



Faculty of Computer Science and
Business Information Systems

Technical University of
Applied Sciences
Würzburg-Schweinfurt

Module Handbook **Bachelor E-Commerce (B. Sc.)**

Summer semester 2025

Winter semester 2025



Contents

1. semester.....	5
Backend Programming.....	6
Discrete Mathematics and Linear Algebra.....	8
English for E-Commerce.....	10
Fundamentals of Business Administration with Accounting.....	12
User Experience and Consumer Psychology.....	14
Webanalytics.....	16
Website Development and Accessibility.....	18
2. semester.....	20
General Compulsory Elective.....	21
Digital Notations.....	23
Basics of Web Technologies with Web Project.....	25
Mathematics II.....	27
Statistics.....	29
Web Programming II.....	31
3. semester.....	33
Databases.....	34
Mobile Systems and Applications.....	36
Online-Marketing.....	38
Accountancy.....	40
Software Engineering.....	42
Software industry, education and economy in India.....	44
Web Programming III.....	46
4. semester.....	48
Content Engineering.....	49
Senior Seminar.....	51
English Communication.....	53
IT Project Management.....	55
Innovation Management and Entrepreneurship.....	57
Web Application and Development Systems.....	59
5. semester.....	61

Supervised Internship	62
Soft and Professional Skills	64
6. semester.....	66
Augmented Reality	67
BSI BCM Practitioner and BSI Incident Practitioner	69
Behavioural Pricing	71
Business Data Visualization with Power BI and AI	74
Containerization and orchestration of microservices	76
Data Science with R	78
Design Thinking & Innovation	80
Digitization Strategy – Document Management in the SAP Environment	82
Emotional and Persuasive Design in E-Commerce	84
Ethical AI Hacking	86
IT Risk Management	89
Introduction in Machine Learning	91
Introduction to Artificial Intelligence	93
Logistics Management in E-Commerce	96
Mobile Applications	98
Penetration Testing	101
Principles of Autonomous Drones	103
Project Work	105
Requirements Engineering	107
SemML: Seminar on Machine Learning	109
Social Media in the business world	111
Software Testing	113
Mobile and Ubiquitous Concepts and Development	115
Process and Landing Page Optimization	117
Shop Systems	119
Seminar Conversion Optimization	121
Seminar Mobile and Ubiquitous Solutions	123
Seminar Shop Systems	125
Video-Production & Video-Marketing	127
Virtual Reality	129
7. semester.....	131
ABAP/4 Development Workbench	132

AI and Security.....	134
Agile Enterprise - Agile Methods in Practice.....	136
Algorithms for Distributed Systems.....	138
Automotive and Industrial Cybersecurity.....	140
Bachelor Thesis / Bachelor Seminar.....	144
Big Data Analytics.....	146
Blockchain and Smart Contracts.....	148
Business Intelligence and Reporting.....	150
CANVA – simple but great design.....	152
Cloud Native Enterprise Java.....	154
Data-driven Team Psychology.....	156
Digital Accessibility.....	158
Introduction to SAP Business Technology Platform.....	160
Ethical Hacking (Blended Intensive Program).....	162
Governance, Risk, Compliance and Ethics (FWPM).....	164
Green IT (Blended Intensive Program).....	166
Low Code Development with Open Source.....	168
Media Psychology: The Magic of Media & Entertainment.....	170
Project-related geovisualization VI (deep sea VR).....	172
Project Management and Strategic Management.....	174
Social Engineering and Security Awareness.....	177
Operating Shop Systems.....	179
Mobile and Ubiquitous Design.....	181
Qualitative and Quantitative User Research.....	183
Web-Intelligence.....	185
Web-based UX-projects in finnish-german cooperation.....	187
Business and IT Law.....	189

1. semester

Module: 6150030

Backend Programming

Module profile

Exam number

6150030

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Tristan Wimmer

Lecturer(s)

Prof. Dr. Tristan Wimmer,
Christine Zilker

Applicability

BEC

Semester according to SPO

1. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

This module aims to teach students the basics of programming using the Python programming language. It introduces the basic concepts of programming languages and programming paradigms and creates the basis for further modules in the Software Engineering degree programme.

The following topics are covered:

- Elementary data types, data structures and operators
- Control structures: loops and conditional statements
- Programming with functions
- Introduction to object-orientated programming
- Introduction to the concept of inheritance
- Introduction to exception handling

In addition to these topics, this module demonstrates the appropriate structuring options for code, as well as documentation options for a clean and readable programming style. Furthermore, students are shown how best to encounter and solve problems.

Examination

**Required prerequisites for
the participation in the
examination according to the
SPO appendix**

None

Examination - type

Written exam (sP) according to
§ 23 APO

Examination - length/format

90 minutes

The concrete length/format
of the examination will be
determined in the study plan.

Language of examination

German

**Condition for the award of
credit points**

None

Learning outcomes

After successfully completing the module, students will be able to identify and name the basic data types, data structures and operators and apply them in the Python programming language.

- Students will be able to explain how control structures such as loops and conditional statements control the flow of programmes and how these are implemented in Python.
- After successfully completing the module, students will be able to write simple Python programmes that use functions and parameter passing to solve specific tasks, applying the principle of divide and conquer.
- Students will be able to apply object-oriented programming to improve the structure and maintainability of a programme through encapsulation.
- After successfully completing the module, students will be able to design and implement an object-oriented programme in Python for a specific requirement using the basic principles of inheritance.
- After successfully completing the module, students will be able to apply exception handling for incorrect inputs and data type incompatibilities.

Literature

Häberlein, Tobias. Programming with Python: An Introduction to Procedural, Object-Oriented and Functional Programming. 1st ed. 2024. Berlin, Heidelberg: Springer Berlin Heidelberg, 2024. <https://doi.org/10.1007/978-3-662-68678-2>.

Module: 6150040,6920020

Discrete Mathematics and Linear Algebra

Module profile

Exam number

6150040,6920020

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Patrik Stilgenbauer

Lecturer(s)

Prof. Dr. Patrik Stilgenbauer

Applicability

BEC, BDGD

Semester according to SPO

1. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

School maths

Content

Linear algebra:

Linear systems of equations, matrices, vectors, scalar product, calculating with matrices, inverse matrices, determinants.

Logic:

Logical operations, truth tables, propositional algebra, normal forms.

Number theory:

Modulo calculus, extended Euclidean algorithm, Euler-Fermat theorem, RSA encryption method.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

- Students know basic concepts and techniques from the mathematical fields of propositional logic, number theory and linear algebra.
- Students understand the importance of mathematical methods and their role in applications from the fields of business informatics and e-commerce, for example in the calculation of IBAN check digits, the introduction of the RSA public key encryption method and the simplification of complex logical expressions in conditional queries in programmes.
- Students apply mathematical techniques to solve practical problems in the fields of business informatics and e-commerce.
- Students analyse mathematical problems from the areas of propositional logic, number theory and linear algebra in order to develop and implement suitable solution strategies.
- Students evaluate different solution strategies with regard to their effectiveness and efficiency in solving specific mathematical problems.
- Students create their own solution strategies to successfully solve mathematical problems.

Literature

Bartholomé, Andreas; Rung, Josef; Kern, Hans: Zahlentheorie für Einsteiger; Vieweg + Teubner, Wiesbaden
Beutelspacher, Albrecht; Zschiegner, Marc-Alexander: Discrete Mathematics for Beginners; Vieweg + Teubner, Wiesbaden
Brill, Manfred: Mathematics for Computer Scientists; Hanser Verlag; Munich/Vienna
Gramlich, Günter: Lineare Algebra - Eine Einführung; Fachbuchverlag Leipzig im Carl Hanser Verlag
Hartmann, Peter: Mathematics for Computer Scientists; Vieweg + Teubner, Wiesbaden
Papula, Lothar: Mathematics for Engineers and Scientists 1 and 2; Vieweg + Teubner; Wiesbaden
Pommersheim, James E.; Marks, Tim K.; Flapan, Erica L.: Number Theory: A Lively Introduction with Proofs, Applications, and Stories; John Wiley & Sons
Schubert, Matthias: Mathematics for Computer Scientists; Vieweg + Teubner, Wiesbaden

Module: 6100820

English for E-Commerce

Module profile

Exam number

6100820

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Graeme Dunphy

Lecturer(s)

Prof. Dr. Graeme Dunphy

Applicability

BEC

Semester according to SPO

1. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Written and spoken English at B2 level

Content

Technical and commercial vocabulary, including maths and statistics; reading, understanding and commenting on authentic journalistic and scholarly texts including newspaper articles on e-commerce, excerpts from text books, and one full-length scholarly journal article; listening comprehension (authentic recordings relevant to business and career), oral communication skills (including talking about studies and work, and job interview practice); written communication (emails, abstracts, summaries, graph-related statistical reports, CVs and letters of application).

This seminar is at level B2 of the CEFR; the readings include some texts at level C1.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

Students will be able to discuss topics related to their studies in English. Having made a close reading of a full-length scholarly research paper under supervision, they will be well placed to read and evaluate English-language scholarship in the field of E-Commerce. They will be able to write short professional texts such as e-mails or data reports in an appropriate English style.

Literature

Course script, scholarly and journalistic articles, listening materials.

Module: 6150060

Fundamentals of Business Administration with Accounting

Module profile

Exam number

6150060

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Christina Völkl-Wolf

Lecturer(s)

Prof. Dr. Eva Wedlich,

Christian Holleber

Applicability

BEC

Semester according to SPO

1. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Fundamentals of business administration and economics

- Meaning of economic activity, types of goods, economic principle
- Economic sectors and production factors

Key figures of corporate management

- Productivity, profitability, return on equity, return on assets, return on sales

Choice of location: Criteria and decision factors

Legal forms of companies

- Partnerships and corporations, advantages and disadvantages

Fundamentals of company accounting

- Tasks, structures, basic concepts of bookkeeping and cost accounting

Pricing on markets

- Demand from households, supply from companies, market mechanism

National accounts: structure and significance

Economic goals: Magic square and conflicting objectives

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- Define and explain the basic terms and concepts of business and economics,
- understand the economic principle and the meaning of scarcity and apply it to practical examples,
- calculate, interpret and critically compare key business figures,
- differentiate between different forms of company law and assess their suitability,
- apply the basics of accounting, in particular to record and analyse economic facts,
- analyse market mechanisms of supply and demand and assess their influence on pricing,
- categorise and critically reflect on national accounts and central economic policy objectives.

Literature

Wöhe, G.; Döring, U.: Einführung in die Allgemeine

Betriebswirtschaftslehre, current edition

Schmalen, H.; Pechtl, H.: Fundamentals and Problems of Economics, current edition

Coenenberg, A. G.; Haller, A.: Annual financial statements and financial statement analysis, current edition

In addition, current lecture notes, legal texts and materials for the course

Module: 6150050

User Experience and Consumer Psychology

Module profile

Exam number

6150050

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Tobias Aubele

Lecturer(s)

Prof. Dr. Tobias Aubele,
Matthias Schloßareck

Applicability

BEC

Semester according to SPO

1. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Usability and interface design in relation to applications on the web.

- Basics of usability and user experience of websites (DIN standards, heuristics)
- Information architecture
 - Navigation concepts (mobile / stationary)
 - Internal search
 - Mental user models
 - Information intake and processing (incl. cognitive distortions)
- Website design
 - Effect of images and text
 - Layout / colour effect
 - Multi-device design aspects
- Texts on the web
- Prototyping: Creating prototypes to develop high-quality user interfaces with prototyping tools
- Usability testing
 - Test preparation and test execution
 - Different test and testing concepts for testing user acceptance
 - Design of order and payment channels
- Conversion optimisation
 - a/b and multivariate testing
- Accessibility on the web
- Exercise: Methods of prototyping and usability evaluation in practical examples

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

The students

- understand basic criteria for user-orientated web design, web usability and accessibility.
- understand basic theoretical concepts for the development of web-oriented user interfaces based on psychological effects and their relevance for different end devices.
- apply principles of information structuring and psychology to design user-friendly websites.
- analyse existing web interfaces with regard to usability, user guidance and accessibility.
- evaluate web design decisions in terms of user acceptance, mobile use and accessibility.
- create simple web-orientated user interfaces taking usability and accessibility criteria into account.
- create concepts for the continuous optimisation and success monitoring of web applications.

Literature

Alan Cooper, Robert Reimann, Dave Cronin: About Face The Essentials of Interaction Design, Wiley Publishing, Inc., 2007

Florian Sardornik, Henning Brau: Methoden der Usability Evaluation: Wissenschaftliche Grundlagen und praktische Anwendung, Huber, Bern; 2nd edition 2011

Jakob Nielsen, Hoa Loranger: Web Usability, Verlag Addison-Wesley, German edition, 2006

Jakob Nielsen: Usability Engineering, Morgan Kaufmann, 1993

Markus Bühner: Introduction to test and questionnaire construction, Pearson Studium, 2nd edition 2006

Michael Richter, Markus Flückiger: Usability Engineering kompakt:

Benutzbare Produkte gezielt entwickeln, Springer, 3rd edition 2013.

Steve Krug: Don't Make Me Think, New Riders, 3rd edition 2013

Steve Krug: Rocket Surgery Made Easy, New Riders, 1st edition 2010

Module: 6150020

Webanalytics

Module profile

Exam number

6150020

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Rolf Schillinger

Lecturer(s)

Prof. Dr. Rolf Schillinger

Applicability

BEC

Semester according to SPO

1. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

In this module, students acquire practical knowledge in the field of web analytics. They learn how to collect and evaluate usage data from websites and apps effectively and in compliance with data protection regulations and how to derive strategic measures for optimising e-commerce websites. They will learn the technical basics, analytical concepts and the use of modern tools such as Google Analytics 4 (GA4) and data protection-friendly alternatives.

In detail, this module deals with

- Goals and benefits of web analytics in e-commerce (engagement, customer journey, conversions)
- Technical and organisational framework conditions for data collection such as HTTP cookies, consent management, GDPR / TTDSG
- Selection and definition of suitable key performance indicators (KPIs)
- Analysis tools and technical implementation options
 - Client-side web analytics (e.g. Google Analytics 4, Plausible Analytics)
 - Tag management systems incl. server-side tagging (e.g. GA4 Server Container)
 - Log file-based analysis methods
- Control and optimisation of (online) marketing campaigns through suitable analyses
- Comparison and application of different attribution models
- Introduction to dashboards, reporting and visualisation of analysis results (e.g. with Looker Studio, Tableau)

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- apply common analysis methods to e-commerce websites in a targeted manner
- define key performance indicators (KPIs) on the basis of individual requirement profiles and implement their collection and evaluation with GA4
- differentiate between various web analysis techniques (e.g. attribution, funnel analysis, heat maps) in terms of their suitability for and informative value in specific e-commerce scenarios
- critically assess the impact of web analytics techniques on user data protection
- strategically plan the use of web analytics technologies in an e-commerce context and assess existing implementations in terms of target achievement and technology

Literature

Kaushik, A. (2010). Web analytics 2.0: The art of online accountability and science of customer centricity. Wiley. ISBN: 978-0-470-59644-9

Chaffey, D., & Ellis-Chadwick, F. (2022). Digital marketing (8th ed.). Pearson. ISBN: 978-1-292-40099-0

Solmecke, C. (2023). Law in online marketing. Rheinwerk Computing. ISBN 978-3-8362-9601-4

Documentation of the tools:

- <https://skillshop.withgoogle.com/> (Google Platform)
- <https://support.google.com/analytics/answer/10089681> (GA4)
- <https://plausible.io/docs> (GA4 Alternative)
- <https://developers.google.com/tag-platform/tag-manager?hl=de> (GTM)

Module: 6150010

Website Development and Accessibility

Module profile

Exam number

6150010

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Rolf Schillinger

Lecturer(s)

Prof. Dr. Tobias Aubele,

Prof. Dr. Rolf Schillinger,

Jannik Fuhr

Applicability

BEC

Semester according to SPO

1. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

In this module, students learn the basic activities, knowledge and tools required to create modern and accessible websites. They acquire the skills to design simple websites from scratch, implement them using Wordpress as a content management system and finally publish them on the Internet. Special emphasis is placed on the early consideration of accessibility in accordance with the Web Content Accessibility Guidelines (WCAG). The latest AI tools are used in all phases to efficiently create and optimise content and structures.

In detail, this module deals with

- The basics of HTML and CSS (semantics, structure, design, responsiveness)
- Introduction to content management systems, in particular WordPress
- Use of AI to create and optimise websites
- Basics of web hosting
- Introduction to digital accessibility and application of the WCAG 2.1/2.2 guidelines

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- create simple, standards-compliant websites independently using HTML and CSS
- publish created websites online independently
- use Large Language Models (LLMs) in a targeted manner to generate the technical foundations and specific content for Wordpress-based websites
- apply the basic requirements of the Web Content Accessibility Guidelines (WCAG 2.1/2.2) when creating new websites
- systematically analyse and evaluate existing websites with regard to their accessibility

Literature

Google Developers (<https://web.dev>)

Grigorik, I. (2013). High Performance Browser Networking: What every web developer should know about networking and web performance. O'Reilly Media. ISBN 978-1-4493-4476-4, available online: <https://hpbnp.co/>

Mozilla Developer Network (<https://developer.mozilla.org/de/>)

Müller, P. (2022). Getting started with HTML and CSS: Programming and designing websites (2nd ed.). Rheinwerk Verlag. ISBN 978-3-8362-9089-0

Springer, S. (2022). React: The comprehensive handbook for modern front-end development. With practical examples of Redux, TypeScript, SSR and PWA (2nd ed.). Rheinwerk publishing house. ISBN 978-3-8362-9254-2

W3C. (2023). Web Content Accessibility Guidelines (WCAG) 2.2. World Wide Web Consortium (W3C). <https://www.w3.org/TR/WCAG22/>

2. semester

Module: 99999999

General Compulsory Elective

Module profile

Exam number

9999999

Duration

1 semester

Frequency

Every semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German/English

Organisation

Responsible lecturer

Prof. Dr. Jochen Seufert

Lecturer(s)

Beate Wassermann

Applicability

BEC, BDGD, BISD

Semester according to SPO

2. semester

Type of module

AWPM

Required prerequisites for the participation in the module according to the SPO

As a rule, none; exceptions are determined and announced by the Faculty of Natural Sciences and Humanities.

Recommended prerequisites for the participation in the module

none

Content

Selection of two general science electives (AWPF) (2 x 2 SWS) or one AWPF (1 x 4 SWS) from the range of subjects offered by the Faculty of Applied Natural Sciences and Humanities (FANG).

Range of subjects offered by the FANG in the areas of

- languages
- cultural studies
- Natural sciences and technology
- Politics, law and economics
- Education, psychology and social sciences
- Soft skills
- Creativity and art.

Courses whose content is already part of or directly related to parts of other modules of the degree programme are excluded from the FANG catalogue. The corresponding courses are marked with a blocking note in the FANG subject catalogue.

The contents of the individual AWPFS are published on the FANG faculty's own homepage.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German/English

Condition for the award of credit points

None

Learning outcomes

The subject-specific learning objectives depend on the AWPf selected. The students

- also acquire knowledge and competences that are not subject-specific but may be important for the desired career goal, such as special knowledge of foreign languages, natural sciences or social sciences
- analyse a wide variety of issues
- categorise subject-specific knowledge in an interdisciplinary context
- transfer what they have learnt to their current training
- have expanded their key competences and, where applicable, foreign language skills, which supports their personal development, also in intercultural terms
- are aware of their personal, social and ethical responsibilities.

Literature

depending on the selected AWPfs

Module: 6100400

Digital Notations

Module profile

Exam number

6100400

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Christina Völkl-Wolf

Lecturer(s)

Prof. Dr. Christina Völkl-Wolf,
Verena Rempel,
Alexandra Kuntz

Applicability

BEC

Semester according to SPO

2. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Basic knowledge of Adobe Photoshop & Illustrator

Content

- Introduction to the concepts, theories and methods for describing, analysing and criticising the effects of visual representations and communication.
- Teaching the basics of perception and design as well as design terminology for the conception of digital media.
- Basic specialist knowledge of morphology, colour, typographic principles, semiotics, font and sign systems.
- Teaching of assessment criteria for the effects of type and character systems.

Using exemplary image analyses, team exercises and an introduction to manual and digital design and digital design techniques, the use of design parameters is taught.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

- Ability to analyse and criticise aesthetic aspects of visual communication in real projects.
- Understanding and sensitivity for screen media and their design characteristics.
- Feeling for form, colour, contrast and composition.
- Analysing and differentiated evaluation of design, intended effect and actual effect.
- Refined understanding and thus optimised communication between project participants such as programmers, designers and clients.

