

Master's degree program

International Information Systems

Module handbook—summer semester 2021



(English version below)

Bitte beachten Sie:

Veränderungen des Lehrangebots bedingt durch COVID-19

Nachdem ein Ende der Pandemie im Sommersemester noch nicht absehbar ist, steuert der Fachbereich in der Organisation der Veranstaltungen nach. Hierfür wird das Konzept WiSo-Virtuell, welches als Antwort auf die Corona-Krise entwickelt wurde, in das Konzept WiSo-Virtuell^{plus} überführt.

Die Studierbarkeit aller Studiengänge ist durch die Digitalisierung aller Pflichtmodule gesichert. Darüber hinaus können ausgewählte Lehrveranstaltungen parallel zu digitalen Inhalten mit Präsenzelementen angereichert sein, die auf freiwilliger Basis besucht werden können. Der Wahlbereich wird neben digitalen Angeboten so strukturiert, dass Module in Teilen oder zur Gänze in Präsenzlehre stattfinden.

Die Studierenden können je nach ihren Bedürfnissen und ihrer persönlichen Lebenssituation entscheiden, ob sie digital studieren wollen oder aber an weiteren Angeboten des Präsenzlernens teilnehmen wollen: "Digitales/virtuelles Studium PLUS freiwillige Präsenzveranstaltungen für ausgewählte Lehrveranstaltungen". Vorausgesetzt das Infektionsgeschehen im Laufe des Semesters lässt dies zu.

Die FAU hat eine Corona-Satzung aufgrund von Einschränkungen im Lehr- und Prüfungsbetrieb durch das Corona-Virus SARS-CoV-2 veröffentlicht. Das Modulhandbuch in der vorliegenden Fassung enthält Coronabedingte Änderungen an der Prüfungsform, die in den jeweiligen Modulbeschreibungen gekennzeichnet sind.

Folgende Szenarien sind auf der Grundlage der Corona-Satzung möglich:

Prüfungsformate unverändert

Das ursprünglich vorgesehene Prüfungsformat, z. B. eine Klausur bleibt bestehen. In diesen Modulbeschreibungen wurde keine Änderung vorgenommen.

Einmaliger Wechsel der Prüfungsform im Sommersemester

Der Wechsel der Prüfungsformate ist möglich, wenn die ursprünglich geplante Prüfungsform auf Grund des Corona-Virus nicht umsetzbar ist. Diese Änderungen finden Sie in den Modulbeschreibungen angeführt. Die ursprüngliche Prüfungsform wird bei dieser Variante durchgestrichen, die neue Prüfungsform ist in oranger Schriftfarbe angegeben.

Alternative Prüfungsformen verankern und später darüber entscheiden

Die Satzung sieht eine weitere Option vor. Es können zwei Alternativen festgelegt werden. Die Entscheidung für die eine oder die andere Alternative trifft der Modulverantwortliche und ist den Studierenden spätestens vier Wochen vor der Prüfung bekannt zu geben. Hier bleibt die ursprüngliche Prüfungsform zunächst bestehen, darunter finden Sie die alternative Prüfungsform eingefügt, ebenfalls in oranger Schriftfarbe. Vier Wochen vor der Prüfung wird die finale Prüfungsform durch den Modulverantwortlichen bekannt gegeben.

Im Informationssystem UnivIS finden Sie unter www.univis.fau.de demnächst für alle Veranstaltungen Angaben, in welchem Format (Online, Präsenz oder hybrid Online/Präsenz) die Lehrveranstaltungen abgehalten werden sowie Detailinformationen zum jeweiligen Online-Format bzw. Informationen zu Zeit und Ort.

Ausführlichere Informationen zu den Modulen finden Sie auch in den jeweiligen Kursen auf StudOn. Treten Sie daher unbedingt den Kursen bei, die Sie dieses Semester besuchen möchten.

Weitere aktuelle Informationen entnehmen Sie bitte den Webseiten der Lehrstühle sowie Informationen zum digitalen Semester an der WiSo auch unter www.wiso-virtuell.fau.de

Please note

Changes of the teaching offer due to COVID-19

Since the end of the pandemic is not yet forecastable, the faculty is adjusting the organization of lectures. This is why the concept WiSo-Virtuell, which was developed as an answer to the corona crisis, has now been expanded to the concept WiSo-Virtuell^{plus}.

By digitalizing all compulsory modules, we are able to guarantee that it remains possible to study all of our study programs. Additionally, a selection of lectures will contain on-site teaching elements next to digital contents, which can be attended on a voluntary basis. The electives will be structured in a way that, next to digital offers, parts of lectures or whole lectures can take place on campus.

Students may decide whether they would like to make use of the on-site offers or prefer to continue studying digitally depending on their needs and personal situation: digital/virtual studies PLUS selected voluntary on-site lectures. All on-site offers are of course subject to the current rate of new infections during the semester. Due to the restrictions in our teaching and examination activities caused by the corona virus SARS CoV-2, FAU has published a set of corona regulations. The module handbook in its present version contains changes in the examination method induced by corona, which are marked in the respective module description

Based on the corona regulations, the following scenarios are possible:

Examination method unchanged

The originally intended examination method, e.g., an exam, persists. There are no changes to this module.

One-time change of the examination method in the summer term

Changes in the examination method are possible if the originally intended examination method is not realizable due to the corona virus. These changes can be found in the module description of the respective module. The original examination method is crossed out in this case, the new examination method is marked in orange font color.

Anchor alternative examination method and decide later

The corona regulations allow for a third alternative. It is possible to set two alternative examination methods. The decision on one of the two alternatives is made by the respective responsible person for the module and must be communicated to the students at least four weeks before the examination takes place. In this case, the originally intended examination method remains in place and you will find the alternative examination method written below in orange font color. Four weeks before the examination, the final examination method will be announced by the responsible examiner.

Soon, you'll find detailed information on all lectures' format (online, on-site, or hybrid), as well as date, time, and place on the information system UnivIS, available at www.univis.fau.de.

More extensive information on the modules offered this term can also be found on StudOn. It is essential to join the courses you would like to attend on StudOn.

Further current information can be found on each department's websites, as well as the digital semester platform www.wiso-virtuell.fau.de.

Impressum

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Rechtsbelehrung

Alle Angaben sind ohne Gewähr. Im Zweifelsfall gilt die Master-Prüfungsordnung. Wenden Sie sich bei Fragen bitte direkt an den zuständigen Modulverantwortlichen.

Stand: 29.03.2021

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| | Create your fintech startup (FinTech) | |
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Abkürzungsverzeichnis

ECTS European Credit Transfer System

EK Einführungskurs

Co Courses

h Hours / StundenHS Hauptseminar

Lect. Lecture

MC-Test Multiple-Choice-Test

min Minutes

P Presentation / Präsentation

ProS Proseminar

S Seminar

SS Summer Term / Sommersemester

SWS Time a module will be held per week. One SWS is 45 min /

Semesterwochenstunden

Ü Exercise / Übung

V Lecture / Vorlesung

WS Winter Term / Wintersemester

Hinweis zu Art und Umfang von Prüfungsleistungen

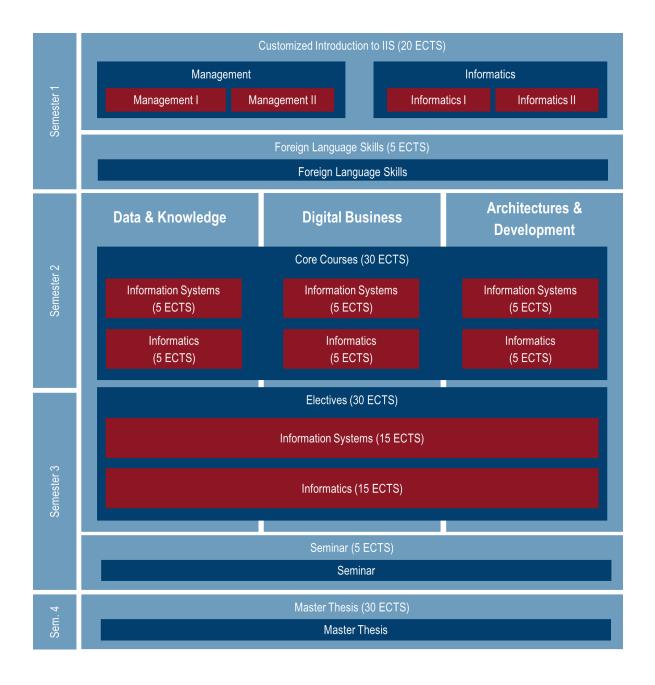
<u>Die Art der am Fachbereich Wirtschaftswissenschaften gültigen Prüfungsleistungen ist definiert in §16 Prüfungsarten der Master-Rahmenprüfungsordnung (MPO). Darüber hinaus sind Prüfungsumfänge in den §§17, 18 MPO geregelt. Die Prüfungsordnungen sind unter folgendem Link einzusehen:</u>

http://www.zuv.fau.de/universitaet/organisation/recht/studiensatzungen/rw.shtml#Wirtschaft

