ideas to your finished paper (2nd ed.). University of Chicago Press.
- Selection of literature according to topic

## Study Format myStudies

<b>Study Format</b> myStudies	<b>Course Type</b> Thesis
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Bachelor Thesis

<b>Student Workload</b>					
<b>Self Study</b> 270 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 0 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 270 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input checked="" type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

**Study Format Distance Learning**

<b>Study Format</b> Distance Learning	<b>Course Type</b> Thesis
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Written Assessment: Bachelor Thesis

<b>Student Workload</b>					
<b>Self Study</b> 270 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 0 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 270 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input checked="" type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

## Colloquium

Course Code: DLBBT02

Study Level	Language of Instruction and Examination	Contact Hours	CP	Admission Requirements
BA	English		1	none

### Course Description

The colloquium will take place after the submission of the bachelor's thesis. This is done at the invitation of the experts. During the colloquium, students must prove that they have 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 as well as the answering of questions by experts.

### Course Outcomes

On successful completion, students will be able to

- present a problem from their field of study using academic presentation and communication techniques.
- reflect on the scientific and methodological approach chosen in their bachelor's thesis.
- demonstrate that they can actively answer subject-related questions from the subject experts (reviewers of the bachelor's thesis).

### Contents

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

### Literature

#### Compulsory Reading

#### Further Reading

- Subject specific literature chosen by the student

**Study Format myStudies**

<b>Study Format</b> myStudies	<b>Course Type</b> Thesis Defense
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Presentation: Colloquium

<b>Student Workload</b>					
<b>Self Study</b> 30 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 0 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 30 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides

## Study Format Distance Learning

<b>Study Format</b> Distance Learning	<b>Course Type</b> Thesis Defense
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<b>Information about the examination</b>	
<b>Examination Admission Requirements</b>	<b>BOLK:</b> no <b>Course Evaluation:</b> no
<b>Type of Exam</b>	Presentation: Colloquium

<b>Student Workload</b>					
<b>Self Study</b> 30 h	<b>Contact Hours</b> 0 h	<b>Tutorial</b> 0 h	<b>Self Test</b> 0 h	<b>Independent Study</b> 0 h	<b>Hours Total</b> 30 h

<b>Instructional Methods</b>	
<input type="checkbox"/> Learning Sprints® <input type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input type="checkbox"/> Shortcast <input type="checkbox"/> Audio <input type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input type="checkbox"/> Live Tutorium/Course Feed <input checked="" type="checkbox"/> Slides