MODULE HANDBOOK

Bachelor of Science

Bachelor Business and IT (FS-WIE-01)

180 ECTS

Distance Learning

INTERNATIONAL
UNIVERSITY OF
APPLIED SCIENCES

Classification: Undergraduate

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2021-03-01

1. Semester

Introduction to Computer Science

Module Code: DLBCSICS

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

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

Module Coordinator

Prof. Dr. Kamal Bhattacharya (Introduction to Computer Science)

Contributing Courses to Module

- Introduction to Computer Science (DLBCSICS01)

Module Exam Type

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

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

Learning Outcomes

Introduction to Computer Science

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.

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

Introduction to Computer Science

Course Code: DLBCSICS01

Study Level	Language of Instruction	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
   - 1.1 Data, information and messages
   - 1.2 Software, firmware and hardware
   - 1.3 Languages, syntax and semantics
   - 1.4 Historical overview
2. Information representation
   - 2.1 Number representation formats
   - 2.2 Representation of non-numerical information
   - 2.3 Data types
   - 2.4 Redundancy and error tolerance

3. Algorithms and data structures
   - 3.1 Algorithms and flow diagrams
   - 3.2 Simple data structures
   - 3.3 Searching and sorting
   - 3.4 Quality of algorithms (correctness, termination, efficiency/complexity)

4. Propositional logic, Boolean algebra and circuit design
   - 4.1 Propositions and logical conclusions
   - 4.2 Conjunctive and disjunctive normal form
   - 4.3 Digital circuit design

5. Hardware and computer architectures
   - 5.1 Computer types and their architecture
   - 5.2 Processors and memory
   - 5.3 Input and output
   - 5.4 Interfaces and drivers
   - 5.5 High-performance computing

6. Networks and the internet
   - 6.1 Wired and wireless networks and their topologies
   - 6.2 The TCP/IP and the ISO/OSI model
   - 6.3 Internet structure and services
   - 6.4 The internet of things

7. Software
   - 7.1 BIOS and operating systems
   - 7.2 Application software and information systems
   - 7.3 Apps
   - 7.4 Embedded systems
   - 7.5 Software development

8. Computer Science as a discipline
   - 8.1 The role and sub-disciplines of computer science
   - 8.2 Artificial intelligence, data science and computer science
   - 8.3 Ethical aspects of computer science
   - 8.4 The ACM Code of Ethics and Professional Conduct

Literature
Compulsory Reading
Further Reading ▪ Association for Computing Machinery (ACM). (2018). ACM code of ethics and professional conduct. Retrieved from https://www.acm.org/code-of-ethics ▪ Brookshear, G., & Bylow, D. (2014). Computer science: An overview (12th ed.). Boston, MA: Pearson. ▪ Dewdney, A. K. (2001). The new turing omnibus. London: Macmillan Education. ▪ Gruhn, V., & Striemer, R. (Eds.). (2018). The essence of software engineering. Cham: Springer. ▪ Sedgewick, R., & Wayne, K. (2016). Computer science: An interdisciplinary approach. Boston, MA: Addison-Wesley.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Business 101

Module Code: DLBBAB_E

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

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

Module Coordinator

Prof. Dr. Markus Prandini (Business 101)

Contributing Courses to Module

- Business 101 (DLBBAB01_E)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

- Businesses and their environment
- Types of business organizations
- Management and structure of business
- Production of goods and services
- Marketing of products and services
- Management of labor
- Accounting in business

Learning Outcomes

Business 101

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.

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

Business 101

Course Code: DLBBAB01_E

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

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
   - 1.1 Concepts of business
   - 1.2 A system of economic relationships
   - 1.3 Business environment
2. Types of business organizations
   - 2.1 Companies in production and service
   - 2.2 Divisions of companies
3. Management and structure of business
   - 3.1 Basics of Business Management
   - 3.2 Functions of organizations, managers and control
   - 3.3 The decision making process
   - 3.4 Organizational structure of business

4. Production of goods and services
   - 4.1 Origin and development of the production process
   - 4.2 Industrial strategy of business

5. Marketing of goods and services
   - 5.1 Goals and types of marketing
   - 5.2 Marketing mix

6. Management of labor
   - 6.1 Process of management of labor
   - 6.2 Demand in labor
   - 6.3 Human relations in organizations

7. Accounting in business
   - 7.1 Functions and goals of accounting
   - 7.2 Spheres of accounting
   - 7.3 Fundamental principles of accounting

Literature

Compulsory Reading

Further Reading

- Edebe, A.E. (2013): Basic Principles and Practice of Business Administration. Xlibris, n. p.
- Ferrell, O.C/Hirt, G.A./Ferrell, L. (2020): Business: A Changing World. 12th ed., Mcgraw-Hill, New York.
- Skripak, S.J. (2018): Fundamentals of Business. 2nd ed., Virginia Tech Libraries, Blacksburg.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam or Written Assessment: Written Assignment

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
100 h	0 h	25 h	25 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

DLBBAB01_E

Introduction to Academic Work

Module Code: DLBCSIAW

Module Type	Admission Requirements	Study Level	CP	Student Workload
s. Curriculum/see curriculum	none	BA	5	150 h

Semester / Term	Duration	Regularly offered in	
s. Curriculum/see curriculum	Minimum 1 semester	WiSe/SoSe	

Module Coordinator

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

Contributing Courses to Module

- Introduction to Academic Work (DLBCSIAW01)

Module Exam Type

Module Exam	Split Exam
Study Format: Distance Learning Workbook	

Weight of Module

s. Curriculum/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

Learning Outcomes

Introduction to Academic Work

Nach erfolgreichem Abschluss sind die Studierenden in der Lage,/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 IUBH.

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

Introduction to Academic Work

Course Code: DLBCSIAW01

Study Level	Language of Instruction	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 IUBH examination forms and insight into their requirements and implementation.

Course Outcomes

Nach erfolgreichem Abschluss sind die Studierenden in der Lage,/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 IUBH.

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
   - 2.1 Research Ethics
   - 2.2 Evidence Teaching
   - 2.3 Data Protection and Affidavit
   - 2.4 Orthography and Shape
   - 2.5 Identification and Delimitation of Topics
   - 2.6 Research Questions and Structure

3. Research Methods
   - 3.1 Empirical Research
   - 3.2 Literature and Reviews
   - 3.3 Quantitative Data Collection
   - 3.4 Qualitative Data Collection
   - 3.5 Mix of Methods
   - 3.6 Critique of Methods and Self-Reflection

4. Librarianship: Structure, Use, and Literature Management
   - 4.1 Plagiarism Prevention
   - 4.2 Database Research
   - 4.3 Literature Administration
   - 4.4 4.4 Citation and Author Guidelines
   - 4.5 4.5 Bibliography

5. Scientific Work at the IUBH – Research Essay

6. Scientific Work at the IUBH - Project Report

7. Scientific Work at the IUBH - Case Study

8. Scientific Work at the IUBH - Bachelor Thesis

9. Scientific Work at the IUBH – Oral Assignment

10. Scientific Work at the IUBH – Oral Project Report

11. Scientific Work at the IUBH - Colloquium

12. Scientific Work at the IUBH - Portfolio

13. Scientific Work at the IUBH - Exam

Literature
Compulsory Reading
Further Reading ▪ Bortz, J./Döring, N. (2012): Forschungsmethoden und Evaluation. Für Human- und Sozialwissenschaftler. 5. Auflage, Springer Medizin Verlag, Heidelberg. ▪ Braunecker, C. (2016): How to do Empirie, how to do SPSS – eine Gebrauchsanleitung. Facultas Verlags- und Buchhandels AG, Wien. ▪ Engelen, E.M. et al. (2010): Heureka – Evidenzkriterien in den Wissenschaften, ein Kompendium für den interdisziplinären Gebrauch. Spektrum akademischer Verlag, Heidelberg. ▪ Flick, U. et al. (2012): Handbuch Qualitative Sozialforschung. Grundlagen, Konzepte, Methoden und Anwendungen. 3. Auflage, Beltz Verlag, Weinheim. ▪ Hug, T./Poscheschnik, G. (2015): Empirisch Forschen, 2. Auflage, Verlag Huter & Roth KG, Wien. ▪ Hussy, W. et al. (2013): Forschungsmethoden in Psychologie und Sozialwissenschaften. 2. Auflage, Springer Medizin Verlag, Heidelberg.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Workbook

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☐ Exam Template	

Mathematics I

Module Code: DLBCSM1

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

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

Module Coordinator

N.N. (Mathematics I)

Contributing Courses to Module

- Mathematics I (DLBCSM101)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

- Basic definitions and terms of discrete mathematics
- Sets and propositional logic
- Number systems such as decimal and binary systems
- Graphs and mappings
- Selected topics of elementary number theory
- Cryptography

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the field(s) of Methods.	All Bachelor Programmes in the Business & Management field(s).

Mathematics I

Course Code: DLBCSM101

Study Level	Language of Instruction	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
   - 1.1 Basic Concepts
   - 1.2 Proof Techniques
   - 1.3 Finite Sums
2. Sets
   - 2.1 Properties and Calculation Rules for Sets
   - 2.2 Equivalence Relations
3. Propositional Logic
   - 3.1 Statements and Logical Connections
   - 3.2 Truth Tables
   - 3.3 Computational Rules of Propositional Logic
   - 3.4 Simplification of Expressions in Propositional Logic

4. Number Systems
   - 4.1 Decimal System
   - 4.2 Binary System
   - 4.3 Hexadecimal System

5. Mappings
   - 5.1 Mappings and Graphs
   - 5.2 Special Properties of Mappings

6. Basic Algebraic Structures
   - 6.1 Groups
   - 6.2 Rings
   - 6.3 Residual Class Rings

7. Prime Numbers
   - 7.1 Definition and Properties of Prime Numbers
   - 7.2 Prime Number Test

8. Modular Arithmetic
   - 8.1 The Euclidean Algorithm
   - 8.2 Fundamental Theorem of Arithmetic

9. Applications in Cryptography
   - 9.1 The Shift Cryptosystem
   - 9.2 Symmetric vs Asymmetric Cryptosystems
   - 9.3 The RSA Cryptosystem

Literature
Compulsory Reading
Further Reading ▪ Beutelspacher, A. (2003): Lineare Algebra. Eine Einführung in die Wissenschaft der Vektoren, Abbildungen und Matrizen. 6. Auflage, Vieweg. ▪ Beutelspacher, A. (2009): Kryptologie. Eine Einführung in die Wissenschaft vom Verschlüsseln, Verbergen und Verheimlichen. 9. Auflage, Vieweg+Teubner. ▪ Drews, R./Scholl, W. (2001): Handbuch der Mathematik. Orbis. ▪ Forster, O. (2001): Analysis 1. 6. Auflage, Vieweg. ▪ Hoffmann, U. (2005): Mathematik für Wirtschaftsinformatiker. Übungen mit Lösungen. (URL: http://opus.uni-lueneburg.de/opus/volltexte/2006/383/pdf/Uebungen_zur_Mathematik_fuer_Wirtschaftsinformatiker.pdf [letzter Zugriff: 27.02.2017]). ▪ Teschl, G./Teschl, S. (2013): Diskrete Mathematik und lineare Algebra. 4. Auflage, Springer Vieweg, Berlin, Heidelberg.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Requirements Engineering

Module Code: DLBCSRE

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

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

Module Coordinator

Prof. Dr. Tobias Brückmann (Requirements Engineering)

Contributing Courses to Module

- Requirements Engineering (DLBCSRE01)

Module Exam Type

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

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

Learning Outcomes

Requirements Engineering

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.

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

Requirements Engineering

Course Code: DLBCSRE01

Study Level	Language of Instruction	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
   - 1.1 Requirements Engineering in the Software Process
   - 1.2 Core Activities in Requirements Engineering
   - 1.3 What is a Requirement?
2. Determination of Requirements
   - 2.1 Determination of the System Context
   - 2.2 Determination of the Sources of Requirements
   - 2.3 Selection of the Appropriate Investigative Techniques
   - 2.4 Determine Requirements Using Techniques

3. Selected Investigative Techniques
   - 3.1 Creativity Techniques
   - 3.2 Interview Techniques
   - 3.3 Observation Techniques
   - 3.4 Prototyping

4. Documentation of Requirements
   - 4.1 Activities for Documenting Requirements
   - 4.2 Typical Elements of Requirements Documentation
   - 4.3 Forms of Documentation

5. Modeling of Processes
   - 5.1 Basics and Terms
   - 5.2 Modeling with the Business Process Model and Notation
   - 5.3 Modeling with Event Driven Process Chains

6. Modeling of Systems
   - 6.1 Fundamentals of Unified Modeling Language
   - 6.2 UML Use Case Diagram
   - 6.3 UML Activity Diagram
   - 6.4 UML Class Diagram
   - 6.5 UML State Diagram

7. Checking and Reconciling Requirements
   - 7.1 Activities for Checking and Reconciling Requirements
   - 7.2 Test Criteria
   - 7.3 Test Principles
   - 7.4 Testing Techniques
   - 7.5 Coordination of Requirements

8. Management of Prioritization Requirements and Techniques
   - 8.1 Managing Requirements
   - 8.2 Techniques for Prioritizing Requirements

Literature
Compulsory Reading
Further Reading ▪ Allweyer, T. (2009): BPMN 2.0. Business Process Model and Notation. Einführung in den Standard für die Geschäftsprozessmodellierung. 2. Auflage, Books on Demand, Norderstedt. ▪ Balzert, H. (2010): UML 2 kompakt mit Checklisten. 3. Auflage, Spektrum, Heidelberg. ▪ Booch, G./Rumbaugh, J./Jacobson, I. (2006): Das UML Benutzerhandbuch. Addison-Wesley, Bonn. ▪ Cohn, M. (2010): User Stories für die agile Software-Entwicklung mit Scrum, XP u.a. mitp, Frechen. ▪ Freund, J./Rücker, B. (2012): Praxishandbuch BPMN 2.0. 3. Auflage, Hanser. München. ▪ Gadatsch, A. (2012): Grundkurs Geschäftsprozess-Management. Methoden und Werkzeuge für die IT-Praxis. Eine Einführung für Studenten und Praktiker. 7. Auflage, Vieweg+Teubner, Wiesbaden. ▪ Pohl, K. (2008): Requirements Engineering. Grundlagen, Prinzipien, Techniken. 2. Auflage, dpunkt.verlag, Heidelberg. ▪ Pohl, K./Rupp, C. (2011): Basiswissen Requirements Engineering. Aus- und Weiterbildung nach IREB-Standard zum Certified Professional for Requirements Engineering Foundation Level. 3. Auflage, dpunkt.verlag, Heidelberg.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Object-oriented Programming with Java

Module Code: DLBCSOOPJ

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

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

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	Split Exam
Study Format: Distance Learning Exam, 90 Minutes	

Weight of Module

see curriculum

Module Contents

- Introduction to the Java language
- Java language constructs
- Introduction to object-oriented system developement
- 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	Links to other Study Programs of IUBH
This module is similar to other modules in the field(s) of Computer Science & Software Development.	All Bachelor Programmes in the IT & Technology field(s).

Object-oriented Programming with Java

Course Code: DLBCSOOPJ01

Study Level	Language of Instruction	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
   - 1.1 Object Orientation as a Way of Looking at Complex Systems
   - 1.2 The Object as a Basic Concept of Object Orientation
   - 1.3 Phases in the Object-Oriented Development Process
   - 1.4 Basic Principle of Object-Oriented System Development

2. Introduction to Object-Oriented Modeling
   - 2.1 Structuring Problems With Classes
   - 2.2 Identifying Classes
   - 2.3 Attributes as Properties of Classes
   - 2.4 Methods as Functions of Classes
   - 2.5 Associations between Classes
   - 2.6 Unified Modeling Language (UML)

3. Programming Classes in Java
   - 3.1 Introduction to the Java Programming Language
   - 3.2 Basic Elements of a Class in Java
   - 3.3 Attributes in Java
   - 3.4 Methods in Java
   - 3.5 Main Method: Starting Point of a Java Program

4. Java Language Constructs
   - 4.1 Primitive Data Types
   - 4.2 Variables
   - 4.3 Operators and Expressions
   - 4.4 Control Structures
   - 4.5 Packages and Visibility Modifiers .

5. Inheritance
   - 5.1 Modeling and Inheritance in the Class Diagram
   - 5.2 Programming Inheritance in Java

6. Important Object-Oriented Concepts
   - 6.1 Abstract Classes
   - 6.2 Polymorphism
   - 6.3 Static Attributes and Methods

7. Constructors for Generating Objects
   - 7.1 The Standard Constructor
   - 7.2 Overloading Constructors
   - 7.3 Constructors and Inheritance

8. Handling Exceptions with Exceptions
   - 8.1 Typical Scenarios of Exception Handling
   - 8.2 Standard Exceptions in Java
   - 8.3 Defining Your Own Exceptions

9. Programming Interfaces with Interfaces
   - 9.1 Typical Scenarios of Programming Interfaces
   - 9.2 Interfaces as Programming Interfaces in Java

Literature
Compulsory Reading
Further Reading ▪ Java (Hrsg.): Java Platform Standard Edition API Specification. (URL: http://www.oracle.com/technetwork/java/api-141528.html [letzter Zugriff: 21.11.2016]). ▪ Krüger G./Stark T. (2011): Handbuch der Java-Programmierung. 7. Auflage, Addison-Wesley, Salt Lake City. ▪ Lahres, B./Raýman, G. (2006): Praxisbuch Objektorientierung. Galileo Computing, Bonn. ▪ Oestereich B. (2012): Analyse und Design mit der UML 2.5. Objektorientierte Softwareentwicklung. 10. Auflage, Oldenbourg, München. ▪ Ratz, D. et al. (2011): Grundkurs Programmieren in Java. 6. Auflage, Carl Hanser Verlag, München. ▪ Ullenboom C. (2011): Java ist auch eine Insel. 10. Auflage, Galileo Computing, Bonn.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

2. Semester

Collaborative Work

Module Code: DLBCSCW

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

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

Module Coordinator

Prof. Dr. Karin Halbritter (Collaborative Work)

Contributing Courses to Module

- Collaborative Work (DLBCSCW01)

Module Exam Type

Module Exam	Split Exam
Study Format: Distance Learning Oral Assignment	

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 self-directed and collaborative learning processes with analog and digital media.
- initiate local and virtual cooperation and select suitable methods for shaping cooperation.
- assess different forms of communication in relation to the goals and requirements of different situations and reflect one's own communication and argumentation behaviour.
- explain potentials for conflict and the role of emotions in conflicts and describe the use of systemic methods in the target- and solution-oriented handling of conflicts.
- form an idea of one's own resources, present methods of self-management and self-motivation, and derive appropriate strategies.