Soweit die einzelnen Modulbeschreibungen nichts Genaueres definieren, sind für die Masterstudiengänge am Fachbereich folgende Prüfungsformen mit den entsprechenden Prüfungsumfängen gültig:

| Pr | Prüfungsart Umfang Master | | | | | | |
|----|--|-----------------------------------|--|--|--|--|--|
| 1. | schriftliche Prüfung: | | | | | | |
| a. | Klausur | 60/90/120 Minuten | | | | | |
| b. | Hausarbeit | ca. 15 Seiten | | | | | |
| C. | Seminararbeit | ca. 15 Seiten | | | | | |
| 2. | mündliche Prüfung | ca. 20 Minuten | | | | | |
| 3. | Sonderformen, insbesondere: | | | | | | |
| a. | Projektarbeit /-bericht | ca. 30 Seiten | | | | | |
| b. | Praktikumsbericht | ca. 4 Seiten | | | | | |
| C. | Thesenpapier | ca. 2 Seiten | | | | | |
| d. | Protokoll | ca. 6 Seiten | | | | | |
| e. | Kurztest | ca. 15 Minuten | | | | | |
| f. | Referat | ca. 25 Minuten | | | | | |
| g. | Präsentation/Präsentationspapier | ca. 20 Minuten/ca. 20 Seiten | | | | | |
| h. | Diskussionspapier | ca. 10 Seiten | | | | | |
| i. | Moderation | ca. 20 Minuten | | | | | |
| j. | Lehrprobe | ca. 45 Minuten | | | | | |
| k. | Fallstudie | ca. 25 Minuten und/oder 10 Seiten | | | | | |
| I. | Diskussionsbeitrag (ehemals: Diskussionsbeteiligung/Mitarbeit) | ca. 10 Minuten | | | | | |
| m. | Portfolioprüfung | k.A. | | | | | |
| n. | Elektronische Prüfung | ca. 90 Minuten | | | | | |
| ο. | Antwort-Wahl-Verfahren | ca. 30 Minuten | | | | | |
| p. | Versuchspersonenstunde | ca. 60 Minuten | | | | | |
| q. | Reflexion | ca. 10 Minuten oder 10 Seiten | | | | | |
| r. | Strategiekonzept | ca. 6 Seiten | | | | | |

Modulübersicht



| Master in International Information Cretama | | | | Sem | ester | |
|--|--------|------|------|------|-------|------|
| Master in International Information Systems | | | 1 | 2 | 3 | 4 |
| | | ECTS | ECTS | ECTS | ECTS | ECTS |
| Customized Introduction to International Information Systems | | | | | | |
| Management I und Management II <u>oder</u> | BWL+WI | 20 | 00 | | | |
| Informatics I und Informatics II | INF | 20 | 20 | | | |
| Foreign Language Skills | | | | | | |
| Foreign Language Skills | NN | 5 | 5 | | | |
| Information Systems | | | | | | |
| Core Courses (Kernbereich)* | WI | 15 | | | | |
| Modulbereich: Data & Knowledge | WI | 5 | 5 | | | |
| Modulbereich: Digital Business | WI | 5 | | 5 | | |
| Modulbereich: Architectures & Development | WI | 5 | | | 5 | |
| Electives (Wahlpflichtbereich)** | WI | 15 | | | | |
| Modulbereich: Data & Knowledge | WI | 0-15 | | 0-15 | 0-15 | |
| Modulbereich: Digital Business | WI | 0-15 | | 0-15 | 0-15 | |
| Modulbereich: Architectures & Development | WI | 0-15 | | 0-15 | 0-15 | |
| Modulbereich: Extension Courses | WI | 0-15 | | 0-15 | 0-15 | |
| Modulbereich: Study Abroad Courses*** | WI | 0-15 | | | 0-15 | |
| Informatics | | | | | | |
| Core Courses (Kernbereich)* | INF | 15 | | | | |
| Modulbereich: Data & Knowledge | INF | 5 | | | 5 | |
| Modulbereich: Digital Business | INF | 5 | | 5 | | |
| Modulbereich: Architectures & Development | INF | 5 | | 5 | | |
| Electives (Wahlpflichtbereich)** | INF | 15 | | | | |
| Modulbereich: Data & Knowledge | INF | 0-15 | | 0-15 | 0-15 | |
| Modulbereich: Digital Business | INF | 0-15 | | 0-15 | 0-15 | |
| Modulbereich: Architectures & Development | INF | 0-15 | | 0-15 | 0-15 | |
| Modulbereich: Extension Courses | INF | 0-15 | | 0-15 | 0-15 | |
| Modulbereich: Study Abroad Courses** | INF | 0-15 | | | 0-15 | |
| Seminar | | | | | | |
| Seminar International Information Systems | WI+INF | 5 | | | 5 | |
| Masterarbeit | | | | | | |
| Master Thesis | WI+INF | 30 | | | | 30 |
| | | | 30 | 30 | 30 | 30 |

^{*} Innerhalb des Kernbereichs müssen pro Modulbereich verpflichtend Module im Umfang von 5 ECTS-Punkten absolviert werden. (Ggf.) Auswahl von Modulen im Wert von 5 ECTS-Punkten gemäß Modulhandbuch. Module, die bereits im Rahmen des Bachelorstudiums oder anderer Modulbereiche des Curriculums absolviert wurden, können wegen des erforderlichen Kompetenzgewinns nicht noch einmal gewählt werden.

Leitfaden zur Stundenplangestaltung

www.wiso.fau.de/pruefungsordnung

Studierende können sich ihren Stundenplan im elektronischen Vorlesungsverzeichnis *univ*is selbst zusammenstellen. Hier sind alle Lehrveranstaltungen semesteraktuell nach bestimmten Themen oder einzelnen Lehrstühlen hinterlegt sowie die jeweiligen Dozierenden einsehbar. Über den Pfad https://univis.fau.de/ >> Vorlesungsverzeichnis >> Rechts- und Wirtschaftswissenschaftliche Fakultät (RW) >> Fachbereich Wirtschaftswissenschaftliche Fakultät (RW) >> Fachbereich Wirtschaftswissenschaften. An dieser Stelle ist es nun möglich, gezielt Bachelor- oder Masterveranstaltungen auszuwählen. Eine Hilfe zur Erstellung des Stundenplans ist hier zu finden: www.wiso.fau.de/stundenplan

^{***} Auswahl von Modulen Im Umfang von 15 ECTS-Punkten gemäß Modulhandbuch. Module, die bereits im Rahmen des Bacheiorstudiums oder anderer Modulbereiche des Curriculums absolviert wurden, können wegen des erforderlichen Kompetenzgewinns nicht noch einmal gewählt werden.
**** In Absprache mit dem Studiengangskoordinator (Learning Agreement) können inhaltlich zum Wahlpflichtbereich passende Veranstaltungen auf Master-Niveau im Umfang von bis zu max. 15 ECTS-Punkten an einer ausländischen Universität erworben werden.
Stand: 31.08.2018. Ohne Gewähr. Änderungen vorbehalten. Die aktuelle Übersicht ist Teil der Prüfungsordnung, die hier zu finden ist:

Please note:

According to section 3 subsection 4 of the examination regulations of the study program M. Sc. International Information Systems as amended on 05.06.2014 students are required to spend at least one semester abroad. Students can go on an exchange semester to a foreign university, do their master's thesis in cooperation with a foreign university or with a company located outside of Germany.

Bitte beachten Sie:

Gemäß § 3 Abs. 4 der Fachprüfungsordnung des Masterstudiengangs International Information Systems in der Fassung vom 05.06.2014 müssen die Studierenden im Verlauf des Studiums mindestens ein Semester im Ausland verbringen. Hierfür kommt ein Studiensemester an einer ausländischen Hochschule, die Masterarbeit an einer ausländischen Hochschule oder die Ausarbeitung der Masterarbeit bei einem Unternehmen im Ausland in Betracht.

| | | Sem. | Sem. | Sem. | Sem. 4 |
|--|------------|-----------|------------------|-----------|--------|
| | ECTS | 1 ECTS | 2 ECTS | 3 ECTS | ECTS |
| Customized Introduction to International Information Systems Management or | 20 | | | | |
| Management I | 10 | | | | |
| Foundations of international management I Foundations of international management II | | 5 5 | | | |
| Management II | 10 | 5 | | | |
| Business strategy | | 5 | | | |
| Global retail logistics <u>or</u> Global operations strategy | | 5 5 | | | |
| Informatics | 20 | 5 | | | |
| Informatics I | 10 | | | | |
| Introduction to Computer Science Informatics II | 10 | 10 | | | |
| Konzeptionelle Modellierung | 10 | 5 | | | |
| Praktische Softwaretechnik or | | 5 | | | |
| Software development in large projects | | 5 | | | |
| Foreign Language Skills Foreign language skills | 5 | | | | |
| Foreign language skills (I+II) | | 5 | | | |
| International Information Systems Management | 45 | | | | |
| Core Courses (Kernbereich) Modulbereich: Data & Knowledge (choose 1 out of 4 options) | 15 5 | | | | |
| Business Intelligence (SS) | | | | | |
| Enterprise Knowledge Management (WS) | | | | | |
| Foundations of Linked Data (SS) Data Analytics for Information Systems (WS) | | | | | |
| Modulbereich: Digital Business (choose 1 out of 3 options) | 5 | | | | |
| Advanced Service Management (SS) | | | | | |
| Digital Change Management (SS) Innovation and Leadership (WS) | | | | | |
| Modulbereich: Architectures & Development (choose 1 out of | 5 | | | | |
| 4 options) | | | | | |
| Designing Technology (WS) Managing enterprise-wide IT Architectures (SS) | | | | | |
| Process Analytics (WS) | | | | | |
| User Experience in a Business Context (WS) | | | | | |
| Electives (Wahlpflichtbereich) Modulbereich: Data & Knowledge | 15 0-15 | | 0-15 | 0-15 | |
| Business Intelligence (SS) | 0-13 | | 0-13 | 0-13 | |
| Enterprise Knowledge Management (WS) | | | | | |
| Foundations of Linked Data (SS) Data Analytics for Information Systems (WS) | | | | | |
| Social and AWI Web Intelligence (WS) | | | | | |
| Platform strategies Strategies (WS) | | | | | |
| Deep Vision Systems Modulbereich: Digital Business | 0-15 | | 0-15 | 0-15 | |
| Advanced Service Management (SS) | 0-15 | | 0-15 | 0-15 | |
| Digital Change Management (SS) | | | | | |
| Innovation and Leadership (WS) | | | | | |
| Create your fintech startup (SS) Praxisseminar Innovative Versich. (SS, WS) | | | | | |
| Digital Transformation Pproject (SS) | | | | | |
| Organizing for Digital Transformation (SS) | | | | | |
| Managing Global Projects + MIT (WS) Service linnovation (SS) | | | | | |
| Patenting for Innovation (PFI) (WS) | | | | | |
| Electronic Human Resources Management (WS) | | | | | |
| Judgment in Decision Making and eb. Management (SS) Modulbereich: Architectures & Development | 0-15 | | 0-15 | 0-15 | |
| Designing Technology (WS) | | | | | |
| Managing enterprise-wide IT Architectures (SS) | | | | | |
| Process Analytics (WS) User Experience in a Business Context (WS) | | | | | |
| Advanced Process Management (WS) | | | | | |
| Case Solving Seminar (WS, SS) | | | | | |
| Designing Gamified Systems Modulbereich: Extension Courses | 0-15 | | 0-15 | 0-15 | |
| Deep Vision Systems | | | 3 .0 | 3.0 | |
| Designing Gamified Systems | | | | | |