Literature

will be announced in the lecture

Module: 6100710

Basics of Web Technologies with Web Project

Module profile

Exam number

6100710

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Rolf Schillinger

Lecturer(s)

Prof. Dr. Rolf Schillinger,
Christine Zilker

Applicability

BEC

Semester according to SPO

2. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

- Network basics: Basic terms, ISO-OSI reference model, network topologies and network types, example setup of a current LAN based on Ethernet
- TCP/IP stack: addressing / subnetworking, routing, multiplexing, TCP and UDP, example services (e.g. DNS)
- World Wide Web: history, HTTP protocol
- Dynamic web content: Limits of the static WWW, client-side extensions (utilities, plug-ins, scripts, applets, ActiveX), server-side extensions (external programmes, server API, scripts: SSI, PHP, JSP), session management
- Data exchange in XML and JSON
- Current cloud computing variants
- Implementation of a comprehensive web project

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- identify the components of a TCP/IP network and explain their interaction
- check given TCP/IP networks for correct functionality
- analyse typical application scenarios of the HTTP protocol
- identify known and new web technologies and place them in an overall context
- evaluate current web technologies
- use XML and JSON to store and exchange data
- compare cloud products and plan their use in the web hosting environment

Literature

Will be announced in the course.

Module: 6100320

Mathematics II

Module profile

Exam number

6100320

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Patrik Stilgenbauer

Lecturer(s)

Prof. Dr. Patrik Stilgenbauer

Applicability

BEC

Semester according to SPO

2. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

School maths, Mathematics I

Content

Complex numbers, elementary functions and function properties

Differential and integral calculus: Differential calculus in one and several variables, integral calculus in one variable.

Financial mathematics: application of analysis in interest calculation, annuity calculation.

Linear algebra: Eigenvalues and eigenvectors.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Maths and science Fundamentals:

Building on the mathematical skills acquired in Mathematics I, students learn further concepts and techniques from the mathematical fields of analysis, financial mathematics and linear algebra. The acquired knowledge of differentiation, integration and linear algebra are important skills for subjects such as statistics, in particular the probability section including normal distribution, as well as operations research.

Ability to develop and implement solution strategies:

An important part of the Maths II course is solving exercises from the fields of financial mathematics and analysis. By analysing and solving these problems, the ability to develop and implement solution strategies is further trained, building on the skills acquired in Mathematics I.

The ability to think logically, analytically and conceptually:

By understanding mathematical texts and working on mathematical tasks, the ability to think abstractly and logically is further trained, building on the skills acquired in Maths I.

Literature

Brill, Manfred: Mathematics for Computer Scientists; Hanser Verlag; Munich/Vienna

Ihrig, Holger; Pflaumer, Peter: Finanzmathematik - Intensivkurs; Oldenbourg Verlag; Munich;

Hartmann, Peter: Mathematics for Computer Scientists; Vieweg + Teubner, Wiesbaden

Papula, Lothar: Mathematics for Engineers and Scientists 1 and 2; Vieweg + Teubner; Wiesbaden

Schubert, Matthias: Mathematics for Computer Scientists, Vieweg + Teubner, Wiesbaden

Tietze, Jürgen: Introduction to Financial Mathematics, Vieweg + Teubner, Wiesbaden

Module: 6101810

Statistics

Module profile

Exam number

6101810

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Patrik Stilgenbauer

Lecturer(s)

Prof. Dr. Patrik Stilgenbauer

Applicability

BEC

Semester according to SPO

2. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Descriptive statistics

- Basic concepts
- Frequency distributions
- Position parameters, scattering parameters
- Concentration calculation
- Time series analysis
- Correlation and regression analysis
- Preparation and presentation of statistical results with Excel

Probability theory

- Result set, events
- Concept of probability, conditional probability and independence

Inductive statistics

- Sampling
- Estimation methods
- AB tests and multivariate test procedures

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Students are familiar with basic methods of descriptive statistics, probability theory and inductive statistics. They are able to confidently apply statistical methods for data analysis, data preparation and testing in the field of e-commerce. Students are sensitised to the importance of statistics in a business context and the correct interpretation of results.

Statistics contributes to the overall objectives of EC as follows:

Math.-nat. Fundamentals:

- Students learn the fundamentals of mathematics necessary for statistics.

Problem-solving skills

- Ability to develop and implement solution strategies: Statistical solution approaches are developed on the basis of technical requirements for analytical information.

Methodological competence

- Ability to think logically, analytically and conceptually: The ability to think logically is trained by solving statistical tasks.
- Selection and safe application of suitable methods: Using examples and tasks from the field of eCommerce, students learn how to select and confidently apply suitable statistical methods and procedures.

Practical experience and professional qualification

- Knowledge of practical tasks: Statistical analyses are part of day-to-day business in eCommerce. A good command of basic procedures is a prerequisite for a successful career start.

Literature

Bourier, Günther: Descriptive Statistics, 9th edition, Gabler, 2011

Bourier, Günther: Probability theory and inferential statistics, 7th ed., Gabler, 2011

Module: 6100220

Web Programming II

Module profile

Exam number

6100220

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Tristan Wimmer

Lecturer(s)

Prof. Dr. Tristan Wimmer

Applicability

BEC

Semester according to SPO

2. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

bZv

Recommended prerequisites for the participation in the module

none

Content

Python is one of the most important programming languages in the context of web application development. In this course, students are introduced to the Python programming language and learn the most important control structures and data structures as well as programming concepts such as inheritance and object-orientated programming. Students also learn how to work with databases in conjunction with Python.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to
§ 23 APO

Examination - length/format

90 minutes

The concrete length/format
of the examination will be
determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- present the concepts of object-oriented programming
- implement these concepts in Python
- analyse the structure of data structures
- implement control structures in Python
- understand and implement the concept of inheritance
- explain the basics of databases and address them with Python

Literature

Will be announced in the course.

3. semester

Module: 6101210

Databases

Module profile

Exam number

6101210

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Frank-Michael Schleif

Lecturer(s)

Michael Rott

Applicability

BEC

Semester according to SPO

3. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

bZv

Recommended prerequisites for the participation in the module

none

Content

The module teaches the basic concepts and techniques of database development. The relational data model and the relational algebra are introduced as theoretical foundations. One focus is on database modelling, in particular the creation of entity-relationship models (ER models) and their conversion into relational schemas, taking normal forms into account. Introduction to the SQL language, including data manipulation, data queries and the definition of schemas and transaction management. Database development and administration is practised in practical exercises and semester-long projects.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

- Students can explain basic concepts of data persistence and the differences between persistent and non-persistent data.
- Students can define the central terms of relational databases, such as relation, primary key, foreign key and normalisation.
- Students understand relational algebra and can apply simple operations to it.
- Students can explain the connection between conceptual, logical and physical data modelling and justify their importance for database development.
- Students are able to create entity-relationship models (ERM) for given use cases and convert these into relational schemas.
- Students are able to formulate and execute SQL queries for data manipulation (DML) and schema definition (DDL).
- Students can analyse existing database schemas and evaluate them with regard to redundancy, consistency and normal forms.
- Students are able to analyse technical information requirements and derive suitable data structures and queries from them.

Literature

- Michael Kofler (2024). Database Systems - The Comprehensive Textbook (2nd edition). Bonn: Rheinwerk Verlag GmbH
- Kemper, A., & Eickler, A. (2015). Database systems - An introduction (10th edition). Munich: De Gruyter Oldenbourg Verlag
- Elmasri, R., & Navathe, S. B. (2015). Fundamentals of database systems (7th edition). Munich: Pearson Studium
- Garcia-Molina, H., Ullman, J. D., & Widom, J. (2013). Database Systems: The Complete Book (2nd ed.). Upper Saddle River, NJ: Pearson
- Saake, G., Sattler, K.-U., & Heuer, A. (2011). Databases - Concepts and Languages (3rd ed.). Munich: Pearson Studium

Module: 6102700

Mobile Systems and Applications

Module profile

Exam number

6102700

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Karsten Huffstadt

Lecturer(s)

Prof. Dr. Karsten Huffstadt

Applicability

BEC

Semester according to SPO

3. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

In the Mobile Systems and Applications module, students acquire the ability to understand, critically scrutinise and practically apply mobile technologies and ubiquitous systems in the context of digital business processes. The focus is on the technological fundamentals of mobile platforms as well as design and user-centred aspects.

Specifically, the following content is covered:

- Introduction to mobile operating systems and app ecosystems
- Device classes and platforms (smartphones, tablets, wearables)
- Architecture of mobile applications (client/server, webview, cross-platform)
- Development of graphical user interfaces (UI/UX design principles)
- Access to device sensors (GPS, camera, accelerometer, etc.)
- Mobile APIs and data communication (RESTful services, JSON)
- Introduction to frameworks and development environments (Flutter, Android SDK etc.)
- Data protection, security and performance aspects in mobile applications
- Project work on the design of a mobile application

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

At the end of the semester, students can...

- recall relevant theories, models and methods of digital business and place them in the context of the research question (to remember)
- analyse the current state of research and explain the meaning of key terms, concepts and relationships (to understand)
- apply scientific methods and models specifically to a practical or research topic (to apply)
- systematically break down complex problems and critically evaluate data and sources of information (to analyse)
- evaluate research results, methods and sources with regard to validity, relevance and significance (to evaluate)
- design, structure and realise an independent scientific work that provides new insights for research or practice in the field of digital business (to create)

Literature

Zettel, J. (2021). Mobile Computing: Basics - Concepts - Applications. Springer Vieweg.

Schmidt, A. & Kranz, M. (2017). Mobile Interaction: Fundamentals, Design and Development of Mobile Applications. De Gruyter Oldenbourg.

Broy, M. (ed.) (2019). Ubiquitous Computing - Fundamentals, Applications and Challenges. Springer Vieweg.

Nazaré, A. (2023). Flutter for Beginners: An introductory guide to building cross-platform mobile applications with Flutter and Dart 3. Packt Publishing.

Mednieks, Z., Dornin, L., Meike, G., & Nakamura, M. (2021). Programming Android: Java + Kotlin Edition. O'Reilly Media.

Möller, A. (2020). Praxisbuch Mobile App Entwicklung: Konzepte, Design, Umsetzung. Carl Hanser Publishing House.

Module: 6102210

Online-Marketing

Module profile

Exam number

6102210

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 50 hrs

Self-study: 100 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Christina Völkl-Wolf

Lecturer(s)

Prof. Dr. Christina Völkl-Wolf,
Jonas Heppt

Applicability

BEC

Semester according to SPO

3. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

In the module, students acquire in-depth knowledge of central strategies, instruments and success factors in digital, specifically online marketing. They learn how companies acquire, retain and convert customers in the digital space - using measures such as search engine marketing (SEO/SEA), social media marketing, email marketing, affiliate strategies, etc.. In addition, trends in content marketing, performance marketing and data-driven campaign management will be discussed.

A central component of the module is a practical project with real companies in which students work in teams to develop, implement and present a specific online marketing strategy. This includes analysing the market, defining target groups, planning measures and selecting suitable channels and tools. The collaboration with the practice partners provides an authentic insight into the entrepreneurial reality of digital marketing work.

The aim of the module is to understand and apply strategic and operational online marketing holistically - from planning and implementation to data-based success monitoring.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

- strategically categorise key online marketing tools (e.g. SEO, SEA, social media, email, affiliate) and apply them in a targeted manner,
- develop an online marketing strategy taking into account market analysis, target groups and customer journey,
- select and justify suitable digital channels and tools for implementing and managing marketing measures,
- interpret data-based performance indicators and derive measures for optimisation,
- design, implement and present a real marketing task in collaboration with a practice partner,
- develop practice-orientated solutions in a team and communicate them professionally.
- Observe data protection and legal framework conditions in online marketing: know the essential legal regulations and provisions in online marketing.

Literature

Bruhn, M. (2022). Digitales Marketing: Grundlagen, Instrumente, Praxisbeispiele (3rd ed.). Vahlen.

Faber, H., & Bachem, M. (2022). Online marketing: The comprehensive practical handbook on strategy, SEO, SEA, e-mail, content, performance & Co. (3rd ed.). Rheinwerk.

Meier, A., & Stormer, H. (2020). E-Business & E-Commerce Management (4th ed.). Springer Gabler. <https://doi.org/10.1007/978-3-658-29297-1>

Ungar, M. (2021). Performance Marketing: Fundamentals and Strategies for Digital Marketing Practice. Springer Gabler. <https://doi.org/10.1007/978-3-658-34610-0>

Furthermore - articles on the above topics in web and print:
Adzine, Website Boosting, Marketing Börse, Onlinemarketing.de, OMR (Online Marketing Rockstars), t3n, Sistrix Blog, BASIC thinking etc.

Module: 6102010

Accountancy

Module profile

Exam number

6102010

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Christina Völkl-Wolf

Lecturer(s)

Prof. Dr. Mario Fischer,
Prof. Dr. Christina Völkl-Wolf,
Christian Holleber

Applicability

BEC

Semester according to SPO

3. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Basic knowledge of Excel is required for the business game

Content

A. Basic principles and definitions

Tasks of accounting

Key figures

Reporting in companies

Legal basics

B. External accounting

Inventory and stocktaking

Balance sheet, balance sheet classification and balance sheet analysis

Double-entry bookkeeping system

Recording current business transactions

Further aspects (tax, goods movement, depreciation)

C. Internal accounting

Differentiation from external accounting

Full cost accounting system

Partial cost accounting system

D. Simulation game e-commerce

The business game takes place over 2 days as part of the accounting module

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

- Students learn the basics of accounting (internal/external) from an operational perspective.
- Students will be familiar with the basics of business accounting (GB) and cost and performance accounting (KLR).
- They will be able to apply double-entry bookkeeping and cost accounting in exercises and business games.

Literature

Bornhofen, M. et al.: Buchführung 1: Grundlagen der Buchführung für Industrie- und Handelsbetriebe, 24th edition, Wiesbaden, 2012.

Further literature will be announced in the lecture and in the business game

Module: 6101600

Software Engineering

Module profile

Exam number

6101600

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Isabel John

Lecturer(s)

Prof. Dr. Isabel John,

Prof. Dr.-Ing. Anne Heß

Applicability

BEC

Semester according to SPO

3. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Basic knowledge of object-orientated programming

Content

The discipline of software engineering is part of practical computer science and deals with all activities of software development from the user's idea to the tested, delivered system

Basic concepts

- Objectives and principles of software engineering
- Presentation of the result types of software development phases with method allocation
- Fundamentals of object-oriented function and data modelling with UML
- Object-oriented analysis based on UML (use case modelling, creation of static models, creation of dynamic models)

In addition to these core activities, the following related topics are also covered:

- Modelling
- Costs and benefits
- Software quality, quality assurance and testing (overview)
- Dynamic and static testing
- Configuration management (rudimentary)
- Fundamentals of data protection, privacy and ethics

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students acquire the following competences:

- Students understand special features of software that distinguish software from other products.
- Students remember the principles of software engineering and understand their application.
- Students analyse requirements in discussions with customers in order to record, model and specify them in a structured manner.
- Students apply UML diagram types (e.g. use case diagrams, class diagrams, activity diagrams, sequence diagrams) to model requirements.
- Students use UML diagrams to create designs.
- Students evaluate the role of quality assurance in the software development process and explain corresponding objectives and skills.
- Students understand the principles of analytical quality assurance and create test cases for different black-box and white-box methods
- Students remember basic data protection regulations and evaluate their application in software projects with regard to data protection and digital sovereignty.

Literature

- Ludewig, J. and Lichter, H.: Software Engineering - Grundlagen, Menschen, Prozesse Techniken, 4th edition, 2023
- Sommerville, Ian: Software Engineering. Pearson, 2018
- Oestereich, Bernd: Analysis and Design with UML 2.5 /UML 2.5.1; Oldenbourg; Munich, 2013/2020
- McLaughlin: Object-oriented analysis and design from head to toe, O'Reilly, 2017
- Kecher, Christoph; Hoffmann-Elbern, Ralf; Will, Torsten T.: UML 2.5: Das umfassende Handbuch, Rheinwerk Computing, 2021
- Spillner, A., & Linz, T.: Basiswissen Softwaretest: Education and Training for Certified Testers - Foundation Level according to ISTQB® Standard. dpunkt.verlag, 7th edition. 2024

Module: 5003031

Software industry, education and economy in India

Module profile

Exam number

5003031

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Isabel John

Lecturer(s)

Prof. Dr. Isabel John,

Prof. Dr.-Ing. Erik Schaffernicht

Applicability

BDGD, BEC, BIN, BISD, BWI

Semester according to SPO

3. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

Good knowledge of English

Recommended prerequisites for the participation in the module

none

Content

Introduction to India and our partner university Christ University in Bangalore

Selection of topics for the intercultural presentations (e.g. politics, religion, IT industry) in preparation for the excursion.

Presentation of methods for developing presentations in terms of topic selection, structure and slide design.

Introduction to the topic for the joint projects with Christ University students, which will be worked on in small groups from October.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

Students recall basic facts about India and its importance in information technology.

Students analyse and evaluate differences between Germany and India.

Students use an image-orientated, free presentation style in their presentations.

Students apply basic communication techniques in the intercultural field using India as an example.

Students demonstrate successful co-operation with students from the partner university in the context of a technical project.

Literature

Will be announced in the seminar depending on the topics.

Module: 6100230

Web Programming III

Module profile

Exam number

6100230

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Tristan Wimmer

Lecturer(s)

Prof. Dr. Tristan Wimmer

Applicability

BEC

Semester according to SPO

3. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

In this course, students consolidate their previous knowledge from Web Programming I and II and apply it to the Django web framework. Students will develop a web project during the semester and learn about the basic functionality of web frameworks, among other things.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the course, students will know the basics of programming with regard to data types, control structures and exception handling and will be able to apply them confidently in the Python programming language. Furthermore, participants will have basic experience of working with the Python web framework and will be able to, among other things

- Understand the use of web frameworks
- Design REST interfaces independently
- Set up a new project with Django
- Safely apply the basics of Django

Literature

Will be announced in the course.

4. semester

Module: 6102110

Content Engineering

Module profile

Exam number

6102110

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Tobias Aubele

Lecturer(s)

Prof. Dr. Tobias Aubele

Applicability

BEC

Semester according to SPO

4. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Knowledge of web languages and databases, interface design & usability

Content

Introduction

- Definition of content and content engineering
- Challenges in relation to content on the Internet

Web Content Management

- Content lifecycle
- Practical creation and optimisation of your own website / shop

Semantic analysis of content

- Basics of information retrieval / semantic web
- How search engines work when indexing and evaluating web pages

Search engine optimised content

- Types of content and their importance for search engine optimisation

- Techniques for the creation of relevant content

- Techniques and technologies for creating unique content

Content marketing

Quantification of content under the aspect of UX

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Students are familiar with processes and technologies for creating, managing, transforming, delivering and analysing content on the Internet.

Students know the technologies relevant to the management and transformation of content and are able to use them in practice.

At a technical level, students know what constitutes relevant content in terms of search engine optimisation and marketing and how relevant content can be created or generated. They also know the effect of content on the user.

Content engineering contributes to the overall learning objectives of EC as follows:

Sound technical knowledge

- Subject-specific specialisations: Introduction to methods and technologies for engineering content tailored to the needs of the degree programme.
- Interdisciplinary knowledge: Integration or refreshing of knowledge from the courses on usability and interface design, online marketing, databases, web and scripting languages and web technologies.

Methodological skills

- Ability to think logically, analytically and conceptually: The course covers a broad spectrum of both specialised and technical topics. The combination of both requires a high degree of analytical and conceptual thinking.
- Selection and safe application of suitable methods: Approaches and technologies are described for specific use cases and the possible applications are discussed.

Practical experience and professional qualification

- Knowledge of practical tasks: The creation, preparation and processing of content are core tasks in the field of eCommerce.

Literature

Abiteboul, S., et al: Web Data Management, Cambridge University Press, 2012

Kirnapci, S.: Successful Web Texts, mitp, 2011

Manning, C.; Raghavan, P.; Schütze, H.: Introduction to Information Retrieval, Cambridge University Press, 2008

Rorig, D.: Being able to write texts, Rheinwerk Verlag, 2020

Löffler, M.: Think Content!: Content strategy, content marketing, copywriting for the web, Rheinwerk Verlag, 2014

Module: 6101710

Senior Seminar

Module profile

Exam number

6101710

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 50 hrs

Self-study: 100 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Mario Fischer

Lecturer(s)

Prof. Dr. Mario Fischer,

Prof. Dr. Christina Völkl-Wolf,

Prof. Dr. Rolf Schillinger

Applicability

BEC

Semester according to SPO

4. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Develop an understanding of current requirements, solutions, tools and trends in e-commerce.

Ability to analyse, develop and evaluate a completed and more complex topic in a problem-oriented manner, structure and deliver a presentation and prepare a written elaboration, discuss and defend the content in front of the plenum.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Presentation, Colloquium

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Acquiring the ability to process and evaluate complex specialised topics in the broadest sense and to compile a comprehensible presentation and documentation of the results obtained. Students present and document their results in the seminar.

Ability to expand existing knowledge independently:

Students learn to familiarise themselves with new content independently, to understand and, if necessary, apply it and to deepen and/or expand it on their own responsibility.

Ability to recognise significant technical developments:

Through the detailed discussions of the topics presented and the joint sorting into a larger professional environment, participants learn to differentiate and assess the potential that new technologies, methodologies or tools hold for their future field of work. This includes taking a critical look at data, surveys, statistics, etc. and jointly checking whether they meet the requirements of scientific quality.