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

Collaborative Work

Course Code: DLBCSCW01

Study Level	Language of Instruction	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 self-directed and collaborative learning processes with analog and digital media.
- initiate local and virtual cooperation and select suitable methods for shaping cooperation.
- assess different forms of communication in relation to the goals and requirements of different situations and reflect one's own communication and argumentation behaviour.
- explain potentials for conflict and the role of emotions in conflicts and describe the use of systemic methods in the target- and solution-oriented handling of conflicts.
- form an idea of one's own resources, present methods of self-management 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
   - 2.1 Finding and Winning Suitable Cooperation Partners
   - 2.2 Sustainable Relationships: Digital Interaction and Building Trust
   - 2.3 Collaboration: Organizing Locally and Virtually and Using Media
   - 2.4 Social Learning: Agile, Collaborative, and Mobile Planning of Learning Processes

3. Performance in (Virtual) Teams
   - 3.1 Goals, Roles, Organization and Performance Measurement
   - 3.2 Team Building and Team Flow
   - 3.3 Scrum as a Framework for Agile Project Management
   - 3.4 Design Thinking, Kanban, Planning Poker, Working-in-Progress-Limits & Co

4. Communicate and Convince
   - 4.1 Communication as Social Interaction
   - 4.2 Language, Images, Metaphors, and Stories
   - 4.3 It's the Attitude that Counts: Open, Empathetic, and Appreciative Communication
   - 4.4 Listen Actively - Argue - Convince - Motivate
   - 4.5 Analyze Your Own Conversational and Argumentational Skills

5. Recognize Conflict Potentials - Handle Conflicts - Negotiate Effectively
   - 5.1 Respecting Diversity - Seizing Opportunities
   - 5.2 Developing Empathy for Yourself and Others
   - 5.3 Systemic Work Solutions and Reframing
   - 5.4 Negotiate Constructively: Finding Clear Words - Interests Instead of Positions

6. Realize Your Own Projects
   - 6.1 Set Goals Effectively - Focus - Reflect
   - 6.2 The Agile Use of One's Own Time
   - 6.3 (Self-)Coaching and Inner Team
   - 6.4 Strategies and Methods for Self-Management and Self-Motivation

7. Mobilize Your Resources
   - 7.1 Recognizing Resources - Regulating Emotions
   - 7.2 Reflection and Innovation - Lateral Thinking and Creativity
   - 7.3 Transfer Strength and Willpower: Analyzing and Controlling Condition Factors

8. Construction Kit: Overview of Concepts, Tools, and Methods
   - 8.1 Communicate, Cooperate, Negotiate, Argue
   - 8.2 Think, Reflect, Develop Ideas, Decide, Lead Yourself

Literature
Compulsory Reading
Further Reading ▪ Baber, A. (2015): Strategic connections. The new face of networking in a collaborative world. Amacom, New York. ▪ Goleman, D. (2013): Focus. The hidden driver of excellence. Harper Collins USA, New York. ▪ Kaats, E./Opheij, W. (2014): Creating conditions for promising collaboration. Alliances, networks, chains, strategic partnerships. Springer Management, Berlin. ▪ Lang, M. D. (2019): The guide to reflective practice in conflict resolution. Rowman & Littlefield, Lanham/Maryland. ▪ Martin, S. J./Goldstein, N. J./Cialdini, R. B. (2015): The small BIG. Small changes that spark BIG influence. Profile Books, London.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Oral Assignment

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☐ Exam Template	

Corporate Finance and Investment

Module Code: DLBCFIE

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

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

Module Coordinator

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

Contributing Courses to Module

- Corporate Finance and Investment (DLBCFIE01)

Module Exam Type

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

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Finance & Tax Accounting	All Bachelor Programmes in the Business & Management fields

Corporate Finance and Investment

Course Code: DLBCFIE01

Study Level	Language of Instruction	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
   - 1.1 The Targets and Scope of Corporate Finance
   - 1.2 The Role of a Financial Manager
   - 1.3 The Financial Market Environment

2. Ownership and Corporate Governance
   - 2.1 Legal Types of Firms
   - 2.2 Agency Relations and Agency Problems in Corporations
   - 2.3 Institutional Investors, Incentives, and Market Control Mechanisms

3. Understanding Financial Statements and Key Performance Indicators
   - 3.1 Balance Sheets
   - 3.2 Income Statements
   - 3.3 Cash Flow Statements
   - 3.4 Measuring Performance: Key Performance Indicators

4. Basic Concepts of Financial Theory
   - 4.1 Time Value of Money and Cash Flow Streams
   - 4.2 Interest Rates: Determinants and Quotes
   - 4.3 Estimating the Cost of Capital

5. Types of Capital and Financing
   - 5.1 Equity Capital
   - 5.2 Debt Financing
   - 5.3 Leasing
   - 5.4 Financial Leverage and Capital Structure

6. Short-Term Financing Decisions
   - 6.1 Cash Budgets and Short-Term Financial Plans
   - 6.2 Treasury and Cash Management
   - 6.3 Working Capital Management

7. Capital Budgeting and Decision-Making Methods in Investment
   - 7.1 Capital Budgeting and Investments
   - 7.2 Incorporating Risk in Capital Budgeting Decisions
   - 7.3 Investment Rules and Decision-Making Methods

Literature
Compulsory Reading
Further Reading ▪ Berk, J., & DeMarzo, P. (2017). Corporate finance (4th ed.). Upper Saddle River, NJ: Pearson. ▪ Brealey, R. A., Myers, S. C., & Allen, F. (2020). Principles of corporate finance (13th ed.). New York, NY: McGraw-Hill. ▪ Ross, S. A., Westerfield, R. W., Jaffe, J., & Jordan, B. D. (2019). Corporate finance (12th ed.). New York, NY: McGraw-Hill. ▪ Zutter, C. J., & Smart, S. B. (2019). Principles of managerial finance (15th ed.). Upper Saddle River, NJ: Pearson. ▪ Moles, P., Parrino, R., & Kidwell, D. S. (2011). Corporate finance. Chichester: John Wiley & Sons. ▪ Baker, H. K., & English, P. (2011). Capital budgeting valuation: Financial analysis for today's investment projects. Chichester: John Wiley & Sons.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Written Assessment: Written Assignment

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☐ Exam Template	

Data structures and Java class library

Module Code: DLBCSDSJCL

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

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

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

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

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the field of Computer Science & Software Development.	All Bachelor Programmes in the IT & Technology fields

Data structures and Java class library

Course Code: DLBCSDSJCL01

Study Level	Language of Instruction	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
   - 1.1 Code Documentation
   - 1.2 Code Annotations
   - 1.3 Code Conventions
2. Working with Objects
   - 2.1 String Representation of Objects
   - 2.2 Compare with ==
   - 2.3 Compare with Equals()
   - 2.4 Compare by HashCode()
   - 2.5 CompareTo()
   - 2.6 Cloning Objects
3. External Packages and Libraries
   - 3.1 Importing Packages
   - 3.2 The Java Class Library

4. Data Structures
   - 4.1 Arrays
   - 4.2 Collections
   - 4.3 Working with Collections
   - 4.4 Lists
   - 4.5 Quantities (Sets)
   - 4.6 Associative Memory (Maps)
   - 4.7 Stacks (Basement)
   - 4.8 Queues (Snakes)

5. Strings and Calendar
   - 5.1 Strings
   - 5.2 StringBuffer
   - 5.3 Splitting Character Strings
   - 5.4 Date and time
   - 5.5 Calendar

6. File System and Data Streams
   - 6.1 Working with the File System
   - 6.2 Working with Files

Literature

Compulsory Reading

Further Reading

- Bloch, J. (2017): Effective Java. 3. Auflage, Addison-Wesley Professional, Boston.
- Bruegge, B./Dutoit, A.H (2013): Object-Oriented Software Engineering Using UML, Patterns, and Java: Pearson New International Edition. Pearson, London.
- Martin, R. (2009): Clean Code - Refactoring, Patterns, Testen und Techniken für sauberen Code: Deutsche Ausgabe. MITP Verlag, Heidelberg.
- McLaughlin, B./Pollice, G./West, D. (2006): Head First Object-Oriented Analysis and Design. O'Reilly, Heidelberg.
- Oracle (2018): The Java Language Specification. Java SE 11 Edition. (URL: https://docs.oracle.com/javase/specs/jls/se11/jls11.pdf [letzter Zugriff: 03.09.2019]).
- Seidl, M. (2015): UML @ Classroom. An Introduction to Object-Oriented Modeling, Springer, Berlin.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☑ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☑ Exam Template	

DLBCSDSJCL01

Statistics: Probability and Descriptive Statistics

Module Code: DLBDSSPDS

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

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

Module Coordinator

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

Contributing Courses to Module

- Statistics: Probability and Descriptive Statistics (DLBDSSPDS01)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

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

Learning Outcomes

Statistics: Probability and Descriptive Statistics

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.

Links to other Modules within the Study Program	Links to other Study Programs of IUBH
This module is similar to other modules in the field of Methods	All Bachelor Programmes in the Business & Management fields

Statistics: Probability and Descriptive Statistics

Course Code: DLBDSSPDS01

Study Level	Language of Instruction	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
   - 1.1 Definitions
   - 1.2 Independent events
   - 1.3 Conditional probability
   - 1.4 Bayesian statistics
2. Random Variables
   - 2.1 Random Variables
   - 2.2 Distribution functions and probability mass functions
   - 2.3 Important discrete probability distributions
   - 2.4 Important continous probability distributions

3. Joint Distributions
   - 3.1 Joint distributions
   - 3.2 Marginal distributions
   - 3.3 Independent random variables
   - 3.4 Conditional distributions

4. Expectation and Variance
   - 4.1 Expectation of a random variable, conditional expectations
   - 4.2 Variance and covariance
   - 4.3 Expectations and variances of important probability distributions
   - 4.4 Algebraic and central moments
   - 4.5 Moment-generating functions

5. Inequalities and Limit Theorems
   - 5.1 Probability inequalities
   - 5.2 Inequalities for expectations
   - 5.3 The law of large numbers
   - 5.4 Central limit theorem

Literature

Compulsory Reading

Further Reading

- Bruce, P., & Bruce, A. (2017). Practical statistics for data scientists: 50 essential concepts. Sebastopol, CA: O'Reilley.
- Downey, A. B. (2014). Think stats (2nd ed.). Sebastopol, CA: O'Reilly.
- Downey, A. B. (2013). Think Bayes. Sebastopol, CA: O'Reilly.
- Reinhart, A. (2015). Statistics done wrong: The woefully complete guide. San Francisco, CA: No Starch Press.
- Wassermann, L. (2004). All of statistics: A concise course in statistical inference. New York, NY: Springer Science+Business Media.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☑ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

DLBDSSPDS01

Database Modeling and Database Systems

Module Code: DLBCSDMDS

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

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

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	Split Exam
Study Format: Distance Learning Exam, 90 Minutes	

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the field(s) of Computer Science & Software Development	All Bachelor Programmes in the IT & Technology field(s).

Database Modeling and Database Systems

Course Code: DLBCSDMDS01

Study Level	Language of Instruction	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
   - 1.1 Basic Concepts of the Relational Data Model
   - 1.2 Find and Delete Records in the Database
   - 1.3 SQL and Relational Database Systems
2. Querying Data from a Single Table
   - 2.1 Query Data (SELECT)
   - 2.2 Query Data With Condition (WHERE)
   - 2.3 Sort Query Output (ORDER BY)
   - 2.4 Queries With Group Formation (GROUP BY)
   - 2.5 Subqueries With Nested SELECT Statements

3. Conception and Modeling of Relational Databases
   - 3.1 The Entity Relationship Model
   - 3.2 Relationships and Cardinalities in E/R Models
   - 3.3 Normal Forms of Databases

4. Creation of Relational Databases
   - 4.1 Logical Database Design Activities
   - 4.2 Mapping of the Conceptual Data Model into the Physical Data Model
   - 4.3 Generation of Tables in SQL Databases from E/R Diagrams

5. Complex Database Queries on Multiple Tables
   - 5.1 Composite Quantities (JOIN)
   - 5.2 Set Operations
   - 5.3 Data Views With CREATE VIEW

6. Manipulating Records in Databases
   - 6.1 Insert New Data Records (INSERT)
   - 6.2 Change Existing Records
   - 6.3 Transactions

7. NoSQL Database Systems
   - 7.1 Motivation and Basic Idea
   - 7.2 Selected Groups of NoSQL Systems

Literature

Compulsory Reading

Further Reading

- Edlich, S./Friedland, A./Hampe, J./Brauer, B./Brückner, M. (2011): NoSQL. Einstieg in die Welt nichtrelationaler Web 2.0 Datenbanken. 2. Auflage, Hanser, München.
- Throll, M/Bartosch, O. (2010): Einstieg in SQL. Verstehen, einsetzen, nachschlagen. 4. Auflage, Galileo Computing, Bonn.
- Steiner, R. (2017): Grundkurs Relationale Datenbanken. Einführung in die Praxis der Datenbankentwicklung für Ausbildung, Studium und IT-Beruf. 9. Auflage, Springer Vieweg, Wiesbaden.
- Unterstein, M./Matthiessen, G. (2013): Anwendungsentwicklung mit Datenbanken. 5. Auflage, Springer Vieweg, Wiesbaden.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

DLBCSDMDS01

Introduction to Process Management

Module Code: DLBWIEPM_E

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

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

Module Coordinator

N.N. (Introduction to Process Management)

Contributing Courses to Module

- Introduction to Process Management (DLBWIEPM01_E)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

- Terms and motivation for process management
- Fundamentals of enterprise modeling
- Modelling of business processes
- Process evaluation
- Utilization of reference processes
- Process changes

Learning Outcomes

Introduction to Process Management

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.

Links to other Modules within the Study Program	Links to other Study Programs of IUBH
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programs in the IT & Technology fields

Introduction to Process Management

Course Code: DLBWIEPM01_E

Study Level	Language of Instruction	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
   - 1.1 Terms: Process, Process Management, Actual Process, Target Process
   - 1.2 Motivation for Process Management
   - 1.3 Risks and Challenges of Changing Processes in Organizations
   - 1.4 Phases of the Process Design
2. Fundamentals of Enterprise Modeling
   - 2.1 Elements of Enterprise Modelling
   - 2.2 Forms of Organization
   - 2.3 Elements in Business Processes

3. Modelling of Business Processes
   - 3.1 Business Process and Notation (BPMN)
   - 3.2 Extended Event-Driven Process Chains (EEPK)

4. Process Evaluation
   - 4.1 Methods of Process Evaluation
   - 4.2 Use of KPIs for Process Evaluation
   - 4.3 IT-Supported Process Evaluation

5. Use of Reference Processes
   - 5.1 Motivation and Typical Examples of Reference Processes
   - 5.2 Example: ITIL as Process Framework for the Operation of IT

6. Process Changes
   - 6.1 Analysis of the Effects of Process Changes
   - 6.2 Rollout of Process Changes
   - 6.3 Change Management

Literature

Compulsory Reading

Further Reading

- 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.
- Dumas, M./La Rosa M./Mendling, J,/Reijers, H. A. (2018): Fundamentals of Business Process Management. 2nd edition, Springer Berlin/Heidelberg .
- Mendling, J. (2008): Metrics for Process Models: Empirical Foundations of Verification, Error Prediction, and Guidelines for Correctness. Springer, Berlin/ Heidelberg.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam or Written Assessment: Written Assignment, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
100 h	0 h	25 h	25 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

DLBWIEPM01_E

3. Semester

Fundamentals of IT and ERP systems

Module Code: DLBFMGSYS_E

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

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

Module Coordinator

N.N. (Fundamentals of IT and ERP systems)

Contributing Courses to Module

- Fundamentals of IT and ERP systems (DLBFMGSYS01_E)

Module Exam Type

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

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

Learning Outcomes

Fundamentals of IT and ERP systems

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.

Links to other Modules within the Study Program	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programs in the IT & Technology fields

Fundamentals of IT and ERP systems

Course Code: DLBFMGSYS01_E

Study Level	Language of Instruction	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
   - 1.1 Structure
   - 1.2 IT Enterprise Architecture as a Management Function
2. Components of a Successful IT Enterprise Architecture
   - 2.1 Business IT Alignment
   - 2.2 Improving Profitability and Cost Management
   - 2.3 Improvement of Time-To-Market
   - 2.4 Improving Customer Relationship Management and Customer Satisfaction
   - 2.5 Reduction of Heterogeneity to Improve Probability of Success in M&A Activities
   - 2.6 Compliance and Risk Management

3. Information Security
   - 3.1 Fundamentals and Protection Goals of Information Security
   - 3.2 Organization of Information Security
   - 3.3 Vulnerability Analysis
   - 3.4 Prevention and Emergency Management
   - 3.5 Security Measures

4. Enterprise Resource Planning (ERP)
   - 4.1 Conceptual Basis of ERP Systems
   - 4.2 System Architectures of ERP Systems
   - 4.3 Planning and Control of Operational Resources
   - 4.4 Planning and Management of Strategic Resources
   - 4.5 Planning and Control of Cross-Company Resources

5. Implementation of Enterprise Resource Planning Systems
   - 5.1 Selection and Introduction of Enterprise Resource Planning Systems
   - 5.2 Operation of Enterprise Resource Planning Systems

6. Open Source Software and Cloud Computing
   - 6.1 Free and Open Source Software
   - 6.2 Licenses and Communities
   - 6.3 Cloud Computing

Literature

Compulsory Reading

Further Reading

- Caserio, C./Trucco S. (2018): Enterprise Resource Planning and Business Intelligence Systems for Information Quality: An Empirical Analysis in the Italian Setting (Contributions to Management Science). Springer International Publishing, Cham.
- Ganesh, K. et al (2016): Enterprise Resource Planning, Fundamentals of Design and Implementation. Springer International Publishing, Cham.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

DLBFMGSYS01_E

Web Application Development

Module Code: DLBCSWAD

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	DLBCSOOPJ01, DLBCSDSJCL01	BA	5	150 h

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

Module Coordinator

Prof. Dr. André Hollstein (Web Application Development)

Contributing Courses to Module

- Web Application Development (DLBCSWAD01)

Module Exam Type

Module Exam	Split Exam
Study Format: Distance Learning Workbook	

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the field of Computer Science & Software Development.	All Bachelor Programmes in the IT & Technology field.

Web Application Development

Course Code: DLBCSWAD01

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

Course Description

TThis 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
   - 1.1 Structure and History of the Internet
   - 1.2 Internet protocols and URIs
   - 1.3 Web application architecture
   - 1.4 Current trends
2. Tools of web development
   - 2.1 Development Tools
   - 2.2 Version management
   - 2.3 Package Manager
   - 2.4 Upload/Deployment

3. Static web pages developement
   - 3.1 Fundamentals of HTML5
   - 3.2 Fundamentals of CSS

4. Advanced design techniques
   - 4.1 Responsive web design
   - 4.2 Page layout
   - 4.3 Media queries
   - 4.4 CSS Frameworks

5. Web page development with JavaScript
   - 5.1 JavaScript history, ES5/ES6
   - 5.2 JavaScript fundamentals
   - 5.3 Use of JSON
   - 5.4 Common JavaScript Frameworks

6. Web application testing and security
   - 6.1 Testing of web applications
   - 6.2 Basic security concepts and principles

Literature

Compulsory Reading

Further Reading

- Ali Sunyaev (2020): Internet Computing: Principles of Distributed Systems and Emerging Internet-Based Technologies. Bd. 1st ed., Springer, Cham.
- Bühler, P./ Sinner, D. / Schlaich P. (2017): HTML5 und CSS3: Semantik - Design - Responsive Layouts. Springer, Berlin Heidelberg.
- Ferguson R. (2019): Beginning JavaScript: The Ultimate Guide to Modern JavaScript Development. Bd.3rd edition, Apress, Berkeley, CA.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Workbook

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☐ Exam Template	

DLBCSWAD01

Programming Information Systems with Java EE

Module Code: IPWA2_E

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

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

Module Coordinator

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

Contributing Courses to Module

- Programming Information Systems with Java EE (IPWA02_E)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

- Programming of business logic
- Programming of database connections

Learning Outcomes

Programming Information Systems with Java EE

On successful completion, students will be able to

- explain and differentiate relevant technologies, standards and frameworks for the creation of business logic and database connectivity in enterprise web applications.
- use different web technologies to implement and integrate application interfaces, business logic and data layers.
- independently create suitable web applications to solve practical problems.

Links to other Modules within the Study Program	Links to other Study Programs of IUBH
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programs in the IT & Technology fields

Programming Information Systems with Java EE

Course Code: IPWA02_E

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

Course Description

This course focuses on the business logic and database connectivity of web applications, starting with extending simple web interfaces with functions for validating and converting inputs and creating error messages. As lowest layer of web applications, concepts and technologies for connecting to database systems are presented and applied.

Course Outcomes

On successful completion, students will be able to

- explain and differentiate relevant technologies, standards and frameworks for the creation of business logic and database connectivity in enterprise web applications.
- use different web technologies to implement and integrate application interfaces, business logic and data layers.
- independently create suitable web applications to solve practical problems.

Contents

1. Programming of Business Logic
   - 1.1 Validation of User Input
   - 1.2 Conversion of Numbers, Currencies and Dates
   - 1.3 Definition of Error Messages
   - 1.4 Page Navigation within JSF Applications
   - 1.5 JSF Life Cycle and Event Handling
2. Programming of Database Connections
   - 2.1 Persistent Storage in Databases
   - 2.2 Object Relational Mapping
   - 2.3 Database Persistence with JPA and Hibernate as Persistence Providers
   - 2.4 Creating Entities
   - 2.5 Associations Between Objects Using JPA
   - 2.6 Deleting Objects Using JPA
   - 2.7 Data Access Objects

Literature
Compulsory Reading
Further Reading ▪ Keith, M./Schincariol, M./Nardone, M. (2018): Pro JPA 2 in Java EE 8. An In-Depth Guide to Java Persistence APIs. 3rd Edition, Apress. ▪ Scholtz, B./ Tijms, A. (2018): The Definitive Guide to JSF in Java EE 8: Building Web Applications with JavaServer Faces. 1st Edition, Apress.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Management Accounting

Module Code: DLBMAE

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

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

Module Coordinator

Prof. Dr. Muhammad Ashfaq (Management Accounting)

Contributing Courses to Module

- Management Accounting (DLBMAE01)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

- Management accounting and control function
- Differences between management accounting, and financial accounting
- Cost terms, cost categories, and cost behavior
- Cost allocation
- General and specific cost allocation methods
- Break-even analysis
- Planning and budgeting

Learning Outcomes

Management Accounting

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.

Links to other Modules within the Study Program	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Finance & Tax Accounting	All Bachelor Programmes in the Business & Management fields

Management Accounting

Course Code: DLBMAE01

Study Level	Language of Instruction	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
   - 1.1 Financial vs. Management/Cost Accounting
   - 1.2 Definition of Cost
   - 1.3 Considering the Contemporary Business World Context
   - 1.4 Cost Behavior: Fixed and Variable Costs
2. Cost-Volume-Profit Analysis
   - 2.1 Break-Even Analysis
   - 2.2 Cost Structure and Operating Leverage
   - 2.3 Cost Structure and Variabilization

3. Simplistic Methods of Cost Allocation
   - 3.1 Cost Behavior: Direct and Indirect Costs
   - 3.2 The Need for Cost Allocation
   - 3.3 Predetermined Overhead Rate
   - 3.4 Departmental Overhead Rate
   - 3.5 Over- and Under-Application of Overhead

4. Activity-Based Costing
   - 4.1 The Rationale of Activity-Based Costing
   - 4.2 Implementing Activity-Based Costing

5. Overhead Analysis Sheet
   - 5.1 Departmental Cost Allocation
   - 5.2 Reciprocal Method
   - 5.3 Step Method

6. Relevant Cost Concepts
   - 6.1 Foundational Cost Concepts
   - 6.2 Replacement of Equipment
   - 6.3 Make or Buy
   - 6.4 Special Order
   - 6.5 Drop Product Line

7. Operating Budgets
   - 7.1 The Budgeting Process
   - 7.2 Sales Budget
   - 7.3 Production Budgets
   - 7.4 Administrative Expense Budget
   - 7.5 Budgeted Income Statement

8. Financial Budgets
   - 8.1 Cash Budget
   - 8.2 Conflicts and Pitfalls in Budgeting

Literature
Compulsory Reading
Further Reading ▪ Bhimani, A. et al (2015): Management and cost accounting. 6th ed., Pearson, Harlow. ▪ Walsh, C. (2006): Key management ratios: The clearest guide to the critical numbers that drive your business. 4th ed., Prentice Hall, Harlow. ▪ Anthony, R./Govindarajan, V. (2006): Management control systems. 12th ed., McGraw Hill, New York, NY.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam or Written Assessment: Written Assignment

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
100 h	0 h	25 h	25 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☑ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Intercultural and Ethical Decision-Making

Module Code: DLBCSIDM

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

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

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

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

Learning Outcomes

Intercultural and Ethical Decision-Making

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.