| - | | Sem. | Sem. | Sem. | Sem. |
|--|-------------------|------|------|------|------|
| | | 1 | 2 | 3 | 4 |
| | ECTS | ECTS | ECTS | ECTS | ECTS |
| Informatics Core Courses (Kernbereich) | 15 | | | | |
| Modulbereich: Data & Knowledge (choose 1 out of 4 options) | 5 | | | | |
| Data Warehousing + Transaction Systems (LS Inf 6, SS) | | | | | |
| Informationsvisualisierung (LS Inf 9, WS) | | | | | |
| Introduction to pattern recognition (LS Inf 5, WS) NYT-VUE (OSR, WS) | | | | | |
| Modulbereich: Digital Business (choose 1 out of 2 options) | 5 | | | | |
| COSS (WS) | | | | | |
| Human Computer Interaction (LS Inf 5, SS) | _ | | | | |
| Modulbereich: Architectures & Development (choose 1 out of 3 options) | 5 | | | | |
| SWE-GL-Konstr + Ü (SS) | | | | | |
| POIS (SS) | | | | | |
| SPM (WS) | | | | | |
| Electives (Wahlpflichtbereich) Modulbereich: Data & Knowledge | 15 0-15 | | 0-15 | 0-15 | |
| Informationsvisualisierung (LS Inf 9, WS) | 0-15 | | 0-15 | 0-15 | |
| NYT-VUE (OSR, WS) | | | | | |
| NYT-PROJ (OSR, WS) | | | | | |
| Middleware – Cloud computing (LS Inf 4, WS) | | | | | |
| Simulation and modeling I (LS Inf 7, WS) Simulation and modeling II (LS Inf 7, SS) | | | | | |
| Introduction to pattern recognition (LS Inf 5, WS) | | | | | |
| Pattern recognition (LS Inf 5, WS) | | | | | |
| Applied visualization (LS Inf 9, SS) | | | | | |
| Künstliche Intelligenz I (WS) Künstliche Intelligenz II (SS) | | | | | |
| Deep Learning (LS Inf 5, WS) | | | | | |
| Pattern Analysis (LS Inf 5, SS) | | | | | |
| Modulbereich: Digital Business COSS-UE (WS) | 0-15 | | 0-15 | 0-15 | |
| Human Computer Interaction (LS Inf 5, SS) | | | | | |
| AMOS-PO (SS) | | | | | |
| ES + DS (LS Inf 1, WS & SS) | | | | | |
| HumSecPri+ Ü (LS Inf 1, SS) Forensische Informatik (LS Inf 1, SS) | | | | | |
| Cryptocurrencies (SS) | | | | | |
| Foundations of Cryptocurrencies (SS) | | | | | |
| EinflTSec + Ü (LS Inf 1, WS) | | | | | |
| IT-Modernisierung (LS Inf 5, SS) Inno-Labor (SS, WS) | | | | | |
| Modulbereich: Architectures & Development | 0-15 | | 0-15 | 0-15 | |
| SWE-GL-Konstr + Ü (SS) | | | | | |
| POIS (SS) | | | | | |
| SPM (WS) Fehlertol. Softwarearchitekturen (WS) | | | | | |
| OSS_PROJ (SS) | | | | | |
| ARCH (SS) | | | | | |
| AMOS-SD (SS) | | | | | |
| TSWS (SS) OOAD (SS) | | | | | |
| ADAP (WS) | | | | | |
| SoSy3 + Ü (WS) | | | | | |
| SWE-ZUV (SS) | | | | | |
| SWE-GL + Design Patterns (SS) SWE-GL + SWE-PR (SS) | | | | | |
| SWE-PR + Design patterns (SS) | | | | | |
| SWE-VV + Ü (WS) | | | | | |
| SWE-PR + Krypto (WS) | | | | | |
| EBTEIS (WS) OSS-SEMI | | | | | |
| Modulbereich: Extension Courses | 0-15 | | 0-15 | 0-15 | |
| Verteilte Systeme (LS Inf 4, SS) | | | | | |

Rechnerkommunikation (LS Inf 7, SS)

Kommunikationssysteme (LS Inf 7, WS)

Dienstgüte von Kommunikationssystemen (LS Inf 7, SS) Fahrzeugkommunikation (LS Inf 7, SS) Smart grids und Elektromobilität (LS Inf 7, SS)

MOSES (LS Inf 7, WS)

| Modulbereich: Study Abroad Courses | 0-15 | 0-15 |
|---|------|------|
| Seminar International Information Systems | | |
| Seminar International Information Systems | 5 | 5 |
| (choose one out of four options) | | |
| 1 (00 140) | | |

Interdisciplinary business seminar (SS, WS)

Nailing your Thesis (NYT) (WS)

Value co-creation seminar (SS)

Research seminar on data management (SS, WS)

Digitalization of work and life (SS)

IoTISS (SS, WS)

UX research (SS)

Designing Information Systems for Behaviour Change (SS)

| Doorgining information Cyclomic for Donation Chair | 90 (00) | | | | |
|--|---------|----|----|----|----|
| Master Thesis | | | | | |
| Master Thesis | 30 | | | | 30 |
| | | | | | |
| | 120 | 30 | 30 | 30 | 30 |

I Specializations / Schwerpunktbereiche

Please note:

Students starting from the **winter term 2016/17** can choose to study specialisations. Specializations are combinations of related modules in which a minimum of 20 ECTS are to be completed. If a module is allocated to more than one specialisation students may decide themselves which specialisation it is to be allocated to. Within a specialization, at least one module (5 ECTS) from the area Information Systems and one module (5 ECTS) from the area Informatics has to be chosen. Upon request, students may receive written confirmation of up to two specialisations that they have studied. The five available specialisations and their respective modules are the following:

Bitte beachten Sie:

Studierende mit Studieneintritt ab dem Wintersemester 2016/17 können Schwerpunktbereiche studieren. Schwerpunktbereiche sind inhaltlich zusammenhängende Module, in denen mindestens 20 ECTS zu erwerben sind. Bei Zuordnung eines Moduls zu mehreren Schwerpunktbereichen können die Studierenden selbst festlegen, welchem Schwerpunktbereich ein Modul zugeordnet wird. In einem Schwerpunktbereich muss mindestens ein Modul (5 ECTS) aus dem Bereich Information Systems und mindestens ein Modul (5 ECTS) aus dem Bereich Informatics gewählt werden. Auf Antrag werden bis zu zwei Schwerpunktbereiche in einer Bescheinigung aufgeführt, wenn sie studiert wurden. Die fünf Schwerpunktbereiche und deren Module sind wie folgt aufgebaut:

Business Analytics

Veranstaltungen zur Verwaltung, Speicherung und Analyse von (Big) Data in Unternehmen, Ergebnisvisualisierung und Anwendungsszenarien.

| Modul | Semester | Sprache | ECTS | Bereich |
|-------------------------------------|----------|-------------------------|------|---------------------|
| Business Intelligence | SS | Englisch | 5 | Information Systems |
| | SS | Deutsch und Englisch | 5 | Informatics |
| <u>Informationsvisualisierung</u> | WS | Deutsch | 5 | Informatics |
| Applied visualization | SS | Englisch | 5 | Informatics |
| Introduction to pattern recognition | WS | Englisch | 5 | Informatics |
| Pattern recognition | WS | Englisch | 5 | Informatics |
| Pattern analysis | SS | Englisch | 5 | Informatics |
| Deep Learning | SS + WS | Englisch | 5 | Informatics |
| Social and web intelligence | WS | Englisch | 5 | Information Systems |
| Process analytics | WS | Englisch | 5 | Information Systems |
| Foundations of linked data | SS | Englisch | 5 | Information Systems |

Enterprise Architecture

Veranstaltungen zur Gestaltung von Strukturen im Unternehmen durch IT-Unterstützung (Softwarearchitekturen) sowie auf strategischer Ebene (Unternehmensarchitekturen)

| Modul | Semester | Sprache | ECTS | Bereich |
|--|----------|--------------------------|------|---------------------|
| Advanced process management | WS | Englisch | 5 | Information Systems |
| Fundamentals of enterprise-wide IT architecture management | SS | Englisch | 5 | Information Systems |
| Designing technology | WS | Englisch | 5 | Information Systems |
| Process-oriented information systems | SS | Englisch | 5 | Informatics |
| E-Business Technologies + Evolutionäre Informationssysteme | WS | Deutsch | 5 | Informatics |
| Software architecture | SS | Deutsch | 5 | Informatics |
| Fehlertolerante Softwarearchitekturen | WS | Deutsch oder Englisch | 5 | Informatics |