The seminar topics deal with current and future-oriented technologies and methods and are issued anew for each event.

Literature

Issued on a case-by-case basis depending on the seminar topic

Module: 6100830

English Communication

Module profile

Exam number

6100830

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Graeme Dunphy

Lecturer(s)

Prof. Dr. Graeme Dunphy,
Laura Schöning

Applicability

BEC

Semester according to SPO

4. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Socialising and small talk;

Presentations;

Telephone conversations;

discussions and meetings;

Negotiations;

projects

This seminar is at level B2 of the CEFR.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Presentation

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

This course focuses on oral language skills with regard to topics and situations relevant to the profession.

Literature

Will be announced in the course

Module: 6101510,6910200

IT Project Management

Module profile

Exam number

6101510,6910200

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

German/English

Organisation

Responsible lecturer

Prof. Dr.-Ing. Anne Heß

Lecturer(s)

Prof. Dr. Eva Wedlich,

Prof. Dr.-Ing. Anne Heß

Applicability

BEC, BDGD

Semester according to SPO

4. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

- Introduction to project and project management
- Project organisation
- Project planning process
- Project costing
- Project control and monitoring
- Project completion
- Personnel management and project marketing
- IT product management
- Activities in IT projects (software development activities)
- Process models (phase models vs. iterative / incremental / agile process models)
- Agile project management / Scrum

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German/English

Condition for the award of credit points

None

Learning outcomes

Students learn project management skills, in particular the necessary knowledge for project managers.

To this end, project management methods, processes and tools are covered.

Students are familiar with the activities of software development in IT projects and can categorise and describe sub-activities

Students can describe various process models (waterfall, V-model, agile, ...), including their respective advantages and disadvantages and can describe and assign activities in the process models

Students know the basic principles, roles, artefacts, ceremonies and practices of agile projects and can find their way around as a team member in an agile project, especially with Scrum

Literature

Johannsen, A. and Kramer, A.: Basiswissen für Softwareprojektmanager, dpunkt.verlag, 2017.

- Olfert, K.: Projektmanagement, NWB Verlag, 10th edition 2016.
- Sterrer, C. and Winkler, G.: setting milestones. Project management (methods, processes, tools), Goldegg Verlag, 2010.
- Sterrer, C.: pm k.i.s.s.: Keep it short and simple, Goldegg Verlag, 2011.
- Tiemeyer, E: Handbook IT Project Management, Hanser 2018
- Ziegler, Michael : Agile project management with Scrum for beginners, ISBN-13: 978-1729408353 , 2019

Module: 6100930,6810190

Innovation Management and Entrepreneurship

Module profile

Exam number

6100930,6810190

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Michael Müßig

Lecturer(s)

Prof. Dr. Michael Müßig

Applicability

BEC, BISD

Semester according to SPO

4. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Intro: Motivation, innovation, company, founding a company, startup and a look at economic history

Definitions: Management, ... and all terms relating to innovation and types of innovation

Processes and correlations: Adoption and diffusion, acceptance

Prediction: Gartner's hypecycle and the three horizons

Innovation in the company, Schumpeter and the innovator's dilemma, disruption

Startup ecosystems

End-to-end: design thinking, personas and value proposition, business model canvas, lean startup and customer development, MVP and prototyping

The business plan, founding team

Growth and change, growth hacking

Founding, financing, designing and evaluating companies

Open and crowd innovation, Jugaad, frugal and sustainability in founding and innovation

CASE studies (alternating): Tesla, Kodak and digital photography, Fashion and TEC, Scoutbee, Vogel Communications

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- Present and explain the terminology in the field of innovation management as well as business creation and management
- assess statements on regional and company-internal ecosystems for innovation and intra- and entrepreneurship
- Understand the importance of teams and team processes in the field of innovation development and business creation and be able to apply team-building methods
- Students learn the basics of a business plan in terms of its structure and creation and are able to develop and create one independently
- Identify the key tax, legal and economic building blocks of a successful business start-up and analyse their significance
- They will be able to present and design their own business model ideas using the methodical approaches of design thinking, value proposition and business modelling

Literature

Mandatory:

Hess, Thomas: Strategically managing digital transformation. Springer Fachmedien Wiesbaden GmbH, 2019

Osterwalder, Alexander; Pigneur, Yves et al: Business Model Generation, campus Verlag, 2013 (and more recent editions)

Ries, Eric: Lean Startup, 4th ed. Reline-Verlag Munich 2015

Kotsemir, M.; Abroskin, A.; Meissner, D.: Innovation Concepts and Typology - an evolutionary

Discussion. Basic Research Programme, Working papers, SERIES: SCIENCE, TECHNOLOGY AND INNOVATION WP BRP 05/STI/2013

Supplementary:

Christensen, Clayton M.: The Innovators Dilemma, Harvard Business Review Press (1997 and current editions, also available in German)

Burkhardt, Christoph: Thinking error innovation; SpringerGabler 2017

Module: 6101400

Web Application and Development Systems

Module profile

Exam number

6101400

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Rolf Schillinger

Lecturer(s)

Prof. Dr. Rolf Schillinger,
Fabian Hagen

Applicability

BEC

Semester according to SPO

4. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

WebProg I - III

Databases

Introduction to web technologies

Content

- MVC architectures
- Convention over configuration, don't repeat yourself paradigms
- Object-relational mapping
- Modern web development toolchain (composer, npm, grunt, ...)
- Implementation of models, views and controllers, active record pattern, asset chain, dependency injection in Laravel or Flask
- JS frameworks and their connection to an API

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- Describe MVC architectures and recognise and classify variants and modifications thereof
- recognise types of implementation of object-relational mapping
- Use modern toolchains
- analyse and structure project requirements
- plan and implement websites with the help of MVC frameworks such as Laravel and JS frameworks such as Vue.js

Literature

Will be announced in the course.

5. semester

Module: 6102410

Supervised Internship

Module profile

Exam number

6102410

Duration

1 semester

Frequency

Every semester

Credit hours (SWS)

1

ECTS-Credits (CP)

25.0

Workload

Guided study time:

Presence time: 15 hrs

Self-study: 735 hrs

Total: 750 hrs

Teaching format

Practice

Language of instruction

German/English

Organisation

Responsible lecturer

Prof. Dr. Mario Fischer

Lecturer(s)

Prof. Dr. Mario Fischer

Applicability

BEC

Semester according to SPO

5. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

> 90 ECTS points. 55 ECTS from 1st year of study

Recommended prerequisites for the participation in the module

None

Content

- As part of a larger IT project, you will be required to work independently in as many project phases as possible (system analysis, system planning, implementation, system introduction and testing). This project should last at least 12 weeks.
- Ideally, the intern will familiarise themselves with various departments and areas of the company prior to the project in order to gain a rough understanding of other departments and the company as a whole.

The contact person/supervisor at the FHWS is the representative for the supervised practical phase, Prof. Dr Tobias Aubele

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Documentation, Presentation

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German/English

Condition for the award of credit points

None

Learning outcomes

The trainee should

- acquire relevant, practice-orientated knowledge of operational processes
- learn (through guidance) to work independently and autonomously in IT projects.
- combine competences acquired during their studies with practical experience.
- learn to understand problems and requirements (e.g. customer requirements).
- learn to design and implement solutions to problems (e.g. for company processes and/or IT projects).
- experience working in a team.
- get to know and experience embedding in the company, its processes and organisational procedures.
- get to know and experience the IT profession.
- learn to approach the right people when problems arise.
- learn about the unconditional will to successfully and professionally realise projects.
- experience excellence and professionalism.
- experience how employees are captivated.
- recognise and feel the meaning of their work.

Literature

No general literature recommendation possible

Module: 5002350,6101110

Soft and Professional Skills

Module profile

Exam number

5002350,6101110

Duration

1 semester

Frequency

Every semester

Credit hours (SWS)

6

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Christina Völkl-Wolf

Lecturer(s)

Prof. Dr. Mario Fischer,

Prof. Dr. Christina Völkl-Wolf,

Aylin Heilsberg,

Katja Hollerbach,

Julia Holleber,

Christian Genheimer,

Prof. Dr.-Ing. Anne Heß

Applicability

BEC, BWI

Semester according to SPO

5. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

The module provides basic theoretical and practical knowledge of essential soft and professional skills. As part of 1-day workshops and seminars, students are introduced to moderation techniques using the Metaplan method, negotiation techniques using the Harvard method, the basics of body language, team management, conflict management and the basics of scientific work.

In addition to imparting knowledge, the focus is on application: in practical exercises, role plays and group work, students take on specific tasks and test the effect of various methods. In addition, scientific working methods such as formulating questions, literature research, correct citation and the creation of structured, argumentative scientific papers are covered.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Presentation

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- Apply moderation techniques (especially Metaplan) as well as negotiation techniques according to the Harvard method,
- understand and consciously use the basics of body language (facial expressions, gestures, posture, external appearance),
- organise team-building processes and apply team management methods,
- analyse conflicts in groups and deal with them using suitable communication and solution strategies,
- recognise and reflect on the importance of methodical action in the application of soft and professional skills,
- develop scientific questions, research suitable sources, cite correctly and write a short scientific paper independently.

Literature

Foppa, K.: Communication. Introduction to language and dialogue. Munich, current edition.

Schulz von Thun, F.: Miteinander reden (Vol. 1-3), Reinbek, current edition.

Fisher, R.; Ury, W.; Patton, B.: The Harvard Concept. The classic of negotiation techniques. Frankfurt a. M., current edition.

Theisen, M. R.: Scientific work. Technique - Methodology - Form. Munich, current edition.

Further up-to-date materials and practical examples are provided in the workshops and seminars.

6. semester

Module: 6322190

Augmented Reality

Module profile

Exam number

6322190

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Mark Vetter

Lecturer(s)

Stefan Sauer

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

The event is organised by the Faculty of Polymer Engineering and Surveying (FKV):

(https://geo.thws.de/studium/bachelor-geovisualisierung/studienablauf/modulhandbuch-bgv-ab-ws-20223/?tx_fhwsmodule_fe%5Bmodul%5D=2025&tx_fhwsmodule_fe%5Baction%5D=show&tx_fhwsmodule_fe%5Bcontroller%5D=Modul&cHash=920ba0c23b4af5fe5fc9e5002ee3b2a5)

The lecture will be held as an online event in 2025ss. Date expected
Wednesday 08:15 - 09:45 (lecture) and 10:00 - 12:30 (exercise)

Augmented and mixed reality and their applications

- Realisation of marker-based applications
- Realisation of image-based applications
- Realisation of LBS applications

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

1. students know the basic concepts of augmented reality (AR) and mixed reality (MR) and their areas of application.
2. students understand the differences between marker-based, image-based and location-based applications (LBS) in AR technology.
3. students use appropriate services to plan and realise AR applications.
4. students analyse requirements and possible uses for AR applications in relation to various content-based approaches.
5. students evaluate the effectiveness of different techniques for visualising content relative to spatial objects and markers.
6. students independently create AR applications that are both marker-based and image-based and can successfully publish them.
7. understand concepts for integrating AR applications into existing systems and services.

Literature

Dörner, R.; Broll, W.; Grimm, P.; Jung, B.: Virtual and Augmented Reality (VR/AR): Fundamentals and Methods of Virtual and Augmented Reality. 2nd edition, Springer-Verlag Berlin, Heidelberg, 2019. ISBN 978-3-662-58860-4.

Vetter, M. & Olberding, H.: E-learning material on geovisualisation, [online] smart.vhb.org, 2019/2020.

Module: 5003836

BSI BCM Practitioner and BSI Incident Practitioner

Module profile

Exam number

5003836

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Alexander Schinner

Lecturer(s)

Prof. Dr. Alexander Schinner,
Liane Kiesewalter

Applicability

BIN, BWI, BEC

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

BCM practitioner

- Introduction to BCM
- BCM process and stage model
- Standards and regulatory principles
- Initiation, planning and set-up
- Structure and empowerment of the BAO
- BIA pre-filter and BIA
- Risk analysis
- Emergency planning (BC strategies, CFPs and WAPs)
- Practising and testing
- Performance review and key figures

Incident practitioner

- Introduction to the cyber security network including framework conditions for digital first responders, incident practitioners and incident experts
- Summary of the content of the basic course
- Behaviour on the phone incl. non-technical measures
- Threats and forms of attack and overview of the current threat situation
- Sequence of standard procedures
- Handling of IT security incidents
- Remote support
- Incident handling for IT systems "away from the usual office environment"
- "After the incident is before the incident" preventive measures

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

- Teaching the BCMS process in accordance with BSI Standard 200-4 with practical relevance
- Effective detection, analysis and management of security incidents in accordance with BSI standards
- Preparation for the relevant BSI audits as part of the cyber security network (CSN)

Literature

https://www.bsi.bund.de/DE/Themen/Unternehmen-und-Organisationen/Standards-und-Zertifizierung/IT-Grundschutz/Zertifizierte-Informationssicherheit/Schulungen-zum-BCM-Praktiker/Schulungen_zum_BCM_Praktiker_node.html
https://www.bsi.bund.de/DE/Themen/Unternehmen-und-Organisationen/Informationen-und-Empfehlungen/Cyber-Sicherheitsnetzwerk/Qualifizierung/Vorfall_Praktiker/Vorfall_Praktiker.html

Module: 5003816

Behavioural Pricing

Module profile

Exam number

5003816

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Tobias Aubele

Lecturer(s)

Juliane Richter

Applicability

BEC, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Students learn about the influence of prices on consumer behaviour from a psychological perspective. They understand the intrapersonal processes of perception, evaluation and storage of price information and can apply price psychological effects themselves.

Contents:

Basics of price management

- Introduction to the price management process
- Basic models of business price theory
- Starting points for price determination

Introduction to behavioural pricing

- Behavioural pricing as a branch of behavioural economics
- Psychological processes and constructs for processing price information
- Behavioural science theories on price perception, assessment and storage

Behavioural pricing in practice

- Design of price information from the supplier's perspective
- Price psychological effects and application examples
- Use of behavioural pricing in various industries

Possibilities and limitations of (behavioural) pricing

- Empirical price research
- Innovative (digital) pricing approaches from a practical and theoretical perspective
- Ethical and legal aspects of (behavioural) pricing

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

General learning objectives:

You are familiar with the methodological and ethical aspects of pricing and can assess pricing approaches from a business and behavioural economics perspective

Sub-objectives:

1. students understand the behavioural pricing approach and know the theoretical principles of the psychological effect of price information.
 - a. Professional competence: Students know the basics of behavioural pricing management. They understand the psychological effect of price information in different phases of the purchasing process.
 - b. Problem-solving and assessment skills: Students understand the approach of behavioural pricing as a sub-discipline of behavioural economics and how it differs from classical price theory.
 - c. Methodological competence: Students practise interpreting behavioural and psychological models and applying them to price management.
 - d. Communication skills: Students are able to discuss the concepts and models presented in the lecture in a precise and technically correct manner.
 - e. Self-competence: Students can deepen their knowledge independently with specific specialised articles.
2. students can apply price psychological effects themselves and are familiar with various areas of application.
 - a. Professional competence: Students understand the influence of different pricing parameters on price perception and consumer behaviour.
 - b. Problem-solving and assessment skills: Students can assess price-psychological measures in different contexts and explain them on the basis of the relevant theory. They can independently derive suitable price-psychological measures and apply them to specific practical cases.
 - c. Methodological competence: Students are able to transfer the effects demonstrated in the lecture to price-related issues in practice.
 - d. Communication skills: Students are able to contribute to discussions on price-psychological measures and present their own approaches. In doing so, they communicate precisely, effectively and correctly using technical language.
 - e. Social competence: Students work together effectively in a team as part of a practical case.
 - f. Self-competence: Students work independently, creatively and use feedback for their personal development.
3. students are familiar with the business principles of pricing policy.
 - a. Professional competence: Students understand the significance and decision-making areas of pricing policy. They are familiar with the classic concepts of pricing theory and the starting points for determining prices.

b. Problem-solving and judgement skills: Students can correctly classify the concepts and approaches of price management and apply them to case studies.

c. Methodological competence: Students know empirical methods for price determination, understand their challenges and can apply selected survey methods themselves.

d. Self-competence: Students are able to expand on the fundamentals covered by studying the literature independently.

4. students critically analyse current trends in price management and innovative, digital pricing approaches.

Literature

Beck, H. (2014). Behavioural Economics - An introduction (focus on chapters 1, 4-6). Wiesbaden: Springer Gabler.

Diller, H., Müller, S., Ivens, B., & Beinert, M. (2021). Pricing: Principles and processes of corporate pricing policy. Stuttgart: Kohlhammer.

Holzwarth et al (2020). Applying behavioural science to health and financial decisions. In: Behavioural Economics Guide 2020.

Kopetzky, M. (2015). Price psychology: four steps to optimised pricing. Wiesbaden: Springer Gabler.

Krämer, A. (2020). Dynamic and individual prices from a company and consumer perspective. In R. Kalka & A. Krämer (Eds.), Price communication. Wiesbaden: Springer Gabler.

Mazumdar, T., Raj, S. P., & Sinha, I. (2005). Reference price research: Review and propositions. Journal of Marketing, 69(4), 84-102.

Meehan, B., Rosenberg, S., & Duke, C. (2018). How to double savings rates: A case study for nudging for good. In: Behavioural Economics Guide 2018.

Pechtl, H. (2014). Price policy: Behavioural pricing and pricing systems. Constance: UVK Verlagsgesellschaft mbH.

Pechtl, H. (2004). The price knowledge of consumers: a theoretical-conceptual analysis (No. 01/2004). Economic Discussion Papers.

Simon, H. (2015). Confessions of the pricing man. Wiesbaden: Springer Gabler.

Simon, H. & Fassnacht, M. (2016). Price management: strategy - analysis - decision - implementation. Wiesbaden: Springer Gabler.

Module: 5003843

Business Data Visualization with Power BI and AI

Module profile

Exam number

5003843

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Isabel John

Lecturer(s)

Dr. Soundarabai Beaulah

Paulsingh

Applicability

BIN, BWI, BEC

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

A basic understanding of problem-solving skills such as simple excel calculations, creating graphs and charts along with preliminary idea on database concepts are sufficient.

Content

In this course, students will learn how to transform and visualise business data using Power BI, integrating advanced features such as AI-driven insights. Students will gain skills in data cleaning and modelling, designing interactive dashboards, and deriving actionable business insights. Through hands-on exercises, students will develop practical expertise in the following areas:

- Introduction to Business Data Visualisation: Power BI overview and setup, Navigating Power Query Editor.
- Data Transformation and Modelling for Analytics: Using Power Query for Data transformation, Relationships between Data models.
- Building Interactive Dashboards: Data preparation with Power Query, Basic visuals, usage of interactive elements: Filters, slicers, Drill-throughs, visualising data in business dashboards using Power BI.
- Incorporating AI Insights: Using Power BI's built-in AI insights: Influencers, Decomposition Tree and Q&A features.
- Case Study: Perform end-to-end analysis and create interactive dashboard on Stock Market Dataset to identify key trends, patterns, and actionable insights.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Presentation

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

By the end of this course, students will be able to

- Demonstrate an understanding of the fundamental concepts of data analysis and its significance.
- Clean and transform data with Power Query ensuring well-structured data for analysis.
- Incorporate built-in AI features into Power BI to create effective dashboard visuals.
- Design and build interactive Power BI dashboards to communicate business insights effectively.

Literature

Literature will be given in the course

Module: 5003818

Containerization and orchestration of microservices

Module profile

Exam number

5003818

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Tristan Wimmer

Lecturer(s)

Lars Hick

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Containerisation plays a very important role in today's enterprise software development and the cloud. In the course "Containerisation and Orchestration of Microservices", you will learn the basics of containerisation with Docker, create efficient microservice architectures and learn how Kubernetes works as an orchestration platform. From design and development to deployment, the practice-orientated course covers all aspects of microservices and enables students to prepare their knowledge for everyday working life. Through group projects and active participation, they are optimally prepared for the challenges of modern application development.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successful participation in the event, participants will be able to

- Recognise usage scenarios for Docker
- Use Docker as a developer tool
- Use Kubernetes as a container orchestration framework for application development
- Delineate, classify and design a microservice architecture

Literature

Will be announced in the course.

Module: 5003806

Data Science with R

Module profile

Exam number

5003806

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Achim Wübker

Lecturer(s)

Prof. Dr. Achim Wübker

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

None

Recommended prerequisites for the participation in the module

Mathematics I+II

Content

R

1. introduction to R (R Studio, packages,...)

2. R Basics (Names and values, Vectors, Control structures, functions,...)

Data Analysis

1. read in data with R

2. data visualisation with R (packages ggplot2, tidyrr, dplyr), histograms, boxplots,...