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

Intercultural and Ethical Decision-Making

Course Code: DLBCSIDM01

Study Level	Language of Instruction	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
   - 1.1 Subject Areas, Terms, and Definitions
   - 1.2 Relevance of Intercultural and Ethical Action
   - 1.3 Intercultural Action - Diversity, Globalization, Ethics
2. Cultural Concepts
   - 2.1 Hofstedes Cultural Dimensions
   - 2.2 Culture Differentiation According to Hall
   - 2.3 Locus of Control Concept to Rotter

3. Culture and Ethics
   - 3.1 Ethics - Basic Terms and Concepts
   - 3.2 Interdependence of Culture and Ethics
   - 3.3 Ethical Concepts in Different Regions of the World

4. Current Topics in the Area of Interculturality, Ethics, and Diversity
   - 4.1 Digital Ethics
   - 4.2 Equality and Equal Opportunities
   - 4.3 Social Diversity

5. Intercultural Learning and Working
   - 5.1 Acculturation
   - 5.2 Learning and Working in Intercultural Groups
   - 5.3 Strategies for Dealing with Cultural Conflicts

6. Case Studies for Cultural and Ethical Conflicts
   - 6.1 Case Study: Interculturality
   - 6.2 Case Study: Diversity
   - 6.3 Case Study: Interculturality and Ethics

Literature

Compulsory Reading

Further Reading

- Emrich, C. (2011): Interkulturelles Management: Erfolgsfaktoren im globalen Business. Kohlhammer-Verlag, Stuttgart/Berlin/Köln.
- Erll, A./Gymnich, M. (2015): Uni-Wissen Interkulturelle Kompetenzen: Erfolgreich kommunizieren zwischen den Kulturen – Kernkompetenzen. 4. Auflage, Klett Lerntraining, Stuttgart.
- Eß, O. (2010): Das Andere lehren: Handbuch zur Lehre Interkultureller Handlungskompetenz. Waxmann Verlag, Münster.
- Hofstede, G./ Hofstede, G. J./Minkov, M. (2017): Lokales Denken, globales Handeln Interkulturelle Zusammenarbeit und globales Management. 6. Auflage, Beck, München.
- Leenen, W.R./Groß, A. (2018): Handbuch Methoden Interkultureller Bildung und Weiterbildung. Verlag Vandenhoeck & Ruprecht, Göttingen.
- Thomas, A. (2011): Interkulturelle Handlungskompetenz. Versiert, angemessen und erfolgreich im internationalen Geschäft. Gabler-Verlag, Wiesbaden.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Case Study

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

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☐ Exam Template	

Software Quality Assurance

Module Code: DLBCSSQA

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

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

Module Coordinator

N.N. (Software Quality Assurance)

Contributing Courses to Module

- Software Quality Assurance (DLBCSSQA01)

Module Exam Type

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

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

Learning Outcomes

Software Quality Assurance

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.

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

Software Quality Assurance

Course Code: DLBCSSQA01

Study Level	Language of Instruction	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
   - 1.1 Motivation and Terms
   - 1.2 Principles of SW Quality Assurance
   - 1.3 Principles in Software Testing
   - 1.4 Cost of Quality
2. Organization and Planning of Software Quality
   - 2.1 Overview of the Quality Management Process
   - 2.2 Quality Planning and Quality Objectives
   - 2.3 Quality Assurance and Quality Improvement
   - 2.4 Quality Control

3. Constructive Quality Management
   - 3.1 Overview of Constructive Quality Assurance
   - 3.2 Selected Techniques

4. Static Quality Assurance: Surveying and Measuring
   - 4.1 Application and Overview of Static Processes
   - 4.2 Reviewing with Review Techniques
   - 4.3 Trade Fairs and Metrics
   - 4.4 Static Code Analysis

5. Dynamic Quality Assurance: Testing
   - 5.1 Deployment and an Overview of Dynamic Processes
   - 5.2 Use Case Based Test Case Creation
   - 5.3 Equivalence Class Formation and Limit Value Analysis
   - 5.4 State Based Test Case Creation
   - 5.5 Creation of Random Test Data

6. Systematic Testing of Software
   - 6.1 Methodological Testing Activities
   - 6.2 Component Test (Also: Module Test, Unit Test)
   - 6.3 Integration Tests
   - 6.4 System Tests
   - 6.5 Acceptance Tests

7. Systematic Quality Assurance of Requirements, Architectures, and Processes
   - 7.1 Quality Assurance of Requirements
   - 7.2 Quality Assurance of Architectures
   - 7.3 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 Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

4. Semester

Data Analytics and Big Data

Module Code: DLBINGDABD_E

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

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

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

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the field of Engineering	All Bachelor Programs in the IT & Technology fields

Data Analytics and Big Data

Course Code: DLBINGDABD01_E

Study Level	Language of Instruction	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
   - 1.1 Decisions, Information, Data
   - 1.2 Historical Development of Data Storage and Evaluation
   - 1.3 Big Data: Features and Examples
   - 1.4 Data Analysis
   - 1.5 Internet of Things as Driver for Big Data

2. Statistical Basics
   - 2.1 Descriptive Data Analysis
   - 2.2 Inferential Data Analysis
   - 2.3 Explorative Data Analysis
   - 2.4 Multivariate Data Analysis

3. Data Mining
   - 3.1 Knowledge Discovery in Databases
   - 3.2 Association Analysis
   - 3.3 Correlation Analysis
   - 3.4 Forecast
   - 3.5 Cluster Analysis
   - 3.6 Classification

4. Big Data Methods and Technologies
   - 4.1 Technology Building Blocks
   - 4.2 MapReduce
   - 4.3 Text- and Semantic Analysis
   - 4.4 Audio and Video Analysis
   - 4.5 BASE and NoSQL
   - 4.6 In-Memory Databases
   - 4.7 Big Data Success Factors

5. Legal Aspects of Data Analysis
   - 5.1 Data Protection Principles in Germany
   - 5.2 Anonymization and Pseudonymization
   - 5.3 International Data Analysis
   - 5.4 Performance and Integrity Protection

6. Solution Scenarios

7. Application of Big Data in the Industry
   - 7.1 Production and Logistics
   - 7.2 Increased Efficiency in the Supply Chain
   - 7.3 Key-Factor Data
   - 7.4 Examples and Conclusion

Literature
Compulsory Reading
Further Reading ▪ Brandt, S. (2013): Datenanalyse für Naturwissenschaftler und Ingenieure. Mit statistischen Methoden und Java-Programmen. 5. Auflage, Springer, Wiesbaden. ▪ Dorschel, J. (Hrsg.) (2015): Praxishandbuch Big Data. Wirtschaft – Recht – Technik. Springer Gabler Wiesbaden. ▪ Gandomi, A./Haider, M. (2015): Beyond the hype. Big data concepts, methods, and analytics. In: International Journal of Information Management, 35. Jg., Heft 2, S. 137–144. ▪ Provost, F./Fawcett, T. (2013): Data science for business. What You Need to Know About Data Mining and Data-Aalytic Thinking. O'Reilly, Sebastopol (CA). ▪ Runkler, T. A. (2015): Data Mining. Modelle und Algorithmen intelligenter Datenanalyse. 2. Auflage, Springer Vieweg, Wiesbaden.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Case Study

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

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☐ Exam Template	

Purchasing, Procurement and Distribution

Module Code: DLBBWEBD_E

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

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

Module Coordinator

N.N. (Purchasing, Procurement and Distribution)

Contributing Courses to Module

- Purchasing, Procurement and Distribution (DLBLOISCM102_E)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

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

Learning Outcomes

Purchasing, Procurement and Distribution

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.

Links to other Modules within the Study Program	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Transportation & Logistics	All Bachelor Programs in the Transport & Logistics fields

Purchasing, Procurement and Distribution

Course Code: DLBLOISCM102_E

Study Level	Language of Instruction	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
   - 1.1 Definition of "Procurement" and "Procurement Process”
   - 1.2 Make-or-Buy Decisions
   - 1.3 In- and Outsourcing Strategies
   - 1.4 Procurement Concepts and Strategies
   - 1.5 Market Research in procurement
   - 1.6 Supply Management
   - 1.7 Information and Communication Systems in Purchasing and Procurement
   - 1.8 Organizational Concepts in Procurement

2. Basics of Distribution
   - 2.1 Functions of Distribution
   - 2.2 Operational Distribution Agencies and Intermediaries
   - 2.3 Distribution Logistics
   - 2.4 Distribution Structures
   - 2.5 Distribution Strategies
   - 2.6 Operational Distribution Management

3. Distribution of Industrial Goods
   - 3.1 Industrial Goods Marketing
   - 3.2 Product Business
   - 3.3 Asset Business
   - 3.4 Systems Business
   - 3.5 Supplier Business

4. Trends and Digitalization in Procurement and Distribution
   - 4.1 Electronic Marketplaces
   - 4.2 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, 11th 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

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

DLBLOISCM102_E

IT Law

Module Code: DLBCSIITL

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

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

Module Coordinator

N.N. (International IT Law)

Contributing Courses to Module

- International IT Law (DLBCSIITL01)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

- Basic Concepts of Legal Systems
- Internet and Domain Law
- Contracts
- Intellectual Property
- Data Protection / Privacy

Learning Outcomes	
International 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 Developement.	**Links to other Study Programs of IUBH** All Bachelor Programmes in the IT & Technology field(s).

International IT Law

Course Code: DLBCSIITL01

Study Level	Language of Instruction	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
   - 1.1 The Role of Law in IT
   - 1.2 Basic Concepts of the Legal System in the European Union
   - 1.3 Basic Concepts of the Legal System in the USA
   - 1.4 Basic Concepts of the Legal System in India
2. Internet and Domain Law
   - 2.1 Web Sites and the Law
   - 2.2 Net Neutrality
   - 2.3 Domain Registration
   - 2.4 Internet Crime

3. Contracts
   - 3.1 Types of IT Contracts
   - 3.2 Electronic Contracts and Electronic Signatures
   - 3.3 Licences
   - 3.4 Free and Open Source Software
   - 3.5 Buying and Selling Off-the-Shelf Software
   - 3.6 Software Development Contracts

4. Intellectual Property
   - 4.1 Brands, Trade Marks and Domain Names
   - 4.2 Copyright
   - 4.3 Software Patents
   - 4.4 Digital and Data Ownership

5. Data Protection/Privacy
   - 5.1 Basic Concepts of Data Protection
   - 5.2 Data Protection in the European Union: the GDPR
   - 5.3 Data Protection in the USA
   - 5.4 Data Protection in India
   - 5.5 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
- 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#

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Case Study

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Written Assessment: Case Study, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☐ Exam Template	

IT project and architecture management

Module Code: DLBCSEITPAM

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

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

Module Coordinator

N.N. (IT Project Management) / N.N. (IT Architecture Management)

Contributing Courses to Module

- IT Project Management (DLBCSEITPAM01)
- IT Architecture Management (DLBCSEITPAM02)

Module Exam Type

Module Exam	Split Exam
	IT Project Management • Study Format "Distance Learning": Exam, 90 Minutes IT Architecture Management • Study Format "Distance Learning": Exam, 90 Minutes

Weight of Module

see curriculum

Module Contents

IT Project Management

- Basic terms and foundations of IT project management
- Large and small planning techniques
- Techniques for prioritization, cost-estimation, and project controlling
- Techniques for stakeholder, communication, and risk management
- Organization and structure in IT project management
- Schools of thought in IT project management

IT Architecture Management

- Basic terms and foundations of IT enterprise architectures management
- IT application portfolio management
- Architecture governance
- Modeling of IT enterprise architectures
- Frameworks using TOGAF as an example
- Reference models and sample catalogues

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.

IT Architecture Management

On successful completion, students will be able to

- describe and explain the basic principles of IT strategy, governance, and architecture management, differentiating between them.
- explain and differentiate the typical activities of IT architecture management, their interrelationships, and their dependencies.
- explain suitable models of IT architecture management, distinguish between them, and explain their intended purpose.
- explain and describe selected IT architectural frameworks as well as reference models and sample catalogues.

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

IT Project Management

Course Code: DLBCSEITPAM01

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

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
   - 1.1 Definition of a Project and Types of IT Projects
   - 1.2 IT Project Lifecycle
   - 1.3 Multi-Project Management – The Project in the Context of the Organization
2. Planning Techniques
   - 2.1 Large-Scale Planning: Milestones, Sub-tasks, and Work Packages
   - 2.2 Large-Scale Planning: Gantt Charts
   - 2.3 Planning and Organization of Work Packages: Kanban Board
3. Prioritization, Estimation of Costs, Project Controlling
   - 3.1 Prioritization
   - 3.2 Estimation of Costs
   - 3.3 Project Controlling

4. Stakeholder, Communication and Risk Management
   4.1 Stakeholder Management
   4.2 Communication Management
   4.3 Risk Management

5. Organization and Structure in IT Project Management
   5.1 Overview and Levels of Management from PRINCE2
   5.2 Management Processes in PRINCE2
   5.3 Pragmatic IT Project Management (PITPM)
   5.4 Configuration of an IT Project in PITPM
   5.5 Management of a project in PITPM

6. Schools of Thought in IT Project Management
   6.1 Agile Software Development
   6.2 Value-Based Software Engineering

Literature

Compulsory Reading

Further Reading

- Berkun, S. (2009): Die Kunst des IT-Projektmanagements. 2. Auflage, O'Reilly, Sebastopol, CA.
- DeMarco, T. (2003): Bärentango. Mit Risikomanagement Projekte zum Erfolg führen. Carl Hanser Verlag, München.
- Geirhos, M. (2011): IT-Projektmanagement. Was wirklich funktioniert – und was nicht. Galileo Computing, Bonn.
- Höhn, R./Höppner S. (2008): Das V-Modell XT. Grundlagen, Methodik und Anwendungen. Springer, Berlin/Heidelberg.
- Malik, M. (2006): Führen, Leisten, Leben. Wirksames Management für eine neue Zeit. Campus, Frankfurt a. M.
- Mangold, P. (2009): IT-Projektmanagement kompakt. 3.Auflage, Spektrum.
- Motzel, E./Pannenbäcker, O. (1998): Projektmanagement-Kanon. Der deutsche Zugang zum Project Management Body of Knowledge. TÜV-Verlag, Köln.
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- Pichler, R. (2007): Scrum. Agiles Projektmanagement erfolgreich einsetzen. dpunkt.verlag, Heidelberg.
- Schwalbe, K. (2010): Information Technology Project Management. 6. Auflage, Course Technology, Independence, KY.
- Tiemeyer, E. (2010): Handbuch IT-Projektmanagement. Vorgehensmodelle, Managementinstrumente, Good Practices. Hanser, München.
- Versteegen, G. (2000): Projektmanagement: mit dem Rational Unified Process. Springer, Berlin/Heidelberg.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

IT Architecture Management

Course Code: DLBCSEITPAM02

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

Course Description

In addition to concrete IT projects, such as the development of a new IT system or the introduction of standard software, a strategic management system for organizational-wide IT infrastructure – that is, for all IT hardware and software systems – must be used.Strategic management is the responsibility of the IT enterprise architect, who operates IT architecture management. Their task is to strategically align IT infrastructure with an organization's business and IT strategy.This course covers the typical concepts, methods, procedures, and IT models of architecture management.

Course Outcomes

On successful completion, students will be able to

- describe and explain the basic principles of IT strategy, governance, and architecture management, differentiating between them.
- explain and differentiate the typical activities of IT architecture management, their interrelationships, and their dependencies.
- explain suitable models of IT architecture management, distinguish between them, and explain their intended purpose.
- explain and describe selected IT architectural frameworks as well as reference models and sample catalogues.

Contents

1. Basic Terms and Foundation for the Management of IT Enterprise Architectures
   - 1.1 IT Enterprise Architecture
   - 1.2 Goals of Enterprise Architecture Management
   - 1.3 Processes in the Management of IT Enterprise Architectures
2. IT Application Portfolio Management
   - 2.1 IT Application Portfolio Management Overview
   - 2.2 Application Manual
   - 2.3 Portfolio Analysis
   - 2.4 Development Planning

3. Architecture Governance
   - 3.1 Organizational Structure
   - 3.2 Policy Development and Enforcement
   - 3.3 Project Support

4. Modeling of IT Enterprise Architectures
   - 4.1 Models in the Context of IT Architecture Management
   - 4.2 Forms of Documentation for Processes and Applications
   - 4.3 Forms of Documentation for Systems and Technologies

5. Frameworks Using the Example of TOGAF
   - 5.1 Fundamentals and Use of IT Architecture Frameworks
   - 5.2 Overview and Categories of EAM Frameworks
   - 5.3 The Open Group Architecture Framework (TOGAF)

6. Reference Models and Sample Catalogues
   - 6.1 Architecture Reference Models
   - 6.2 EAM Design Sample Catalogue

Literature

Compulsory Reading

Further Reading

- Hanschke, I. (2011): Enterprise Architecture Management. Einfach und effektiv. Hanser, München.
- Keller, W. (2012): IT-Unternehmensarchitektur. Von der Geschäftsstrategie zur optimalen IT-Unterstützung. 2. Auflage, dpunkt.verlag, Heidelberg.
- Keuntje. J. H./Barkow, R. (Hrsg.) (2010): Enterprise Architecture. Management in der Praxis. Wandel, Komplexität und IT-Kosten im Unternehmen beherrschen. Symposion Publishing, Ettlingen.
- Ross, J. W./ Weill, P./Robertson, D. C. (2006): Enterprise Architecture as Strategy. Creating a Foundation for Business Execution. Harvard Business Review Press, Boston, MA.
- Schwarzer, B. (2009): Einführung in das Enterprise Architecture Management. Verstehen – Planen – Umsetzen. Books on Demand, Norderstedt.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Project: Software Engineering

Module Code: DLBCSPSE

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

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

Module Coordinator

N.N. (Project: Software Engineering)

Contributing Courses to Module

- Project: Software Engineering (DLBCSPSE01)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

- 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.

Learning Outcomes

Project: Software Engineering

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.

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

Project: Software Engineering

Course Code: DLBCSPSE01

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

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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

International Marketing

Module Code: DLBDSEIMB1

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

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

Module Coordinator

Caterina Fox (International Marketing)

Contributing Courses to Module

- International Marketing (DLBDSEIMB01)

Module Exam Type

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

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Marketing & Sales	All Bachelor Programmes in the Marketing & Communication fields

International Marketing

Course Code: DLBDSEIMB01

Study Level	Language of Instruction	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
   - 1.1 Internationalization
   - 1.2 Theoretical Foundations of International Market Entry Strategies
   - 1.3 Forms of International Market Entry
2. Cultural Differences as an Aspect of International Marketing
   - 2.1 Overview of Culture
   - 2.2 Cultural Model Based on Hofstede
   - 2.3 Cultural Model Based on Trompenaars

3. Case Studies in International Market Entry and Marketing Strategies
   - 3.1 Case Study: Nivea in South Korea
   - 3.2 Case Study: Bosch and Siemens Hausgeräte GmbH in China
   - 3.3 Case Study: Siemens Mobile in China
   - 3.4 Case Study: Siemens in China

4. International Product Management and Product Development
   - 4.1 Goals of International Product Management
   - 4.2 Framework Conditions for International Product Management
   - 4.3 International Product Decisions
   - 4.4 International Product Development

5. Exchange Rate Fluctuations and International Price Calculation
   - 5.1 Tasks and Objectives of International Price Management
   - 5.2 Factors Influencing International Price Management
   - 5.3 Instruments of International Price Management

6. International Communication and International Sales Policy
   - 6.1 International Communication Management
   - 6.2 International Sales Management

7. International Marketing and Ethics
   - 7.1 Overview of International Marketing and Ethics
   - 7.2 Business Ethics in International Companies
   - 7.3 Case Study: Nestlé

8. Applied Market Research and Its Influence on Consumer Behavior
   - 8.1 Scope of International Market Research
   - 8.2 Requirements for International Market Research Information
   - 8.3 International Secondary Research
   - 8.4 International Primary Research

9. Monitoring and Control in International Marketing
   - 9.1 Controlling in International Management

10. Six Sigma, Brand Management, and Rebranding
    - 10.1 Six Sigma: Basics, Definitions, and Processes
    - 10.2 Brand Management
    - 10.3 Rebranding

Literature
Compulsory Reading
Further Reading ▪ Backhaus, K./Voeth, M. (2010): Internationales Marketing. Schäffer-Poeschel Stuttgart. ▪ Berndt, R./Altobelli, C. F./Sander, M. (2010): Internationales Marketing-Management. 4. Auflage, Springer, Berlin. ▪ Homburg, C./Krohmer, H. (2009): Marketingmanagement. Strategie – Instrumente – Umsetzung – Unternehmensführung. 3. Auflage, Gabler, Wiesbaden. ▪ Horx, M. (2005): Wie wir leben werden. Unsere Zukunft beginnt jetzt. Campus, Frankfurt a. M. ▪ Kotabe, M./Helsen, K. (2008): Global Marketing Management. 4. Auflage, Wiley, Hoboken (NJ). ▪ Kotler, P./Keller K. L./Bliemel, F. (2007): Marketing-Management. Strategien für wertschaffendes Handeln. 12. Auflage, Pearson Studium, Stuttgart.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

5. Semester

Principles of Management

Module Code: DLBBAPM_E

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

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

Module Coordinator

Prof. Dr. Markus Prandini (Principles of Management)

Contributing Courses to Module

- Principles of Management (DLBBAPM01_E)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

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

Learning Outcomes

Principles of Management

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 und competitive strategies.
- analyze organizational structures and designs.
- transfer knowledge about basic principles of management to real-world cases.