Networked Business

Veranstaltungen zur Organisation und Verwaltung technischer Netzwerke im Unternehmen sowie der strategischen Vernetzung mit Kunden und Partnern

| Modul | Semester | Sprache | ECTS | Bereich |
|--|----------|----------|------|---------------------|
| Advanced service management | SS | Englisch | 5 | Information Systems |
| Platform strategies | WS | Englisch | 5 | Information Systems |
| Managing global projects + managing information technologies | WS | Englisch | 5 | Information Systems |

| <u>Verteilte Systeme</u> | SS | Deutsch | 5 | Informatics |
|--|----|----------|---|-------------|
| Rechnerkommunikation | SS | Deutsch | 5 | Informatics |
| <u>Kommunikationssysteme</u> | WS | Deutsch | 5 | Informatics |
| <u>Dienstgüte von Kommu-</u> <u>nikationssystemen</u> | SS | Deutsch | 5 | Informatics |
| Free, Libre and Open-Source software | SS | Englisch | 5 | Informatics |

Digital Transformation

Veranstaltungen zur Organisation und kontinuierlichen Entwicklung neuer Geschäftsmodelle und Informationstechnologien

| Modul | Semester | Sprache | ECTS | Bereich |
|--|--------------|----------|------|---------------------|
| Organizing for digital transformation | SS | Englisch | 5 | Information Systems |
| Innovation and leadership | WS | Englisch | 5 | Information Systems |
| Managing global projects + Managing information technologies | WS | Englisch | 5 | Information Systems |
| Praxisseminar: Innovative Versicher- ungsprodukte | WS und SS | Deutsch | 5 | Information Systems |
| Digital change management | SS | Englisch | 5 | Information Systems |
| E-Business Technologies + Evolutionäre Informationssysteme | WS | Deutsch | 5 | Informatics |
| Human computer interaction | SS | Deutsch | 5 | Informatics |
| IT-Modernisierung | SS | Deutsch | 5 | Informatics |
| Free, Libre and Open-Source software | SS | Englisch | 5 | Informatics |

Software Product Management

Veranstaltungen zur Organisation und Durchführung interner Marktanalysen sowie externer Vermarktungsstrategien in der Software-Produktentwicklung.

| Modul | Semester | Sprache | ECTS | Bereich |
|--|----------|--------------------------|------|-------------|
| Software project management | WS | Deutsch | 5 | Informatics |
| Commercial Open Source Startups / Product Management | WS | Englisch | 5 | Informatics |
| Praktische Softwaretechnik | WS | Deutsch oder Englisch | 5 | Informatics |
| The AMOS project | SS | Englisch | 5/10 | Informatics |

II Customized Introduction (20 ECTS)

Depending on their previous field of study, students take **one** of these two options. The option will be assigned and cannot be chosen by the student.

- Students with a background in computer science and students with a background in business information systems must take the "Management" option.
- Students with management background are required to study "Informatics".

Je nach Vorbildung belegen die Studierenden eine der zwei folgenden Optionen. Die Option wird den Studierenden zugeteilt und ist nicht frei wählbar.

- Studierende mit Grundkenntnissen in Wirtschaftsinformatik oder Informatik belegen die Module im "Management" Bereich.
- Studierende, die BWL Grundkenntnisse haben, belegen die Option "Informatics".

Management Introduction (20 ECTS)

Management I (10 ECTS)

Foundations of international management I (FIM I)

| 1 | Module name MIBS-53710 | Foundations of international management I | 5 ECTS |
|---|--|---|--------|
| 2 | Courses/lectures IIS37101 IIS37102 | Lect 1/S 1: Foundations of international management I (3 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Holtbrügge and assistants | P |

| 4 | Module coordinator | Prof. Holtbrügge |
|----|-----------------------------------|---|
| 5 | Contents | Environment of International Management: History and Major Trends Theoretical and Conceptual Foundations of International Management Theories of Internationalization Strategic management in International Corporations |
| 6 | Learning objectives and skills | The participants understand and analyze typical management problems of international firms. The participants will get to know modern theories and methods of international management and will be able to apply these to practical problems. They get a detailed overview of the current state of international management research and are able to evaluate theoretical and empirical studies in this area critically. |
| 7 | Recommended prerequisites | English language proficiency (C1) |
| 8 | Integration in curriculum | First semester |
| 9 | Module compatibility | Master in International Information Systems: Module in the section Customized Introduction to IIS (Management) (ab 2016/17 + 2018/19) Master IBS: core course (Pflichtbereich) Master Marketing: Wahlpflichtbereich der Modulgruppe "Management" Master Sozialökonomik: freier Vertiefungsbereich sowie im Pflichtbereich "Spezielle BWL" Master Arbeitsmarkt und Personal: Wahlbereich Master Economics: Wahlbereich Master Management: Vertiefungsbereich |
| 10 | Method of examination | Discussion paper and Presentation |
| 11 | Grading procedure | Discussion paper (80%) and Presentation (20%) |
| 12 | Module frequency | Each winter term |
| 13 | Workload | Contact hours: 45 h Independent study: 105 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examination language | English |
| 16 | (Recommended) reading | Holtbrügge, D. & Welge, M.K. (2020). International Management. Mimeo, Nürnberg (chapters 1-4). Holtbrügge, D. & Haussmann, H. (eds.) (2017). Internationalization Strategies of Firms. Case Studies from the Nürnberg Metropolitan Region. 2 nd edition. Augsburg-München: Hampp. |

| 1 | Module name MIBS-53720 | Foundations of international management II | 5 ECTS | |
|----|-----------------------------------|--|--|--|
| 2 | Courses/lectures | Lect/S: Foundations of international management II (3 SWS) | 5 ECTS | |
| 3 | Lecturers | Prof. Holtbrügge and assistants | | |
| 4 | Module coordinator | Prof. Holtbrügge | | |
| 5 | Contents | Foundations of International Management II: 1. Organization of International Corporations 2. Human Resources Management in International Corporations 3. Public Affairs Management in International Corporations | | |
| 6 | Learning objectives and skills | The participants understand and analyze typical management problems of international firms. The participants will get to know modern theories and methods of international management and will be able to apply these to practical problems. They get a detailed overview of the current state of international management research and are able to evaluate theoretical and empirical studies in this area critically. | | |
| 7 | Recommended prerequisites | Successful attendance of Foundations of International Manager English language proficiency (C1) | Successful attendance of Foundations of International Management I English language proficiency (C1) | |
| 8 | Integration in curriculum | First semester | First semester | |
| 9 | Module compatibility | Master in International Information Systems: Module in the section Customized Introduction to IIS (Management) (ab 2016/17 + 2018/19) Master IBS: core course (Pflichtbereich) Master Management: Vertiefungsbereich Master Marketing: Wahlpflichtbereich der Modulgruppe "Management" Master Sozialökonomik: freier Vertiefungsbereich oder im Pflichtbereich "Spezielle BWL" Master Arbeitsmarkt und Personal: Wahlbereich Master Economics: Wahlbereich | | |
| 10 | Method of examination | Discussion paper and Presentation | | |
| 11 | Grading procedure | Discussion paper (80%) and Presentation (20%) | | |
| 12 | Module frequency | Each winter term | | |
| 13 | Workload | Contact hours: 45 h Independent study: 105 h | | |
| 14 | Module duration | 1 semester | | |
| 15 | Teaching and examination language | English | | |
| 16 | (Recommended) reading | Holtbrügge, D. & Welge, M.K. (2020): International Managemer Nürnberg (chapters 5, 6 & 8). Holtbrügge, D. & Haussmann, H. (eds.) (2017). Internationalizatigies of Firms. Case Studies from the Nürnberg Metropolitan Reedition. Augsburg-München: Hampp. | tion Strate- | |

Management II (10 ECTS)

The module "Management II" comprises two parts:

- Part 1: The course "Business strategy" is mandatory.
- Part 2: Students have to take either "Global retail logistics" (Option 1) or
 "Global operations strategy" (Option 2).
- Das Modul "Management II" besteht aus zwei Teilen:
 - Teil 1: Die Lehrveranstaltung "Business strategy" ist verpflichtend.
 - **Teil 2**: Die Studierenden belegen entweder die die Vorlesung "Global retail logistics" (Option 1) <u>oder</u> "Global operations strategy" (Option 2).

Business strategy

| 1 | Module name MIM-53410 | Business strategy | 5 ECTS |
|---|--------------------------|--------------------------------|--------|
| 2 | Courses/lectures | L/P: Business strategy (3 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Junge and assistants | |

| 4 | Module coordinator | Prof. Junge / Prof. Hungenberg |
|----|--------------------------------|--|
| 5 | Contents | This course focuses on selected theories, concepts and tools of strategic management. It is concerned with formulation and implementation of strategies, focusing on the business level of strategy. At business level, customer value and competitive advantage are the central issues. In this context, the digital transformation triggers digital business models, such as platform strategies or other related disruptive innovations. Therfore, the digital transformation is a central focus of this course. The course uses a combination of lectures, discussions and case studies in order to provide the analytic and conceptual foundations for making strategic decisions at business level. |
| 6 | Learning objectives and skills | By the end of the course, students can appreciate the need for a comprehensive approach to strategy making and they are aware of top management's role in setting the direction of a company. Students develop knowledge of theories, concepts and tools of business strategy and they develop an understanding of the application of concepts and tools to real life cases. |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | First semester |
| 9 | Module compatibility | Master IBS: core course (Pflichtbereich) Master in International Information Systems (ab 2018/19): Module in the section Customized Introduction to IIS (Management II) Master Management: Pflichtbereich I Master Wirtschaftspädagogik, Studienrichtung I: fachwissenschaftlicher Pflichtbereich; Studienrichtung II: fachwissenschaftlicher Wahlbereich Master International Production Engineering and Management: Interdisziplinäre IEM Master Wirtschaftsingenieurwesen: Wahlbereich |
| 10 | Method of examination | Written examination (60 min.) |

| 11 | Grading procedure | Written examination result (100%) |
|----|--|---|
| 12 | Module frequency | Winter term |
| 13 | Workload | Attendance: 45 h Self-study: 105 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | English |
| 16 | (Recommended) reading | Hungenberg, H.: Strategisches Management in Unternehmen, 8. Ed., Wiesbaden 2014 Dess, G., McNamara, G., Eisner, A.: Strategic management, 8. Ed., Maidenhead 2016 |