Labs: (Practical computer exercises): Read in Example Data-Files and graphical representation

3. basic data analysis with R

a. Visual Correlation Analysis

b. Effect measurements and parameter identification - Linear and Multiple Regression

Labs: Write your own book-recommendation engine in R

4. stochastic simulation

Monte Carlo Method in R with application to Measuring deviations from random pattern, Newcomb-Benford Law

Labs: Fraud detection: Read in manipulated data-file

Writing your own fraud detection programme and apply this program to the data

5. advanced data analysis with R

Face recognition with „eigenfaces" based on principal component analysis with R

Labs: Writing a program to recognise you own face

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

1. the students know how to use R as a calculator for performing basic arithmetic operations.
2. the students understand fundamental programming tasks in R, including variable assignment and control structures.
3. the students apply methods to read data into R and display it graphically using various visualisation tools.
4. the students analyze data to recognize patterns both visually and analytically, enhancing their interpretative skills.
5. the students evaluate the quality of simple statistical models, assessing their fit and appropriateness for the data.
6. the students create simulated data and use Monte Carlo simulations to verify regularities experimentally or to identify underlying patterns.
7. the students implement a procedure for face recognition based on Principal Component Analysis (PCA) using Eigenfaces, demonstrating practical application of the concepts covered.

Literature

Efron, B.; Tibshirani, R.: An Introduction to the Bootstrap. Chapman & Hall/CRC, 1993. Faraway, J.: Linear Models with R. 2nd ed., Chapman & Hall/CRC, 2016.
Freedman, M.; Ross, J.: Programming Skills for Data Science. Addison-Wesley, 2019.
Matloff, M.: The Art of R Programming. No Starch Press, 2011.
Strang, G.: Introduction to Linear Algebra. 5th ed, Wellesley-Cambridge Press, 2016.
Wickham, H.: Advanced R. 2nd ed., Chapman & Hall/CRC, 2019.

Module: 5003135

Design Thinking & Innovation

Module profile

Exam number

5003135

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Michael Müßig

Lecturer(s)

Lisa Straub

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

- Interest in creative but challenging problem-solving approaches
- Entrepreneurial thinking
- Willingness to rigorously put your own ideas to the test

Content

In this course, the basic principles and background of innovation management and especially design thinking are explained and illustrated with clear examples. It is particularly important to convey to the participants that today's innovation processes place people at the centre and attempt to harmonise their customer needs with technical feasibility and economic efficiency. The students are given the first tools to organise and carry out simple design thinking innovation processes independently.

They need to understand which basic elements an innovation or design thinking process is based on and how these can be skilfully run through exercises. This makes it clear in a practical way what differences there are to the classic development process and what advantages a customer-centred approach offers, but also what disadvantages are associated with the DT approach.

The course is divided into two main modules:

1. a brief introduction to innovation management

Participants will gain an insight into common innovation models and processes, as well as the background and basic concepts of innovation research.

2. learning and going through Design Thinking yourself

Design Thinking is based on an iterative, customer-centred and playful problem-solving process that makes it possible to think outside the box in order to realise or strive for the previously unconsidered, seemingly impossible, possibly illogical and unattainable. In the course of this course, participants will go through a design thinking process and develop their own ideas as a project. The course is therefore designed to be interactive, which is why a high degree of proactive participation is expected. In return, participants can expect a course full of creativity, interesting discussions and crazy ideas.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio, Presentation

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

1. students know the basic components of the design thinking process and can name them.
2. students understand the role of design thinking in the context of other innovation models and processes and can categorise them.
3. students apply methods of effective problem definition to identify relevant challenges in the innovation process.
4. students analyse the basics of user studies in the design thinking process and can explain their significance for solution development.
5. students evaluate innovation-relevant assumptions and hypotheses in order to be able to (de)construct them effectively.
6. students organise and conduct brainstorming sessions to generate creative ideas.
7. students create prototyping processes, describe them conceptually and can explain their practical application.

Literature

Wobser, Gunther (2022): Agile innovation management: overcoming dilemmas, mastering ambidexterity and achieving long-term success with innovations. Springer Gabler. 978-3662645147

Hasso Plattner Institute (A): What is Design Thinking. <https://hpi-academy.de/en/design-thinking/what-is-design-thinking.html>.

Hasso Plattner Institute (B): The six steps in the Design Thinking innovation process. <https://hpi.de/school-of-design-thinking/design-thinking/hintergrund/design-thinking-process.html>.

Ideo: Design Thinking. https://designthinking.ideo.com/?page_id=1542.

d.School: An Introduction to Design Thinking. PROCESS GUIDE. Institute of Design at Stanford. <https://dschool-old.stanford.edu/sandbox/groups/designresources/wiki/36873/attachments/74b3d/ModeGuideBOOTCAMP2010L.pdf>.

Brown, Tim (2009): Change by Design. How Design Thinking Transforms Organisations and Inspires Motivation. 1st edition. Harper Business. 978-006176608-4.

Lewrick, Michael; Link, Patrick; Larry, Leifer (2017): The Design Thinking Playbook. With traditional, current and future success factors. Verlag Franz Vahlen GmbH. 978-3039097050.

Uebersnickel, Falk; Brenner, Walter; Pukall, Britta; Naef, Therese; Schindholzer, Bernhard (2015): Design Thinking. The handbook. 1st edition. Frankfurter Allgemeine Buch. 978-3956010651.

Wobser, Gunther: Reinventing yourself: What SMEs can learn from Silicon Valley. BESHU BOOKS. 978-3982195025

Module: 5003115

Digitization Strategy – Document Management in the SAP Environment

Module profile

Exam number

5003115

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Karl Liebstückel

Lecturer(s)

Christian Fink

Applicability

BEC, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

- 1) SAP processes and documents - how do they interact?
- 2) Basic aspects of a digitisation strategy for documents with SAP technology.
- 3) SAP's strategy for digitising document-based processes with SAP.
- 4) Various practical units to apply the theory learnt in the SAP system and the SAP Business Technology Platform.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Presentation

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Students know the relationship between SAP processes and documents (unstructured content).

Students will be able to explain the options for integrating documents into business processes in the SAP standard.

Students are familiar with the compliance requirements for unstructured content such as documents.

Students can set up various scenarios for the management of documents in S/4HANA and in the SAP Business Technology Platform. Students will familiarise themselves with SAP's strategy and new technologies in document management for on-premise and cloud and will be able to set these up.

Literature

Enterprise Content Management with SAP; Christian Fink; 2019, SAP PRESS, ISBN 978-3-8362-6524-9

Business process-orientated document management with SAP; Heck, Rinaldo, ISBN: 978-3-8362-1316-5, Galileo Press

Commercial Code - HGB

Retention obligations; Dauen, Sabine; ISBN: 978-3-448-08042-1; Haufe-Mediengruppe, 2007

Module: 5003845

Emotional and Persuasive Design in E-Commerce

Module profile

Exam number

5003845

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Tobias Aubele

Lecturer(s)

Petteri Markkanen

Applicability

BIN, BWI, BEC

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

The course aims to guide students in designing and building an e-commerce website over the course, applying principles of good user experience with a particular focus on theories and strategies related to emotional and persuasive design. During the course, students test each other's projects using various methods, such as interviews and observational studies, in addition to employing analytics tools to enhance their understanding.

- Core Principles of User Experience (UX) in E-Commerce
- Theories and Strategies of Emotional Design and Their Application in E-Commerce
- Persuasive Design Methods and Their Impact on User Behaviour
- Key Concepts of User Segmentation and Targeting Strategies
- Essential Strategies for Growth and Optimisation of E-Commerce Platforms
- Practical Development, Implementation, and Iterative Improvement of E-Commerce Websites

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

After completing the course, students will have a solid foundational understanding of:

- The fundamental principles of user experience (UX) in e-commerce and their practical applications.
- Emotional Design theories and strategies, and how to effectively apply them to e-commerce websites.
- Persuasive design techniques to influence user behaviour in digital environments.
- Qualitative and quantitative research methods, such as interviews and web analytics, and how they contribute to user-centered design.
- User segmentation and targeting strategies, allowing them to identify and reach different user groups effectively.
- Growth and optimisation strategies to enhance the performance of e-commerce platforms.
- The process of designing, implementing, and iteratively improving a fully functional e-commerce website.

Literature

Norman, D. A. (2004) Emotional Design: Why We Love (or Hate)

Everyday Things. New York, NY: Basic Books.

Yocco, V. S. (2016) Design for the Mind: Seven Psychological Principles of Persuasive Design. Brooklyn, NY: Manning Publications.

Ellis, S. and Brown, M. (2017) Hacking Growth: How Today's Fastest-Growing Companies Drive Breakout Success. New York: Currency.

Module: 5003846

Ethical AI Hacking

Module profile

Exam number

5003846

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Frank-Michael Schleif

Lecturer(s)

Paulius Baltrušaitis

Applicability

BIN, BWI, BEC

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Python, ML/AI basics

Content

This course provides a comprehensive understanding of Artificial Intelligence (AI) security, with a focus on ethical hacking principles, attacks on ML models and data, and defence strategies and techniques.

Students will gain theoretical and practical knowledge of key threats such as evasion, model extraction, model inversion, data extraction, data poisoning, backdoor attacks. How to provide attacks for testing purposes and what detection and protection techniques to use and how to use them.

Machine learning models such as Linear Regression, Support Vector Regression, K-Nearest Neighbours, Logistic Regression, Support Vector Machines (SVM), Decision Trees will be used.

Red and blue team scenarios will be used for practical exercises. Each student will play a role on both sides. The course will use several different scenarios for different attacks and machine models.

There is an example of a scenario for a red and blue team exercise focused on data poisoning and detection:

The company is developing a machine learning model to predict customer churn. The red team wants to reduce the accuracy of the logistic regression model by poisoning the data with label flipping. The goal of the blue team is to detect and mitigate the attack.

Red team tasks: Analyse the data set, develop the poisoning strategy, execute the attack, document the attack. The success of the red team is measured by the degree to which they degrade the performance of the model.

Blue team tasks: Establish a baseline (train a baseline model and evaluate the model's performance), Implement detection mechanisms - use techniques such as outlier detection (e.g. Isolation Forest), Mitigate the attack, Document the defence. The Blue Team's success is measured by their ability to detect and mitigate the attack and restore the model's performance.

Both teams will be judged on the clarity and thoroughness of their documentation and presentation of their findings to the whole group

of students, showing and commenting on their Python code and explaining their strategies.

Tools for coding: Jupyter Notebook environment for Python (scikit-learn, pandas, numpy, matplotlib, seaborn), e.g. Google Colab.

By the end of the course, students will work in teams to formulate responsible AI security testing methodologies that meet ethical and legal standards. They will discuss and evaluate the ethical implications of AI vulnerabilities and develop a set of ethical guidelines for AI security and ethical hacking.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

- 1 Understand basic AI security concepts, ethical hacking principles, and key machine learning threats.
- 2 Identify and classify AI-specific attacks, including evasion, model extraction, and data poisoning.
- 3 Simulate red team (attacker) and blue team (defender) AI security scenarios.
4. apply ethical hacking techniques to assess and exploit vulnerabilities in AI models.
5. evaluate AI attack detection and protection strategies to improve security.
6. investigate AI security breaches and analyse countermeasures.
7. develop ethical guidelines for responsible AI security testing and vulnerability disclosure.

Literature

To be clarified while lesson

Module: 5003095

IT Risk Management

Module profile

Exam number

5003095

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Kristin Weber

Lecturer(s)

Dr. Thomas Lohre

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Basic knowledge of information systems and IT security

Content

The FWPM IT Risk Management considers the following topics

- Risk management versus IT risk management
- Standards, norms and best practice for IT risk management
- Organisational structures for IT risk management
- IT risk management process
- Methods and tools for IT risk management
- Risk management in IT operations, IT projects and IT outsourcing
- Introduction of IT risk management

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Colloquium

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the course IT Risk Management

- know the regulatory requirements for IT risk management,
- structure the process of IT risk analysis and successfully identify IT risks,
- be able to select and apply quantitative and qualitative methods for identifying and analysing risks depending on the situation,
- know how IT risks can be assessed,
- understand how standard software can be used to implement efficient IT risk management.

Literature

Literature will be announced in the first session.

Introductory source: BITKOM: IT risk and opportunity management guidelines for small and medium-sized enterprises

Module: 5003139

Introduction in Machine Learning

Module profile

Exam number

5003139

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Magda Gregorová

Lecturer(s)

Dana Simian

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

This module introduces the core ideas and the basis techniques of machine learning. It covers theory, algorithms and applications, focusing on real understanding of the principles of inductive learning theory and of several machine learning techniques.

- Concept Learning
- Decision Tree Learning
- Bayesian Learning
- Artificial Neural Networks
- Support Vector Machines

Python is the programming language used in this module but prior knowledge of Python programming is not required. Students will gain all required knowledge in a step-by-step fashion, through examples.

The module complements courses on data management and data processing by teaching machine learning algorithms to analyze data.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Colloquium

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

Students will:

- develop a basic understanding of the field of machine learning and theory behind it.
- acquire theoretical knowledge about the most effective machine learning techniques.
- identify basic theoretical principles, algorithms, and applications of machine learning.
- identify and compare different solutions based on machine learning techniques.
- apply different techniques to improve the results.
- learn how to evaluate the performance of machine learning algorithms.
- gain the practical know-how needed to apply machine learning techniques to practical problems.
- know how to code a machine learning algorithm in python using machine learning library scikit-learn.
- apply machine learning techniques in developing practical projects.

Literature

Mitchel, Tom M.: Machine Learning. McGraw-Hill, 1997. <http://www.cs.cmu.edu/~tom/>

VanderPlas, Jake: Python Data Science Handbook. O'Reilly Media, 2022.

<https://jakevdp.github.io/PythonDataScienceHandbook/> scikit-learn User Guide.

Module: 5003837

Introduction to Artificial Intelligence

Module profile

Exam number

5003837

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Lecture

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Andreas Lehrmann

Lecturer(s)

Prof. Dr. Andreas Lehrmann

Applicability

BIN, BWI, BEC

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Basic knowledge in programming (Python) and mathematics (linear algebra, analysis).

Content

Over the last few years, artificial intelligence (AI) has profoundly changed the way we process information and make decisions, both in our personal and professional lives. A thorough understanding of the principles underlying AI is therefore a critical skill in many industries.

This course serves as a broad introduction to AI and its subfields. We are going to discuss - from scratch - the design, training, and operation of an AI system. Motivated by intuitive concepts and visual insights, we are going to introduce a technical framework that allows us to express the fundamental building blocks of an intelligently operating system (e.g., an autonomous robot). Such a system needs to:

- Organise task-dependent data and use this data to make predictions.
- Understand its environment by connecting sensory information to physical location.
- Interact with its environment by planning routes and manipulating objects.

The course will be accompanied by small coding projects in Python that demonstrate the application of these concepts in a series of practical scenarios.

In particular, the course covers the following topics:

[The State of AI] Historical developments, emerging trends, and open questions

[Tools & Techniques] AI-assisted productivity & creativity

[The AI Pipeline] From hard-coded rules to learned decisions

[Data] Collection, representation, and analysis of data

[Hello World] Algebraic, analytical, and statistical foundations of AI

[Supervised Learning I] Data-driven models of reality: classification and regression

[Supervised Learning II] Data-driven models of reality: model complexity and regularisation

[Unsupervised Learning] Finding patterns without annotations

[Reinforcement Learning] No data, no problem: learning actions from interactions

[From Perception to Action I] Visual AI: understanding information in images

[From Perception to Action II] Visual AI: localising information in images

[From Perception to Action III] Embodied AI: manipulating environments

[From Perception to Action IV] Embodied AI: navigating environments

[Guest Lecture] Industrial applications of AI in the automotive industry

[AI & U] Working with and contributing to the future of AI

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

- The students understand the structure of the AI landscape, including its different subfields and how they are connected.
- They can express industry tasks as learning problems (supervised, unsupervised, reinforcement) and select an appropriate AI framework for the type of data at hand. - They are familiar with the individual components of the selected AI framework - (1) data acquisition and representation; (2) model specification and optimisation; and (3) performance evaluation and analysis - and can set up and execute this pipeline.
- The students understand the role of embodied AI and the challenges and solutions that come with it, such as perception, kinematics, and navigation.

Literature

W. Ertel: Introduction to Artificial Intelligence, Springer, 2024.
C. Bishop: Pattern Recognition and Machine Learning, Springer, 2016.

Module: 5003133

Logistics Management in E-Commerce

Module profile

Exam number

5003133

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 40 hrs

Self-study: 110 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Tobias Aubele

Lecturer(s)

Oliver Dahms

Applicability

BEC

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Interest in logistical contexts, analytical skills, networked and interdisciplinary thinking

Content

Supply chain in e-commerce

Fulfilment strategies / make or buy

Returns management

Technology, IT in logistics

Performance management (SLA, KPI)

Personnel concept (deployment planning, working time models)

ReCommerce

Structure and functionality of an intralogistics system:

- Systems, subsystems, products
- Procedure and phases in the planning and realisation of logistics systems
- Data analyses (order structures, article structures)

CEP sector (solutions, trends, specialisation of volume flows, ground networks)

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Presentation

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Introduction to the structure and mode of operation of logistics systems and their evaluation, teaching the procedure and basics of system design, familiarisation with different approaches and models, data analysis and what can be derived from it.

Students are familiarised with practical tasks, procedures and processes in the e-commerce environment. Logistics issues are addressed, analysed and solved using case studies from the e-commerce environment. Students learn about the objectives of logistics, the basics of system design and acquire the ability to plan and outsource logistics processes.

Literature

Aggtelekey, B. - Factory Planning , Volume 1-3
 Jünemann, R. - Material Flow and Logistics
 Pfohl H.-C. - Logistics Systems
 Gudehus, T. - Logistics: Fundamentals Strategies Applications
 Arnold, D.; Isermann, H. - Handbook of Logistics
 Fischer, M.; Dittrich, L. - Material Flow and Logistics
 Goldratt, E. M.; Cox, J. - The goal
 Packard, D. - The Hewlett Packard Story
 Peters, T. - In search of excellence
 Womack, J. P. - The second revolution in the automotive industry
 Masaaki, I. - Kaizen
 Michael Pulverich, Jörg Schietinger - Manual Order Picking
 Jay R. Galbraith - Designing Organisations
 Helmut Baumgarten - The best of logistics
 Willibald A. Günthner - Technical Innovations for Logistics
 Detlef Spee - Successfully implementing lean warehousing
 Detlef Spee - Designing efficient warehouse processes

Module: 5003069

Mobile Applications

Module profile

Exam number

5003069

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 50 hrs

Self-study: 100 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Peter Braun

Lecturer(s)

Prof. Dr. Peter Braun

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

Good programming skills (e.g. from Programming 1 and 2, Web Programming 1 to 3) or similar.

Recommended prerequisites for the participation in the module

none

Content

This module introduces software development of mobile devices. The Android operating system and/or iOS will be used in the course. The development environment will be Flutter on Android Studio or VS Code. Dart will be used as the programming language. No prior knowledge of Dart programming is expected, but a good understanding of other languages (e.g., Java, Python, or JavaScript) is required.

Introduction to Dart Programming

- Short Overview of Flutter: History, advantages, and architecture.
- Introduction to Dart programming language.
- Setting up the development environment.

Introduction to Flutter - Flutter GUI development

- Understanding widgets and basic UI elements.
- Understanding Stateful and Stateless widgets.
- Layout widgets: Row, Column, Stack, etc.
- Basic interaction elements: Buttons, sliders, and switches.

Navigation and State Management

- Navigation patterns: push/pop navigation, named routes.
- State management basics: setState, Provider.
- Implementing forms and user input handling.

Working with External Data

- Fetching data from the internet (APIs).
- JSON serialisation and deserialisation.
- Firebase

Integrating Device APIs like Location and Camera

- Introduction to Device APIs in Flutter.
- Implementing location services: getting and using GPS data.
- Accessing and using the camera: taking pictures and video recording.
- Permissions handling for location and camera.

Testing Advanced Features and Best Practices

- Animations and transitions.
- Using custom fonts and assets.
- Best practices in Flutter development.
- Testing Flutter Apps

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

- The students understand the fundamentals of mobile application development using Flutter for Android and iOS, focusing on professional programming practices.
- The students apply concepts of asynchronous programming and thread management to handle complex tasks in mobile applications efficiently.
- The students analyse architecture concepts for mobile solutions, including the distribution between client and server and communication protocols for mobile devices.
- The students design mobile user interfaces based on reusable software components, ensuring an intuitive and consistent user experience.
- The students implement mobile applications that integrate sensor data evaluation and server communication, following best practices in mobile development.
- The students evaluate different mobile architecture approaches and technologies to choose the most suitable solutions for specific application requirements.
- The students create a fully functional mobile application for Android or iOS, including publishing and deployment.

Literature

Dieter Meiller: Modern App Development with Dart and Flutter 2: A comprehensive introduction to Flutter. De Gruyter Oldenbourg, 2021.