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

Principles of Management

Course Code: DLBBAPM01_E

Study Level	Language of Instruction	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 und competitive strategies.
- analyze organizational structures and designs.
- transfer knowledge about basic principles of management to real-world cases.

Contents

1. Introduction to Management
   - 1.1 Functions, Roles and Skills of Managers
   - 1.2 Influencing Factors on Managers' Tasks
   - 1.3 History of Management
2. Managerial Decision-Making
   - 2.1 Decision-Making Process
   - 2.2 Approaches to Decision Making
   - 2.3 Types of Decisions and Decision-Making Conditions
3. Planning and Goal-Setting
   - 3.1 The Role of Planning
   - 3.2 Goals and Plans
   - 3.3 Setting Goals and Developing Plans

4. Strategic Planning
   - 4.1 Strategic Management
   - 4.2 The Strategic Management Process
   - 4.3 Corporate Strategies
   - 4.4 Competitive Strategies

5. Organizing
   - 5.1 Organizational Structures and Design
   - 5.2 Organizational Change
   - 5.3 Managing Change

6. Leading
   - 6.1 Interpersonal and Organizational Communication
   - 6.2 Organizational Behavior
   - 6.3 Leadership

7. Controlling
   - 7.1 The Control Process
   - 7.2 Tools for Measuring Organizational Performance

Literature

Compulsory Reading

Further Reading

- Becerra, M. (2009): Theory of the Firm for Strategic Management. Cambridge University Press, Cambridge.
- Bright D.S. et al (2020): Principles of Management. (URL: http://cnx.org/content/col28330/1.8 [Retrieved: 19 March 2020]).
- Carpenter, M./Sanders, G. (2014): Strategic Management. Concepts and Cases, New International Edition. 2nd Edition, Pearson, Harlow.
- Hitt, M.A./Freeman, R.E./Harrison, J.S. (Eds.) (2020): The Blackwell Handbook of Strategic Management. Blackwell, Oxford.
- Robbins, S.P./Coulter, M. (2020): Management, Global Edition. 15th Edition, Pearson, Hoboken, NJ.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Case Study

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

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☐ Exam Template	

DLBBAPM01_E

Seminar: Software Engineering

Module Code: ISSE_E

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

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

Module Coordinator

N.N. (Seminar: Software Engineering)

Contributing Courses to Module

- Seminar: Software Engineering (ISSE01_E)

Module Exam Type

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

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fiels of Computer Science & Software Development	All Bachelor Programs in the IT & Technology fields

Seminar: Software Engineering

Course Code: ISSE01_E

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

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 Distance Learning

Study Format	Course Type
Distance Learning	Seminar

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Written Assessment: Research Essay

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

Digital Business Models

Module Code: DLBLODB_E

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

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

Module Coordinator

Prof. Dr. Mario Boßlau (Digital Business Models)

Contributing Courses to Module

- Digital Business Models (DLBLODB01_E)

Module Exam Type

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

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the Business Administration and Management fields	All Bachelor Programmes in the Business & Management fields

Digital Business Models

Course Code: DLBLODB01_E

Study Level	Language of Instruction	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
   - 1.1 Goals and Functions of Digital Business Models
   - 1.2 Business Model - Origin of the Term and its Meaning in the Digital Economy
   - 1.3 Definition of the terms Business Model and Digital Business Model
   - 1.4 Differentiation from Other Terminologies of the Digital Economy

2. Basic Concepts for the Description of Business Models
   - 2.1 Value Chain
   - 2.2 Value Chains
   - 2.3 Dominant Logic
   - 2.4 Revenue Model
   - 2.5 Unique Selling Proposition
   - 2.6 Transaction
   - 2.7 Product or Service Range

3. Tools for the Description of Business Models
   - 3.1 Business Model Canvas
   - 3.2 St. Gallen Business Model Navigator
   - 3.3 DVC Framework

4. Patterns of Digital Business Models
   - 4.1 Long Tail
   - 4.2 Multi-Sided Pattern
   - 4.3 Free and Freemium
   - 4.4 OPEN API Pattern

5. Digital Business Models and Business Plans
   - 5.1 Integration of the Business Model into the Business Plan
   - 5.2 Company Positioning and the Digital Business Model
   - 5.3 Digital Business Models as Innovation Drivers for the Development of New Businesses

Literature

Compulsory Reading

Further Reading

- Brynjolfsson, E./Hu, Yu J./Smith, M. D. (2006): From Niches to Riches. Anatomy of the Long Tail. In: MIT Sloan Management Review, 47. Jg., Heft 4, S. 67–71.
- Gassmann, O./Frankenberger, K./Csik, M. (2013): Geschäftsmodelle entwickeln. 55 innovative Konzepte mit dem St. Galler Business Model Navigator. Hanser, München.
- Hoffmeister, C. (2015): Digital Business Modelling. Digitale Geschäftsmodelle entwickeln und strategisch verankern. Hanser, München.
- Osterwalder, A./Pigneur, Y. (2010): Business Modell Generation. Wiley, Hoboken (NJ).

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

DLBLODB01_E

Organizational Behavior

Module Code: DLBBWOB_E

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

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

Module Coordinator

Prof. Dr. Karin Halbritter (Organizational Behavior)

Contributing Courses to Module

- Organizational Behavior (DLBBWOB01_E)

Module Exam Type

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

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the field of Human Resources	All Bachelor Programmes in the Human Resources field

Organizational Behavior

Course Code: DLBBWOB01_E

Study Level	Language of Instruction	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
   - 1.1 Attitudes and Behavior as Determinants of Performance and Commitment
   - 1.2 Organizational Mechanisms
   - 1.3 Group-related Mechanisms
   - 1.4 Individual Characteristics
   - 1.5 Individual Mechanisms

2. Target Figures: Performance and Commitment
   - 2.1 Performance
   - 2.2 Commitment
3. Organizational Mechanisms
   - 3.1 Corporate Structure
   - 3.2 Corporate Culture
4. Group-Related Mechanisms
   - 4.1 Management Styles
   - 4.2 Power Structures
   - 4.3 Negotiation Strategies
   - 4.4 Team Dynamics
   - 4.5 Diversity
5. Individual Characteristics
   - 5.1 Skill and Intellect
   - 5.2 Personality
6. Individual Mechanisms
   - 6.1 Job Satisfaction
   - 6.2 Stress
   - 6.3 Motivation
   - 6.4 Trust
   - 6.5 Integrity
   - 6.6 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. 6. Auflage, McGraw-Hill Irwin, New York.
- Luthans, F./Luthans, B. C./Luthans, K. W. (2015): Organizational Behavior. An Evidence-based approach. 13. Auflage, Information Age Publishing, Charlotte, North Carolina.
- Robins, S. P./Judge, T. A. (2016): Organizational behavior. Prentice Hall International, New Jersey.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Case Study

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam or Written Assessment: Case Study

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods

- ☐ Learning Sprints®
- ☑ Course Book
- ☐ Vodcast
- ☑ Shortcast
- ☑ Audio
- ☐ Exam Template
- ☐ Review Book
- ☐ Creative Lab
- ☑ Guideline
- ☑ Live Tutorium/Course Feed

DLBBWOB01_E

Salesforce Platform Development

Module Code: DLSFPD

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

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

Module Coordinator

Prof. Dr. Maik Günther (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

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

Weight of Module

see curriculum

Module Contents

Salesforce Platform App Builder

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

Salesforce Platform Developer

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

Learning Outcomes

Salesforce Platform App Builder

On successful completion, students will be able to

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

Salesforce Platform Developer

On successful completion, students will be able to

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

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

Salesforce Platform App Builder

Course Code: DLSFPD01

Study Level	Language of Instruction	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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

Salesforce Platform Developer

Course Code: DLSFPD02

Study Level	Language of Instruction	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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Oral Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods

- ☐ Learning Sprints®
- ☐ Course Book
- ☐ Vodcast
- ☐ Shortcast
- ☐ Audio
- ☐ Exam Template
- ☐ Review Book
- ☐ Creative Lab
- ☑ Guideline
- ☐ Live Tutorium/Course Feed

DLSFPD02

Mobile Software Engineering

Module Code: DLBCSEMSE

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

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

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

Module Exam	Split Exam
	Mobile Software Engineering I • Study Format "Distance Learning": Exam, 90 Minutes Mobile Software Engineering II • Study Format "Distance Learning": Written Assessment: Project Report

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programs in the IT & Technology fields

Mobile Software Engineering I

Course Code: DLBCSEMSE01

Study Level	Language of Instruction	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
   - 1.1 Special Features of Mobile Devices
   - 1.2 Special Features of Mobile Software Development
   - 1.3 Classification of Mobile Devices
   - 1.4 The Android Platform
2. Android System Architecture
   - 2.1 The Android System
   - 2.2 Safety and Security
   - 2.3 Communication with Networks
3. Development Environment
   - 3.1 Android Studio
   - 3.2 First App and Emulator Test
   - 3.3 Application Deployment

4. Core Components of an Android App
   - 4.1 Overview of the Components of an Android App
   - 4.2 Activities, Layouts, and Views
   - 4.3 Resources
   - 4.4 Summary in an App
   - 4.5 Graphic Design

5. Interaction Between Application Components
   - 5.1 Intents
   - 5.2 Services
   - 5.3 Broadcast Receiver

6. Advanced Techniques
   - 6.1 Threading
   - 6.2 Application Memory

Literature

Compulsory Reading

Further Reading

- 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: https://android-developers.googleblog.com/2014/12/android-studio-10.html
- Eason, J. (2014): Android Studio 1.0. (URL: https://android-developers.googleblog.com/2014/12/android-studio-10.html [letzter Zugriff: 12.06.2015]).
- Franke, F./Ippen, J. (2012): Apps mit HTML5 und CSS3. Galileo Computing, Bonn.
- Google Inc. (Hrsg.) (2015): Android Developer Guide. (URL: http://developer.android.com/guide) [letzter Zugriff: 12.06.2015]).
- Google Inc. (Hrsg.) (2015): App Components. (URL: http://developer.android.com/guide/components/index.html [letzter Zugriff: 12.06.2015]).
- Google Inc. (Hrsg.) (2015): Installing the Android SDK. (URL: http://developer.android.com/sdk/installing/index.html[letzter Zugriff: 13.05.2015]).
- Google Inc. (Hrsg.) (2015): Resources Overview. (URL: http://developer.android.com/guide/topics/resources/overview.html[letzter Zugriff: 12.06.2015]).

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Mobile Software Engineering II

Course Code: DLBCSEMSE02

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

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 theses 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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

IT-Service Management

Module Code: DLBCSITSM

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

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

Module Coordinator

N.N. (IT-Service Management)

Contributing Courses to Module

- IT-Service Management (DLBCSITSM01)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

- Fundamentals and terms of IT Service Management
- IT Infrastructure Library (ITIL)
- ITIL - Service Design
- ITIL - Service Transition
- ITIL - Service Operation
- Information Security Management with the IT-Baseline Protection-Framework of the BSI

Learning Outcomes

IT-Service Management

On successful completion, students will be able to

- identify the basics and challenges of IT service management.
- describe the motivation and structure of the IT Infrastructure Library (ITIL) in order to determine its main elements and distinguish concrete activities in the service life cycle.
- present and compare the activities of ITIL governance and ITIL operational processes and develop concrete solutions using these activities.

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

IT-Service Management

Course Code: DLBCSITSM01

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

Course Description

IT Service Management is an approach to aligning and understanding a company's IT as a service provider and supporter of operational and business processes. Quality management and the handling of daily operations are at the forefront.This course covers the use of the IT Infrastructure Library (ITIL) in order to teach concepts, procedures, and best practice in IT Service Management (IT Operations).The course therefore considers the management of activities within the SW life cycle, which take place after the development of an IT system, and IT operation as a ongoing process in the day-to-day operation of a company’s IT department.

Course Outcomes

On successful completion, students will be able to

- identify the basics and challenges of IT service management.
- describe the motivation and structure of the IT Infrastructure Library (ITIL) in order to determine its main elements and distinguish concrete activities in the service life cycle.
- present and compare the activities of ITIL governance and ITIL operational processes and develop concrete solutions using these activities.

Contents

1. Fundamentals and Terms of IT Service Management
   - 1.1 IT Services
   - 1.2 IT Service Management
2. IT Infrastructure Library (ITIL)
   - 2.1 Service Life Cycle and Process Groups in ITIL
   - 2.2 Service Strategy
   - 2.3 Continual Service Improvement
3. ITIL – Service Design
   - 3.1 Service Level Management
   - 3.2 Service Catalog Management
   - 3.3 Availability Management
   - 3.4 Further Processes in the Service Transition

4. ITIL – Service Transition
   - 4.1 Transition Planning and Support
   - 4.2 Change Management
   - 4.3 Service Asset and Configuration Management (SACM)
   - 4.4 Further Processes in the Service Transition

5. ITIL – Service Operation
   - 5.1 Event Management
   - 5.2 Incident Management
   - 5.3 Problem Management
   - 5.4 Further Processes in the Service Operation

6. Information Security Management with the IT-Baseline Protection Framework of the BSI
   - 6.1 Structure and Elements of BSI Basic Protection
   - 6.2 The Information Security Process

Literature

Compulsory Reading

Further Reading

- Beims, M. (2012): IT-Service Management in der Praxis mit ITIL. Hanser, München.
- Bundesamt für Sicherheit und Informationstechnik (Hrsg.) (2008): BSI-Standard 100-1. Managementsysteme für Informationssicherheit (ISMS). (URL: https://www.bsi.bund.de/SharedDocs/Downloads/DE/BSI/Publikationen/ITGrundschutzstandards/standard_1001_pdf.pdf?__blob=publicationFile [letzter Zugriff: 27.02.2017]).
- Bundesamt für Sicherheit und Informationstechnik (Hrsg.) (2008): BSI-Standard 100-2. IT-Grundschutz-Vorgehensweise. (URL: https://www.bsi.bund.de/SharedDocs/Downloads/DE/BSI/Publikationen/ITGrundschutzstandards/standard_1002_pdf.pdf?__blob=publicationFile [letzter Zugriff: 27.02.2017]).
- Bundesamt für Sicherheit und Informationstechnik (Hrsg.) (2014): IT-Grundschutz-Kataloge. 14. Ergänzungslieferung. (URL: https://download.gsb.bund.de/BSI/ITGSK/IT-Grundschutz-Kataloge_2014_EL14_DE.pdf [letzter Zugriff: 27.02.2017]).
- Renner, B./Moser, U./Schmid, D. (2006): IT-Service-Management. Transparente IT-Leistungen & Messbare Qualität. BPX Edition, Rheinfelden.
- Tiemeyer, E. (Hrsg.) (2011): Handbuch IT-Management. Konzepte, Methoden, Lösungen und Arbeitshilfen für die Praxis. Hanser, München.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Business Intelligence

Module Code: DLBCSEBI

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

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

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

Module Exam	Split Exam
	Business Intelligence • Study Format "Distance Learning": Exam, 90 Minutes Project: Business Intelligence • Study Format "Distance Learning": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

Business Intelligence

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

Project: Business Intelligence

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

Learning Outcomes

Business Intelligence

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.

Project: Business Intelligence

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.

Links to other Modules within the Study Program	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programmes in the IT & Technology fields

Business Intelligence

Course Code: DLBCSEBI01

Study Level	Language of Instruction	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
   - 1.1 Motivation and Historical Development
   - 1.2 BI as a Framework
2. Data Provision
   - 2.1 Operative and Dispositive Systems
   - 2.2 The Data Warehouse Concept
   - 2.3 Architectural Variations
3. Data Warehouse
   - 3.1 ETL Process
   - 3.2 DWH and Data Mart
   - 3.3 ODS and Metadata

4. Modelling of Multidimensional Data Spaces
   - 4.1 Data Modeling
   - 4.2 OLAP Cubes
   - 4.3 Physical Storage
   - 4.4 Star and Snowflake Scheme
   - 4.5 Historicization

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

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

Literature

Compulsory Reading

Further Reading

- Bachmann, R./Kemper, G. (2011): Raus aus der BI-Falle. Wie Business Intelligence zum Erfolg wird. 2. Auflage, mitp, Heidelberg.
- Bauer, A./Günzel, H. (2008): Data Warehouse Systeme. Architektur, Entwicklung, Anwendung. 3. Auflage, dpunkt.verlag, Heidelberg.
- Betz, R. (2015): Werde Jäger des verlorenen Schatzes. In: Immobilienwirtschaft, Heft 5, S. 1614–1164. (URL https://www.haufe.de/download/immobilienwirtschaft-ausgabe-052015-immobilienwirtschaft-fachmagazin-fuer-management-recht-praxis-303530.pdf [letzter Zugriff: 27.02.2017]).
- Bodendorf, F. (2006): Daten- und Wissensmanagement. 2. Auflage, Springer, Berlin.
- Chamoni, P./Gluchowski, P. (Hrsg.) (2006): Analytische Informationssysteme Business Intelligence-Technologien und -Anwendungen. Springer, Berlin.
- Engels, C. (2008): Basiswissen Business Intelligence. W3L, Herdecke/Witten.
- Gansor, T./Totok, A./Stock, S. (2010): Von der Strategie zum Business Intelligence Competency Center (BICC). Konzeption – Betrieb – Praxis. Hanser, München.
- Gluchowski, P./Gabriel, R./Dittmar, C. (2008): Management Support Systeme und Business Intelligence. Computergestützte Informationssysteme für Fach- und Führungskräfte. 2. Auflage, Springer, Berlin/Heidelberg.
- Grothe, M. (2000): Business Intelligence. Aus Informationen Wettbewerbsvorteile gewinnen. Addison-Wesley, München.
- Gutenberg, E. (1983): Grundlagen der Betriebswirtschaft, Band 1. Die Produktion. 18. Auflage, Springer, Berlin/Heidelberg/New York.
- Hannig, U. (Hrsg.) (2002): Knowledge Management und Business Intelligence. Springer, Berlin.
- Hansen, H.-R./Neumann, G. (2001): Wirtschaftsinformatik I. Grundlagen betrieblicher Informationsverarbeitung. 8. Auflage, Lucius & Lucius UTB, Stuttgart.
- Humm, B./Wietek, F. (2005): Architektur von Data Warehouses und Business Intelligence Systemen. In: Informatik Spektrum, S. 3–14. (URL: https://www.fbi.h-da.de/fileadmin/personal/b.humm/Publikationen/Humm__Wietek_-_Architektur_DW__Informatik-Spektrum_2005-01_.pdf [letzter Zugriff: 27.02.2017]).
- Kemper, H.-G./Baars, H./Mehanna, W. (2010): Business Intelligence – Grundlagen und praktische Anwendungen. Eine Einführung in die IT-basierte Managementunterstützung. 3. Auflage, Vieweg+Teubner, Stuttgart.
- Turban, E. et al. (2010): Business Intelligence. A Managerial Approach. 2. Auflage, Prentice Hall, Upper Saddle River (NJ).

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Project: Business Intelligence

Course Code: DLBCSEBI02

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

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

- Brenner, W./Uebernickel, F. (2015): Design Thinking. Das Handbuch. Frankfurter Allgemeine Buch, Frankfurt a. M.
- Brown, T. (2008): Design Thinking. In: Harvard Business Review, Heft Juni, S. 84–95.
- Meinel, C./Weinberg, U./Krohn, T. (Hrsg.) (2015): Design Thinking Live. Wie man Ideen entwickelt und Probleme löst. Murmann, Hamburg.
- Uebernickel, F./Brenner, W. (2016): Design Thinking. In: Hoffmann, C. P. et al. (Hrsg.): Business Innovation: Das St. Galler Modell. Springer, Wiesbaden, S. 243–265.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

Foundations of Programming with Python

Module Code: DLBBUEFPP

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

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

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

Module Exam	Split Exam
	Introduction to Programming with Python • Study Format "Distance Learning": Exam, 90 Minutes Object oriented and functional programming in Python • Study Format "Distance Learning": Portfolio (50)

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Data Science & Artificial Intelligence	All Bachelor Programs in the IT & Technology fields

Introduction to Programming with Python

Course Code: DLBDSIPWP01

Study Level	Language of Instruction	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
   - 1.1 Why Python?
   - 1.2 Obtaining and installing Python
   - 1.3 The Python interpreter , IPython, and Jupyter
2. Variables and Data Types
   - 2.1 Variables and value assignment
   - 2.2 Numbers
   - 2.3 Strings
   - 2.4 Collections
   - 2.5 Files

3. Statements
   - 3.1 Assignment, expressions, and print
   - 3.2 Conditional statements
   - 3.3 Loops
   - 3.4 Iterators and comprehensions

4. Functions
   - 4.1 Function declaration
   - 4.2 Scope
   - 4.3 Arguments

5. Errors and Exceptions
   - 5.1 Errors
   - 5.2 Exception handling
   - 5.3 Logs

6. Modules and Packages
   - 6.1 Usage
   - 6.2 Namespaces
   - 6.3 Documentation
   - 6.4 Popular data science packages

Literature

Compulsory Reading

Further Reading

- Barry, P. (2016): Head first Python: A brain-friendly guide. 2nd ed., O'Reilly, Sebastopol, CA.
- Lubanovic, B. (2019): Introducing Python. 2nd ed., O'Reilly, Sebastopol, CA.
- Lutz, M. (2013): Learning Python. 5th ed., O'Reilly, Sebastopol, CA.
- Matthes, E. (2019): Python crash course: A hands-on, project-based introduction to programming. 2nd ed., No Starch Press, San Francisco, CA.
- Ramalho, L. (2015): Fluent Python: Clear, concise, and effective programming. O'Reilly, Sebastopol, CA.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Object oriented and functional programming in Python

Course Code: DLBDSOOFPP01

Study Level	Language of Instruction	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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Portfolio

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☑ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

Java and Web Development

Module Code: DLBBUEJWD

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	▪ DLBCSOOPJ01, DLBCSDSJCL01 ▪ DLBCSOOPJ01, DLBCSDSJCL01, DLBCSWAD01, DLBCSDWIS01	BA	10	300 h

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

Module Coordinator

Prof. Dr. André Hollstein (Web Application Development) / Prof. Dr. Sandra Rebholz (Project: Java and Web Development)

Contributing Courses to Module

- Web Application Development (DLBCSWAD01)
- Project: Java and Web Development (DLBCSPJWD01)

Module Exam Type

Module Exam	Split Exam
	Web Application Development • Study Format "Distance Learning": Workbook Project: Java and Web Development • Study Format "Distance Learning": Portfolio

Weight of Module

see curriculum

Module Contents

Web Application Development

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

Project: Java and Web Development

This course focuses on the development of practical skills. For a given problem and/or context, students independently plan, design, develop, and evaluate small web applications. A set of specific problems and contexts are provided by the tutor and may vary. Each student chooses one and creates an individual solution, the results of which are gathered in a portfolio.