Global operations strategy

| 1 | Module name MIM-53650 | Global operations strategy | 5 ECTS |
|---|--------------------------|---------------------------------------|--------|
| 2 | Courses/lectures | S: Global operations strategy (2 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Voigt and research assistants | |

| 4 | Module coordinator | Prof. Voigt |
|----|--------------------------------|---|
| 5 | Contents | During the past decades, operations have become increasingly international or even global in nature. Drivers of the globalization include increased competitiveness through offshore manufacturing and global sourcing. During this module, the increasing complexity and the challenges of operations on a global scale will be discussed together with the participants. The theory modules at the beginning structure the options of a general operations strategy and illustrate its implementation in the organization. The subject specific modules, elaborated by the participants, enable a profound understanding of single activity areas of global operations and their relation to the global operations strategy. Therewith the students will get insights in the importance of an integrated global operations strategy and will become familiar with the main strategic options in this field. |
| 6 | Learning objectives and skills | Participation in the first seminar session is mandatory, as the topics for the teamwork are chosen during this session by the participants. In the following weeks, based on own research using scientific sources, key topics are elaborated in teams. Following predefined learning targets, the students need to structure the elaborated content in an academic presentation and present their results in class. Thereby, the teams are responsible for developing a didactic concept in order to support the understanding of the discussed topics. Furthermore, the participants are required to document their research method as well as their results. After the course, the participants are able to discuss the functions and impact of operations management in an international context. |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | First semester |
| 9 | Module compatibility | Master IBS: core course (Pflichtbereich) Master Management: Vertiefungsbereich Master Marketing: Wahlpflichtbereich der Modulgruppe "Management" Master Sozialökonomik: freier Vertiefungsbereich oder im Pflichtbereich "Spezielle BWL" Master Arbeitsmarkt und Personal: Wahlbereich Master Economics: Wahlbereich Master in International Information Systems (ab 2018/19): Module in the section Customized Introduction to IIS (Management II) |
| 10 | Method of examination | Written examination 60 min. (Klausur, 60 Min.); Presentation (group presentation) (around three to five minutes per participant) |
| 11 | Grading procedure | Written examination (50%), Presentation (50%) |

| 12 | Module frequency | Winter Term (WS) All participants have to register in advance on StudOn! The registration for GOS on StudOn starts mid-September. The number of participants is limited to 60. |
|----|-----------------------------------|---|
| 13 | Workload | Attendance: 30 h Self-study: 120 h |
| 14 | Module duration | 1 term |
| 15 | Teaching and examination language | English |
| 16 | (Recommended) reading | Abele, E. et al. (2008): Global Production. A Handbook for Strategy and Implementation. Berlin: Springer. Reid, R. D. & Sanders N. R. (newest ed.): Operations Management. Hoboken: Wiley & Sons. Slack, N. & Lewis, M. (newest ed.): Operations Strategy. Harlow: Prentice-Hall. |

Global retail logistics

| 1 | Module name MIM-55291 | Global retail logistics | 5 ECTS |
|---|--------------------------|--------------------------------------|--------|
| 2 | Courses/lectures | L/E: Global retail logistics (4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Hartmann and assistants | |

| 4 | Module coordinator | Prof. Hartmann | |
|---|--------------------------------|---|--|
| 5 | Contents | This e-learning course offers specific insights on the logistic processes in the global retail industry. Upon completion of the course, the students should understand the peculiarities of logistics for fast moving consumer goods. | |
| | | Every module consists of an interactive lecture and script. Additional material and exercises enhance the presented topics further. As the entire lecture, the readings, the additional material and the exam is in English, proficiency in German is not necessary. | |
| | | The course is supposed to provide the students with the following content concerning the global retail industry: • Module 1: Overview of global retail logistics • Module 2: Characteristics & Basics | |
| | | Module 3: Trends & Challenges Module 4: PoS Logistics Module 5: Interfaces | |
| | | Module 6: Load units & transport logistics Module 7: Cross docking Module 8: Warehousing & distribution | |
| | | Module 9: Food Supply ChainModule 10: Sustainability in the Supply Chain | |
| 6 | Learning objectives and skills | The following learning objectives are anticipated: | |
| | | You will be able to define the topic of retail logistics and describe its specific requirements. | |
| | | You will be able to report the retail industry specific peculiarities relating to | |
| | | the usage of logistics processes. You will be able to use the relevant methods of planning, controlling and | |
| | | monitoring of logistics processes in the retail industry. You will be able to analyse various retail-specific characteristics in the use of logistics processes and assess their application in a practical context. You will be able to apply the most important principles of global retail logistics, to manage logistic processes while solving the questions of supply, distribution, transport and storage of goods. | |
| | | You will be able to work creatively, generate new ideas, and solve problems regarding retail logistics in an international context, international interaction and cooperation, while accepting social and ethical responsibility. You will be able to manage, organise and discipline yourself, and plan your time independently. | |

| | | You will be able to demonstrate the ability to engage in critical thinking by analysing complex situations thus concluding and selecting viable solutions to solve problems. |
|----|--|--|
| 7 | Recommended prerequisites | English language proficiency (C1) Produktions- und Supply Chain Management Registration via vhb (www.vhb.org) is necessary in order to gain access to the StudOn e-learning platform. |
| 8 | Integration in curriculum | First semester |
| 9 | Module compatibility | Master in International Information Systems (ab 2018/19): Module in the section Customized Introduction to IIS (Management II) Master Management: Vertiefungsbereich Master Economics: Wahlbereich Master Wirtschaftsingenieurwesen: Wahlpflichtbereich |
| 10 | Method of examination | Written examination (60 min., partly with single choice) |
| 11 | Grading procedure | Written examination (100%) |
| 12 | Module frequency | Every semester |
| 13 | Workload | Presence hours: 1 h Self-study: 149 h |
| 14 | Module duration | 1 Semester |
| 15 | Teaching and examina- tion language | English |
| 16 | (Recommended) reading | Will be announced during the course |

Informatics introduction (20 ECTS)

Informatics I (10 ECTS)

| 1 | Module name IIS57019 | Informatics I | 10 ECTS |
|----|--|---|------------------|
| 2 | Courses/lectures | L: Introduction to Computer Science (4 SWS) E: Problem set exercises (2 SWS) | 5 ECTS 5 ECTS |
| 3 | Lecturers | Prof. Andreas Harth, Prof. Martin Matzner and assistants | |
| 4 | Module coordinator | Prof. Martin Matzner | |
| 5 | Contents | Concepts like: abstraction & encapsulation Foundations of programming Programming in languages C and Python Web programming with HTML, CSS, SQL and JavaSo Basics of algorithms & data structures | cript |
| 6 | Learning objectives and skills | The students understand the foundations of programming the functional principle of programs to abstract and solve problems algorithmically the basics of web programming | |
| 7 | Recommended prerequisites | None | |
| 8 | Integration in curriculum | First semester | |
| 9 | Module compatibility | Master in International Information Systems: Module in the section Custom-ized Introduction to IIS (Informatics) | |
| 10 | Method of examination | 120-minute written examination (Klausur (120 min)) | |
| 11 | Grading procedure | 100% of module score (Lect.: 100 % der Modulnote) | |
| 12 | Module frequency | Each WS | |
| 13 | Workload | Contact hours: 60 h Independent study: 240 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examina- tion language | English | |
| 16 | (Recommended) reading | Perry G., Miller D: C Programming Absolute Beginner's Guide White, R.: How Computers Work, 10. Ed., 2014 Kochan S.G.: Programming in C, 4 Ed. | , 3. Ed, 2014 |

Informatics II (10 ECTS)

- The module "Informatics II" comprises two parts:
 - Part 1: The course "Konzeptionelle Modellierung" (lecture and exercise) is mandatory.
 - Part 2: Students have to take either "Praktische Softwaretechnik" (Option 1) or
 "Software Development in Large Projects" (Option 2).
- Das Modul "Informatics II" besteht aus zwei Teilen:
 - Teil 1: Die Lehrveranstaltung "Konzeptionelle Modellierung" (Vorlesung und Übung) ist verpflichtend.
 - **Teil 2**: Die Studierenden belegen entweder die die Vorlesung "Praktische Softwaretechnik" (Option 1) <u>oder</u> "Software Development in Large Projects" (Option 2).