Module: 5003821

Penetration Testing

Module profile

Exam number

5003821

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

German/English

Organisation

Responsible lecturer

Prof. Dr.-Ing. Sebastian

Biedermann

Lecturer(s)

Prof. Dr.-Ing. Sebastian

Biedermann

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Students learn about the profession of penetration tester or security researcher with the associated framework conditions and procedures. In this context, the focus is on identifying, understanding and exploiting common vulnerabilities in IT systems.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German/English

Condition for the award of credit points

None

Learning outcomes

- Students understand the job description of "penetration tester" or "security researcher" and know the process of penetration tests
- Students know popular classes of vulnerabilities in web applications and classic applications and can exploit them
- Students understand so-called post-exploitation strategies and lateral movement strategies in networks that have already been infiltrated
- Students know the legal basis and framework conditions for carrying out penetration tests
- Students can systematically evaluate potential vulnerabilities, categorise them based on standards and present them
- Students are able to develop appropriate countermeasures to close vulnerabilities

Literature

The Web Application Hacker's Handbook. Dafydd Stuttard and Marcus Pinto. 2nd ed, Wiley, 2011.

Penetration Testing: A Hands-On Introduction to Hacking. Georgia Weidman. No Starch Press, 2014.

Hacking: The Next Generation. Nitesh Dhanjani, Billy Rios, and Brett Hardin. O'Reilly Media, 2009.

Module: 5003809

Principles of Autonomous Drones

Module profile

Exam number

5003809

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Frank Deinzer

Lecturer(s)

Marcel Kyas

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

You will learn the fundamental methods for endowing aerial autonomous drones with perception, planning, and decision-making capabilities. You will learn algorithmic approaches for robot perception, localisation, and simultaneous localisation and mapping, as well as the control of non-linear systems, learning-based control, and aerial drone motion planning. You will learn methodologies for reasoning under uncertainty.

On day one, you will learn to describe the basic control loop of an autonomous robot. You will explain the basics of drone locomotion and kinematics (how drones move). On day two, you will learn to enumerate the purpose of sensors on a drone. You will explain the structure and applications of Bayesian filters. On day three, you will learn to implement a simple localisation system. On day four, you will learn to explain behavior trees as a formalism to describe drone behaviour. You will learn to define principles of planning algorithms (Dijkstra's Algorithm, A* Search, D* Search). You will apply reinforcement learning to solve drone planning problems.

You will design a simulation in Robot Operating System 2 (ROS2) for demonstrations and hands-on activities.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Colloquium

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

1. the students know the fundamental principles of motion control applied to aerial autonomous drones.
2. the students understand basic concepts of perception, distinguishing between classic approaches and deep learning methods for robot perception.
3. the students can explain principles of localisation and Simultaneous Localization and Mapping (SLAM), including their importance for autonomous navigation.
4. the students analyze navigation algorithms, focusing on planning and decision-making processes necessary for effective drone operation.
5. the students apply algorithmic approaches for robot perception, localisation, and planning in practical scenarios.
6. the students implement learning-based control techniques for aerial drones to enhance their motion planning capabilities.
7. the students utilize the Robot Operating System (ROS) in demonstrations and hands-on activities, reinforcing the theoretical concepts covered in the course.

Literature

Roland Siegwart, Illah Reza Nourbakhsh, and Davide Scaramuzza. Introduction to Autonomous Mobile Robots, second edition. 2011, The MIT Press

Sebastian Thrun, Wolfram Burgard, and Dieter Fox. Probabilistic Robotics. 2005, The MIT Press

Module: 6102800

Project Work

Module profile

Exam number

6102800

Duration

1 semester

Frequency

Every semester

Credit hours (SWS)

4

ECTS-Credits (CP)

10.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 240 hrs

Total: 300 hrs

Teaching format

Project

Language of instruction

German/English

Organisation

Responsible lecturer

Prof. Dr. Tobias Aubele

Lecturer(s)

Prof. Dr. Tobias Aubele,

Prof. Dr. Mario Fischer,

Prof. Dr. Christina Völkl-Wolf,

Prof. Dr. Rolf Schillinger,

Prof. Dr. Tristan Wimmer

Applicability

BEC

Semester according to SPO

6. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

100 ECTS points

Recommended prerequisites for the participation in the module

none

Content

The project work is usually teamwork (at least three students). It involves either end-to-end software development according to the rules of software engineering or another task from the IT field (e.g. software comparison, software selection, software introduction). Each project is supervised by a professor from the Faculty of Computer Science and Business Informatics. In the course of the project work, the techniques and methods learned in business informatics are practised in a practical professional context (teamwork; project organisation; practical tasks).

Minimum content of the written project work:

- For software development
- Requirements specification in which the requirements for the project work are summarised (with milestones/schedule)
- Technical design using appropriate methods
- IT design
- Listing
- User manual
- Appendix (literature used; list of abbreviations, glossary, etc.)
- For other tasks:
- Project description in which the requirements for the project work are summarised (with milestones/schedule)
- Further contents to be specified by the supervising professor, which result from the individual character of the respective assignment
- Appendix (literature used; list of abbreviations, glossary, etc.)

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

error

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German/English

Condition for the award of credit points

None

Learning outcomes

Students can methodically process and solve comprehensive tasks. Students can develop and implement suitable solution strategies in a team. They know how team processes work and how they can contribute their own personality.

Literature

depending on the respective project work

Module: 5003067

Requirements Engineering

Module profile

Exam number

5003067

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Isabel John

Lecturer(s)

Prof. Dr. Isabel John,

Dr. Anne Heß,

Dr.-Ing. Benedikt Kämpgen

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Software Engineering /Software Development

Content

This module focuses on the crucial initial phase of the software development lifecycle, where the needs and constraints of the system are gathered, analysed, and documented. Similarly, machine learning (ML) system development projects benefit from RE. So this module covers requirements engineering techniques for traditional systems as well as for ML systems.

Basics of Requirements Engineering

Task Oriented, Goal Oriented RE

Elicitation Techniques

Analysis techniques

Specification / Modelling techniques

Validation techniques

RE in User Experience Engineering

RE Skills

Case Studies and Applications of Requirements Engineering

Requirements Engineering for machine learning systems

Requirements Engineering in the age of ChatGPT / generative artificial intelligence

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

- Understand the importance of RE for software development
- Gain knowledge of common RE models and methods
- Ability to select and apply different requirements elicitation techniques
- Ability to analyze requirements (negotiation, prioritisation)
- Ability to model and structure requirements based on UML and other modelling techniques
- Ability to model textual Use Cases, Use Case diagrams and non functional requirements
- Ability to specify requirements using (structured) natural language (use cases, scenarios, user stories)
- Ability to validate requirements against quality criteria for requirements
- Knowledge of stakeholder analysis and ability to perform basic stakeholder analysis
- Selection and planning of appropriate RE methods for different case studies and scenarios
- RE in International projects
- Understand (and practice) relevant skills
- Understand the specialities of Requirements Engineering in machine learning context
- Ability to apply Requirements Engineering techniques for machine learning applications
- Ability to adapt Requirements Engineering techniques for generative artificial intelligence based systems

Literature

Cockburn, Writing Effective Use Cases, Addison Wesley

Hull, Requirements engineering, Springer Verlag

Berenbach, Software & Systems Requirements Engineering: In Practice, McGraw Hill

Chris Rupp & die SOPHISTen , Requirements Engineering (in German), Hanser

Huyen, Chip. Designing machine learning systems. " O'Reilly Media, Inc.", 2022.

Module: 5003841

SemML: Seminar on Machine Learning

Module profile

Exam number

5003841

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Dominik Seuß

Lecturer(s)

Prof. Dr. Dominik Seuß

Applicability

BIN, BWI, BEC

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

In this seminar, students are given the opportunity to deal individually with various aspects of machine learning. From a selection of topics, they choose those that correspond to their interests and strengths. The topics range from programming tasks to theoretical questions.

At the beginning of the semester, basic knowledge of machine learning is taught, which is then deepened and expanded by the students in the form of presentations. Current approaches in various disciplines such as computer vision are covered. In addition to the technical discussion, great emphasis is placed on the development of soft skills.

The basics of presentations are introduced in order to prepare students for the presentation of their topics. The aim is to train not only subject-specific knowledge, but also presentation and communication skills.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Multimedia presentation

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Specialist specialisation:

- Acquisition of basic knowledge in the field of machine learning
- Specialisation in a selected topic from a variety of current disciplines, such as computer vision
- Understanding of modern approaches and methods in machine learning, both on a theoretical and practical level

Methodological competences:

- Ability to familiarise oneself independently with machine learning topics
- Development and structuring of scientific presentations
- Critical analysis of current research results and approaches

Social and communication skills:

- Confident and goal-oriented presentation in front of a group
- Communicating complex content in an understandable way
- Receiving and integrating feedback to improve your own performance

Personal development:

- Developing skills to communicate technical content clearly and effectively
- Training self-confidence in dealing with scientific topics and discussions

Literature

Depending on the selected topic

Module: 5003098

Social Media in the business world

Module profile

Exam number

5003098

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 40 hrs

Self-study: 110 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Christina Völkl-Wolf

Lecturer(s)

Tobias Tellers,

Philipp Oberkalkofen

Applicability

BEC

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

- Basic knowledge of social media, use of internet applications
- Interest in corporate communications

Content

- Structure and elements of social media strategies
- Defining and analysing goals and target groups
- Social media channels
- Utilising the various channels
- In particular blogs, Facebook, Twitter, YouTube, Instagram, XING/LinkedIn
- Linking and combining channels, integration into marketing strategies
- Monitoring, measuring success and controlling

Community management as a key success factor for communication in social media.

- Basics of community management
- Community strategy
- Online dialogue - principles and challenges
- Crisis communication in the social media
- Trolls and other contemporaries
- Community engagement - how do I activate my community?
- Psychological factors of community management
- Content strategy
- Social customer service
- Measuring success

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

- Be able to use social media channels professionally in the corporate context, understand and use different strategies, know practical handling and tricks
- Understanding of how social media dialogue can be successfully implemented
- Solid basic knowledge of the broad field of community management
- Examples and best practices that can be applied to your own situation

Literature

- Beilharz: Social media marketing in B2B, 2014.
- Grabs/Bannour: Follow Me, 2014.
- Online Marketing Manager (<https://www.amazon.de/Online-Marketing-Manager-Handbuch-für-die-Praxis/dp/396009048X>)
- Pein: The Social Media Manager, 2013.
- Amy Joe Kim, Community Building on the Web: Secret Strategies for Successful Online Communities;
- Jono Bacon, The Art of Community: Building the New Age of Participation

Module: 5003810

Software Testing

Module profile

Exam number

5003810

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Peter Braun

Lecturer(s)

Pascal Moll

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

None

Recommended prerequisites for the participation in the module

Programming I, Programming II, Programming project/software development project

Content

This module deals with different types of tests and their application in software development. The SOLID principles and the 4-layer concept for test architectures are taught. It also covers the automated testing of interfaces and APIs as well as the use of mocking. Another focus is on behaviour-driven development with Cucumber. Exploratory testing and the integration of automated tests into a DevOps life cycle are also discussed. The module includes practical content for which a virtual machine is provided. The prerequisite for this is the installation of VirtualBox.

- Fundamentals of testing (test coverage, test paths, black box, white box, grey box, functional and non-functional tests, test pyramid)
- Test automation (goals, success factors, differences between different types, test framework JUnit, annotations, assertions, exception testing, parameterisation, test types, record replay, scripted testing, keyword-driven testing)
- Test architecture (SOLID principles, 4-layer concept, test modelling layer, test definition, test execution, test adaptation, interfaces, design and development, important design patterns for testing)
- Testing of graphical user interfaces (introduction to Selenium, drivers, PageObject patterns, identifiers, waits, cookies)
- Mocking (Wiremock)
- Behaviour Driven Development (Feature Files & Step Files, Cucumber & Gherkin, Parameters, Data Tables, Scenario Outlines and Background, Runner Classes)
- Exploratory testing (methods and techniques)
- Build Server (Jenkins basics & DevOps basics, gPipelines, DevOps process from a testing perspective)

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

- Students can select and define test objectives for software
- Students can select suitable test types for the test objectives
- Students can translate test types into automated tests
- Students can select and apply design patterns for testing
- Students understand Behaviour Driven Development
- Students can set up and configure a build server for testing

Literature

Essentials of Software Testing by Ralf Bierig, Stephen Brown, Edgar Galván, Joe Timoney, 2021, Cambridge University Press

Module: 5007211

Mobile and Ubiquitous Concepts and Development

Module profile

Exam number

5007211

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Karsten Huffstadt

Lecturer(s)

Prof. Dr. Karsten Huffstadt

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

Concentration module

Required prerequisites for the participation in the module according to the SPO

120 ECTS credits, course 5002530 or 5102530 or 6102410

Recommended prerequisites for the participation in the module

none

Content

In this module, students gain an in-depth insight into mobile application scenarios and business models.

They gain the necessary knowledge of operating platforms and architecture concepts for mobile business applications.

Integration aspects (ERP integration) of mobile solutions and communication paradigms (SOA, REST, SOCKETS) are also covered.

Another important point is the development using cross-platform development (HTML5).

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

- Students can describe, implement and analyse mobile solutions and their development platforms.
- They will be able to assess investment decisions based on business model developments.
- Students will be able to develop integration concepts for mobile solutions.

Literature

Literature will be announced in the lecture

Module: 6106201

Process and Landing Page Optimization

Module profile

Exam number

6106201

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Tobias Aubele

Lecturer(s)

André Morys,

Ina Reinhardt

Applicability

BEC

Semester according to SPO

6. semester

Type of module

Concentration module

Required prerequisites for the participation in the module according to the SPO

120 ECTS credits,, Course 6102410

Recommended prerequisites for the participation in the module

Modules Interface Design & Usability, Statistics, Online Marketing

Content

Conversion Optimisation Framework

- Technical analysis of a website
- Heuristic analysis of landing pages, web pages and processes
- Use of personas and their development
- Quantitative web analysis
- Interview techniques (qualitative web analysis)
- User testing with eye tracking

Design and realisation of (mobile) landing pages in conjunction with online marketing campaigns

Techniques of behavioural economics

Website testing (A/B; multivariate)

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Students deepen their knowledge of interface design and usability. They analyse and optimise a website in terms of design, processes and the interaction with upstream online marketing measures. They learn how website visitors can complete the user intention in a targeted manner. Both the necessary technical aspects and consumer psychology principles are learnt and deepened.

In addition to a technical and heuristic analysis of the existing website, user-friendly and high-conversion websites are designed, created and further developed based on knowledge of interface design theory. Process-related weaknesses are uncovered, analysed and individually remedied using web analysis and eye tracking studies. Due to the special features of the websites' business models, students are required to develop customised solution strategies.

Literature

Ariely, Dan: Predictably Irrational

Ash, Tim: Landing Pages

Beck, Alexander: Google Adwords

Kahneman, Daniel: Think fast, think slow

Morys, André: Conversion Optimisation

Vollmert, Markus; Lück, Heike: Google Analytics

Various current (online) specialist articles, which are distributed by the lecturer according to topic

Module: 6108201

Shop Systems

Module profile

Exam number

6108201

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Rolf Schillinger

Lecturer(s)

Prof. Dr. Rolf Schillinger,

Oliver Dahms,

Prof. Dr. Tristan Wimmer

Applicability

BEC

Semester according to SPO

6. semester

Type of module

Concentration module

Required prerequisites for the participation in the module according to the SPO

120 ECTS credits,, Course 6102410

Recommended prerequisites for the participation in the module

Web Programming I - III, Web Application and Development Systems, Introduction to Web Technologies

Content

In this course, students deal with the following topics:

Taxonomy of current shop system variants

- Cloud / on premise systems
- Open source / proprietary systems
- Standalone systems / part of (ERP) platforms

Data and data management

- ERP
- PIM

Hands-on deployments

- On premise shop system
- Cloud-only shop system
- Connection of a shop system to an ERP system using connectors

Connection of marketplaces and external services

- Amazon
- eBay
- Price search engines

Multichannel platforms

- General functionality
- Example project on a multichannel platform

Logistics / fulfilment

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- differentiate between the most important types of shop systems
- plan an optimal shop platform based on project requirements
- set up, book and configure shop systems themselves
- plan and implement the connection of shop systems to price search engines
- connect shop systems to several sales channels via multichannel platforms
- differentiate between operator concepts for logistics and fulfilment solutions and select them based on project requirements

Literature

Will be announced in the course.

Module: 6106100

Seminar Conversion Optimization

Module profile

Exam number

6106100

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Tobias Aubele

Lecturer(s)

Prof. Dr. Tobias Aubele,

Prof. Dr. Rolf Schillinger

Applicability

BEC

Semester according to SPO

6. semester

Type of module

Concentration module

Required prerequisites for the participation in the module according to the SPO

120 ECTS credits, course 6102410

Recommended prerequisites for the participation in the module

Interface Design & Usability module, Statistics module, Content Engineering module

Content

The contents of the seminar deal with various current topics from the field of "Conversion Optimisation", especially from the main topics of usability, user experience, behavioural economics in the e-commerce environment, emotion measurement and website tracking. Preparation of a paper on the topic area as well as presentation, discussion and processing of the topic.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Term paper, Presentation

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Students deepen their knowledge in the field of conversion optimisation and evaluate current topics.

The broad focus of the topics covers a practice-oriented range of tasks, which shows the cross-connections between conversion optimisation and related scientific fields (in particular technology, economics, psychology). At the same time, students learn to independently expand and deepen their knowledge in the field of conversion optimisation / interface design & usability.

The preparation of a written paper helps students to underpin their concepts and ideas with scientific findings and corresponding current specialist literature.

By presenting their written work, students improve their persuasive appearance.

Literature

Students' own research based on the topic

Module: 5007110

Seminar Mobile and Ubiquitous Solutions

Module profile

Exam number

5007110

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Karsten Huffstadt

Lecturer(s)

Prof. Dr. Karsten Huffstadt,

Prof. Dr. Isabel John

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

Concentration module

Required prerequisites for the participation in the module according to the SPO

120 ECTS credits, course 5X02530

Recommended prerequisites for the participation in the module

none

Content

- In the in-depth seminar, scientific questions are identified and empirically analysed in the context of overarching topics from the fields of mobility, AR, VR and ubiquitous computing.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

- Students in the specialisation seminar are enabled to carry out a scientific investigation.
- They will analyse the current state of research and evaluate their own research results.
- They will also be able to deal with, analyse and classify English-language literature.
- Finally, they will be able to develop their own conclusions from the results, understand and categorise questions posed by other students and document the need for further research.

Literature

Literature will be announced in the lecture

Module: 6108100

Seminar Shop Systems

Module profile

Exam number

6108100

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 40 hrs

Self-study: 110 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Rolf Schillinger

Lecturer(s)

Prof. Dr. Rolf Schillinger,

Prof. Dr. Tristan Wimmer

Applicability

BEC

Semester according to SPO

6. semester

Type of module

Concentration module

Required prerequisites for the participation in the module according to the SPO

120 ECTS credits, course 6102410

Recommended prerequisites for the participation in the module

none

Content

In this seminar, students work on current topics from all areas of the planning and implementation of online shop systems.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Term paper, Presentation

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Students deepen their knowledge of shop systems and learn to categorise and process current topics.

The written elaboration and oral presentation of the topics prepare the students for the corresponding activities in their further professional or academic career.

Literature

Will be announced in the seminar

Module: 5003154

Video-Production & Video-Marketing

Module profile

Exam number

5003154

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 50 hrs

Self-study: 100 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Christina Völkl-Wolf

Lecturer(s)

Alexander Gillich,

Christian Huller

Applicability

BEC

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Part 1: Video production

In the first part of the module, students are introduced to the individual steps of a video production. All levels of video production are covered, from mobile phone videos to cinema productions.

- Introduction and historical development of image & moving image
- Technology & technique - the tension between low-budget and high-end productions
- Definition of terms: data format & moving image format
- Content & Context
- Current developments in video marketing
- Production & post-production - from the idea to the finished film
- Transfer:

o Analysis & categorisation of current video formats (using a developed matrix)

o Derivation of a best-practice approach

- Practical part - video production

Part 2: Video marketing

The second part deals with the correct online marketing of videos with a focus on YouTube marketing.

- Video marketing - introduction & overview
- Video portals - status quo of YouTube, Vimeo, Facebook, Snapchat & Co.
- YouTube channel set-up: Account creation, administration levels and functions
- Video SEO:
 - o Ranking factors and optimisation options for YouTube videos
 - o Channel optimisation
 - o CTAs: strategic use of info cards, credits, watermarks and links as a call to action
- Community management: active & passive ways to increase channel subscribers and trust
- Video monetisation - possibilities, opportunities & risks
- Video advertising - advertising strategies and targeting options for video adverts
- YouTube analytics - measuring the success of video content
- Brand communication, PR, product communication with videos
- Practical part - video optimisation of the video produced in part 1

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Learning objectives Video production: Basics, stylistic devices and estimation of effort in video production

Video marketing: After completing the course, students will be able to optimise the use of 'YouTube' as an online marketing channel.

This includes:

- working with the 'YouTube Creator Studio' and the new 'YouTube Studio' (currently in beta).
- The best possible optimisation of videos on YouTube.
- the strategic development of a YouTube channel and a strong community.