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.

Project: Java and Web Development

On successful completion, students will be able to

- plan the development process of small web applications.
- specify requirements of small web applications to fulfill given needs.
- design and develop web applications that meet specific requirements.
- evaluate if a developed web application meets the specified requirements.

Links to other Modules within the Study Program	Links to other Study Programs of IUBH
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programs in the IT & Technology fields

Web Application Development

Course Code: DLBCSWAD01

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

Course Description

TThis 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
   - 1.1 Structure and History of the Internet
   - 1.2 Internet protocols and URIs
   - 1.3 Web application architecture
   - 1.4 Current trends
2. Tools of web development
   - 2.1 Development Tools
   - 2.2 Version management
   - 2.3 Package Manager
   - 2.4 Upload/Deployment

3. Static web pages developement
   - 3.1 Fundamentals of HTML5
   - 3.2 Fundamentals of CSS

4. Advanced design techniques
   - 4.1 Responsive web design
   - 4.2 Page layout
   - 4.3 Media queries
   - 4.4 CSS Frameworks

5. Web page development with JavaScript
   - 5.1 JavaScript history, ES5/ES6
   - 5.2 JavaScript fundamentals
   - 5.3 Use of JSON
   - 5.4 Common JavaScript Frameworks

6. Web application testing and security
   - 6.1 Testing of web applications
   - 6.2 Basic security concepts and principles

Literature

Compulsory Reading

Further Reading

- Ali Sunyaev (2020): Internet Computing: Principles of Distributed Systems and Emerging Internet-Based Technologies. Bd. 1st ed., Springer, Cham.
- Bühler, P./ Sinner, D. / Schlaich P. (2017): HTML5 und CSS3: Semantik - Design - Responsive Layouts. Springer, Berlin Heidelberg.
- Ferguson R. (2019): Beginning JavaScript: The Ultimate Guide to Modern JavaScript Development. Bd.3rd edition, Apress, Berkeley, CA.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Workbook

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☐ Exam Template	

Project: Java and Web Development

Course Code: DLBCSPJWD01

Study Level	Language of Instruction	Contact Hours	CP	Admission Requirements
BA	English		5	DLBCSOOPJ01, DLBCSDSJCL01, DLBCSWAD01, DLBCSDWIS01

Course Description

This course focuses on the development of practical skills. Students apply their skills to create a small web application that fulfills a set of given needs and evaluate the result. The results are gathered and presented in a portfolio which will be assessed.

Course Outcomes

On successful completion, students will be able to

- plan the development process of small web applications.
- specify requirements of small web applications to fulfill given needs.
- design and develop web applications that meet specific requirements.
- evaluate if a developed web application meets the specified requirements.

Contents

- To a given problem and/or a given context, the students plan, design, develop and evaluate small web applications on their own authority. A set of specific problems and contexts are provided by the tutor and may vary. The students choose one and create their own solution.

Literature

Compulsory Reading

Further Reading

- Bloch, J. (2017). Effective Java (3rd ed.). Boston, MA: Addison-Wesley.
- Harrer, S., Lenhard, J., & Dietz, L. (2018). Java by comparison: Become a Java craftsman in 70 examples. Raleigh, NC: Pragmatic Bookshelf.
- Martin, R. M. (2017). Clean architecture: A craftsman's guide to software structure and design. Boston, MA: Prentice Hall.
- Freeman, E., & Robson, E. (2004). Head first design patterns: A brain-friendly guide. Sebastopol, CA: O'Reilly.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Portfolio

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

Big Data and Cloud Technologies

Module Code: DLBCSEBDCT

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	▪ none ▪ DLBCSDMDS01	BA	10	300 h

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

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

Module Exam	Split Exam
	Big Data Technologies • Study Format "Distance Learning": Exam, 90 Minutes Cloud Computing • Study Format "Distance Learning": Exam, 90 Minutes

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	Links to other Study Programs of IUBH
This module is similar to other modules in the field(s) of Computer Science & Software Developement.	All Bachelor Programmes in the IT & Technology field(s).

Big Data Technologies

Course Code: DLBDSBDT01

Study Level	Language of Instruction	Contact Hours	CP	Admission Requirements
BA	English		5	DLBCSDMDS01

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
   - 1.1 The 4Vs of data: volume, velocity, variety, veracity
   - 1.2 Data sources
   - 1.3 Data types
2. Text-Based and Binary Data Formats
   - 2.1 Simple formats: CSV, YAML
   - 2.2 XML
   - 2.3 JSON
   - 2.4 Hierarchical data format 5 (HDF 5)
   - 2.5 Apache Parquet
   - 2.6 Apache Arrow

3. NoSQL data stores
   - 3.1 Introduction and motivation
   - 3.2 Approaches and technical concepts

4. Distributed Systems
   - 4.1 Hadoop & MapReduce
   - 4.2 Hadoop file system (HDFS)
   - 4.3 Spark
   - 4.4 DASK

5. Streaming Frameworks
   - 5.1 Spark streaming
   - 5.2 Kafka

Literature

Compulsory Reading

Further Reading

- Karau, H., Konwinski, A., Wendell, A., & Zaharia, M. (2015). Learning spark: Lightning-fast data analysis. Sebastopol, CA: O'Reilly.
- Kleppmann, M. (2017). Designing data-intensive applications: The big ideas behind reliable, scalable, and maintainable systems. Sebastopol, CA: O'Reilly.
- Narkhede, N., Shapira, G., & Palino, T. (2017). Kafka: The definitive guide: Real-time data and stream processing at scale. Sebastopol, CA: O'Reilly.
- Psaltis, A. (2017). Streaming data: Understanding the real-time pipeline. Shelter Island, NY: Manning.
- White, T. (2015). Hadoop: The definitive guide: Storage and analysis at Internet scale. Sebastopol, CA: O'Reilly.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Cloud Computing

Course Code: DLBDSCC01

Study Level	Language of Instruction	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
   - 1.1 Fundamentals of Cloud computing
   - 1.2 Cloud Service Models
   - 1.3 Benefits and Risks
2. Enabling Technology
   - 2.1 Virtualization and Containerization
   - 2.2 Storage Technology
   - 2.3 Networks and RESTful Services
3. Serverless Computing
   - 3.1 Introduction to Serverless Computing
   - 3.2 Benefits
   - 3.3 Limitations

4. Established Cloud Platforms
   - 4.1 Google Cloud Platform
   - 4.2 Amazon Web Services
   - 4.3 Microsoft Azure

5. Data Science in the Cloud
   - 5.1 Google Data Science and Machine Learning Services
   - 5.2 Amazon Web Services Data Science and Machine Learning Services
   - 5.3 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 Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

IT Security

Module Code: DLBROEITS_E

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

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

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 Cryptography • 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.

Links to other Modules within the Study Program	Links to other Study Programs of IUBH
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programs in the IT & Technology fields

Introduction to Data Protection and Cyber Security

Course Code: DLBCSIDPITS01

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

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
   - 1.1 Conceptual Bases, Protection Goals
   - 1.2 Attacks and Threats
   - 1.3 Security Strategy
   - 1.4 Legal Regulations
2. Data Protection
   - 2.1 Data Protection as a Personal Right
   - 2.2 Basic Principles of Data Protection
   - 2.3 EU General Data Protection Regulation
   - 2.4 Further International Regulations on Data Protection
   - 2.5 Cross-Border Data Flow
   - 2.6 Data Protection in Everyday Life

3. Basic Functions of Cyber Security and Their Implementation
   - 3.1 Identification and Authentication
   - 3.2 Rights Management
   - 3.3 Rights Check
   - 3.4 Preservation of Evidence

4. Cyber Security Management
   - 4.1 Basic Concepts and Standards in Cyber Security Management
   - 4.2 Series of Standards ISO 2700x

5. Cyber Security Management in Everyday Life
   - 5.1 Password Management
   - 5.2 Data Backup
   - 5.3 Email Security
   - 5.4 Protection Against Viruses and Other Malware
   - 5.5 Protection Against Social Engineering Attacks

6. Network and Communication Security
   - 6.1 Firewall Technology
   - 6.2 Network Separation
   - 6.3 Security in WLAN, Mobile Networks, Bluetooth, and NFC

7. Cyber Security in the Development of Software and Systems
   - 7.1 Protection of the Development Environment
   - 7.2 Secure Development
   - 7.3 Common Criteria

Literature

Compulsory Reading

Further Reading

- Eckert, C. (2014): IT-Sicherheit. Konzepte – Verfahren – Protokolle. 9. Auflage, De Gruyter, München.
- Poguntke, W. (2013): Basiswissen IT-Sicherheit. Das Wichtigste für den Schutz von Systemen & Daten. 3. Auflage, W3l, Dortmund.
- Witt, B. C. (2010): Datenschutz kompakt und verständlich. 2. Auflage, Vieweg+Teubner, Wiesbaden.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Cryptography

Course Code: DLBCSCT01

Study Level	Language of Instruction	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
   - 1.1 Protection Goals
   - 1.2 Vulnerabilities and Threats
2. Foundations of Cryptology and its Core Components
   - 2.1 Encoding
   - 2.2 Symmetrical Encryption
   - 2.3 Asymmetric Encryption
   - 2.4 One-way Functions and Cryptographic Hash Functions

3. Basic Cryptographic Applications
   - 3.1 Key exchange and Hybrid Processes
   - 3.2 Digital Signature
   - 3.3 Message Authentication Code
   - 3.4 Steganographic Methods

4. Authentication
   - 4.1 Passwords and Public-Key-Certificates
   - 4.2 Challenge-Response-Procedure and Zero-Knowledge-Procedure
   - 4.3 Biometric Methods
   - 4.4 Authentication in Distributed Systems
   - 4.5 Identities Through Smartcards

5. Security of Single Computers
   - 5.1 Malware and Cookies
   - 5.2 Some Special Features of Operating Systems
   - 5.3 Web Server Security

6. Security in Communication Networks
   - 6.1 Security Problems and Defense Concepts
   - 6.2 Internet Standards for Communication Security
   - 6.3 Identity and Anonymity
   - 6.4 Security in Mobile and Wireless Communications

7. Security in E-Commerce
   - 7.1 Email Security
   - 7.2 Online Banking and Online Payments
   - 7.3 Electronic Money

8. Secure Software Development
   - 8.1 Threat Modeling
   - 8.2 Secure Software Design
   - 8.3 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 Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☑ Exam Template	

Logic and Artificial Intelligence

Module Code: DLBBUELAI

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

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

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

Module Exam	Split Exam
	Theoretical Computer Science and Mathematical Logic • Study Format "Distance Learning": Exam, 90 Minutes Artificial Intelligence • Study Format "Distance Learning": Exam, 90 Minutes

Weight of Module

see curriculum

Module Contents

Theoretical Computer Science and Mathematical Logic

- Proposition and predicate logic
- Finite automata
- Formal languages
- Computability and Turing machines
- Complexity theory
- Petri nets

Artificial Intelligence

- 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.

Learning Outcomes

Theoretical Computer Science and Mathematical Logic

On successful completion, students will be able to

- formulate and translate predicate logical relationships into programming languages.
- use finite automatons 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.

Artificial Intelligence

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.

Links to other Modules within the Study Program	Links to other Study Programs of IUBH
This module is similar to other modules in the fields of Computer Science & Software Development and Data Science & Artificial Intelligence	All Bachelor Programs in the IT & Technology fields

Theoretical Computer Science and Mathematical Logic

Course Code: DLBCSTCSML01

Study Level	Language of Instruction	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 automatons 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
   - 1.1 Basic Concepts
   - 1.2 Interpretation and Satisfiability
   - 1.3 Normal Forms
   - 1.4 Proof by Contradiction and Resolution
   - 1.5 Completeness
2. Predicate Logic
   - 2.1 Basic Concepts
   - 2.2 Completeness and Incompleteness
   - 2.3 Logic Programming with Prolog

3. Finite Automata and Regular Expressions
   - 3.1 Basic Concepts of Finite Automata
   - 3.2 Regular Expressions
   - 3.3 Practical Applications

4. Formal Languages and Grammars
   - 4.1 Basic Concepts
   - 4.2 The Chomsky Hierarchy
   - 4.3 Regular Languages
   - 4.4 Context Free Languages
   - 4.5 Context Sensitive Languages

5. Computability and Turing Machines
   - 5.1 Models of Computability
   - 5.2 Turing Machines
   - 5.3 Recursive Functions
   - 5.4 Computability and Decidability
   - 5.5 The Halting Problem

6. Complexity Theory
   - 6.1 Basic Concepts
   - 6.2 Complexity Classes
   - 6.3 P=NP?

7. Petri Nets
   - 7.1 Basic Concepts of Graphs and Petri Nets
   - 7.2 Invariants, Liveliness, and Safety
   - 7.3 Process Modeling and Analysis with Petri Nets

8. Applications of Mathematical Logic and Theoretical Computer Science
   - 8.1 Parser and Compiler
   - 8.2 Program Verification
   - 8.3 Artificial Intelligence

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 Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Artificial Intelligence

Course Code: DLBDSEAIS01

Study Level	Language of Instruction	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
   - 1.1 Historical developments
   - 1.2 AI winter
   - 1.3 Expert systems
   - 1.4 Notable advances
2. Modern AI Systems
   - 2.1 Narrow versus general AI
   - 2.2 Application areas
3. Reinforcement Learning
   - 3.1 What is reinforcement learning?
   - 3.2 Markov Chains and value function
   - 3.3 Time-difference and Q Learning

4. Natural Language Processing (NLP)
   - 4.1 Introduction to NLP and application areas
   - 4.2 Basic NLP techniques
   - 4.3 Vectorizing data

5. Computer Vision
   - 5.1 Pixels and filters
   - 5.2 Feature detection
   - 5.3 Distortions and calibration
   - 5.4 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 Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

DLBDSEAIS01

Data Engineer

Module Code: DLBDSEDE

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

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

Module Coordinator

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

Contributing Courses to Module

- Data Engineering (DLBDSEDE01)
- Project: Data Engineering (DLBDSEDE02)

Module Exam Type

Module Exam	Split Exam
	Data Engineering • Study Format "Distance Learning": Exam, 90 Minutes Project: Data Engineering • Study Format "Distance Learning": Portfolio

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the field(s) of Data Science & Artificial Intelligence.	All Bachelor Programmes in the IT & Technology field(s).

Data Engineering

Course Code: DLBDSEDE01

Study Level	Language of Instruction	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
   - 1.1 Reliability
   - 1.2 Scalability
   - 1.3 Maintainability
2. NoSQL In Depth
   - 2.1 Fundamentals of NoSQL
   - 2.2 Established NoSQL solutions
3. Architectures for Data Processing at Scale
   - 3.1 Batch processing architectures
   - 3.2 Architectures for stream and complex event processing
   - 3.3 Lambda architecture

4. Containerization In Depth
   - 4.1 Docker containers
   - 4.2 Container management

5. Governance & Security
   - 5.1 Data protection
   - 5.2 Data security
   - 5.3 Data governance

6. Operational Aspects
   - 6.1 Defining principles of DataOps
   - 6.2 Building and maintaining data pipelines
   - 6.3 Metrics and monitoring

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

Study Format	Course Type
Distance Learning	Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Project: Data Engineering

Course Code: DLBDSEDE02

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

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. Porfolio 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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Portfolio

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☑ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

6. Semester

Applied Sales

Module Code: DLBDSEAS

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

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

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

Module Exam	Split Exam
	Applied Sales I • Study Format "Distance Learning": Exam Applied Sales II • Study Format "Distance Learning": Exam

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Marketing & Sales	All Bachelor Programmes in the Marketing & Communication fields

Applied Sales I

Course Code: DLBDSEAS01

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

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
   - 1.1 Tasks and Forms of Applied Distribution
   - 1.2 Marketing as the Basis of Sales
   - 1.3 Distribution, Sales, and Other Terms
   - 1.4 Sales in Different Economic Sectors

2. The Distribution System
   - 2.1 Forms of Sales
   - 2.2 Sales Organisation
   - 2.3 Key Account Management
   - 2.4 Multi-Channel Distribution

3. Personal Sales
   - 3.1 The "New Sellers"
   - 3.2 Requirements for Sales Personalities
   - 3.3 The Key Account Manager
   - 3.4 Task of Sales Managers

4. Sales Plan
   - 4.1 Tasks and Objectives of Sales Management
   - 4.2 Observation of Competition in the Context of Sales Management
   - 4.3 Potential Analyses and Sales Planning
   - 4.4 Sales Control and Visit Strategies

5. New Customer Acquisition
   - 5.1 Identification of New Customer Potential
   - 5.2 Customer Relationship Management and Customer Acquisition
   - 5.3 Trade Fairs and Events
   - 5.4 Networking

6. The Sales Visit
   - 6.1 Frequency and Preparation of Visits
   - 6.2 Conduct of a Visit
   - 6.3 Visit Reports and Follow-Up
   - 6.4 Aftercare and Follow-Up

7. Conversational Tactics
   - 7.1 Structured Conversation Preparation
   - 7.2 Goal-Oriented Conversation: The D.A.L.A.S Model
   - 7.3 Questioning Techniques

8. Conducting Negotiations
   - 8.1 Psychology of Negotiation
   - 8.2 Negotiation Structure
   - 8.3 Objection Handling
   - 8.4 Price Negotiations

9. Other Sales Channels
   - 9.1 Telemarketing
   - 9.2 Catalogue and Brochure Sales
   - 9.3 Internet and E-Commerce

Literature

Compulsory Reading

Further Reading

- Dannenberg, H./Zupancic, D. (2010): Spitzenleistungen im Vertrieb. Optimierungen im Vertriebs- und Kundenmanagement. 2. Auflage, Gabler, Wiesbaden.
- Eicher, H. (2006): Die geheimen Spielregeln im Verkauf. Wissen, wie der Kunde tickt. Campus, Frankfurt a. M.
- Herndl, K. (2014): Führen im Vertrieb. So unterstützen Sie Ihre Mitarbeiter direkt und konsequent. 4. Auflage, Gabler, Wiesbaden.
- Limbeck, M. (2016): Das neue Hardselling. Verkaufen heißt verkaufen – So kommen Sie zum Abschluss. 6. Auflage, Gabler, Wiesbaden.
- Schneider, W./Henning, A. (2008): Lexikon Kennzahlen für Marketing und Vertrieb. Das Marketing-Cockpit von A – Z. 2. Auflage, Springer, Berlin/Heidelberg.
- Winkelmann, P. (2012): Marketing und Vertrieb. Fundamente für die Marktorientierte Unternehmensführung. 8. Auflage, Oldenbourg, München.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Applied Sales II

Course Code: DLBDSEAS02

Study Level	Language of Instruction	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
   - 1.1 Marketing Tasks and Functions
   - 1.2 Sales Marketing in Different Economic Sectors
   - 1.3 Relationship Marketing
   - 1.4 International Marketing and Sales Cooperations

2. Customer Satisfaction as a Success Factor
   - 2.1 Customer Relationship Management (CRM)
   - 2.2 The CRM Success Chain
   - 2.3 Customer Relationship Strategies

3. Personalities in Sales
   - 3.1 Sales Personalities and Differentiation
   - 3.2 Selling in Teams
   - 3.3 Negotiating With Committees

4. Customer-Oriented Communication
   - 4.1 Communication Tasks in Sales
   - 4.2 Sales Promotion by Sales Staff
   - 4.3 Team Sales Promotion
   - 4.4 Sales Promotion by the Company

5. Presentation and Rhetoric
   - 5.1 Rhetoric in Sales
   - 5.2 Presentation Techniques
   - 5.3 Nonverbal Communication

6. Customer Loyalty
   - 6.1 Customer Retention Management
   - 6.2 Customer Programs and Other Customer Loyalty Tools
   - 6.3 Complaint Management

7. Networking
   - 7.1 Network Competencies in the Company
   - 7.2 Building and Shaping Relationships
   - 7.3 Networking via Social Media

8. Case Study in IQ Media Marketing
   - 8.1 The Market Situation
   - 8.2 The Marketing Situation
   - 8.3 IQ Media Marketing and IQ Digital Media Marketing

Literature

Compulsory Reading

Further Reading

- Dannenberg, H./Zupancic, D. (2010): Spitzenleistungen im Vertrieb. Optimierungen im Vertriebs- und Kundenmanagement. 2. Auflage, Gabler, Wiesbaden.
- Eicher, H. (2006): Die geheimen Spielregeln im Verkauf. Wissen, wie der Kunde tickt. Campus, Frankfurt a. M.
- Herndl, K. (2014): Führen im Vertrieb. So unterstützen Sie Ihre Mitarbeiter direkt und konsequent. 4. Auflage, Gabler, Wiesbaden.
- Limbeck, M. (2016): Das neue Hardselling. Verkaufen heißt verkaufen – So kommen Sie zum Abschluss. 6. Auflage, Gabler, Wiesbaden.
- Schneider, W./Henning, A. (2008): Lexikon Kennzahlen für Marketing und Vertrieb. Das Marketing-Cockpit von A – Z. 2. Auflage, Springer, Berlin/Heidelberg.
- Winkelmann, P. (2012): Marketing und Vertrieb. Fundamente für die Marktorientierte Unternehmensführung. 8. Auflage, Oldenbourg, München.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Supply Chain Management