Informatics II part 1

| 1 | Modulbezeichnung IIS57026 | Informatics II (Teil 1) | 5 ECTS |
|---|---------------------------------|--|----------------------|
| 2 | Lehrveranstaltungen IIS31301 | V: Konzeptionelle Modellierung (2 SWS) Ü: Konzeptionelle Modellierung (2 SWS) | 2,5 ECTS 2,5 ECTS |
| 3 | Lehrende | Prof. Lenz | |

| 4 | Modulverantwortliche/r | Prof. Lenz |
|---|------------------------------|---|
| 5 | Inhalt | Die Vorlesung behandelt die folgenden Themen: 1. Grundlagen der Modellierung 2. Datenmodellierung am Beispiel Entity-Relationship-Modell 3. Modellierung objektorientierter Systeme am Beispiel UML 4. Relationale Datenmodellierung und Anfragemöglichkeiten 5. Grundlagen der Metamodellierung 6. XML 7. Multidimensionale Datenmodellierung 8. Domänenmodellierung und Ontologien |
| 6 | Lernziele und Kompetenzen | Die Studierenden: definieren grundlegende Begriffe aus der Datenbankfachliteratur erklären die Vorteile von Datenbanksystemen erklären die verschiedenen Phasen des Datenbankentwurfs benutzen das Entity-Relationship Modell und das erweiterte Entity-Relationship Modell zur semantischen Datenmodellierung unterscheiden verschiedene Notationen für ER-Diagramme erläutern die grundlegenden Konzepte des relationalen Datenmodells bilden ein gegebenes EER-Diagramm auf ein relationales Datenbankschema ab erklären die Normalformen 1NF, 2NF, 3NF, BCNF und 4NF definieren die Operationen der Relationenalgebra erstellen Datenbanktabellen mit Hilfe von SQL lösen Aufgaben zur Datenselektion und Datenmanipulation mit Hilfe von SQL erklären die grundlegenden Konzepte der XML erstellen DTDs für XML-Dokumente benutzen XPATH zur Formulierung von Anfragen an XML-Dokumente definieren die grundlegenden Strukturelemente und Operatoren des multidimensionalen Datenmodells erklären Star- und Snowflake-Schema |

| | | benutzen einfache UML Use-Case Diagramme benutzen einfache UML-Aktivitätsdiagramme erstellen UML-Sequenzdiagramme erstellen einfache UML-Klassendiagramme erklären den Begriff Meta-Modellierung definieren den Begriff der Ontologie in der Informatik definieren die Begriffe RDF und OWL |
|----|--|--|
| 7 | Empfohlene Voraussetzungen für die Teilnahme | Gewünscht "Algorithmen und Datenstrukturen" und "Grundlagen der Logik und Logikprogrammierung" |
| 8 | Einpassung in Musterstudienplan | 1. Semester |
| 9 | Verwendbarkeit des Moduls | Bachelor Wirtschaftsinformatik Bachelor Informatik Bachelor IuK Master International Information Systems: Teilmodul zu Informatics im Bereich Customized Introduction to IIS (ab 2016/17 + 2018/19) |
| 10 | Studien- und Prüfungsleistungen | Klausur (tw. mit MC Aufgaben) 90 Minuten |
| 11 | Berechnung Modulnote | 100% der Klausurnote |
| 12 | Turnus des Angebots | Jedes Wintersemester |
| 13 | Arbeitsaufwand | Präsenzzeit: 60 h Eigenstudium: 90 h |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und Prüfungssprache | Deutsch |
| 16 | (Vorbereitende) Literatur | Alfons Kemper, Andre Eickler: <i>Datenbanksysteme: Eine Einführung.</i> 6., aktualis. u. erw. Aufl. Oldenbourg, März 2006 ISBN-10: 3486576909 (Kapitel 2 bis 4 und Abschnitt 17.2) Bernd Oestereich: <i>Analyse und Design mit UML 2.1.</i> 8. Aufl. Oldenbourg, Januar 2006 ISBN-10: 3486579266 Ian Sommerville: <i>Software Engineering.</i> 8., aktualis. Aufl. Pearson Studium, Mai 2007 ISBN-10: 3827372577 Horst A. Neumann: <i>Objektorientierte Softwareentwicklung mit der Unified Modeling Language. (UML).</i> Hanser Fachbuch, März 2002 ISBN-10: 3446188797 Rainer Eckstein, Silke Eckstein: <i>XML und Datenmodellierung.</i> Dpunkt Verlag, November 2003 ISBN-10: 3898642224 |

Informatics II part 2 (Option 1)

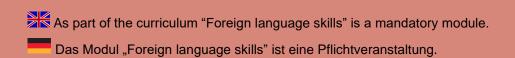
| 1 | Modulbezeichnung IIS57027 | Informatics II (Teil 2: Option 1) | 5 ECTS |
|---|---------------------------------|---|--------|
| 2 | Lehrveranstaltungen IIS70241 | V: PSWT (Praktische Softwaretechnik - 4 SWS) | 5 ECTS |
| 3 | Lehrende | Prof. Hindel, DrIng. Jung, Prof. Kips, DrIng. Oster, Prof. Riehle | |

| 4 | Modulverantwortliche/r | Prof. Dr. Riehle |
|---|--|---|
| 5 | Inhalt | Software ist überall und Software ist komplex. Nicht triviale Software wird von Teams entwickelt. Oft müssen bei der Entwicklung von Softwaresystemen eine Vielzahl von funktionalen und nicht funktionalen Anforderungen berücksichtigt werden. Hierfür ist eine disziplinierte und ingenieurmäßige Vorgehensweise notwendig. Die Vorlesung "Praktische Softwaretechnik" soll |
| | | ein Bewusstsein für die typischen Problemstellungen schaffen, die bei der Durchführung umfangreicher Softwareentwicklungspro- jekte auftreten, |
| | | ein breites Basiswissen über die Konzepte, Methoden, Notationen und Werkzeuge der modernen Softwaretechnik vermitteln und |
| | | die Möglichkeiten und Grenzen ihres Einsatzes im Kontext realisti- scher Projektumgebungen anhand praktischer Beispiele demonst- rieren und bewerten. |
| | | Die Vorlesung adressiert inhaltlich alle wesentlichen Bereiche der Softwaretechnik. Vorgestellt werden unter anderem |
| | | traditionelle sowie agile Methoden der Softwareentwicklung, |
| | | Methoden der Anforderungsanalyse und des Systementwurfs, |
| | | Konzepte der Softwarearchitektur, -implementierung und Dokumentation und |
| | | Testen und Qualitätssicherung sowie Prozessverbesserung. |
| | | Weitere Materialien und Informationen sind hier zu finden: |
| | | Zeitplan: http://goo.gl/0fy1T |
| | | Materialien: Auf StudOn über den Zeitplan |
| | | Die Teilnahme ist begrenzt. Bitte registrieren Sie sich zeitig für den Kurs auf StudOn, um sicherzustellen, dass Sie einen Platz erhalten. |
| 6 | Lernziele und | Die Studierenden |
| | Kompetenzen | verstehen den Unterschied zwischen "Programmieren im Kleinen" und "Programmieren im Großen" (Softwaretechnik) zu verstehen wenden grundlegende Methoden der Softwaretechnik über den gesamten Projekt- und Produktlebenszyklus zu verstehen und anwenden zu können kennen die Rolle und Zuständigkeiten der Berufsbilder "Projektleiter", "Anforderungsermittler", "Softwareentwickler" und "Qualitätssicherer" zu verstehen. |
| 7 | Empfohlene Voraussetzungen für die Teilnahme | Keine |
| 8 | Einpassung in Musterstudienplan | Informatik-Bachelor und Wirtschaftsinformatik-Bachelor: Während oder nach dem 4ten Semester |

| | | Informatik-Master: Jederzeit Master International Information Systems: 1. Semester PSWT-PSWT steht weiteren Studiengängen offen, je nach Studienplan und –ordnung |
|----|-------------------------------------|---|
| 9 | Verwendbarkeit des Moduls | 5 ECTS Vorlesung, je nach Studiengang als Pflicht oder Wahlpflichtveranstaltung Master International Information Systems: Teilmodul zu Informatics im Bereich Customized Introduction to IIS (ab 2016/17 + 2018/19) |
| 10 | Studien- und Prüfungsleistungen | 90min. Klausur |
| 11 | Berechnung Modulnote | 100% Klausurnote |
| 12 | Turnus des Angebots | Alle zwei Semester |
| 13 | Arbeitsaufwand | 60h (4 SWS) Unterricht 90h Hausaufgaben sowie Vor- und Nachbereitung |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und Prüfungssprache | Deutsch oder Englisch |
| 16 | (Vorbereitende) Literatur | http://goo.gl/JSoUbV |

Informatics II part 2 (Option 2)

| 4 | Module name IIS57028 | Informatics II (Teil 2: Option 2) | 5 ECTS |
|----|--|---|--------|
| 5 | Courses/lectures IIS31601 | Software development in large projects (SoSy3) (lectures + exercises, 4 SWS) | 5 ECTS |
| 6 | Lecturers | Prof. Saglietti | |
| 4 | Module coordinator | Prof. Saglietti | |
| 5 | Contents | Introduction to the single phases of software development: requirements analysis, specification, design, implementation, test, maintenance Exemplifying application of selected, representative techniques supporting the developments phases mentioned above Ergonomic principles for usage interfaces Object-oriented analysis and design with UML Design patterns as constructive, re-usable solutions to whole classes of problems Automatic support for code implementation from UML diagrams Testing strategies Re-factoring techniques supporting the maintenance phase | |
| 6 | Learning objectives and skills | On the basis of programming skills already acquired the students will learn systematic and structured approaches to deal with the complexity of "developing in the large", gain the capability of expressing complex problems in a well-defined way by means of appropriate specification languages, of analyzing such problems, as well as of deriving appropriate designs for their solution, get experience in the application of UML diagrams for the purpose of object-oriented analysis and design activities, get proficiency in re-using general design solutions by specialization of established design patterns, get acquainted with principles of the testing process, get familiar with re-factoring strategies aimed at increasing systematically software modifiability. | |
| 7 | Recommended prerequisites | None | |
| 8 | Integration in curriculum | First semester | |
| 9 | Module compatibility | Master in International Information Systems: Module in the set tomized Introduction to IIS (Informatics) (ab 2016/17 + 2018/1 | |
| 10 | Method of examination | 90-minute written examination (Klausur (90 min)) | |
| 11 | Grading procedure | Lect.: 100% of module score (Lect.: 100 % der Modulnote) | |
| 12 | Module frequency | Each WS | |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examina- tion language | German or English | |
| 16 | (Recommended) reading | Lehrbuch der Softwaretechnik (Band 1), Helmut Balzert, 2000 | |