Literature

Will be announced in the lecture

Module: 6322200

Virtual Reality

Module profile

Exam number

6322200

Duration

1 semester

Frequency

Every summer semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction,
Exercise

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Mark Vetter

Lecturer(s)

Stefan Sauer

Applicability

BEC, BIN, BWI

Semester according to SPO

6. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

The event is organised by the Faculty of Polymer Engineering and Surveying (FKV):

(https://geo.thws.de/studium/bachelor-geovisualisierung/studienablauf/modulhandbuch-bgv-ab-ws-20223/?tx_fhwsmodule_fe%5Bmodul%5D=2026&tx_fhwsmodule_fe%5Baction%5D=show&tx_fhwsmodule_fe%5Bcontroller%5D=Modul&cHash=8af82bbabaa82a62a346795d4cba76ed)

The lecture will be held as an online event in 2025ss. Date expected Wednesday 08:15 - 09:45 (lecture) and 13:30 - 16:00 (exercise)

- Creation of 3D models for transfer to game engines
- Dealing with game engines
- Rendering pipeline
- Integration of VR functionalities in game engines
- Creation of fully functional 3D models in game engines
- Realisation of virtual tours

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After participating in the module, students can independently plan, realise and set up VR applications or publish them using appropriate services.

Game engines are used to create VR environments. Students therefore learn the basics of importing and operating geodata in game engines, as well as the settings for rendering and preparing the data for VR applications, including programming controllers and the interface to VR glasses.

Literature

Akenine-Möller, T.; Haines, E.; Hoffman, N.; Pesce, A.; Iwanicki, M.; Hillaire, S.: Real-Time Rendering, 2018, 4th edition, Milton: Chapman and Hall/CRC, London, ISBN: 9781138627000
Edler, D.; Husar, A.; Keil, J.; Vetter, M. & Dickmann, F.: Virtual Reality (VR) and Open Source Software: A Workflow for Constructing an Interactive Cartographic VR Environment to Explore Urban Landscapes, 2018. In: Kartographische Nachrichten, Journal of Cartography and Geographic Information, 68(1), p. 5-13, ISSN: 2524-4965
Edler, D.; Kühne, O.; Jenal, C.; Vetter, M.; Dickmann, F.: Potentials of spatial visualisation in virtual reality (VR) for social constructivist landscape research, 2018. In: Kartographische Nachrichten, Journal of Cartography and Geographic Information, 68(5), p. 245-254, ISSN: 2524-4965
Vetter, M.: Technical Potentials for the Visualisation in Virtual Reality, 2020. in D. Edler, C. Jenal, & O. Kühne (Eds.), Modern Approaches to the Visualisation of Landscapes, 2020, Wiesbaden: Springer VS, ISBN: 978-3-658-30956-5

7. semester

Module: 5003028

ABAP/4 Development Workbench

Module profile

Exam number

5003028

Duration

1 semester

Frequency

Every semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Karl Liebstückel

Lecturer(s)

Martin Espenschied

Applicability

BIN, BWI, BEC

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Basics of programming with ABAP

- Overview of the ABAP programming language
- Creating and testing an ABAP report
- Output statements
- Programme data - types and variables
- Multilingualism - Text elements
- Reading database tables
- Control statements
- Programme data - field strings and internal tables
- Modularisation through function blocks and classes

Dialogue programming

- Dialogue programs from the developer's perspective
- Developing a simple dialogue program
- The graphical elements of a screen
- Transferring definitions from the data dictionary
- The Menu Painter
- Dynamic screen sequence
- Field input checks/messages
- Dynamic screen modifications
- Database changes and locks

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Students are familiar with the architecture and use of the ABAP/4 Development Workbench.

They can create simple programmes and use SAP-specific instructions.

They can analyse and rectify errors. They can create function modules and classes and design interfaces

Literature

ABAP Development for SAP S/4HANA by Constantin-Catalin Chiuaru, Sebastian Freilinger- Huber, Timo Stark, Tobias Trapp, Rheinwerk-Verlag, 2nd edition, Bonn 2021.

ABAP - Das umfassende Handbuch by Felix Roth, Rheinwerk-Verlag, 3rd edition, Bonn 2023.

Agile ABAP Development by Winfried Schwarzmann, Rheinwerk-Verlag, Bonn 2018.

BOPF - Developing Business Objects with ABAP by Felix Roth, Stefan Stöhr, Rheinwerk-Verlag, Bonn 2017.

Module: 5003850

AI and Security

Module profile

Exam number

5003850

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Benjamin

Weggenmann

Lecturer(s)

Prof. Dr. Benjamin

Weggenmann

Applicability

BIN, BWI, BEC

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Linear Algebra

Content

In this module, students learn about the basic concepts and methods of artificial intelligence (AI) and specifically apply them to information security issues.

First, various classification strategies -- such as Naive Bayes or neural networks -- are introduced, and their possible applications in a security context are explained. In practical exercises, students develop and train their own models, e.g. for the automated detection of phishing emails or attacks in network traffic.

Another component of the module is the critical examination of the use of AI by attackers.

Here, application scenarios are discussed in which AI is used to improve digital attacks, for example to optimize social engineering strategies or to generate deceptively authentic content.

Finally, students deal with issues concerning the security and privacy of AI systems themselves.

Among other things, forms of attack such as data poisoning, adversarial examples, and backdoors are discussed, which can be used specifically to manipulate AI models.

The aim of the module is to develop a sound understanding of the responsible and security-conscious use of AI in cybersecurity.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

- Students know the basics of artificial intelligence and at least two classification strategies (e.g., Naive Bayes Classifier, neural networks).
- Students can analyse a given application scenario and accordingly select and use suitable models (e.g., using Python).
- Students can train their own models with suitable data (incl. pre-processing) and evaluate the results.
- Students recall various scenarios in the field of information security in which AI models are already being used successfully and understand how.
- Students understand the fundamental security-related problems of AI models. They can apply corresponding attacks and basic defences.

Literature

Introduction to Artificial Intelligence (3rd edition), Wolfgang Ertel, 2025

Machine Learning and Security: Protecting Systems with Data and Algorithms, Clarence Chio and David Freeman, O'Reilly 2018

Machine Learning for Hackers, Drew Conway, 2012

Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, Aurélien Géron, 2022

Module: 5003123

Agile Enterprise - Agile Methods in Practice

Module profile

Exam number

5003123

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Isabel John

Lecturer(s)

Christoph Schüll,

Christian Dewein

Applicability

BEC, BIN, BWI

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Basic knowledge of IT project management, IT process models

Content

- Agile values & principles
- Scrum, Kanban and XP
- Agile estimating, planning and reporting
- Setting up agile IT projects
- Continuous integration, delivery and deployment
- DevOps basics
- Scaling Agile
- Communication & leadership

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

- Students can identify the prerequisites of current agile concepts based on different company models, explain their practical effects and assess key success factors in their application.
- Students can confidently name terms and methods of agile concepts, explain their meaning, apply them to specific situations and differentiate between different approaches.
- Students can explain agile values and principles, analyse their relevance in typical project situations and critically evaluate typical conflicts and contextual factors.
- Students can plan and apply Scrum and related agile methods in a project context, orchestrate their process components and formulate and evaluate the effects on results.
- Students can implement DevOps practices in development, plan and execute continuous integration, delivery and deployment in the project and critically assess efficiency, quality and risk.

Literature

Extract from recommended literature on the subject areas:

- Mike Cohn: Agile Estimating and Planning.2005, Prentice Hall
- Ken Schwaber: Agile Project Management with Scrum.2004, Microsoft Professional
- Mike Cohn: User Stories applied.2010, MITP
- Boris Gloger: Scrum. 2016, Hanser
- Fritz B. Simons: Introduction to systems theory and constructivism.
- Paul Watzlawick, Janet H Beavin: Human Communication: Forms, Disorders, Paradoxes.
- Friedemann Schulz von Thun: Talking to each other 1: Disruptions and clarifications: General psychology of communication.
- T. Groth, G.P.Krejci. S.Günther: New Organising

Module: 5003847

Algorithms for Distributed Systems

Module profile

Exam number

5003847

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr.-Ing. Erik Schaffernicht

Lecturer(s)

Prof. Dr.-Ing. Erik Schaffernicht

Applicability

BIN, BWI, BEC

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Courses on computer networks and communication (e.g. internet communication, backend systems), algorithms and data structures, operating system basics

Content

Introduction/recap regarding of communication models for distributed systems

- Remote procedure calls
- Blackboards and Event-based models

Fundamentals for distributed algorithms

- differences between algorithms in distributed systems, parallel algorithms and single machine algorithms
- consensus problems
- failure models
- physical clocks and logical clocks

Algorithms for

- coordination
- leader election
- searching
- failure tolerance / failure handling
- consistent data replication

The course will be given in English.

The course is programming language agnostic, students can choose their preferred languages to implement seminar assignments.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

none

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

none

Learning outcomes

After completing the course students are able to

- understand the capabilities and limitations of distributed systems,
- explain different failure models,
- utilise remote procedure call frameworks to program in distributed systems,
- design and implement solutions to common problems in distributed systems,
- choose algorithms to handle conflicts and failures in distributed systems,
- discuss the major challenges in distributed systems both in general and for specific tasks,
- compare different algorithmic solutions to common problems in distributed systems and discuss potential trade-offs

Literature

M. van Steen and A.S. Tanenbaum, Distributed Systems, 4th ed., 2023
Additional specific reading recommendations will be provided during the course

Module: 5003828

Automotive and Industrial Cybersecurity

Module profile

Exam number

5003828

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German/English

Organisation

Responsible lecturer

Prof. Dr.-Ing. Sebastian
Biedermann

Lecturer(s)

Dr.-Ing. Rodrigo Daniel do
Carmo

Applicability

BEC, BIN, BWI

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Part I: Automotive Cybersecurity

Introduction to Automotive Cybersecurity

- Architecture of Modern Vehicles
- Cybersecurity Challenges of Modern Vehicles and E/E Architectures

Legislation and Standardisation for Cybersecurity in the Automotive Industry

- Introduction to Automotive Cybersecurity Regulations and Standards: UN ECE WP.29 and the UN Regulations No. 155 and 156, Vehicle Type Approval, Overview of Global and European Approach
- Introduction to the International Standard ISO/SAE 21434
- Related and Upcoming Standards

Automotive Threat Analysis and Risk Assessment (TARA) According to ISO/SAE 21434

- Introduction to Risk Management and TARA
- Scope of a TARA, Attacker Model, Item Definition
- Asset Identification (Typical Assets for Automotive Embedded Systems)
- Cybersecurity Properties (CIA Triad and Other Properties)
- Definition of Damage Scenarios
- Identifying Threats: Overview of Threat Modelling, STRIDE, Brainstorming, MITRE ATT&CK, OWASP
- Definition of Attack Paths: Identification and Description of Attack Paths, Attack Trees, Vulnerabilities
- Attack Feasibility Evaluation
- Risk Evaluation
- Risk Treatment Decision: Cybersecurity Goals
- Cybersecurity Claims, Typical Controls for Automotive Embedded Systems

Part II: Industrial Cybersecurity

Introduction to Industrial Networks and Control Systems

- Industrial Security, Basic Process Control Systems, Differences Between IT and OT Systems

- Components and Architecture of Industrial Control Systems: Field Devices, Programmable Logic Controllers, Distributed Control Systems, Supervisory Control and Data Acquisition (SCADA) Systems, Network Transmission Media, Field Device Architecture, Industrial Network Protocols, Enterprise Network Protocols, Industrial Safety and Protection Systems, Safety Instrument Systems (SIS), OT/IT Network Integration, Purdue Reference Model

Industrial Cybersecurity and Secure OT Architectures

- Introduction to Cybersecurity Challenges in the Modern Industry (Industry 4.0): Examples of Attacks, MITRE ATT&CK Database, SHODAN
- Overview of Relevant EU Cybersecurity Regulations: NIS2, Cyber Resilience Act (CRA), Regulation on Machinery, Radio Equipment Directive (RED)
- Secure OT Architecture: Boundary protection, Firewalls, Industrial Demilitarised Zone, Proxies, Network Zoning, Data Diode, Zero Trust Architecture (ZTA)

The International Standard IEC 62443

- Overview of the International Standard ISA/IEC 62443
- Basic Terminology
- Security of Industrial Networks: Security Programme, The Automation Solution Security Lifecycle, Security Levels and Maturity Levels, Security Objectives and Foundational Requirements, Defense-in-Depth Principle, Threat-Risk Assessment, Security Zones and Conduits
- Security of Products: Risk-based Approach and Relation to Cyber Resilience Act, Security Levels and Functional Requirements, Secure Development Lifecycle

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Practical study achievement

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German/English

Condition for the award of credit points

None

Learning outcomes

- Students understand the architecture and cybersecurity challenges of modern vehicles, including the basics of E/E architectures.
- Students know the essentials of risk management and threat modelling, including terminology, standards, and methods for conducting threat analysis and risk assessment (TARA) in both automotive and industrial contexts.
- Students know fundamental cybersecurity protection concepts for industrial control systems (ICS), understand the differences between OT and IT, understand terminology and concepts of the IEC 62443 standard, and are aware of relevant guidelines and new European regulations.
- Students are capable of performing comprehensive threat analysis and risk assessment (TARA) for automotive systems and industrial/operational technology (OT) environments, identifying vulnerabilities, and evaluating risks.
- Students are able to manage and develop the work products of automotive development projects in accordance with the international standard ISO/SAE 21434.
- Students can design and implement secure network architectures for industrial systems, applying principles such as zoning, Zero Trust, and Defence-in-Depth.
- Develop analytical, structured, and logical thinking skills to systematically evaluate and address cybersecurity challenges in both automotive and industrial contexts.
- Enhance abstraction skills to understand and apply complex cybersecurity concepts, standards, and risk management techniques.

Literature

- N. Ferguson, B. Schneier, T. Kohno, "Cryptography Engineering - Design Principles and Practical Applications", Wiley, 2010
- C. Paar, J. Pelzl, "Understanding Cryptography - A Textbook for Students and Practitioners", Springer, 2010
- M. Rosulek, "The Joy of Cryptography", 2021. URL: <https://joyofcryptography.com>
- L. Van Houtven, "Crypto 101", 2013. URL: <https://www.crypto101.io>
- C. Smith, "The Car Hacker's Handbook: A Guide for the Penetration Tester", 1st edn. No Starch Press, San Francisco, 2016
- M. Wurm, "Automotive Cybersecurity: Security Building Blocks for Automotive Embedded Systems", Springer Berlin Heidelberg, Berlin, Heidelberg, 2022
- A. Shostack, "Threat Modelling: Designing for Security", 1st edn. Wiley Publishing, 2014
- ISO/SAE 21434:2021, "Road vehicles - Cybersecurity engineering", International Standard
- R. do Carmo, A. Schlensog, "Automotive Threat Analysis and Risk Assessment in Practice", Springer, 2024
- IEC 62443 International Series of Standards (Parts 1-1 to 4-2)
- The MITRE Corporation, MITRE ATT&CK®. URL <https://attack.mitre.org/>
- OWASP Foundation, "OWASP Top Ten". URL <https://owasp.org/www-project-top-ten/>

- C. Brooks, P. Craig, "Practical Industrial Cybersecurity - ICS, Industry 4.0, and IIoT", Wiley, 2022
- P. Kobes, "Guideline Industrial Security: IEC 62443 is easy", VDE Verlag, 2023
- NIST SP 800-82r3, "Guide to Operational Technology (OT) Security", 2023
- P. Ackermann, "Industrial Cybersecurity - Second Edition: Efficiently monitor the cybersecurity posture of your ICS environment", Packt Publishing, 2021

Module: 6103700

Bachelor Thesis / Bachelor Seminar

Module profile

Exam number

6103700

Duration

1 semester

Frequency

Every semester

Credit hours (SWS)

1

ECTS-Credits (CP)

15.0

Workload

Guided study time:

Presence time: 40 hrs

Self-study: 410 hrs

Total: 450 hrs

Teaching format

Seminar

Language of instruction

German/English

Organisation

Responsible lecturer

Prof. Dr. Tobias Aubele

Lecturer(s)

Prof. Dr. Tobias Aubele,

Prof. Dr. Mario Fischer,

Prof. Dr. Christina Völkl-Wolf,

Prof. Dr. Rolf Schillinger,

Prof. Dr. Tristan Wimmer

Applicability

BEC

Semester according to SPO

7. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

120 ECTS points from 1st - 2nd year, Soft and Professional Skills courses, project work

Compulsory participation in Bachelor's seminar

Recommended prerequisites for the participation in the module

none

Content

The Bachelor's thesis module consists of the Bachelor's thesis (12 CP) and the Bachelor's seminar (3 CP).

The Bachelor's thesis includes own studies and research on the state of the art in the respective subject area. In particular, the thesis must abstract from boundary conditions that are not technically based in nature, but result from the specific circumstances of the company/operation. If software solutions are required as part of the assignment, this generally means that prototypes are implemented as part of the Bachelor's thesis, but does not include ensuring product features (incl. accompanying manuals, etc.).

The Bachelor's seminar includes, among other things, own studies and research on the state of the art in the respective subject area. In particular, the work must abstract from boundary conditions that are not technically based in nature, but result from the specific circumstances of the company/operation. If software solutions are required as part of the assignment, this generally means that prototypes are implemented as part of the Bachelor's thesis, but does not include ensuring product features (incl. accompanying manuals, etc.).

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Thesis, Presentation

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German/English

Condition for the award of credit points

None

Learning outcomes

With the Bachelor's thesis / Bachelor's seminar, the student demonstrates that he/she is capable of independently solving a challenging task in the field of computer science (possibly interdisciplinary), that he/she has mastered the methodological and scientific principles of the subject and can adequately present the result.

Literature

depending on the topic; the Bachelor's thesis should be written scientifically, i.e. literature must be intensively analysed, used and cited according to the topic.

Module: 5003848

Big Data Analytics

Module profile

Exam number

5003848

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Isabel John

Lecturer(s)

Rajesh Ramachandram

Applicability

BIN, BWI, BEC

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

- Basic programming knowledge (Java/Python)
- Prior exposure to databases and Linux recommended

Content

This comprehensive course provides an in-depth introduction to Big Data technologies, focusing on Hadoop and its ecosystem. Participants will learn core concepts such as the Big Data 4 Vs, analytics types, and Hadoop architecture, followed by hands-on programming skills with MapReduce, Hadoop Streaming, Pig, Hive, and Kafka. The modules combine theoretical knowledge with practical projects, including real-world case studies and an integrated data pipeline, preparing learners to handle large-scale data processing and analytics.

The course has the following content:

- Understanding Big Data concepts, including the 4 Vs and analytics types
- Overview of the Hadoop ecosystem and architecture components
- Programming with MapReduce using Java, including advanced techniques
- Developing Hadoop Streaming applications with Python/Shell scripts
- Exploring real-world case studies and mini projects for practical experience
- Data analysis with Pig Latin and scripting operators
- Building data warehousing solutions using Hive and HiveQL
- Learning Kafka architecture, topics, and data pipeline integration
- Hands-on exercises with HDFS, YARN, Pig, Hive, and Kafka
- Final project focusing on designing an end-to-end data processing pipeline

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

Upon successful completion of this module, students will be able to:

- LO1: Explain the fundamental characteristics of Big Data systems and analytics.
- LO2: Operate Hadoop HDFS and perform distributed storage and processing.
- LO3: Implement MapReduce programs using Java, including advanced features like distributed cache and joins.
- LO4: Use Pig Latin and HiveQL for high-level querying over large datasets.
- LO5: Demonstrate understanding of real-time streaming using Apache Kafka.
- LO6: Develop integrated solutions using multiple Hadoop ecosystem components.

Literature

Tom White, Hadoop: The Definitive Guide (2012), O'Reilly
Garry Turkington, Hadoop Beginner's Guide (2013), Packt Publishing
Pethuru Raj et al, High-Performance Big Data Analytics (2015), Springer
Official Apache Docs: Hadoop, Pig, Hive, Kafka (2018)

Module: 5003188

Blockchain and Smart Contracts

Module profile

Exam number

5003188

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr.-Ing. Tobias Fertig

Lecturer(s)

Prof. Dr.-Ing. Tobias Fertig,
Andreas Schütz

Applicability

BEC, BIN, BWI

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

In this module, students gain deep insights into blockchain technology and smart contracts. After learning the basics, students are divided into teams to develop prototypes for suitable use cases. At the end of the module, students are able to evaluate use cases and implement them in practice.

The following content is taught to students:

- Evaluating use cases
- How blockchains work
- How the various consensus models work
- Introduction to contract-oriented programming
- Introduction to Solidity and suitable development environments
- Introduction to programming smart contracts
- Testing and debugging smart contracts
- Common design patterns for smart contracts
- Deployment and management of smart contracts
- Basics of decentralised applications (DApps)
- Frameworks for programming DApps
- Development of DApps
- Deployment of DApps
- Testing of DApps

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

1. students recall the basic concepts of blockchain technology and its functionalities.
2. students understand the principles and functioning of smart contracts and their significance within the blockchain ecosystem.
3. students apply the Solidity programming language to develop and implement smart contracts.
4. students develop decentralised applications (DApps) for the Ethereum blockchain and integrate smart contracts.
5. students analyse security vulnerabilities in smart contracts and can formulate and implement strategies to avoid these risks.