Module Code: DLBDSESCM

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

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

Module Coordinator

N.N. (Supply Chain Management I) / N.N. (Supply Chain Management II)

Contributing Courses to Module

- Supply Chain Management I (DLBDSESCM01)
- Supply Chain Management II (DLBDSESCM02)

Module Exam Type

Module Exam	Split Exam
	Supply Chain Management I • Study Format "Distance Learning": Module Exam (50) Supply Chain Management II • Study Format "Distance Learning": Module Exam (50)

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Logistics & Transportation	All Bachelor Programmes in the Transport & Logistics fields

Supply Chain Management I

Course Code: DLBDSESCM01

Study Level	Language of Instruction	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
   - 1.1 Terminological and Conceptual Fundamentals
   - 1.2 Supply Chain Typology According to Otto
   - 1.3 Supply Chain Typology According to Bechtel/Jayaram
   - 1.4 Dynamic Aspects of Supply Chains

2. Selected Theoretical Concepts for the Supply Chain Concept
   2.1 New Institutional Economics
   2.2 Game Theory
   2.3 Network Approach
   2.4 Other Theoretical Additions

3. Supply Chain Management
   3.1 Basic Information on the Goals and Scope of SCM
   3.2 Popular Problem Areas of the SCM
   3.3 Supply Chain Management as an Evolutionary Step in Logistics
   3.4 Supply Chain Management as Cooperation Management

4. SCM Model
   4.1 Basic Information on the Term SCM Models
   4.2 SCOR Model
   4.3 SCM Task Model

5. SCM as a Coordination Problem
   5.1 Basic Information on the Concept of Coordination
   5.2 Coordination Concepts, Context, and Perspectives of SCM
   5.3 Coordination Instruments

Literature
Compulsory Reading
Further Reading ▪ Arndt, H. (2018): Supply Chain Management. Optimierung logistischer Prozesse. 7. Auflage, Gabler, Wiesbaden. ▪ Grosche, P. (2012): Konfiguration und Koordination von Wertschöpfungsaktivitäten in internationalen Unternehmen. Eine empirische Untersuchung in der Automobilindustrie. Gabler-Verlag, Wiesbaden. ▪ Heiserich, O.E./Helbig, K./Ullmann, W. (2011): Logistik. Eine praxisorientierte Einführung. 4. Auflage, Gabler-Verlag | Springer Fachmedien, Wiesbaden 2011. ▪ Hertel, J./Zentes, J./Schramm-Klein, H. (2011): Supply-Chain-Management und Warenwirtschaftssysteme im Handel. 2. Auflage, Springer Verlag, Heidelberg. ▪ Hungenberg, H. (2014): Strategisches Management in Unternehmen. Ziele-Prozesse-Verfahren. 8. Auflage, Wiesbaden. ▪ Pfohl, H. C. (2010): Logistiksysteme. Betriebswirtschaftliche Grundlagen. 8 Auflage, Springer, Berlin. ▪ Schulte, C. (2013): Logistik. Wege zur Optimierung der Supply Chain. 6. Auflage, Vahlen, München. ▪ Werner, H. (2013): Supply Chain Management. Grundlagen, Strategien, Instrumente und Controlling. 5. Auflage, Gabler, Wiesbaden.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Module Exam

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Supply Chain Management II

Course Code: DLBDSESCM02

Study Level	Language of Instruction	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
   - 1.1 Strategic Thinking and Action: General Information
   - 1.2 Competition Focus and SCM
   - 1.3 Competition Location and SCM
   - 1.4 Competition Rules and SCM

2. SCM Practice: Core Process Planning
   - 2.1 General Preliminary Considerations
   - 2.2 Collaborative Planning, Forecasting, and Replenishment
   - 2.3 Order Promoting
   - 2.4 Kanban
   - 2.5 Integration of X-PL Logistics Service Providers

3. SCM Practice: Core Process Procurement
   - 3.1 General Preliminary Considerations
   - 3.2 Production Synchronous Procurement
   - 3.3 Sourcing Concepts
   - 3.4 Supplier Relations Management

4. SCM Practice: Core Process Production
   - 4.1 Selected Aspects of the Problem Background
   - 4.2 Collaborative Engineering
   - 4.3 Postponement Strategies
   - 4.4 Value Added Partnership

5. SCM Practice: Core Process Distribution
   - 5.1 Basic Information on the Distribution Problem
   - 5.2 Efficient Consumer Response (ECR)
   - 5.3 Consignment Warehouse

Literature
Compulsory Reading
Further Reading ▪ Arndt, H. (2018): Supply Chain Management. Optimierung logistischer Prozesse. 7. Auflage, Gabler, Wiesbaden. ▪ Grosche, P. (2012): Konfiguration und Koordination von Wertschöpfungsaktivitäten in internationalen Unternehmen. Eine empirische Untersuchung in der Automobilindustrie. Gabler-Verlag, Wiesbaden. ▪ Heiserich, O.E./Helbig, K./Ullmann, W. (2011): Logistik. Eine praxisorientierte Einführung. 4. Auflage, Gabler-Verlag | Springer Fachmedien, Wiesbaden 2011. ▪ Hertel, J./Zentes, J./Schramm-Klein, H. (2011): Supply-Chain-Management und Warenwirtschaftssysteme im Handel. 2. Auflage, Springer Verlag, Heidelberg. ▪ Hungenberg, H. (2014): Strategisches Management in Unternehmen. Ziele-Prozesse-Verfahren. 8. Auflage, Wiesbaden. ▪ Pfohl, H. C. (2010): Logistiksysteme. Betriebswirtschaftliche Grundlagen. 8 Auflage, Springer, Berlin. ▪ Schulte, C. (2013): Logistik. Wege zur Optimierung der Supply Chain. 6. Auflage, Vahlen, München. ▪ Werner, H. (2013): Supply Chain Management. Grundlagen, Strategien, Instrumente und Controlling. 5. Auflage, Gabler, Wiesbaden.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Module Exam

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

DLBDSESCM02

Smart Services

Module Code: DLBINGSS_E

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

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

Module Coordinator

N.N. (Smart Services I) / N.N. (Smart Services II)

Contributing Courses to Module

- Smart Services I (DLBINGSS01_E)
- Smart Services II (DLBINGSS02_E)

Module Exam Type

Module Exam	Split Exam
	Smart Services I • Study Format "Distance Learning": Exam, 90 Minutes Smart Services II • Study Format "Distance Learning": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

Smart Services I

- Digitization and disruption
- Potential of Smart Services
- Development and specification of Smart Services
- Service architectures
- Integration platforms
- Technologies for Smart Services
- Quality and operation of Smart Services

Smart Services II

Analysis of a selected topic of Smart Services and design of a self-chosen assignment in a prototyping environment.

Learning Outcomes

Smart Services I

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.

Smart Services II

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.

Links to other Modules within the Study Program	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programs in the IT & Technology fields

Smart Services I

Course Code: DLBINGSS01_E

Study Level	Language of Instruction	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
   - 1.1 Digitization and Cyber-Physical Production Systems
   - 1.2 Smart Services in Industry 4.0
   - 1.3 Examples of Smart Services

2. Digitization and Disruption
   - 2.1 Definition: Digital Business Models
   - 2.2 Strategies for Change and Innovation
   - 2.3 Digital Intermediaries
   - 2.4 Examples of Disruptive Business Models

3. Recognizing Potential for Smart Services
   - 3.1 Business Model Canvas
   - 3.2 Personas
   - 3.3 Customer Journeys
   - 3.4 Domain-Driven Design

4. Development and Specification of Smart Services
   - 4.1 Modelling of the System Context
   - 4.2 Modelling of Business Processes
   - 4.3 Modelling of Technical Interfaces
   - 4.4 Tools for API Specification

5. Service Architectures
   - 5.1 Infrastructure/Platform/Software-as-a-Service
   - 5.2 Everything-as-a-Service
   - 5.3 Service-oriented Architectures
   - 5.4 Micro Services

6. Integration Platforms
   - 6.1 Features and Purpose of Integration Platforms
   - 6.2 Enterprise Integration Patterns
   - 6.3 External Integration with Zapier, IFTTT & Others

7. Technologies for Smart Services
   - 7.1 Formats for Data Exchange
   - 7.2 Internet Communication Protocols
   - 7.3 Semantic Descriptions
   - 7.4 Complex Event Processing
   - 7.5 Security

8. Quality and Operation of Smart Services
   - 8.1 Quality Characteristics and Maturity of APIs
   - 8.2 Service Level Agreements
   - 8.3 Service Level Management

Literature

Compulsory Reading

Further Reading

- 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

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Smart Services II

Course Code: DLBINGSS02_E

Study Level	Language of Instruction	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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

Smart Factory

Module Code: DLBDSESF

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

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

Module Coordinator

N.N. (Smart Factory I) / Prof. Dr. Christian Magnus (Smart Factory II)

Contributing Courses to Module

- Smart Factory I (DLBDSESF01)
- Smart Factory II (DLBDSESF02)

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.

Links to other Modules within the Study Program	Links to other Study Programs of IUBH
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programmes in the IT & Technology fields

Smart Factory I

Course Code: DLBDSESF01

Study Level	Language of Instruction	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
   - 1.1 Goals of Smart Factory
   - 1.2 Internet of Things
   - 1.3 Cyber-Physical Systems
   - 1.4 Cyber-Physical Production Systems
   - 1.5 Smart Factory as a Cyber-Physical (Production) System

2. Development of Automation
   - 2.1 Automation Pyramid
   - 2.2 Networked, Decentralized Organization of Production
   - 2.3 Future Challenges

3. Technological Basics and Standards
   - 3.1 Identification of Physical Objects
   - 3.2 Formal Description Languages and Ontologies
   - 3.3 Digital Object Memory
   - 3.4 Physical Situation Recognition
   - 3.5 (Partially) Autonomous Action and Cooperation
   - 3.6 Human-Machine Interaction
   - 3.7 Machine to Machine Communication

4. Basic Concepts of a Smart Factory
   - 4.1 Order-Controlled Production
   - 4.2 Bundling of Machine and Production Data
   - 4.3 Supporting People in Production
   - 4.4 Intelligent Products and Resources
   - 4.5 Smart Services

5. Reference Architectures
   - 5.1 Purpose and Properties of Reference Architectures
   - 5.2 Overview of Standardization Initiatives
   - 5.3 CyProS Reference Architecture
   - 5.4 RAMI 4.0 (DIN SPEC 91345)

6. Smart Factory Engineering
   - 6.1 Classification of Different Engineering Tools
   - 6.2 Virtual Engineering
   - 6.3 User-Centered Design
   - 6.4 Requirements Engineering
   - 6.5 Modelling
   - 6.6 Integration of Classic and Smart Components

Literature
Compulsory Reading
Further Reading ▪ Bangemann, T. et al. (2016): Integration of Classical Components into Industrial Cyber–Physical Systems. In: Proceedings of the IEEE, 104. Jg., Heft 5, S. 947–959. DOI: 10.1109/JPROC.2015.2510981. ▪ Bauernhansl, T./Hompel, M. ten/Vogel-Heuser, B. (Hrsg.) (2014): Industrie 4.0 in Produktion, Automatisierung und Logistik. Springer, Berlin. ▪ Bundesministerium für Wirtschaft und Energie (Hrsg.) (2016): IT-Sicherheit für die Industrie 4.0. Produktion, Produkte, Dienste von morgen im Zeichen globalisierter Wertschöpfungsketten. Berlin. ▪ Geisberger, E./Broy, M. (Hrsg.) (2012): agendaCPS. Integrierte Forschungsagenda Cyber-Physical Systems. Springer, Berlin/Heidelberg. ▪ Harrison, R./Vera, D.; Ahmad, B. (2016): Engineering Methods and Tools for Cyber–Physical Automation Systems. In: Proceedings of the IEEE, 104. Jg., Heft 5, S. 973–985. DOI: 10.1109/JPROC.2015.2510665. ▪ Haupert, J. (2013): DOMeMan: Repräsentation, Verwaltung und Nutzung von digitalen Objektgedächtnissen. Akademische Verlagsgesellschaft AKA, Berlin. ▪ VDMA & Partner (2016): Leitfaden Industrie 4.0 Security. Handlungsempfehlungen für den Mittelstand. VDMA Verlag, Frankfurt a. M.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Smart Factory II

Course Code: DLBDSESF02

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

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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☑ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

DLBDSESF02

Salesforce Platform Development

Module Code: DLSFPD

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

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

Module Coordinator

Prof. Dr. Maik Günther (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

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

Weight of Module

see curriculum

Module Contents

Salesforce Platform App Builder

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

Salesforce Platform Developer

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

Learning Outcomes

Salesforce Platform App Builder

On successful completion, students will be able to

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

Salesforce Platform Developer

On successful completion, students will be able to

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

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

Salesforce Platform App Builder

Course Code: DLSFPD01

Study Level	Language of Instruction	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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

Salesforce Platform Developer

Course Code: DLSFPD02

Study Level	Language of Instruction	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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Oral Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

DLSFPD02

Mobile Software Engineering

Module Code: DLBCSEMSE

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

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

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

Module Exam	Split Exam
	Mobile Software Engineering I • Study Format "Distance Learning": Exam, 90 Minutes Mobile Software Engineering II • Study Format "Distance Learning": Written Assessment: Project Report

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programs in the IT & Technology fields

Mobile Software Engineering I

Course Code: DLBCSEMSE01

Study Level	Language of Instruction	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
   - 1.1 Special Features of Mobile Devices
   - 1.2 Special Features of Mobile Software Development
   - 1.3 Classification of Mobile Devices
   - 1.4 The Android Platform
2. Android System Architecture
   - 2.1 The Android System
   - 2.2 Safety and Security
   - 2.3 Communication with Networks
3. Development Environment
   - 3.1 Android Studio
   - 3.2 First App and Emulator Test
   - 3.3 Application Deployment

4. Core Components of an Android App
   - 4.1 Overview of the Components of an Android App
   - 4.2 Activities, Layouts, and Views
   - 4.3 Resources
   - 4.4 Summary in an App
   - 4.5 Graphic Design

5. Interaction Between Application Components
   - 5.1 Intents
   - 5.2 Services
   - 5.3 Broadcast Receiver

6. Advanced Techniques
   - 6.1 Threading
   - 6.2 Application Memory

Literature

Compulsory Reading

Further Reading

- 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: https://android-developers.googleblog.com/2014/12/android-studio-10.html
- Eason, J. (2014): Android Studio 1.0. (URL: https://android-developers.googleblog.com/2014/12/android-studio-10.html [letzter Zugriff: 12.06.2015]).
- Franke, F./Ippen, J. (2012): Apps mit HTML5 und CSS3. Galileo Computing, Bonn.
- Google Inc. (Hrsg.) (2015): Android Developer Guide. (URL: http://developer.android.com/guide) [letzter Zugriff: 12.06.2015]).
- Google Inc. (Hrsg.) (2015): App Components. (URL: http://developer.android.com/guide/components/index.html [letzter Zugriff: 12.06.2015]).
- Google Inc. (Hrsg.) (2015): Installing the Android SDK. (URL: http://developer.android.com/sdk/installing/index.html[letzter Zugriff: 13.05.2015]).
- Google Inc. (Hrsg.) (2015): Resources Overview. (URL: http://developer.android.com/guide/topics/resources/overview.html[letzter Zugriff: 12.06.2015]).

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Mobile Software Engineering II

Course Code: DLBCSEMSE02

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

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 theses 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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

IT-Service Management

Module Code: DLBCSITSM

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

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

Module Coordinator

N.N. (IT-Service Management)

Contributing Courses to Module

- IT-Service Management (DLBCSITSM01)

Module Exam Type

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

Weight of Module

see curriculum

Module Contents

- Fundamentals and terms of IT Service Management
- IT Infrastructure Library (ITIL)
- ITIL - Service Design
- ITIL - Service Transition
- ITIL - Service Operation
- Information Security Management with the IT-Baseline Protection-Framework of the BSI

Learning Outcomes

IT-Service Management

On successful completion, students will be able to

- identify the basics and challenges of IT service management.
- describe the motivation and structure of the IT Infrastructure Library (ITIL) in order to determine its main elements and distinguish concrete activities in the service life cycle.
- present and compare the activities of ITIL governance and ITIL operational processes and develop concrete solutions using these activities.

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

IT-Service Management

Course Code: DLBCSITSM01

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

Course Description

IT Service Management is an approach to aligning and understanding a company's IT as a service provider and supporter of operational and business processes. Quality management and the handling of daily operations are at the forefront.This course covers the use of the IT Infrastructure Library (ITIL) in order to teach concepts, procedures, and best practice in IT Service Management (IT Operations).The course therefore considers the management of activities within the SW life cycle, which take place after the development of an IT system, and IT operation as a ongoing process in the day-to-day operation of a company’s IT department.

Course Outcomes

On successful completion, students will be able to

- identify the basics and challenges of IT service management.
- describe the motivation and structure of the IT Infrastructure Library (ITIL) in order to determine its main elements and distinguish concrete activities in the service life cycle.
- present and compare the activities of ITIL governance and ITIL operational processes and develop concrete solutions using these activities.

Contents

1. Fundamentals and Terms of IT Service Management
   - 1.1 IT Services
   - 1.2 IT Service Management
2. IT Infrastructure Library (ITIL)
   - 2.1 Service Life Cycle and Process Groups in ITIL
   - 2.2 Service Strategy
   - 2.3 Continual Service Improvement
3. ITIL – Service Design
   - 3.1 Service Level Management
   - 3.2 Service Catalog Management
   - 3.3 Availability Management
   - 3.4 Further Processes in the Service Transition

4. ITIL – Service Transition
   - 4.1 Transition Planning and Support
   - 4.2 Change Management
   - 4.3 Service Asset and Configuration Management (SACM)
   - 4.4 Further Processes in the Service Transition

5. ITIL – Service Operation
   - 5.1 Event Management
   - 5.2 Incident Management
   - 5.3 Problem Management
   - 5.4 Further Processes in the Service Operation

6. Information Security Management with the IT-Baseline Protection Framework of the BSI
   - 6.1 Structure and Elements of BSI Basic Protection
   - 6.2 The Information Security Process

Literature

Compulsory Reading

Further Reading

- Beims, M. (2012): IT-Service Management in der Praxis mit ITIL. Hanser, München.
- Bundesamt für Sicherheit und Informationstechnik (Hrsg.) (2008): BSI-Standard 100-1. Managementsysteme für Informationssicherheit (ISMS). (URL: https://www.bsi.bund.de/SharedDocs/Downloads/DE/BSI/Publikationen/ITGrundschutzstandards/standard_1001_pdf.pdf?__blob=publicationFile [letzter Zugriff: 27.02.2017]).
- Bundesamt für Sicherheit und Informationstechnik (Hrsg.) (2008): BSI-Standard 100-2. IT-Grundschutz-Vorgehensweise. (URL: https://www.bsi.bund.de/SharedDocs/Downloads/DE/BSI/Publikationen/ITGrundschutzstandards/standard_1002_pdf.pdf?__blob=publicationFile [letzter Zugriff: 27.02.2017]).
- Bundesamt für Sicherheit und Informationstechnik (Hrsg.) (2014): IT-Grundschutz-Kataloge. 14. Ergänzungslieferung. (URL: https://download.gsb.bund.de/BSI/ITGSK/IT-Grundschutz-Kataloge_2014_EL14_DE.pdf [letzter Zugriff: 27.02.2017]).
- Renner, B./Moser, U./Schmid, D. (2006): IT-Service-Management. Transparente IT-Leistungen & Messbare Qualität. BPX Edition, Rheinfelden.
- Tiemeyer, E. (Hrsg.) (2011): Handbuch IT-Management. Konzepte, Methoden, Lösungen und Arbeitshilfen für die Praxis. Hanser, München.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Business Intelligence

Module Code: DLBCSEBI

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

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

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

Module Exam	Split Exam
	Business Intelligence • Study Format "Distance Learning": Exam, 90 Minutes Project: Business Intelligence • Study Format "Distance Learning": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

Business Intelligence

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

Project: Business Intelligence

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

Learning Outcomes

Business Intelligence

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.

Project: Business Intelligence

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.