Foreign language skills

| 1 | Modulbezeichnung IIS57090 | Foreign language skills | 5 ECTS |
|---|------------------------------|--|--------------------------|
| 2 | Lehrveranstaltungen | Allgemeinsprachliche Grundausbildung 1 Übung im Umfang von 5 ECTS in einer Fremdsprache (mit Ausnahme von Englisch und Deutsch als Fremdsprache) aus dem Bereich UNIcert I oder II, d.h. aus dem Niveaubereich A1 bis B2 GER | 1 x 5 ECTS |
| | | <u>oder</u> | <u>oder</u> 1x |
| | | 1 Übung im Umfang von 5 ECTS in Deutsch als Fremd- sprache ab dem Niveaubereich B1 | 5 ECTS |
| | | <u>oder</u> | <u>oder</u> 1x |
| | | Fachsprachliche Grundausbildung 1 Übung im Umfang von 5 ECTS oder 2 Übungen im Umfang von 2,5 ECTS in einer Fremdsprache aus dem Bereich UNIcert III Fachsprache. Die Kurse enden auf dem Niveau C1 GER | 5 ECTS oder 2x 2,5 ECTS |
| 3 | Lehrende | Mitarbeiter der Abteilung Fremdsprachenausbildung Nürnberg des Sprachenzentrums der FAU (Leitung: Dr. Oesterreicher) | |

| 4 | Modulverantwortliche/r | Dr. Oesterreicher | |
|---|--|---|--|
| 5 | Inhalt | Allgemeinsprachliche Grundausbildung: Vermittlung und Vertiefung grundlegender schriftlicher und mündlicher Kompetenzen Einführung in Präsentations- und kommunikativen Kompetenzen unter Berücksichtigung interkultureller Spezifika Auf- und Ausbau einer fremdsprachlichen Hilfsmittelkompetenz Fachsprachliche Grundausbildung: Vermittlung und Vertiefung handlungsorientierter schriftlicher und mündlicher Kompetenzen mit fachsprachlichem Bezug Vermittlung von Präsentations- und kommunikativen Kompetenzen unter Berücksichtigung interkultureller Spezifika Förderung der Studierfähigkeit Auf- und Ausbau einer fremdsprachlichen Hilfsmittelkompetenz | |
| 6 | Lernziele und Kompetenzen | Auf- und Ausbau einer fremdsprachlichen Hilfsmittelkompetenz Allgemeinsprachliche Grundausbildung: Die Studierenden erwerben die nötigen Grundkenntnisse der jeweiligen Fremdsprache. Sie werden an eine schriftlich und mündlich idiomatische Ausdrucksweise herangeführt. Sie erhalten einen Einblick in die interkulturellen und sprachimmanenten Spezifika der entsprechenden Kommunikationsformen. Sie können den Erwerb von in vorausgegangenen Modulen begonnenen Sprachen fortsetzen. Fachsprachliche Grundausbildung: Die Studierenden lernen schriftlichen und mündlichen Diskursen sowohl im Studium als auch arbeitsplatzbezogen zu folgen. Sie lernen sich idiomatisch adäquat schriftlich und mündlich auszudrücken. Sie erreichen eine Vertrautheit mit den interkulturellen und sprachimmanenten Spezifika der entsprechenden Kommunikationsformen. Sie können an in vorhergehenden Modulen erworbene Kenntnisse anknüpfen. | |
| 7 | Empfohlene Voraussetzungen für die Teilnahme | Abschluss der dem Sprachkurs jeweils vorangehenden Niveaustufe des GER – nachweisbar über einen Einstufungstest, entsprechende Zertifikate oder erfolgreich abgeschlossene Kurse | |

| 8 | Einpassung in Musterstudienplan | Ab 1. Semester |
|----|-------------------------------------|--|
| 9 | Verwendbarkeit des Moduls | Master International Information Systems; (ab 2016/17 + 2018/19) Master in Arbeitsmarkt & Personal (Wahlbereich); Master in Sozialökonomik (Wahlbereich) Master in Economics (Wahlbereich) |
| 10 | Studien- und Prüfungsleistungen | Je Übung eine 60 minütige Abschlussklausur + mündliche Leistung |
| 11 | Berechnung Modulnote | Ü = 100% |
| 12 | Turnus des Angebots | Jährlich im WS und SS |
| 13 | Arbeitsaufwand | Präsenzstudium: 60 h Eigenstudium: 90 h |
| 14 | Dauer des Moduls | 1-2 Semester |
| 15 | Unterrichts- und Prüfungssprache | Je nach gewählter Fremdsprache |
| 16 | (Vorbereitende) Literatur | Lt. Auskunft Dozent |

IV Information Systems

The Information Systems part is made up of "Core Courses" and "Electives" worth 15 ECTS each. Students have to earn 5 ECTS in the Core Courses of each of the subject areas "Data & Knowledge", "Digital Business" and "Architectures & Development". Within the electives students can freely combine different modules of these subject areas. Some modules are included in the core courses as well as in the electives. These modules can only be taken once, as either a core or an elective course.

The graph below shows the available options for the Core Courses and Electives.

Der Bereich Information Systems besteht aus "Core Courses" (Kernbereich) und "Electives" (Wahlbereich) mit jeweils 15 ECTS. Die Studierenden müssen jeweils 5 ECTS aus den Kernbereichen der "Data & Knowledge", "Digital Business" und "Architectures & Development" einbringen. Im Wahlbereich können die Studierenden verschiedene Module dieser Gebiete frei kombinieren. Manche Module werden sowohl im Kernbereich als auch im Wahlbereich angeboten. Diese Module können nur einmal belegt werden, entweder als Core Course oder als Elective Course.

Die nachfolgende Grafik zeigt die angebotenen Module im Kern- und Wahlbereich.

| | <u>Data &</u> Knowledge | | <u>Digital Business</u> | | tures <u>&</u> oment |
|----------------|--------------------------------|----------------|-------------------------|----------------|-----------------------------|
| Core Course | Elective | Core Course | Elective | Core Course | Elective |
| <u>BI</u> | | DC | <u>CM</u> | <u>DT</u> | |
| EKN | <u>M</u> | <u>lu</u> | <u>L</u> | <u>MEIT</u> | <u>-A</u> |
| FLC | <u>)</u> | AS | <u>SM</u> | <u>PA</u> | |
| DAI | <u>s</u> | | <u>ODT</u> | UXE | <u>3</u> |
| | <u>SAWI</u> | | <u>MGPMIT</u> | | <u>APM</u> |
| | <u>PS</u> | | <u>SI</u> | | <u>CSS</u> |
| | <u>DVS</u> | | <u>DMI</u> | | <u>DGS</u> |
| | | | SMM | | |
| | | | <u>PSV</u> | | |
| | | | <u>DTP</u> | | |
| | | | <u>FinTech</u> | | |
| | | | <u>PFI</u> | | |
| | | | <u>EHRM</u> | | |
| | | | <u>JUDEM</u> | | |

Data & Knowledge

Enterprise knowledge management (EKM)

| 1 | Module name IIS57290 | Enterprise knowledge management | 5 ECTS |
|---|-------------------------|--|--------|
| 2 | Courses/lectures | Lecture: Enterprise knowledge management Tutorial: Enterprise knowledge management | 5 ECTS |
| 3 | Lecturers | Prof. Dr. Sven Laumer | |

| 4 | Module coordinator | Prof. Dr. Sven Laumer |
|----|-----------------------------------|--|
| 5 | Contents | Lecture on demand: This module uses the "Flipped Classroom" method and provides an advanced perspective on enterprise knowledge management. It focuses on knowledge management strategy and processes, knowledge management governance, knowledge modelling and visualization as well as concepts like crowdsourcing, open innovation and crowdfunding in a knowledge management context. From a theoretical perspective, the module introduces social networks and social network analysis as base for enterprise knowledge management. |
| | | Tutorial: The contents of the lecture on demand are further discussed by means of exercises and case studies. Practical exercises are conducted using common social network analysis or knowledge management software. |
| 6 | Learning objectives and skills | Students can analyze, visualize, design and discuss enterprise knowledge management approaches. |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | First or third semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Data & Knowledge (Core Course or Elective) Master International Information Systems (from 2016/17): Module in the section Information Systems – Extension Courses |
| 10 | Method of examination | Lecture on demand and tutorial: written examination (90 Minutes) |
| 11 | Grading procedure | Lecture on demand and tutorial: 100% of module score |
| 12 | Module frequency | Each winter term |
| 13 | Workload | Lecture: 40h Tutorial:40h Self-study: 70h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examination language | English |
| 16 | (Recommended) reading | ТВА |