Literature

<https://www.rheinwerk-verlag.de/blockchain-the-comprehensive-guide-to-blockchain-development-ethereum-solidity-and-smart-contracts/>

Module: 100000

Business Intelligence and Reporting

Module profile

Exam number

100000

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 0 hrs

Self-study: 150 hrs

Total: 150 hrs

Teaching format

Lecture

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Frank-Michael Schleif

Lecturer(s)

Applicability

BEC, BIN, BWI

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

This is an offer of the Virtual University of Bavaria. Further information can be found at

<https://kurse.vhb.org/VHBPORTAL/kursprogramm/kursprogramm.jsp?kDetail=true&COURSEID=19535,82,1508,1>

Recommended prerequisites for the participation in the module

This is an offer of the Virtual University of Bavaria. Further information can be found at

<https://kurse.vhb.org/VHBPORTAL/kursprogramm/kursprogramm.jsp?kDetail=true&COURSEID=19535,82,1508,1>

Content

The module currently replaces the Business Intelligence course in the Business Technologies specialisation.

It can therefore only be selected once either as an FWPM or (exclusively) for the Business Intelligence course.

If the BT specialisation is selected, the module is recognised as specialisation I.

This is an offer of the Virtual University of Bavaria. Further information:

<https://kurse.vhb.org/VHBPORTAL/kursprogramm/kursprogramm.jsp?kDetail=true&COURSEID=19535,82,1508,1>

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to
§ 23 APO

Examination - length/format

90 minutes

The concrete length/format
of the examination will be
determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

This is an offer of the Virtual University of Bavaria. Further information
can be found at

[https://kurse.vhb.org/VHBPORTAL/kursprogramm/kursprogramm.jsp?
kDetail=true&COURSEID=19535,82,1508,1](https://kurse.vhb.org/VHBPORTAL/kursprogramm/kursprogramm.jsp?kDetail=true&COURSEID=19535,82,1508,1)

Literature

This is an offer of the Virtual University of Bavaria. Further information
can be found at

[https://kurse.vhb.org/VHBPORTAL/kursprogramm/kursprogramm.jsp?
kDetail=true&COURSEID=19535,82,1508,1](https://kurse.vhb.org/VHBPORTAL/kursprogramm/kursprogramm.jsp?kDetail=true&COURSEID=19535,82,1508,1)

Module: 5003829

CANVA – simple but great design

Module profile

Exam number

5003829

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Christina Völkl-Wolf

Lecturer(s)

Verena Rempel

Applicability

BEC, BWI

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Install Canva Pro version as a test account on your own computer

Content

The seminar CANVA - Simple. Good. Design. is aimed at beginners who want to learn how the CANVA software works from scratch and how to use it. Attendance is compulsory on all seminar days.

In this seminar, students acquire basic design and media technology skills for creating digital content with the online design tool Canva. The focus is on the practical application for social media, in particular reels, stories, videos and other content formats.

Content:

Introduction to the Canva design tool (free/pro version)

Canva editor for image and video editing

Overview of platform formats: Instagram, LinkedIn, TikTok, Facebook, YouTube etc.

Basics of visual design (colour, font, layout, imagery)

Analysing different formats with regard to their design components.

Colour management & visual hierarchy

Image composition with grid, white space and contrast

Use of typography and graphic elements

Creation of social media content (posts, stories, reels, videos)

Introduction to storyboards & visual scripting for reels, video

Photo editing & integration of icons, animations and videos

Creation of own templates and consistent design lines

Project-related work on real or fictitious communication tasks

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

Attendance is compulsory.

Learning outcomes

After successful participation, students will be able to

Students understand the structure and functions of Canva for designing digital media formats.

Students use Canva confidently to create their own posts, reels, stories and videos.

Students remember basic principles of visual design such as colour effects, typography and composition.

Students analyse existing templates with regard to design and target group relevance.

Students evaluate design decisions with regard to brand impact and media-appropriate implementation.

Students create their own projects in the area of social media by applying the content they have learnt in a targeted manner in order to realise a specific final project or a set task.

Literature

https://www.canva.com/de_de/

Module: 5003804

Cloud Native Enterprise Java

Module profile

Exam number

5003804

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Rolf Schillinger

Lecturer(s)

Matthias Reining

Applicability

BEC, BIN, BWI

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Programming I/II

Content

The lecture teaches the basics of Jakarta EE (<https://jakarta.ee/>), also known under its predecessor name Java EE (EE: Enterprise Edition).

The focus of the course is on the creation of modern cloud native enterprise applications, divided into the following topics

- General requirements for business applications
- Web services (JAX-RS - Restful Web Services)
- Enterprise software patterns (CDI - Context and Dependency Injection)
- Data persistence (JPA - Java Persistence API)
- Use of microservice architecture patterns (via Microprofile <https://microprofile.io/>)
- Different runtimes (on-prem and cloud)

Most of the topics will be demonstrated and discussed directly using source code and live coding examples.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- Differentiate between terms such as Java, Java EE and Jakarta EE and categorise buzz words from the Java Enterprise world.
- efficiently implement applications in different runtime environments based on the Jakarta EE APIs
- design and implement microservice architectures using Jakarta EE / Quarkus.
- use Docker in the Jakarta EE / Quarkus environment
- Analyse Docker cloud deployments.

Literature

<https://eclipse-ee4j.github.io/jakartaee-tutorial/>

<https://jakarta.ee/>

<https://microprofile.io/>

<https://www.adam-bien.com/roller/abien/>

Module: 5003812

Data-driven Team Psychology

Module profile

Exam number

5003812

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German/English

Organisation

Responsible lecturer

Prof. Dr. Christina Völkl-Wolf

Lecturer(s)

Urs Merkel

Applicability

BEC, BWI

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

In the Data-Driven Team Psychology module, students learn the data-based collection, analysis and interpretation of psychometric data points. With the help of people interaction mining, both formal and informal data sources are used to visualise information flows, decision-making processes and group dynamics.

A central focus is on informal social network analysis (SNA) in companies, which serves as the basis for designing agile teams - both physical and digital - in a data-driven way. Students deal with people intelligence, a combination of business intelligence and people analytics, in order to manage transformation processes in groups. They also develop the ability to recognise psychometric patterns, analyse group dynamics in a targeted manner and plan and implement data-based interventions to improve team performance.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Colloquium

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German/English

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- systematically collect psychological and sociological dimensions and facets in a data-based manner,
- apply methods of social network analysis and people interaction mining to group processes using suitable (open source) software,
- apply people intelligence as a combination of business intelligence and people analytics in order to manage data-based transformation processes in teams,
- analyse and understand psychometric group dynamics in agile teams and influence them in a targeted manner through data-based interventions,
- evaluate the effectiveness of interventions by measuring effect sizes and feed this back into team management.

Literature

Borgatti, S. P.; Everett, M. G.; Johnson, J. C. (2018): Analysing Social Networks. 2nd edition. SAGE Publications, London.

Pentland, A. (2014): Social Physics: How Social Networks Can Make Us Smarter. Penguin Press, New York.

Pease, A.; Pease, B. (2016): The Definitive Book of Body Language. Bantam, London.

McAfee, A.; Brynjolfsson, E. (2017): Machine, Platform, Crowd: Harnessing Our Digital Future. W. W. Norton & Company, New York.

Current scientific articles and documentation will be announced in the course.

Module: 5003814

Digital Accessibility

Module profile

Exam number

5003814

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Tobias Aubele

Lecturer(s)

Joschi Kuphal

Applicability

BEC, BIN, BWI, BDGD

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Experience in the design and/or development of web applications (HTML, CSS, JavaScript)

Content

The event is divided into theoretical and practical parts, each with a specific focus on digital accessibility:

- Fundamentals of digital accessibility, design and development models
- Types of disabilities, assistive technologies and adaptation strategies
- Types and modes of action of barriers and allocation of responsibilities
- Relevant standards, norms and laws to support accessibility in the national and international environment
- Strategies for implementing accessible design & development processes
- Recognising, reducing and avoiding barriers in digital media: web, documents (e.g. MS Word, MS PowerPoint, PDF, e-book), audio-visual media (e.g. video, audio)
- Conception, design, implementation and testing of accessible web applications
- Setting up and working with screen readers and other assistive technologies

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Students are familiar with various approaches to thinking and design that are associated with accessibility and are aware of their similarities and differences.

- They know the most common types of disabilities and are able to characterise the dominant models in society and science.
- They understand the demographic development and know the most important key figures on disabilities worldwide, in Europe and in Germany.
- You will be able to identify different types of barriers that occur when interacting with digital products. They will be familiar with assistive technologies and adaptation strategies for overcoming these barriers.
- They are familiar with the standards, norms and laws relevant to accessibility at various levels (world, Europe, D-A-CH) and know their interrelationships.
- They have internalised the advantages of accessible design on a personal, social and business level and know strategies for implementing and anchoring accessibility in organisations and development processes.
- They understand the barriers that can occur in various digital media (web, documents, multimedia systems, e-books, apps, software, terminals, etc.) and know principles, techniques and tools for recognising, reducing and avoiding barriers.
- They have in-depth knowledge of the conception, design and implementation of accessible web applications, can evaluate them for accessibility and are familiar with relevant testing tools and methods.
- They have the skills to check, evaluate and correct digital documents for accessibility and to create accessible documents independently.
- They know how to use common screen readers on different platforms and are able to set up a suitable test environment for testing web and other applications.

Literature

- Matuzović, Manuel (2024) - Web Accessibility Cookbook: Creating Inclusive Experiences, O'Reilly
- Kalbag, Laura (2017) - Accessibility for Everyone, A Book Apart
- Silver, Adam (2018) - Form Design Patterns, Smashing
- Pickering, Heydon (2018) - Inclusive Components: The Book, Smashing
- Alexander, Kerstin (2019) - Image & Type: Communicating Accessibly with Typography and Image, Frank & Timme
- Miller, Susi (2021) - Designing Accessible Learning Content, Kogan Page

Module: 5003830

Introduction to SAP Business Technology Platform

Module profile

Exam number

5003830

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Karl Liebstückel

Lecturer(s)

Christian Fink

Applicability

BEC, BIN, BWI

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

SAP user knowledge

Content

- What is SAP Business Technology Platform (SAP BTP)?
- History of SAP BTP
- SAP's strategy in the area of SAP BTP
- How is the BTP structured?
- What services does SAP BTP contain?
- Technical aspects of SAP BTP
- Overview of the areas of application of SAP BTP such as side-by-side extension, clean core, integration, analytics and AI, low-code / no-code
- Reference architectures with without S/4HANA

SAP BTP Customizing

- Basic customising
- Roles and authorisations
- Development of sample applications
 - o A first app in SAP BTP
 - o Configuring the work zone
 - o Clean Core with S/4HANA
 - o Setting up an integration scenario
 - o First integration of Generative AI

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

- 1) Students will be familiar with the basic concepts and definitions of the SAP Business Technology Platform (SAP BTP) and its historical development.
2. understand the strategic importance of SAP BTP and its role in the context of a company's digitalisation strategy.
3. explain the structure and architecture of SAP BTP as well as the services it contains and their functions
4. apply basic customising techniques to adapt SAP BTP to specific application scenarios.
5. students analyse different areas of application of SAP BTP, such as side-by-side extensions, integration and analytics as well as low-code / no-code approaches.
6. students evaluate reference architectures of SAP BTP, including their integration with S/4HANA and the development of integration scenarios.

Literature

SAP Business Technology Platform - Administration, Martin Koch, Siegfried Ziegler, Rheinwerk-Verlag, Bonn 2024, ISBN 978-3-367-10020-0.

SAP Integration Suite, Jan Arensmeyer, Enrico Hegenbart, Rheinwerk-Verlag, Bonn 2024, ISBN 978-3-8362-9933-6

Enterprise Content Management with SAP, Christian Fink, Rheinwerk-Verlag, Bonn 2019, ISBN 978-3-8362-6524-9

Module: 5003851 Ethical Hacking (Blended Intensive Program)

Module profile

Exam number

5003851

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr.-Ing. Tobias Fertig

Lecturer(s)

Prof. Dr.-Ing. Tobias Fertig,

Franziska Königer

Applicability

BIN, BWI, BEC

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

n/a

Recommended prerequisites for the participation in the module

Before the course unit, the learner/student is expected to be able to have basic computer networking, Linux, programming skills and ML/AI basics.

Content

This intensive Ethical Hacking learning programme focuses on ethical hacking techniques and practices. The programme in 2025 is oriented towards network and AI security, and typically covers topics such as attacks on AI systems, penetration testing, vulnerability assessment, IDS, Packet Analysis, various testing and hacking tools, and defensive strategies. Participants can expect hands-on training and real-world simulations to enhance their skills in ethical hacking. Team-based learning approaches will be used. The competition will take place at the end. By the end of the programme, participants should be equipped with the knowledge and tools needed to conduct ethical hacking assessments, identify security weaknesses, and recommend solutions to strengthen cybersecurity defences.

This course will be offered as a Blended Intensive Programme with several online sessions and a study trip to Kaunas, Lithuania.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

n/a

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

n/a

Learning outcomes

- The students explain foundational ethical and legal principles of ethical hacking and organise effective teamwork norms.
- The students justify technical findings in clear oral and written presentations for diverse audiences.
- The students construct a controlled simulation environment (cyber range) to practice and test skills safely.
- The students analyse full packet captures with Wireshark to extract protocols, flows, and indicators.
- The students classify common cybersecurity attacks and select appropriate tools for safe reproduction and analysis.
- The students design basic penetration tests and interpret IDS outputs to assess detection and response.
- The students evaluate vulnerabilities in AI systems and propose defence strategies against adversarial attacks.
- The students plan a continuous-learning roadmap, selecting tools and resources that build knowledge and self-confidence.

Literature

Will be announced during class.

Module: 5003827

Governance, Risk, Compliance and Ethics (FWPM)

Module profile

Exam number

5003827

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Kristin Weber

Lecturer(s)

Prof. Dr. Kristin Weber,

Prof. Dr. Markus Oermann

Applicability

BIN, BWI, BEC

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

ISM Standards & Processes

Content

Many people and units inside and outside organisations are involved in the management of information security. Governance regulates how transparency, accountability and efficiency are ensured by defining structures, responsibilities and framework conditions, while at the same time safeguarding the interests of all stakeholders. This module shows which stakeholders are involved in information security management, how responsibilities are defined, decisions are made and optimal framework conditions for maximum information security are created.

The identification and assessment of IT risks helps organisations to deal with threats to information security in a targeted and structured manner. The risk-oriented approach is pursued in many ISMS frameworks (information security management system). The module teaches the basics of IT risk management, such as measures for identifying, analysing, assessing and handling IT risks in a structured risk management process.

In the section on ethics, essential conceptual foundations of moral philosophy are explained. On the basis of established schools of ethics, the normative justification of (information) security as a value and guiding principle is examined. The consideration of models for the integration of ethical considerations in development and system design processes builds a bridge to the application of ethical principles in practice. Questions of compliance with the applicable data protection law are also of particular relevance here. After an overview of its basic structures, the focus is on the requirements for technical and organisational data protection as well as the enforcement and consequences of legal violations. Finally, the basics of the reformed information security law are explained.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After completing the module, students will be able to

- name and specifically design basic governance mechanisms (e.g. responsibilities, guidelines, decision-making processes, committees) in the context of information security.
- describe relevant roles and stakeholders in information security management within and outside of organisations and differentiate between their tasks.
- explain the importance and function of IT risk management for information security and illustrate this using practical examples.
- identify and describe the organisational framework conditions for effective IT risk management.
- understand, apply and document a simple, structured IT risk management process.
- recognise ethical challenges in dealing with digital systems with security relevance and develop solutions for integrating ethical principles into work processes.
- explain the basic structures of data protection law and answer fundamental questions about data protection compliance.
- describe the main contents of information security law and assess their relevance for operational practice.
- communicate in a targeted manner with legal or regulatory experts on issues relating to data protection and information security law.
- reflect on the relationships between governance, risk and compliance management and ethics in security-critical IT environments.

Literature

Harich, T.: IT-Sicherheitsmanagement: das umfassende Praxis-Handbuch für IT-Security und technische Datenschutz nach ISO 27001. 3rd edition, MITP, 2021.

Johannsen, A.; Kant, D.: IT Governance, Risk and Compliance Management (IT-GRC) - A competence-orientated approach for SMEs. In: HMD - Praxis der Wirtschaftsinformatik, 57, 2020, pp. 1058-1074. <https://doi.org/10.1365/s40702-020-00625-8>

Kersten, H. et al: IT security management according to the new ISO 27001 - ISMS, risks, indicators, controls. 2nd, updated edition, SpringerVieweg, 2020.

Lang, M.; Löhr, H.: IT-Sicherheit - Technologien und Best Practices für die Umsetzung in Unternehmen. 2nd, revised edition, Hanser, 2024.

Lewinski/Rüpke/Eckhardt (2022): Data protection law. 2nd edition. Munich, C.H. Beck.

Module: 5003198

Green IT (Blended Intensive Program)

Module profile

Exam number

5003198

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Peter Braun

Lecturer(s)

Prof. Dr. Peter Braun,

Prof. Dr. Frank-Michael Schleif

Applicability

BIN, BWI, BEC, BISD, BDGD

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

None

Recommended prerequisites for the participation in the module

None

Content

This module explores how sustainability principles can be integrated into the design, development, deployment, and management of IT systems. It offers a multidisciplinary perspective on the environmental, economic, and societal implications of information technology. Through lectures, case studies, and collaborative international projects, students gain both theoretical foundations and practical experience in Green IT strategies. Partnering with universities in the Czech Republic, Germany, and Iceland, the module includes cross-border collaboration and comparative analysis of regional IT sustainability approaches. This module contains a compulsory study trip to Prague, the Czech Republic.

- Introduction to Green IT: Definition, significance, and global relevance; real-world applications in industry and academia
- Environmental Impact of IT: Carbon footprint, e-waste, lifecycle analysis, and Green Computing standards
- Sustainable Software Engineering: Design principles and code optimisation for energy efficiency
- Green Algorithms and Data Structures: Techniques to reduce energy consumption and benchmark software for efficiency
- AI and Machine Learning for Green IT: Optimisation of energy use, environmental monitoring, and ethical implications
- Green IT Strategies in Mobile and Distributed Systems: Sustainable design and management of mobile technologies and data centres
- Life Cycle Assessment (LCA): Application of LCA in IT hardware and software development
- Education and Training for Green IT: Curriculum development, capacity building, and case studies
- Regulatory and Compliance Aspects: Overview of international standards, compliance practices, and green certifications

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

Upon successful completion of this module, students will be able to:

- Remember key concepts and terminology related to Green IT, including sustainability goals, environmental impacts, and regulatory frameworks
- Understand the ecological footprint of hardware and software systems and explain how IT contributes to global sustainability challenges
- Apply principles of sustainable software engineering, energy-efficient algorithms, and lifecycle assessments to practical use cases
- Analyse and compare national and regional Green IT strategies and regulatory approaches across Germany, Iceland, and the Czech Republic
- Evaluate the sustainability impact of IT systems and development practices using recognised metrics and standards
- Create innovative, practical solutions to real-world Green IT challenges by working on interdisciplinary, cross-national projects

Literature

It will be announced in class

Module: 5003849

Low Code Development with Open Source

Module profile

Exam number

5003849

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Michael Müßig

Lecturer(s)

Dietmar Fischer

Applicability

BWI, BEC

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

Digital transformation presents companies with the challenge of efficiently digitalising business processes - often with limited IT resources. Low-code developments can offer a modern and practical solution for this. In this module, students learn how operational applications can be implemented quickly and flexibly with the help of open source tools such as the Frappe Framework - even without in-depth programming knowledge.

The focus of this module is on the practical development of business applications, e.g. for managing customer relationships or internal company communication. By working with an open source tool such as the Frappe Framework, students develop a deeper understanding of the opportunities and challenges of low-code approaches in a corporate context.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Practical study achievement

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Students acquire a basic understanding of the concepts and terms relating to low-code development and open source technologies in a business context. They recognise the importance of such tools for digital transformation in companies and are able to name and describe typical use cases.

In addition, they understand how the Frappe framework works and can use it in a targeted manner to digitally map operational processes. They will be able to analyse simple business processes, design suitable digital solutions and implement them as prototypes using the framework.

Literature

<https://frappe.io/>

Module: 5003815

Media Psychology: The Magic of Media & Entertainment

Module profile

Exam number

5003815

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Christina Völkl-Wolf

Lecturer(s)

Nayomi Polcar

Applicability

BEC, BWI

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

None

Recommended prerequisites for the participation in the module

None

Content

Media psychology deals with traditional media (radio & music, TV & streaming, books, etc.) as well as new media (online and mobile communication, social media, games, etc.). Media psychology attempts to describe and explain human behaviour, actions, thoughts and feelings in connection with the use of media. The module deals with the methods of media psychology, the motivation for the selection of media, as well as media reception and the effects of consumption.

The aim of the module is to convey the psychological principles of media use and to apply them to central issues of media selection, reception and effects. Students learn about theoretical approaches in media psychology and deal with central motives for media choice - such as entertainment, identity work, social connection or the need for information.