Links to other Modules within the Study Program	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programmes in the IT & Technology fields

Business Intelligence

Course Code: DLBCSEBI01

Study Level	Language of Instruction	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
   - 1.1 Motivation and Historical Development
   - 1.2 BI as a Framework
2. Data Provision
   - 2.1 Operative and Dispositive Systems
   - 2.2 The Data Warehouse Concept
   - 2.3 Architectural Variations
3. Data Warehouse
   - 3.1 ETL Process
   - 3.2 DWH and Data Mart
   - 3.3 ODS and Metadata

4. Modelling of Multidimensional Data Spaces
   - 4.1 Data Modeling
   - 4.2 OLAP Cubes
   - 4.3 Physical Storage
   - 4.4 Star and Snowflake Scheme
   - 4.5 Historicization

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

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

Literature

Compulsory Reading

Further Reading

- Bachmann, R./Kemper, G. (2011): Raus aus der BI-Falle. Wie Business Intelligence zum Erfolg wird. 2. Auflage, mitp, Heidelberg.
- Bauer, A./Günzel, H. (2008): Data Warehouse Systeme. Architektur, Entwicklung, Anwendung. 3. Auflage, dpunkt.verlag, Heidelberg.
- Betz, R. (2015): Werde Jäger des verlorenen Schatzes. In: Immobilienwirtschaft, Heft 5, S. 1614–1164. (URL https://www.haufe.de/download/immobilienwirtschaft-ausgabe-052015-immobilienwirtschaft-fachmagazin-fuer-management-recht-praxis-303530.pdf [letzter Zugriff: 27.02.2017]).
- Bodendorf, F. (2006): Daten- und Wissensmanagement. 2. Auflage, Springer, Berlin.
- Chamoni, P./Gluchowski, P. (Hrsg.) (2006): Analytische Informationssysteme Business Intelligence-Technologien und -Anwendungen. Springer, Berlin.
- Engels, C. (2008): Basiswissen Business Intelligence. W3L, Herdecke/Witten.
- Gansor, T./Totok, A./Stock, S. (2010): Von der Strategie zum Business Intelligence Competency Center (BICC). Konzeption – Betrieb – Praxis. Hanser, München.
- Gluchowski, P./Gabriel, R./Dittmar, C. (2008): Management Support Systeme und Business Intelligence. Computergestützte Informationssysteme für Fach- und Führungskräfte. 2. Auflage, Springer, Berlin/Heidelberg.
- Grothe, M. (2000): Business Intelligence. Aus Informationen Wettbewerbsvorteile gewinnen. Addison-Wesley, München.
- Gutenberg, E. (1983): Grundlagen der Betriebswirtschaft, Band 1. Die Produktion. 18. Auflage, Springer, Berlin/Heidelberg/New York.
- Hannig, U. (Hrsg.) (2002): Knowledge Management und Business Intelligence. Springer, Berlin.
- Hansen, H.-R./Neumann, G. (2001): Wirtschaftsinformatik I. Grundlagen betrieblicher Informationsverarbeitung. 8. Auflage, Lucius & Lucius UTB, Stuttgart.
- Humm, B./Wietek, F. (2005): Architektur von Data Warehouses und Business Intelligence Systemen. In: Informatik Spektrum, S. 3–14. (URL: https://www.fbi.h-da.de/fileadmin/personal/b.humm/Publikationen/Humm__Wietek_-_Architektur_DW__Informatik-Spektrum_2005-01_.pdf [letzter Zugriff: 27.02.2017]).
- Kemper, H.-G./Baars, H./Mehanna, W. (2010): Business Intelligence – Grundlagen und praktische Anwendungen. Eine Einführung in die IT-basierte Managementunterstützung. 3. Auflage, Vieweg+Teubner, Stuttgart.
- Turban, E. et al. (2010): Business Intelligence. A Managerial Approach. 2. Auflage, Prentice Hall, Upper Saddle River (NJ).

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Project: Business Intelligence

Course Code: DLBCSEBI02

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

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

- Brenner, W./Uebernickel, F. (2015): Design Thinking. Das Handbuch. Frankfurter Allgemeine Buch, Frankfurt a. M.
- Brown, T. (2008): Design Thinking. In: Harvard Business Review, Heft Juni, S. 84–95.
- Meinel, C./Weinberg, U./Krohn, T. (Hrsg.) (2015): Design Thinking Live. Wie man Ideen entwickelt und Probleme löst. Murmann, Hamburg.
- Uebernickel, F./Brenner, W. (2016): Design Thinking. In: Hoffmann, C. P. et al. (Hrsg.): Business Innovation: Das St. Galler Modell. Springer, Wiesbaden, S. 243–265.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

Foundations of Programming with Python

Module Code: DLBBUEFPP

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

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

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

Module Exam	Split Exam
	Introduction to Programming with Python • Study Format "Distance Learning": Exam, 90 Minutes Object oriented and functional programming in Python • Study Format "Distance Learning": Portfolio (50)

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Data Science & Artificial Intelligence	All Bachelor Programs in the IT & Technology fields

Introduction to Programming with Python

Course Code: DLBDSIPWP01

Study Level	Language of Instruction	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
   - 1.1 Why Python?
   - 1.2 Obtaining and installing Python
   - 1.3 The Python interpreter , IPython, and Jupyter
2. Variables and Data Types
   - 2.1 Variables and value assignment
   - 2.2 Numbers
   - 2.3 Strings
   - 2.4 Collections
   - 2.5 Files

3. Statements
   - 3.1 Assignment, expressions, and print
   - 3.2 Conditional statements
   - 3.3 Loops
   - 3.4 Iterators and comprehensions

4. Functions
   - 4.1 Function declaration
   - 4.2 Scope
   - 4.3 Arguments

5. Errors and Exceptions
   - 5.1 Errors
   - 5.2 Exception handling
   - 5.3 Logs

6. Modules and Packages
   - 6.1 Usage
   - 6.2 Namespaces
   - 6.3 Documentation
   - 6.4 Popular data science packages

Literature

Compulsory Reading

Further Reading

- Barry, P. (2016): Head first Python: A brain-friendly guide. 2nd ed., O'Reilly, Sebastopol, CA.
- Lubanovic, B. (2019): Introducing Python. 2nd ed., O'Reilly, Sebastopol, CA.
- Lutz, M. (2013): Learning Python. 5th ed., O'Reilly, Sebastopol, CA.
- Matthes, E. (2019): Python crash course: A hands-on, project-based introduction to programming. 2nd ed., No Starch Press, San Francisco, CA.
- Ramalho, L. (2015): Fluent Python: Clear, concise, and effective programming. O'Reilly, Sebastopol, CA.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Object oriented and functional programming in Python

Course Code: DLBDSOOFPP01

Study Level	Language of Instruction	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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Portfolio

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☑ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

Java and Web Development

Module Code: DLBBUEJWD

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	▪ DLBCSOOPJ01, DLBCSDSJCL01 ▪ DLBCSOOPJ01, DLBCSDSJCL01, DLBCSWAD01, DLBCSDWIS01	BA	10	300 h

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

Module Coordinator

Prof. Dr. André Hollstein (Web Application Development) / Prof. Dr. Sandra Rebholz (Project: Java and Web Development)

Contributing Courses to Module

- Web Application Development (DLBCSWAD01)
- Project: Java and Web Development (DLBCSPJWD01)

Module Exam Type

Module Exam	Split Exam
	Web Application Development • Study Format "Distance Learning": Workbook Project: Java and Web Development • Study Format "Distance Learning": Portfolio

Weight of Module

see curriculum

Module Contents

Web Application Development

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

Project: Java and Web Development

This course focuses on the development of practical skills. For a given problem and/or context, students independently plan, design, develop, and evaluate small web applications. A set of specific problems and contexts are provided by the tutor and may vary. Each student chooses one and creates an individual solution, the results of which are gathered in a portfolio.

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.

Project: Java and Web Development

On successful completion, students will be able to

- plan the development process of small web applications.
- specify requirements of small web applications to fulfill given needs.
- design and develop web applications that meet specific requirements.
- evaluate if a developed web application meets the specified requirements.

Links to other Modules within the Study Program	Links to other Study Programs of IUBH
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programs in the IT & Technology fields

Web Application Development

Course Code: DLBCSWAD01

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

Course Description

TThis 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
   - 1.1 Structure and History of the Internet
   - 1.2 Internet protocols and URIs
   - 1.3 Web application architecture
   - 1.4 Current trends
2. Tools of web development
   - 2.1 Development Tools
   - 2.2 Version management
   - 2.3 Package Manager
   - 2.4 Upload/Deployment

3. Static web pages developement
   - 3.1 Fundamentals of HTML5
   - 3.2 Fundamentals of CSS

4. Advanced design techniques
   - 4.1 Responsive web design
   - 4.2 Page layout
   - 4.3 Media queries
   - 4.4 CSS Frameworks

5. Web page development with JavaScript
   - 5.1 JavaScript history, ES5/ES6
   - 5.2 JavaScript fundamentals
   - 5.3 Use of JSON
   - 5.4 Common JavaScript Frameworks

6. Web application testing and security
   - 6.1 Testing of web applications
   - 6.2 Basic security concepts and principles

Literature

Compulsory Reading

Further Reading

- Ali Sunyaev (2020): Internet Computing: Principles of Distributed Systems and Emerging Internet-Based Technologies. Bd. 1st ed., Springer, Cham.
- Bühler, P./ Sinner, D. / Schlaich P. (2017): HTML5 und CSS3: Semantik - Design - Responsive Layouts. Springer, Berlin Heidelberg.
- Ferguson R. (2019): Beginning JavaScript: The Ultimate Guide to Modern JavaScript Development. Bd.3rd edition, Apress, Berkeley, CA.

Study Format Distance Learning

Study Format	**Course Type**
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Workbook

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☐ Exam Template	

Project: Java and Web Development

Course Code: DLBCSPJWD01

Study Level	Language of Instruction	Contact Hours	CP	Admission Requirements
BA	English		5	DLBCSOOPJ01, DLBCSDSJCL01, DLBCSWAD01, DLBCSDWIS01

Course Description

This course focuses on the development of practical skills. Students apply their skills to create a small web application that fulfills a set of given needs and evaluate the result. The results are gathered and presented in a portfolio which will be assessed.

Course Outcomes

On successful completion, students will be able to

- plan the development process of small web applications.
- specify requirements of small web applications to fulfill given needs.
- design and develop web applications that meet specific requirements.
- evaluate if a developed web application meets the specified requirements.

Contents

- To a given problem and/or a given context, the students plan, design, develop and evaluate small web applications on their own authority. A set of specific problems and contexts are provided by the tutor and may vary. The students choose one and create their own solution.

Literature

Compulsory Reading

Further Reading

- Bloch, J. (2017). Effective Java (3rd ed.). Boston, MA: Addison-Wesley.
- Harrer, S., Lenhard, J., & Dietz, L. (2018). Java by comparison: Become a Java craftsman in 70 examples. Raleigh, NC: Pragmatic Bookshelf.
- Martin, R. M. (2017). Clean architecture: A craftsman's guide to software structure and design. Boston, MA: Prentice Hall.
- Freeman, E., & Robson, E. (2004). Head first design patterns: A brain-friendly guide. Sebastopol, CA: O'Reilly.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Portfolio

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
110 h	0 h	20 h	20 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

Big Data and Cloud Technologies

Module Code: DLBCSEBDCT

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	▪ none ▪ DLBCSDMDS01	BA	10	300 h

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

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

Module Exam	Split Exam
	Big Data Technologies • Study Format "Distance Learning": Exam, 90 Minutes Cloud Computing • Study Format "Distance Learning": Exam, 90 Minutes

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	Links to other Study Programs of IUBH
This module is similar to other modules in the field(s) of Computer Science & Software Developement.	All Bachelor Programmes in the IT & Technology field(s).

Big Data Technologies

Course Code: DLBDSBDT01

Study Level	Language of Instruction	Contact Hours	CP	Admission Requirements
BA	English		5	DLBCSDMDS01

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
   - 1.1 The 4Vs of data: volume, velocity, variety, veracity
   - 1.2 Data sources
   - 1.3 Data types
2. Text-Based and Binary Data Formats
   - 2.1 Simple formats: CSV, YAML
   - 2.2 XML
   - 2.3 JSON
   - 2.4 Hierarchical data format 5 (HDF 5)
   - 2.5 Apache Parquet
   - 2.6 Apache Arrow

3. NoSQL data stores
   - 3.1 Introduction and motivation
   - 3.2 Approaches and technical concepts

4. Distributed Systems
   - 4.1 Hadoop & MapReduce
   - 4.2 Hadoop file system (HDFS)
   - 4.3 Spark
   - 4.4 DASK

5. Streaming Frameworks
   - 5.1 Spark streaming
   - 5.2 Kafka

Literature

Compulsory Reading

Further Reading

- Karau, H., Konwinski, A., Wendell, A., & Zaharia, M. (2015). Learning spark: Lightning-fast data analysis. Sebastopol, CA: O'Reilly.
- Kleppmann, M. (2017). Designing data-intensive applications: The big ideas behind reliable, scalable, and maintainable systems. Sebastopol, CA: O'Reilly.
- Narkhede, N., Shapira, G., & Palino, T. (2017). Kafka: The definitive guide: Real-time data and stream processing at scale. Sebastopol, CA: O'Reilly.
- Psaltis, A. (2017). Streaming data: Understanding the real-time pipeline. Shelter Island, NY: Manning.
- White, T. (2015). Hadoop: The definitive guide: Storage and analysis at Internet scale. Sebastopol, CA: O'Reilly.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Cloud Computing

Course Code: DLBDSCC01

Study Level	Language of Instruction	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
   - 1.1 Fundamentals of Cloud computing
   - 1.2 Cloud Service Models
   - 1.3 Benefits and Risks
2. Enabling Technology
   - 2.1 Virtualization and Containerization
   - 2.2 Storage Technology
   - 2.3 Networks and RESTful Services
3. Serverless Computing
   - 3.1 Introduction to Serverless Computing
   - 3.2 Benefits
   - 3.3 Limitations

4. Established Cloud Platforms
   - 4.1 Google Cloud Platform
   - 4.2 Amazon Web Services
   - 4.3 Microsoft Azure

5. Data Science in the Cloud
   - 5.1 Google Data Science and Machine Learning Services
   - 5.2 Amazon Web Services Data Science and Machine Learning Services
   - 5.3 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 Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

IT Security

Module Code: DLBROEITS_E

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

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

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 Cryptography • 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.

Links to other Modules within the Study Program	Links to other Study Programs of IUBH
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programs in the IT & Technology fields

Introduction to Data Protection and Cyber Security

Course Code: DLBCSIDPITS01

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

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
   - 1.1 Conceptual Bases, Protection Goals
   - 1.2 Attacks and Threats
   - 1.3 Security Strategy
   - 1.4 Legal Regulations
2. Data Protection
   - 2.1 Data Protection as a Personal Right
   - 2.2 Basic Principles of Data Protection
   - 2.3 EU General Data Protection Regulation
   - 2.4 Further International Regulations on Data Protection
   - 2.5 Cross-Border Data Flow
   - 2.6 Data Protection in Everyday Life

3. Basic Functions of Cyber Security and Their Implementation
   - 3.1 Identification and Authentication
   - 3.2 Rights Management
   - 3.3 Rights Check
   - 3.4 Preservation of Evidence

4. Cyber Security Management
   - 4.1 Basic Concepts and Standards in Cyber Security Management
   - 4.2 Series of Standards ISO 2700x

5. Cyber Security Management in Everyday Life
   - 5.1 Password Management
   - 5.2 Data Backup
   - 5.3 Email Security
   - 5.4 Protection Against Viruses and Other Malware
   - 5.5 Protection Against Social Engineering Attacks

6. Network and Communication Security
   - 6.1 Firewall Technology
   - 6.2 Network Separation
   - 6.3 Security in WLAN, Mobile Networks, Bluetooth, and NFC

7. Cyber Security in the Development of Software and Systems
   - 7.1 Protection of the Development Environment
   - 7.2 Secure Development
   - 7.3 Common Criteria

Literature

Compulsory Reading

Further Reading

- Eckert, C. (2014): IT-Sicherheit. Konzepte – Verfahren – Protokolle. 9. Auflage, De Gruyter, München.
- Poguntke, W. (2013): Basiswissen IT-Sicherheit. Das Wichtigste für den Schutz von Systemen & Daten. 3. Auflage, W3l, Dortmund.
- Witt, B. C. (2010): Datenschutz kompakt und verständlich. 2. Auflage, Vieweg+Teubner, Wiesbaden.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Cryptography

Course Code: DLBCSCT01

Study Level	Language of Instruction	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
   - 1.1 Protection Goals
   - 1.2 Vulnerabilities and Threats
2. Foundations of Cryptology and its Core Components
   - 2.1 Encoding
   - 2.2 Symmetrical Encryption
   - 2.3 Asymmetric Encryption
   - 2.4 One-way Functions and Cryptographic Hash Functions

3. Basic Cryptographic Applications
   - 3.1 Key exchange and Hybrid Processes
   - 3.2 Digital Signature
   - 3.3 Message Authentication Code
   - 3.4 Steganographic Methods

4. Authentication
   - 4.1 Passwords and Public-Key-Certificates
   - 4.2 Challenge-Response-Procedure and Zero-Knowledge-Procedure
   - 4.3 Biometric Methods
   - 4.4 Authentication in Distributed Systems
   - 4.5 Identities Through Smartcards

5. Security of Single Computers
   - 5.1 Malware and Cookies
   - 5.2 Some Special Features of Operating Systems
   - 5.3 Web Server Security

6. Security in Communication Networks
   - 6.1 Security Problems and Defense Concepts
   - 6.2 Internet Standards for Communication Security
   - 6.3 Identity and Anonymity
   - 6.4 Security in Mobile and Wireless Communications

7. Security in E-Commerce
   - 7.1 Email Security
   - 7.2 Online Banking and Online Payments
   - 7.3 Electronic Money

8. Secure Software Development
   - 8.1 Threat Modeling
   - 8.2 Secure Software Design
   - 8.3 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 Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☑ Exam Template	

Logic and Artificial Intelligence

Module Code: DLBBUELAI

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

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

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

Module Exam	Split Exam
	Theoretical Computer Science and Mathematical Logic • Study Format "Distance Learning": Exam, 90 Minutes Artificial Intelligence • Study Format "Distance Learning": Exam, 90 Minutes

Weight of Module

see curriculum

Module Contents

Theoretical Computer Science and Mathematical Logic

- Proposition and predicate logic
- Finite automata
- Formal languages
- Computability and Turing machines
- Complexity theory
- Petri nets

Artificial Intelligence

- 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.

Learning Outcomes

Theoretical Computer Science and Mathematical Logic

On successful completion, students will be able to

- formulate and translate predicate logical relationships into programming languages.
- use finite automatons 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.

Artificial Intelligence

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.

Links to other Modules within the Study Program	Links to other Study Programs of IUBH
This module is similar to other modules in the fields of Computer Science & Software Development and Data Science & Artificial Intelligence	All Bachelor Programs in the IT & Technology fields

Theoretical Computer Science and Mathematical Logic

Course Code: DLBCSTCSML01

Study Level	Language of Instruction	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 automatons 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
   - 1.1 Basic Concepts
   - 1.2 Interpretation and Satisfiability
   - 1.3 Normal Forms
   - 1.4 Proof by Contradiction and Resolution
   - 1.5 Completeness
2. Predicate Logic
   - 2.1 Basic Concepts
   - 2.2 Completeness and Incompleteness
   - 2.3 Logic Programming with Prolog

3. Finite Automata and Regular Expressions
   - 3.1 Basic Concepts of Finite Automata
   - 3.2 Regular Expressions
   - 3.3 Practical Applications

4. Formal Languages and Grammars
   - 4.1 Basic Concepts
   - 4.2 The Chomsky Hierarchy
   - 4.3 Regular Languages
   - 4.4 Context Free Languages
   - 4.5 Context Sensitive Languages

5. Computability and Turing Machines
   - 5.1 Models of Computability
   - 5.2 Turing Machines
   - 5.3 Recursive Functions
   - 5.4 Computability and Decidability
   - 5.5 The Halting Problem

6. Complexity Theory
   - 6.1 Basic Concepts
   - 6.2 Complexity Classes
   - 6.3 P=NP?

7. Petri Nets
   - 7.1 Basic Concepts of Graphs and Petri Nets
   - 7.2 Invariants, Liveliness, and Safety
   - 7.3 Process Modeling and Analysis with Petri Nets

8. Applications of Mathematical Logic and Theoretical Computer Science
   - 8.1 Parser and Compiler
   - 8.2 Program Verification
   - 8.3 Artificial Intelligence

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 Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** yes
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Artificial Intelligence

Course Code: DLBDSEAIS01

Study Level	Language of Instruction	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
   - 1.1 Historical developments
   - 1.2 AI winter
   - 1.3 Expert systems
   - 1.4 Notable advances
2. Modern AI Systems
   - 2.1 Narrow versus general AI
   - 2.2 Application areas
3. Reinforcement Learning
   - 3.1 What is reinforcement learning?
   - 3.2 Markov Chains and value function
   - 3.3 Time-difference and Q Learning

4. Natural Language Processing (NLP)
   - 4.1 Introduction to NLP and application areas
   - 4.2 Basic NLP techniques
   - 4.3 Vectorizing data

5. Computer Vision
   - 5.1 Pixels and filters
   - 5.2 Feature detection
   - 5.3 Distortions and calibration
   - 5.4 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 Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

DLBDSEAIS01

Data Engineer

Module Code: DLBDSEDE

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

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

Module Coordinator

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

Contributing Courses to Module

- Data Engineering (DLBDSEDE01)
- Project: Data Engineering (DLBDSEDE02)

Module Exam Type

Module Exam	Split Exam
	Data Engineering • Study Format "Distance Learning": Exam, 90 Minutes Project: Data Engineering • Study Format "Distance Learning": Portfolio

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the field(s) of Data Science & Artificial Intelligence.	All Bachelor Programmes in the IT & Technology field(s).

Data Engineering

Course Code: DLBDSEDE01

Study Level	Language of Instruction	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
   - 1.1 Reliability
   - 1.2 Scalability
   - 1.3 Maintainability
2. NoSQL In Depth
   - 2.1 Fundamentals of NoSQL
   - 2.2 Established NoSQL solutions
3. Architectures for Data Processing at Scale
   - 3.1 Batch processing architectures
   - 3.2 Architectures for stream and complex event processing
   - 3.3 Lambda architecture

4. Containerization In Depth
   - 4.1 Docker containers
   - 4.2 Container management
5. Governance & Security
   - 5.1 Data protection
   - 5.2 Data security
   - 5.3 Data governance
6. Operational Aspects
   - 6.1 Defining principles of DataOps
   - 6.2 Building and maintaining data pipelines
   - 6.3 Metrics and monitoring

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

Study Format	Course Type
Distance Learning	Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Project: Data Engineering

Course Code: DLBDSEDE02

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

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. Porfolio 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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Portfolio

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☑ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

Applied Sales

Module Code: DLBDSEAS

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

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

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

Module Exam	Split Exam
	Applied Sales I • Study Format "Distance Learning": Exam Applied Sales II • Study Format "Distance Learning": Exam

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Marketing & Sales	All Bachelor Programmes in the Marketing & Communication fields

Applied Sales I

Course Code: DLBDSEAS01

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

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
   - 1.1 Tasks and Forms of Applied Distribution
   - 1.2 Marketing as the Basis of Sales
   - 1.3 Distribution, Sales, and Other Terms
   - 1.4 Sales in Different Economic Sectors

2. The Distribution System
   - 2.1 Forms of Sales
   - 2.2 Sales Organisation
   - 2.3 Key Account Management
   - 2.4 Multi-Channel Distribution

3. Personal Sales
   - 3.1 The "New Sellers"
   - 3.2 Requirements for Sales Personalities
   - 3.3 The Key Account Manager
   - 3.4 Task of Sales Managers

4. Sales Plan
   - 4.1 Tasks and Objectives of Sales Management
   - 4.2 Observation of Competition in the Context of Sales Management
   - 4.3 Potential Analyses and Sales Planning
   - 4.4 Sales Control and Visit Strategies

5. New Customer Acquisition
   - 5.1 Identification of New Customer Potential
   - 5.2 Customer Relationship Management and Customer Acquisition
   - 5.3 Trade Fairs and Events
   - 5.4 Networking

6. The Sales Visit
   - 6.1 Frequency and Preparation of Visits
   - 6.2 Conduct of a Visit
   - 6.3 Visit Reports and Follow-Up
   - 6.4 Aftercare and Follow-Up

7. Conversational Tactics
   - 7.1 Structured Conversation Preparation
   - 7.2 Goal-Oriented Conversation: The D.A.L.A.S Model
   - 7.3 Questioning Techniques

8. Conducting Negotiations
   - 8.1 Psychology of Negotiation
   - 8.2 Negotiation Structure
   - 8.3 Objection Handling
   - 8.4 Price Negotiations

9. Other Sales Channels
   - 9.1 Telemarketing
   - 9.2 Catalogue and Brochure Sales
   - 9.3 Internet and E-Commerce

Literature

Compulsory Reading

Further Reading

- Dannenberg, H./Zupancic, D. (2010): Spitzenleistungen im Vertrieb. Optimierungen im Vertriebs- und Kundenmanagement. 2. Auflage, Gabler, Wiesbaden.
- Eicher, H. (2006): Die geheimen Spielregeln im Verkauf. Wissen, wie der Kunde tickt. Campus, Frankfurt a. M.
- Herndl, K. (2014): Führen im Vertrieb. So unterstützen Sie Ihre Mitarbeiter direkt und konsequent. 4. Auflage, Gabler, Wiesbaden.
- Limbeck, M. (2016): Das neue Hardselling. Verkaufen heißt verkaufen – So kommen Sie zum Abschluss. 6. Auflage, Gabler, Wiesbaden.
- Schneider, W./Henning, A. (2008): Lexikon Kennzahlen für Marketing und Vertrieb. Das Marketing-Cockpit von A – Z. 2. Auflage, Springer, Berlin/Heidelberg.
- Winkelmann, P. (2012): Marketing und Vertrieb. Fundamente für die Marktorientierte Unternehmensführung. 8. Auflage, Oldenbourg, München.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Applied Sales II

Course Code: DLBDSEAS02

Study Level	Language of Instruction	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
   - 1.1 Marketing Tasks and Functions
   - 1.2 Sales Marketing in Different Economic Sectors
   - 1.3 Relationship Marketing
   - 1.4 International Marketing and Sales Cooperations

2. Customer Satisfaction as a Success Factor
   - 2.1 Customer Relationship Management (CRM)
   - 2.2 The CRM Success Chain
   - 2.3 Customer Relationship Strategies

3. Personalities in Sales
   - 3.1 Sales Personalities and Differentiation
   - 3.2 Selling in Teams
   - 3.3 Negotiating With Committees

4. Customer-Oriented Communication
   - 4.1 Communication Tasks in Sales
   - 4.2 Sales Promotion by Sales Staff
   - 4.3 Team Sales Promotion
   - 4.4 Sales Promotion by the Company

5. Presentation and Rhetoric
   - 5.1 Rhetoric in Sales
   - 5.2 Presentation Techniques
   - 5.3 Nonverbal Communication

6. Customer Loyalty
   - 6.1 Customer Retention Management
   - 6.2 Customer Programs and Other Customer Loyalty Tools
   - 6.3 Complaint Management

7. Networking
   - 7.1 Network Competencies in the Company
   - 7.2 Building and Shaping Relationships
   - 7.3 Networking via Social Media

8. Case Study in IQ Media Marketing
   - 8.1 The Market Situation
   - 8.2 The Marketing Situation
   - 8.3 IQ Media Marketing and IQ Digital Media Marketing

Literature

Compulsory Reading

Further Reading

- Dannenberg, H./Zupancic, D. (2010): Spitzenleistungen im Vertrieb. Optimierungen im Vertriebs- und Kundenmanagement. 2. Auflage, Gabler, Wiesbaden.
- Eicher, H. (2006): Die geheimen Spielregeln im Verkauf. Wissen, wie der Kunde tickt. Campus, Frankfurt a. M.
- Herndl, K. (2014): Führen im Vertrieb. So unterstützen Sie Ihre Mitarbeiter direkt und konsequent. 4. Auflage, Gabler, Wiesbaden.
- Limbeck, M. (2016): Das neue Hardselling. Verkaufen heißt verkaufen – So kommen Sie zum Abschluss. 6. Auflage, Gabler, Wiesbaden.
- Schneider, W./Henning, A. (2008): Lexikon Kennzahlen für Marketing und Vertrieb. Das Marketing-Cockpit von A – Z. 2. Auflage, Springer, Berlin/Heidelberg.
- Winkelmann, P. (2012): Marketing und Vertrieb. Fundamente für die Marktorientierte Unternehmensführung. 8. Auflage, Oldenbourg, München.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Supply Chain Management

Module Code: DLBDSESCM

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

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

Module Coordinator

N.N. (Supply Chain Management I) / N.N. (Supply Chain Management II)

Contributing Courses to Module

- Supply Chain Management I (DLBDSESCM01)
- Supply Chain Management II (DLBDSESCM02)

Module Exam Type

Module Exam	Split Exam
	Supply Chain Management I • Study Format "Distance Learning": Module Exam (50) Supply Chain Management II • Study Format "Distance Learning": Module Exam (50)

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	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Logistics & Transportation	All Bachelor Programmes in the Transport & Logistics fields

Supply Chain Management I

Course Code: DLBDSESCM01

Study Level	Language of Instruction	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
   - 1.1 Terminological and Conceptual Fundamentals
   - 1.2 Supply Chain Typology According to Otto
   - 1.3 Supply Chain Typology According to Bechtel/Jayaram
   - 1.4 Dynamic Aspects of Supply Chains

2. Selected Theoretical Concepts for the Supply Chain Concept
   2.1 New Institutional Economics
   2.2 Game Theory
   2.3 Network Approach
   2.4 Other Theoretical Additions

3. Supply Chain Management
   3.1 Basic Information on the Goals and Scope of SCM
   3.2 Popular Problem Areas of the SCM
   3.3 Supply Chain Management as an Evolutionary Step in Logistics
   3.4 Supply Chain Management as Cooperation Management

4. SCM Model
   4.1 Basic Information on the Term SCM Models
   4.2 SCOR Model
   4.3 SCM Task Model

5. SCM as a Coordination Problem
   5.1 Basic Information on the Concept of Coordination
   5.2 Coordination Concepts, Context, and Perspectives of SCM
   5.3 Coordination Instruments

Literature
Compulsory Reading
Further Reading ▪ Arndt, H. (2018): Supply Chain Management. Optimierung logistischer Prozesse. 7. Auflage, Gabler, Wiesbaden. ▪ Grosche, P. (2012): Konfiguration und Koordination von Wertschöpfungsaktivitäten in internationalen Unternehmen. Eine empirische Untersuchung in der Automobilindustrie. Gabler-Verlag, Wiesbaden. ▪ Heiserich, O.E./Helbig, K./Ullmann, W. (2011): Logistik. Eine praxisorientierte Einführung. 4. Auflage, Gabler-Verlag | Springer Fachmedien, Wiesbaden 2011. ▪ Hertel, J./Zentes, J./Schramm-Klein, H. (2011): Supply-Chain-Management und Warenwirtschaftssysteme im Handel. 2. Auflage, Springer Verlag, Heidelberg. ▪ Hungenberg, H. (2014): Strategisches Management in Unternehmen. Ziele-Prozesse-Verfahren. 8. Auflage, Wiesbaden. ▪ Pfohl, H. C. (2010): Logistiksysteme. Betriebswirtschaftliche Grundlagen. 8 Auflage, Springer, Berlin. ▪ Schulte, C. (2013): Logistik. Wege zur Optimierung der Supply Chain. 6. Auflage, Vahlen, München. ▪ Werner, H. (2013): Supply Chain Management. Grundlagen, Strategien, Instrumente und Controlling. 5. Auflage, Gabler, Wiesbaden.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Module Exam

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Supply Chain Management II

Course Code: DLBDSESCM02

Study Level	Language of Instruction	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
   - 1.1 Strategic Thinking and Action: General Information
   - 1.2 Competition Focus and SCM
   - 1.3 Competition Location and SCM
   - 1.4 Competition Rules and SCM

2. SCM Practice: Core Process Planning
   - 2.1 General Preliminary Considerations
   - 2.2 Collaborative Planning, Forecasting, and Replenishment
   - 2.3 Order Promoting
   - 2.4 Kanban
   - 2.5 Integration of X-PL Logistics Service Providers

3. SCM Practice: Core Process Procurement
   - 3.1 General Preliminary Considerations
   - 3.2 Production Synchronous Procurement
   - 3.3 Sourcing Concepts
   - 3.4 Supplier Relations Management

4. SCM Practice: Core Process Production
   - 4.1 Selected Aspects of the Problem Background
   - 4.2 Collaborative Engineering
   - 4.3 Postponement Strategies
   - 4.4 Value Added Partnership

5. SCM Practice: Core Process Distribution
   - 5.1 Basic Information on the Distribution Problem
   - 5.2 Efficient Consumer Response (ECR)
   - 5.3 Consignment Warehouse

Literature
Compulsory Reading
Further Reading ▪ Arndt, H. (2018): Supply Chain Management. Optimierung logistischer Prozesse. 7. Auflage, Gabler, Wiesbaden. ▪ Grosche, P. (2012): Konfiguration und Koordination von Wertschöpfungsaktivitäten in internationalen Unternehmen. Eine empirische Untersuchung in der Automobilindustrie. Gabler-Verlag, Wiesbaden. ▪ Heiserich, O.E./Helbig, K./Ullmann, W. (2011): Logistik. Eine praxisorientierte Einführung. 4. Auflage, Gabler-Verlag | Springer Fachmedien, Wiesbaden 2011. ▪ Hertel, J./Zentes, J./Schramm-Klein, H. (2011): Supply-Chain-Management und Warenwirtschaftssysteme im Handel. 2. Auflage, Springer Verlag, Heidelberg. ▪ Hungenberg, H. (2014): Strategisches Management in Unternehmen. Ziele-Prozesse-Verfahren. 8. Auflage, Wiesbaden. ▪ Pfohl, H. C. (2010): Logistiksysteme. Betriebswirtschaftliche Grundlagen. 8 Auflage, Springer, Berlin. ▪ Schulte, C. (2013): Logistik. Wege zur Optimierung der Supply Chain. 6. Auflage, Vahlen, München. ▪ Werner, H. (2013): Supply Chain Management. Grundlagen, Strategien, Instrumente und Controlling. 5. Auflage, Gabler, Wiesbaden.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Module Exam

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

DLBDSESCM02

Smart Services

Module Code: DLBINGSS_E

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

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

Module Coordinator

N.N. (Smart Services I) / N.N. (Smart Services II)

Contributing Courses to Module

- Smart Services I (DLBINGSS01_E)
- Smart Services II (DLBINGSS02_E)

Module Exam Type

Module Exam	Split Exam
	Smart Services I • Study Format "Distance Learning": Exam, 90 Minutes Smart Services II • Study Format "Distance Learning": Written Assessment: Project Report

Weight of Module

see curriculum

Module Contents

Smart Services I

- Digitization and disruption
- Potential of Smart Services
- Development and specification of Smart Services
- Service architectures
- Integration platforms
- Technologies for Smart Services
- Quality and operation of Smart Services

Smart Services II

Analysis of a selected topic of Smart Services and design of a self-chosen assignment in a prototyping environment.

Learning Outcomes

Smart Services I

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.

Smart Services II

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.

Links to other Modules within the Study Program	**Links to other Study Programs of IUBH**
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programs in the IT & Technology fields

Smart Services I

Course Code: DLBINGSS01_E

Study Level	Language of Instruction	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
   - 1.1 Digitization and Cyber-Physical Production Systems
   - 1.2 Smart Services in Industry 4.0
   - 1.3 Examples of Smart Services

2. Digitization and Disruption
   - 2.1 Definition: Digital Business Models
   - 2.2 Strategies for Change and Innovation
   - 2.3 Digital Intermediaries
   - 2.4 Examples of Disruptive Business Models

3. Recognizing Potential for Smart Services
   - 3.1 Business Model Canvas
   - 3.2 Personas
   - 3.3 Customer Journeys
   - 3.4 Domain-Driven Design

4. Development and Specification of Smart Services
   - 4.1 Modelling of the System Context
   - 4.2 Modelling of Business Processes
   - 4.3 Modelling of Technical Interfaces
   - 4.4 Tools for API Specification

5. Service Architectures
   - 5.1 Infrastructure/Platform/Software-as-a-Service
   - 5.2 Everything-as-a-Service
   - 5.3 Service-oriented Architectures
   - 5.4 Micro Services

6. Integration Platforms
   - 6.1 Features and Purpose of Integration Platforms
   - 6.2 Enterprise Integration Patterns
   - 6.3 External Integration with Zapier, IFTTT & Others

7. Technologies for Smart Services
   - 7.1 Formats for Data Exchange
   - 7.2 Internet Communication Protocols
   - 7.3 Semantic Descriptions
   - 7.4 Complex Event Processing
   - 7.5 Security

8. Quality and Operation of Smart Services
   - 8.1 Quality Characteristics and Maturity of APIs
   - 8.2 Service Level Agreements
   - 8.3 Service Level Management

Literature

Compulsory Reading

Further Reading

- 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

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☐ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Smart Services II

Course Code: DLBINGSS02_E

Study Level	Language of Instruction	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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

Smart Factory

Module Code: DLBDSESF

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

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

Module Coordinator

N.N. (Smart Factory I) / Prof. Dr. Christian Magnus (Smart Factory II)

Contributing Courses to Module

- Smart Factory I (DLBDSESF01)
- Smart Factory II (DLBDSESF02)

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.

Links to other Modules within the Study Program	Links to other Study Programs of IUBH
This module is similar to other modules in the fields of Computer Science & Software Development	All Bachelor Programmes in the IT & Technology fields

Smart Factory I

Course Code: DLBDSESF01

Study Level	Language of Instruction	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
   - 1.1 Goals of Smart Factory
   - 1.2 Internet of Things
   - 1.3 Cyber-Physical Systems
   - 1.4 Cyber-Physical Production Systems
   - 1.5 Smart Factory as a Cyber-Physical (Production) System

2. Development of Automation
   - 2.1 Automation Pyramid
   - 2.2 Networked, Decentralized Organization of Production
   - 2.3 Future Challenges

3. Technological Basics and Standards
   - 3.1 Identification of Physical Objects
   - 3.2 Formal Description Languages and Ontologies
   - 3.3 Digital Object Memory
   - 3.4 Physical Situation Recognition
   - 3.5 (Partially) Autonomous Action and Cooperation
   - 3.6 Human-Machine Interaction
   - 3.7 Machine to Machine Communication

4. Basic Concepts of a Smart Factory
   - 4.1 Order-Controlled Production
   - 4.2 Bundling of Machine and Production Data
   - 4.3 Supporting People in Production
   - 4.4 Intelligent Products and Resources
   - 4.5 Smart Services

5. Reference Architectures
   - 5.1 Purpose and Properties of Reference Architectures
   - 5.2 Overview of Standardization Initiatives
   - 5.3 CyProS Reference Architecture
   - 5.4 RAMI 4.0 (DIN SPEC 91345)

6. Smart Factory Engineering
   - 6.1 Classification of Different Engineering Tools
   - 6.2 Virtual Engineering
   - 6.3 User-Centered Design
   - 6.4 Requirements Engineering
   - 6.5 Modelling
   - 6.6 Integration of Classic and Smart Components

Literature
Compulsory Reading
Further Reading ▪ Bangemann, T. et al. (2016): Integration of Classical Components into Industrial Cyber–Physical Systems. In: Proceedings of the IEEE, 104. Jg., Heft 5, S. 947–959. DOI: 10.1109/JPROC.2015.2510981. ▪ Bauernhansl, T./Hompel, M. ten/Vogel-Heuser, B. (Hrsg.) (2014): Industrie 4.0 in Produktion, Automatisierung und Logistik. Springer, Berlin. ▪ Bundesministerium für Wirtschaft und Energie (Hrsg.) (2016): IT-Sicherheit für die Industrie 4.0. Produktion, Produkte, Dienste von morgen im Zeichen globalisierter Wertschöpfungsketten. Berlin. ▪ Geisberger, E./Broy, M. (Hrsg.) (2012): agendaCPS. Integrierte Forschungsagenda Cyber-Physical Systems. Springer, Berlin/Heidelberg. ▪ Harrison, R./Vera, D.; Ahmad, B. (2016): Engineering Methods and Tools for Cyber–Physical Automation Systems. In: Proceedings of the IEEE, 104. Jg., Heft 5, S. 973–985. DOI: 10.1109/JPROC.2015.2510665. ▪ Haupert, J. (2013): DOMeMan: Repräsentation, Verwaltung und Nutzung von digitalen Objektgedächtnissen. Akademische Verlagsgesellschaft AKA, Berlin. ▪ VDMA & Partner (2016): Leitfaden Industrie 4.0 Security. Handlungsempfehlungen für den Mittelstand. VDMA Verlag, Frankfurt a. M.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Online Lecture

Information about the examination	
Examination Admission Requirements	**BOLK:** yes **Course Evaluation:** no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
90 h	0 h	30 h	30 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☑ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☑ Shortcast	☑ Live Tutorium/Course Feed
☑ Audio	
☑ Exam Template	

Smart Factory II

Course Code: DLBDSESF02

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

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

Study Format	Course Type
Distance Learning	Project

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** no
Type of Exam	Written Assessment: Project Report

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
120 h	0 h	30 h	0 h	0 h	150 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☑ Guideline
☐ Shortcast	☑ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	

DLBDSESF02

Bachelor Thesis

Module Code: DLBBT

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

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

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 "Distance Learning": Written Assessment: Bachelor Thesis Colloquium • Study Format "Distance Learning": Presentation: Colloquium

Weight of Module

see curriculum

Module Contents

Bachelor Thesis

- Bachelor's thesis
- Colloquium on the bachelor's thesis

Colloquium

Learning Outcomes

Bachelor Thesis

On successful completion, students will be able to

- work on a problem from their major field of study by applying the specialist and methodological skills they have acquired during their studies.
- 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.

Colloquium

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).

Links to other Modules within the Study Program	Links to other Study Programs of IUBH
All modules in the bachelor program	All bachelor programs in distance learning

Bachelor Thesis

Course Code: DLBBT01

Study Level	Language of Instruction	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 ▪ Hunziker, A.W. (2010): Spaß am wissenschaftlichen Arbeiten. So schreiben Sie eine gute Semester-, Bachelor- oder Masterarbeit. 4. Auflage, Verlag SKV, Zürich. ▪ Wehrlin, U. (2010): Wissenschaftliches Arbeiten und Schreiben. Leitfaden zur Erstellung von Bachelorarbeit, Masterarbeit und Dissertation – von der Recherche bis zur Buchveröffentlichung. AVM, München. ▪ Selection of literature according to topic

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Thesis

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** yes
Type of Exam	Written Assessment: Bachelor Thesis

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
270 h	0 h	0 h	0 h	0 h	270 h

Instructional Methods

- ☐ Learning Sprints®
- ☐ Course Book
- ☐ Vodcast
- ☐ Shortcast
- ☐ Audio
- ☐ Exam Template
- ☑ Review Book
- ☐ Creative Lab
- ☐ Guideline
- ☐ Live Tutorium/Course Feed

Colloquium

Course Code: DLBBT02

Study Level	Language of Instruction	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

- Renz, K.-C. (2016): Das 1 x 1 der Präsentation. Für Schule, Studium und Beruf. 2. Auflage, Springer Gabler, Wiesbaden.

Study Format Distance Learning

Study Format	Course Type
Distance Learning	Thesis Defense

Information about the examination	
Examination Admission Requirements	**BOLK:** no **Course Evaluation:** yes
Type of Exam	Presentation: Colloquium

Student Workload					
Self Study	**Presence**	**Tutorial**	**Self Test**	**Practical Experience**	**Hours Total**
30 h	0 h	0 h	0 h	0 h	30 h

Instructional Methods	
☐ Learning Sprints®	☐ Review Book
☐ Course Book	☐ Creative Lab
☐ Vodcast	☐ Guideline
☐ Shortcast	☐ Live Tutorium/Course Feed
☐ Audio	
☐ Exam Template	