A particular focus is on understanding media psychological methods, e.g. experimental designs, reception studies and impact research. In addition, current developments such as media dependency, algorithm-controlled content and the psychology of digital platforms are covered. The module enables students to critically classify media phenomena and analyse them in a psychologically sound manner.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to:

- describe which classical and digital forms of media are considered in media psychology and which psychological issues are associated with them.
- explain how cognitive, emotional and motivational processes influence media usage behaviour.
- analyse which individual and situational factors lead to the selection of certain media formats.
- distinguish which theoretical models of media reception (e.g. uses-and-gratifications, mood management) are useful in which application contexts.
- assess which psychological effects can arise from media consumption - for example in the area of social media, digital games or streaming services.
- develop their own questions or research designs on media effects on the basis of theoretical and methodological principles.
- reflect on the extent to which media experiences can contribute to identity formation, social orientation or emotional regulation.

Literature

Wulf, T., Naderer, B., & Rieger, D. (2023). Media psychology. Nomos.
 Hennighausen, C., Lange, B. P., & Schwab, F. (2024). Evolutionary media psychology. In M. Hammerl, S. Schwarz & K. P. Willführ (Eds.), Evolutionary social sciences. A tour (pp. 83-102). Springer VS. https://doi.org/10.1007/978-3-658-41860-7_5
 Trepte, S., Reinecke, L., Gimmmler, R., Gleich, U., Winter, S., Frischlich, L., Krämer, N., Appel, M., Hutmacher, F., Mengelkamp, C., Stein, J.-P., & Weber, S. (2023). Occupational fields of media psychology. University of Hohenheim. <https://doi.org/10.18724/001c.81580>
 ZHAW Zurich University of Applied Sciences. (2023). JAMESfocus 2023: Mobile phone behaviour and sustainability - current trends. https://www.zhaw.ch/storage/psychologie/upload/forschung/medienpsychologie/james/2023/JAMESfocus_Nachhaltigkeit_Bericht_D.pdf

Module: 6322290

Project-related geovisualization VI (deep sea VR)

Module profile

Exam number

6322290

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Project

Language of instruction

German

Organisation

Responsible lecturer

Stefan Sauer

Lecturer(s)

Stefan Sauer

Applicability

BIN, BWI, BEC

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

Interest in games

Experience with Unreal

Creation of small VR applications

Basic experience with Blender or 3ds max

Content

As part of the module, specific, application-related topics are developed and previously acquired specialist knowledge is applied to specific projects. The design of these modules allows a flexible, contemporary selection of topics as well as interdisciplinary work through the inclusion of other subject areas, e.g:

- Facility Management
- Property and insurance management
- transport logistics
- Telecommunications
- product design

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

none

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Presentation

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

none

Learning outcomes

By participating in the module, students are able to investigate and apply selected topics from the field of geovisualisation using practical examples/exercises, thereby expanding and deepening their knowledge. Participants are able to assess, evaluate and compare the results of the practical work and present them in a topic- and target group-specific manner.

Literature

Varies depending on the project

Module: 5003170

Project Management and Strategic Management

Module profile

Exam number

5003170

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Eva Wedlich

Lecturer(s)

Prof. Dr. Eva Wedlich,
 Manuela Ziegler

Applicability

BEC, BIN, BWI

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

"IT Project Management" or "Project Management" and

"Fundamentals of Economics" or "Fundamentals of Business Administration"

Content

This course consists of a two-day business game "Project Management" (SysTeams by RIVA) and a two-day business game "Strategic Management" (Global Strategy).

Structure:

I. Introduction to FWPM (organisational aspects),

II. part 1: "Project Management" block course

Content: Project management simulation game from SysTeamsProject by Riva.

The simulation game simulates a project management process from initial contact with the client to successful project completion. In small teams, the participants define, plan and control the project and also implement it themselves. Numerous project management tools are available for competent planning, e.g:

- Target plan
- work breakdown structure
- Milestone plan
- Gantt chart
- Project reports
- Risk analyses

The project is divided into several phases in which various project management tasks and work packages have to be completed, taking into account the available resources.

III Introduction "Strategic Management"

IV. Part 2: "Strategic Management" block course

Content: Global Strategy is an intensive general management simulation. Over the course of several rounds, participants develop a successful strategy for their company. The importance of strategic management for the company's success and business interrelationships are recognised and understood.

Contents and procedure:

- Profit and loss account, balance sheet
- Corporate and liquidity planning
- Costing
- Contribution margin accounting
- Cost management
- Break-even analysis
- Financing
- marketing
- Investment appraisal
- Balanced Scorecard
- SWOT analysis
- Value-orientated corporate management
- Investment appraisal
- Balanced Scorecard
- SWOT analysis
- Value-orientated corporate management

V. Review

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

- Students understand the principles and methods required for the effective planning and implementation of projects and for the management of a company.
organisation.
- Students apply the knowledge they have learnt in realistic, simulated projects to gain practical experience.
- Students analyse the results of each phase of the project and each financial year to identify strengths and weaknesses.
- Students evaluate the effectiveness of the implemented strategies in project management and business management based on the simulation results.
simulation results.
- Students develop new strategies for future simulation periods based on the findings from the previous phases.
- Students reflect on their experiences in the simulation in order to set personal and team-related learning goals for future challenges.

Literature

Workbook and explanatory literature will be provided during the course.

Module: 5003826

Social Engineering and Security Awareness

Module profile

Exam number

5003826

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Kristin Weber

Lecturer(s)

Prof. Dr. Kristin Weber,
 Andreas Schütz

Applicability

BIN, BWI, BEC

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

The module Social Engineering and Security Awareness focuses on the human factor of information security. People make a decisive contribution to information security in companies with their behaviour - they are an important security factor. Due to this influence, they are increasingly targeted by cyber criminals. The module primarily looks at these two aspects - security factor and victim - of the human factor in information security.

Information security awareness describes the sensitisation of employees for information security (security factor). The module contains the following contents on awareness:

- Concept and models, psychological understanding of awareness
- Practical examples of awareness measures
- Promoting and measuring awareness

Social engineering is the targeted manipulation of people in order to seduce them into unintentional actions (victims). The following contents, among others, are dealt with in social engineering:

- Basics and forms
- Psychological tricks
- Phishing and phishing simulations

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

Students see people as a solution and not as a problem for information security.

They explain the role of the human factor in information security using examples.

The students know and identify the principles of social engineering and can explain them using examples.

They name different forms of phishing and can discuss the advantages and disadvantages of phishing simulations.

They understand what information security awareness means and know methods to enhance the different aspects of awareness.

Students can create awareness measures in a targeted and individualised way.

Literature

Beißel, S.: Security Awareness, De Gruyter, 2019.

Cialdini, R.: Influence - The Psychology of Persuasion, Collins Business, 2007.

Hadnagy, C. (with Schulman, S.): Human Hacking - Win Friends, Influence People, and Leave Them Better Off for Having Met You, Harper Business, 2021.

Helisch, M.; Pokoyski, D. (eds.): Security Awareness - New Ways to Successfully Sensitise Employees, Vieweg+Teubner, 2010.

Schroeder, J.: Advanced Persistent Training, Apress, 2017.

Verplanken, B. (Ed.): The Psychology of Habit - Theory, Mechanisms, Change, and Context, Springer, 2018.

Weber, K.: Humans and Information Security, Hanser, 2024.

Weber, K.; Schütz, A.; Fertig, T.: Fundamentals and Application of Information Security Awareness, SpringerVieweg, 2019.

Take Aware Sec&Life Magazine, <https://www.take-aware-events.com/news-post/magazinesecandlife>

Module: 6108202

Operating Shop Systems

Module profile

Exam number

6108202

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Rolf Schillinger

Lecturer(s)

Prof. Dr. Rolf Schillinger,

Prof. Dr. Tristan Wimmer

Applicability

BEC

Semester according to SPO

7. semester

Type of module

Concentration module

Required prerequisites for the participation in the module according to the SPO

120 ECTS credits, course 6102410

Recommended prerequisites for the participation in the module

Web Programming I - III, Web Application and Development Systems, Introduction to Web Technologies

Content

In this course, students deal with the lifecycle of a typical e-commerce project by realising the typical tasks along this lifecycle in group projects. This includes in particular

- requirements engineering
- Design of data flows and system architecture
- project management
- Development of a strategy to measure the success of the developed solution

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- Consistently capture and present the requirements of e-commerce projects
- Develop e-commerce projects within the framework of an agile methodology
- Develop and connect suitable logistics concepts
- analyse and assess the performance of existing websites from a business and technical perspective

Literature

Will be announced in the course

Module: 5007212

Mobile and Ubiquitous Design

Module profile

Exam number

5007212

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Karsten Huffstadt

Lecturer(s)

Prof. Dr. Karsten Huffstadt

Applicability

BEC, BIN, BWI

Semester according to SPO

7. semester

Type of module

Concentration module

Required prerequisites for the participation in the module according to the SPO

Course Practical module; 120 ECTS credits

Recommended prerequisites for the participation in the module

none

Content

In the Mobile and Ubiquitous Design module, students develop comprehensive skills in context-sensitive interaction design. The focus is on designing digital products and services that adapt flexibly to mobile usage situations and ubiquitous environments. The user-centred design process encompasses all relevant phases - from analysing the context of use, conception and prototype implementation through to systematic evaluation.

Particular emphasis is placed on the visual, functional and interactive quality of the solution: At the end of the module, students create a fully clickable high-fidelity prototype that realistically simulates central interactions, interface logic and design elements. This is developed using the Figma design tool and embedded in a structured, professionally designed design brochure that documents the usage scenario, the derivation of the design decisions and reflections on the development process. This results in design-based, practical solutions that are both convincing in terms of content and communicable.

Specific contents are

- Design principles of mobile and ubiquitous systems
- Context-sensitive interaction design (location, time, movement, environment)
- Methods of human-centred and participatory design
- UX/UI design for mobile contexts (touch, language, responsive design)
- Wireframing, low-fidelity and high-fidelity prototyping with Figma
- Design and construction of interactive click prototypes
- Usability testing, user testing and feedback integration
- Documentation and visualisation of design processes (structure, style, argumentation)
- Design ethics, accessibility and data protection in ubiquitous systems
- Project work: conception, prototyping and design brochure

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Practical study achievement

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to

- name central terms, interaction patterns and technologies of mobile and ubiquitous systems (to remember)
- explain the special features of mobile usage contexts and their influence on design decisions (to understand)
- use user-centred methods (e.g. personas, scenarios, customer journeys, wireframes) specifically in the design process (to apply)
- capture real-life usage scenarios and technical requirements and systematically translate them into design concepts (to analyse)
- evaluate designed interaction solutions in terms of user-friendliness, context sensitivity, accessibility and feasibility (to evaluate)
- develop context-sensitive application concepts, realise them with Figma as a high-fidelity prototype and document them professionally in a design brochure (to create)

Literature

Rogers, Y., Sharp, H., & Preece, J. (2023). Interaction Design: Beyond Human-Computer Interaction. Wiley

Schmidt, A., & Kranz, M. (2017). Mobile interaction. Oldenbourg

Norman, D. A. (2013). The Design of Everyday Things. Basic Books

Buxton, B. (2007). Sketching User Experiences. Morgan Kaufmann

Kuutti, K., & Bannon, L. (2014). The turn to practice in HCI: towards a research agenda. In CHI '14

Figma Design Tool: <https://www.figma.com>

Module: 6106202

Qualitative and Quantitative User Research

Module profile

Exam number

6106202

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Tobias Aubele

Lecturer(s)

Prof. Dr. Tobias Aubele,

Cornelia Schnell

Applicability

BEC

Semester according to SPO

7. semester

Type of module

Concentration module

Required prerequisites for the participation in the module according to the SPO

Course Practical module; 120 ECTS credits

Recommended prerequisites for the participation in the module

Interface design and usability

online marketing

content engineering

Statistics

Content

Consumer behaviour

Basics of web analytics

Quantitative analysis

- Multivariate statistics, quality measures
- Test theory basics
- Creation of a test design (questionnaire)
- Testing reliability and validity
- Empirical testing of test concepts

Qualitative analysis

- Techniques of qualitative content analysis
- Quality criteria for content analysis
- Usability studies (think aloud; guided interviews)
- Conception and realisation of focus groups and interviews

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

Students will acquire theoretical knowledge of qualitative user research and will apply this in the form of designing, conducting and analysing interviews, surveys and moderated usability studies. They will have understood how quantitative data is collected and analysed, particularly through web analysis and CRM systems. Students know how these systems work and are able to set up a standard web analysis tool including website testing tools themselves, create customised reports and derive well-founded findings from them. The validity and reliability of data is tested for significance using statistical methods.

Quantitative and qualitative user research contributes to the overall learning objectives of e-commerce as follows:

Sound subject knowledge

- Subject-specific specialisations: Tailored idea of methods and technologies to adapt websites and processes to the needs of visitors to the degree programme.
- Interdisciplinary knowledge: Integration or refreshing of knowledge from the courses on online marketing, interface design and usability, content engineering and statistics.

Methodological expertise

- Ability to think logically, analytically and conceptually: The course covers a broad spectrum of both specialised and technical topics. The combination of both requires a high degree of analytical and conceptual thinking.
- Selection and safe application of suitable methods: Approaches and technologies are described for specific use cases in website design and the possible applications are discussed.

Practical experience and professional qualification

- Knowledge of practical tasks: The creation and optimisation of user-centred content and research into underlying consumer needs are core tasks in the field of e-commerce.

Literature

Kroeber-Riel, Werner; Gröppel-Klein, Andrea: Consumer Behaviour, Vahlen, 2013

Sauro, Jeff: Quantifying the User Experience: Practical Statistics for User Research, Morgan Kaufmann, 2012

Bühner, Markus: Introduction to test and questionnaire construction, Pearson, 2010

Sedlmeier, Peter: Research Methods and Statistics for Psychologists and Social Scientists, Pearson, 2013

Mayring, Philipp: Qualitative Content Analysis: Basics and Techniques, Beltz, 2015

Vollmert, Markus; Lück, Heike: Google Analytics: The comprehensive manual. Incl. Google AdWords integration and Google Webmaster Tools, Gallileo, 2014

Module: 5003834

Web-Intelligence

Module profile

Exam number

5003834

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Mario Fischer

Lecturer(s)

Dr.-Ing. Benedikt Kämpgen

Applicability

BEC, BIN, BWI

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

- Methods and technologies for the systematic, preferably automatic collection and evaluation of business-relevant information from the Internet, in particular from the World Wide Web
- Web Intelligence as a type of "data reconnaissance/procurement via the web",
- for better decisions and
- for the development of more useful web applications.
- Practical insights into the following topics:
 - Data analytics (e.g. pivot, OLAP, data warehousing, BigQuery),
 - Web applications (e.g. Low-Code, AppSheet, MediaWiki),
 - Data Lake (e.g. Big Data, NoSQL, Cloud, SaaS, MapReduce),
 - Graph data (e.g. knowledge graph, semantic web, reasoning),
 - Text data (e.g. natural language processing, large language model, ChatGPT),
 - Internet of Things (e.g. sensor, actuator, micro:bit),
 - Artificial intelligence (e.g. machine learning, responsible AI).

Each course consists of approximately 50% lecture and 50% exercise. The contents of the lecture are taught in lectures and presentations. Students are encouraged to study the literature and analyse the content of the topics.

In addition to the lecturer, up to two external speakers will give practical presentations.

In the exercises, students will work together in groups to answer specific questions and work on practical examples. You will need your own laptop or one laptop per group to complete the exercises.

The lecture slides, sample solutions for the exercises and additional material will be made available on the THWS e-learning platform (<https://elearning.fhws.de>).

The portfolio examination form is chosen for the award of credit points. This involves 6-8 portfolio tasks, which students are allowed to solve on predetermined dates in 1-3-page documents.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Portfolio

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

After successfully completing the module, students will be able to:

- Identify appropriate data sources and data on the web and apply analysis tools to compare data.
- Identify systems on the web and apply low-code systems for their own systems.
- Illustrate the problem of big data and apply possible solutions.
- Identify, compare and demonstrate the use of text data and graph data.
- Illustrate the Internet of Things.
- Apply artificial intelligence to data on the web. Discuss further use cases for Artificial Intelligence on the web.

Literature

Jiming Liu, Ning Zhong, Yiyu Yao, and Zbigniew W. Ras. The Wisdom Web: New Challenges for Web Intelligence (WI). Journal of Intelligent Information Systems. 2003.

Tom Heath, and Christian Bizer. Linked Data: Evolving the Web into a Global Data Space. Vol. 1. Morgan & Claypool. 2011.

Sergey Melnik, Andrey Gubarev, Jing Jing Long, Geoffrey Romer, Shiva Shivakumar, Matt Tolton, Theo Vassilakis, Hossein Ahmadi, Dan Delorey, Slava Min, Mosha Pasumansky, and Jeff Shute. Dremel: A Decade of Interactive SQL Analysis at Web Scale. PVLDB. 2020.

Module: 5003145

Web-based UX-projects in finnish-german cooperation

Module profile

Exam number

5003145

Duration

1 semester

Frequency

Irregular

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar

Language of instruction

English

Organisation

Responsible lecturer

Prof. Dr. Tobias Aubele

Lecturer(s)

Prof. Dr. Tobias Aubele

Applicability

BEC

Semester according to SPO

7. semester

Type of module

FWPM

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

English courses

Content

Process:

10 students from Finland and 10 students from Germany (20 students, min. 4 students in one group, 5 groups, 5 topics)

5 days in Finland (Mon-Fri) 3x 8 hours in jan.

3 days in Germany (Mon-Fri) 3x 8 hours in oct.

During this time: (project work collaboration) in each project group

Expected optional involved businesses will be contacted beforehand in Germany and Finland and possible topics discussed. These topics will be eligible in the course starting in Finland.

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Other exam (soP) according to §§ 26, 27 APO

Examination - length/format

Practical study achievement

The concrete length/format of the examination will be determined in the study plan.

Language of examination

English

Condition for the award of credit points

None

Learning outcomes

The students should be able to collaborate in international interdisciplinary groups together. They use different tools for e-collaboration and work on one topic. Finally they present their results at the end of the course.

Literature

to be defined, depending on the topics

Module: 5102120,6102600

Business and IT Law

Module profile

Exam number

5102120,6102600

Duration

1 semester

Frequency

Every winter semester

Credit hours (SWS)

4

ECTS-Credits (CP)

5.0

Workload

Guided study time:

Presence time: 60 hrs

Self-study: 90 hrs

Total: 150 hrs

Teaching format

Seminar-style instruction

Language of instruction

German

Organisation

Responsible lecturer

Prof. Dr. Oliver Ehret

Lecturer(s)

Prof. Dr. Oliver Ehret

Applicability

BEC, BIN

Semester according to SPO

7. semester

Type of module

Compulsory module

Required prerequisites for the participation in the module according to the SPO

none

Recommended prerequisites for the participation in the module

none

Content

General contract law

Special contract law with regard to IT, special types of contracts Basic principles of copyright law

Overview of relevant areas of intellectual property law Internet law

Data protection law

Examination

Required prerequisites for the participation in the examination according to the SPO appendix

None

Examination - type

Written exam (sP) according to § 23 APO

Examination - length/format

90 minutes

The concrete length/format of the examination will be determined in the study plan.

Language of examination

German

Condition for the award of credit points

None

Learning outcomes

1. students know the basic terms and concepts of our legal system and its basic structures.
2. students understand the role of law for computer scientists and the relevance of legal knowledge in the IT sector.
3. students acquire the essential basics of general private and public law and their application in practice.
4. students explain IT legal terms and are able to categorise them in the context of relevant areas of law and contractual areas.
5. students recognise legal risks in the IT sector, are able to assess them and develop strategies to limit them.
6. students develop practical skills in dealing with IT-relevant legal problems, including knowledge of basic types of contracts in the IT sector.
7. students understand the principles of data protection, especially in the IT sector and their significance in an international context.
8. students reflect on the interlinking of computer science, architecture of IT systems, information security and data protection in order to gain a holistic understanding of these topics.

Literature

- o Köhler, German Civil Code, dtv, 89th edition 2022
- o Schneider: IT and Computer Law, 15th edition, Beck dtv, Munich 2022.
- o Kallwass, Abels: Private Law, Verlag Franz Vahlen Munich, 24th edition, 2021
- o Hoeren: IT Contract Law, 2nd edition, Verlag Otto Schmidt, Cologne 2012.
- o Marly: Praxishandbuch Softwarerecht, 7th edition, C.H.Beck, Munich 2018.
- o Härtling: Internetrecht, 7th edition, Verlag Otto Schmidt, Cologne 2022.
- o Hoeren: Skript Internetrecht Uni Münster, as of April 2020
- o Haug: Basic knowledge of internet law, Verlag W. Kohlhammer, 3rd edition, 2016
- o Redeker: IT law, C.H.Beck, 7th edition, 2020
- o Schneider: Handbook, IT law, Otto Schmidt, 5th edition, 2017
- o Kühling, Sack, Hartmann: Data protection law, 5th edition C.F.Müller, 2021