Business intelligence (BI)

| 1 | Module name IIS57043 | Business intelligence | 5 ECTS |
|---|------------------------------|--|--------|
| 2 | Courses/lectures IIS70415 | Lecture: Business intelligence Exercise: Business intelligence | 5 ECTS |
| 3 | Lecturers | Prof. Bodendorf and colleagues | |

| 4 | Module coordinator | Prof. Bodendorf |
|---|--------------------------------|--|
| 5 | Contents | Lect/Ex: The interest in data analytics has increased tremendously in the last few years, and it is part of almost every business or organization we can think of. There has been a tremendous development in the field since we all heard the term Big Data for the first time close to a decade ago. The demand for skilled practitioners has also increased significantly and is projected to keep increasing in the next years. At the same time, a qualified data scientist or data analyst is expected to have knowledge in different areas like statistics, data mining, data visualization or programming, to name a few. It is often challenging to decide where to start if one has interest in this career path. In this lecture, we introduce a variety of topics which will give you a kick start in the field of data science and will help you to continue the learning path in other, more advanced courses. We teach the whole data science process (based on the industry-wide accepted CRISP model) from the business and data understanding to the deployment and management steps. Students get familiar with terms like data science, machine learning and artificial intelligence, as well as available tools and technologies. You will learn what is behind the technology that powers everything from your shopping suggestions on Amazon to automatic systems like chatbots and self-driving cars. We teach you the most used machine learning alorithms right now: decision trees, neural networks, support vector machines, association rules (Apriori and FP Growth), clustering algorithms (k-Means, DBSCAN). In the end of the lecture, you will know the difference between machine learning and artificial intelligence, understand how the most popular algorithms work, and how they can be applied in practice. The lecture is intended for students with no prior knowledge in data analytics. After familiarizing with the relevant theory, students also have the chance to apply their knowledge on a given data set. This will be done with a data science tool that does not re |
| 6 | Learning objectives and skills | Can describe important business intelligence and data science concepts, tools, and algorithms Learn how to structure a data science project Work on a practical exercise and apply the learned algorithms on a real-world dataset Are able to evaluate a machine learning model and decide on its goodness of fit |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | Second semester |
| 9 | Module compatibility | Master in International Information Systems (from 2018/19): Module in the section Information Systems – Data & Knowledge (Core Course or Elective) |

| | | Master in International Information Systems (from 2016/17): Module in the section Information Systems— Services, processes, and intelligence I or II (Core Course or Elective) Master Arbeitsmarkt und Personal: Wahlbereich Master FACT: Vertiefungsbereich (Modulgruppe Interdisziplinäre Module) Master Marketing: Wahlpflichtbereich der Modulgruppe "Management" bzw. "Data Science" (MARK-54081) Master Wirtschaftsmathematik: Wahlbereich Master Wirschaftsingenieurswesen: Informatik Nebenfach Betriebswirtschaftslehre Master Management: Vertiefungsbereich |
|----|--|--|
| 10 | Method of examination | Written examination, 90 minutes (Klausur, 90 Minuten) |
| 11 | Grading procedure | 100% of exam score (100% der Klausurnote) |
| 12 | Module frequency | Each summer term |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | English |
| 16 | (Recommended) reading | All relevant material will be provided during the lecture. |

Foundations of linked data (FLD)

| 1 | Module name IIS-57320 | Foundations of linked data | 5 ECTS | |
|----|-----------------------------------|--|-----------------------------|--|
| 2 | Courses/lectures IIS-73201 | Lecture: Foundations of linked data (2 SWS) Exercise: Foundations of linked data (2 SWS) | 5 ECTS | |
| 3 | Lecturers | Prof. Harth (mostly lectures) and collegues (mostly exercises) | | |
| 4 | Module coordinator | Prof. Dr. Andreas Harth | | |
| 5 | Contents | The Linked Data principles provide a unified interface to data and software systems based on web architecture. Linked Data is increasingly popular in scenarios where data and systems from multiple providers have to be integrated, both in an enterprise setting and on open data from the web. The module covers foundational techniques to access, process and integrate data, both from a theoretical and a practical perspective, and provides a coherent treatment of protocols and languages specified by the World Wide Web Consortium. The module combines techniques from different areas, such as databases and artificial intelligence, adapted for use in a decentralised setting on the web. The overarching topic is to facilitate data integration on the basis of resource-oriented modelling, knowledge representation, hyperlinks and state transfer between user agents and servers. The module sets out with a history of hypertext systems, followed from an introduction to web architecture and knowledge representation, including algorithms for query evaluation and deductive reasoning. The module | | |
| 6 | Learning objectives and skills | closes with a user agents for querying integrated data from sources attainable through the web. You will learn how to describe data in a way that facilitates integrated access. You will be able to write queries that access large amounts of data within a unified logical framework. You will be able to apply the technologies and techniques around Linked Data to support data integration in an enterprise setting and on the web, and therefore have the necessary skills for a broad variety of data science applications. | | |
| 7 | Recommended prerequisites | Students should have a basic understanding of how the internation web work. Some knowledge of relational databases is benefic | | |
| 8 | Integration in curriculum | Second semester | | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Mod section Information Systems – Data & Knowledge (Core Courtive) Master International Information Systems (from 2016/17): Mod section Information Systems – Extension courses Master in Marketing (start before WS17/18): Wahlpflichtbereich ulgruppe "Methoden" Master in Marketing (start since WS17/18): Wahlpflichtbereich ulgruppe "Data Science" Master Wirschaftsingenieurswesen | rse or Elec- dule in the | |
| 10 | Method of examination | Written examination (60 minutes) (Klausur: 60 Minuten) Successful completion of all tasks in the practical exercises ca grade improvement of maximum 0.4 points | an lead to a | |
| 11 | Grading procedure | 100% of exam score | | |
| 12 | Module frequency | Each summer term | | |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h | | |
| 14 | Module duration | 1 semester | | |
| 15 | Teaching and examination language | English | | |
| 16 | (Recommended) reading | All relevant material will be provided during the lecture. The following books give an overview of the topics of the lecture. | ıre: | |

| Tim Berners-Lee. Weaving the Web. Harper, 1999 |
|---|
| Tom Heath, Christian Bizer. Linked Data: Evolving the Web into a Global |
| Data Space. Morgan & Claypool, 2011. |
| Dean Allemang. Semantic Web for the Working Ontologist: Effective |
| Modeling in RDFS and OWL. Morgan Kaufmann, 2008. |
| For a brief motivation read tyfair.com/news/2018/07/the-man-who-cre- |
| ated-the-world-wide-web-has-some-regrets |

Data Analytics for Information Systems (DAIS)

| 1 | Module name IIS-57465 | Data Analytics for Information Systems | 5 ECTS | | |
|---|--------------------------------|--|--|--|--|
| 2 | Courses/lectures | V: Data Analytics for Information Systems Ü: Data Analytics for Information Systems | 5 ECTS | | |
| 3 | Lecturers | Prof. Dr. Verena Tiefenbeck; Prakhar Mehta Leonard Michels, M.Sc. | | | |
| 4 | Module coordinator | Prof. Dr. Verena Tiefenbeck | | | |
| 5 | Contents | This course provides a hands-on introduction to master the essentials of data analytics and machine learning using R. | | | |
| | | The growing ubiquity of information systems both in organizational and private consumer contexts increasingly makes large data streams available in various domains. As part of the digital transformation, kKnowing how to handle these data sets, how to analyze and to interpret them, becomes a more and more important skillset in companies, policymaking and in academic research. | | | |
| | | The course builds on real-word data sets from information systems in the realm of consumer behavior, in particular in the resource consumption context. Based on hands-on examples and practical challenges, we cover fundamental data analytics methods using the software environment R. | | | |
| | | The course starts with basic concepts from descriptive and inferential statistics that will be needed in the following course units, followed by an introduction to the statistics software R and R Studio. Students will be introduced to experimental design to distinguish between correlation and causation and to critically evaluate the validity and reliability of results. In the following, a large share of the course is dedicated to regression analysis, clustering, and different classification techniques. Students will apply these methods to data sets from concrete real-world challenges. The course closes with a discussion of relevant privacy regulations and also highlights social concerns and ethical aspects. | | | |
| | | In the second half of the semester, students have the possibility to earn bonus points in a course project (self-study), by applying the skills and methods covered in the lecture and exercise sessions in the analysis a large real-world dataset. | | | |
| 6 | Learning objectives and skills | In this course, students will acquire - an introduction (or refresher) to fundamental concepts needed for various quantitative methods in data analy - skills to design and use information systems to collect data - skills to formulate hypotheses and to perform and exp responding statistical tests - skills to formulate, solve, and interpret linear and logis sion analyses - skills to conduct clustering analyses - skills to set up, train, and evaluate machine learning a including K-means, regression, and support vector machine learning skills in the statistics software R that allower efficiently perform the related tasks - a solid understanding of the ethical issues when dealing sonal data and of the privacy regulations to follow | tics behavioral lain the cortic regres- lgorithms, achines bw you to | | |

| 8 | Recommended prerequisites Integration in curriculum | An introductory part that covers essential concepts from statistics and an introduction to R is part of the course. However, a basic level of familiarity with some programming languages prior to the course is strongly recommended. 1st or 3rd semester |
|----|--|--|
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Data & Knowledge (Core Course or Elective) Master Wirtschaftsingenieurwesen: allgemeines Wahlmodul (Elective) Master Marketing: Wahlpflichtbereich der Modulgruppe "Data Science" |
| 10 | Method of examination | Written examination (90 minutes) |
| 11 | Grading procedure | Written examination (100 %) – bonus points can be acquired in a project in the second half of the semester. Students who pass the exam may increase their exam grade by up to 0.7 with the project. |
| 12 | Module frequency | Each winter term |
| 13 | Workload | Lecture and exercise sessions: 50h Self-study: 100h |
| 14 | Module duration | In WS 2020, the module will be taught in blocked sessions mainly in the first half of the semester. |
| 15 | Teaching and examina- tion language | English |
| 16 | (Recommended) reading | Will be announced in class |

Social and web intelligence (SAWI)

| 1 | Module name IIS-53305 | Social and web intelligence | 5 ECTS |
|---|-------------------------------|-------------------------------------|--------|
| 2 | Courses/lectures IIS-33004 | Social and web intelligence (4 SWS) | 5 ECTS |
| 3 | Lecturers | Dr. Pavlina Kröckel | |

| 4 | Module coordinator | Prof. Bodendorf |
|----|--------------------------------|--|
| 5 | Contents | Social media became an inseparable part of today's companies. The vast amount of user-generated data online gives huge advantages to companies primarily by providing them with easy access to customer data free of charge. With every action online, users leave a trace behind which companies can use for a wide variety of decisions – product development and improvement, more targeted advertising, customer support. The user data come in various forms: text, images, and videos. In this seminar, we put special focus on text and network data. We first teach the theory behind text and network mining and then apply this knowledge on given datasets. |
| 6 | Learning objectives and skills | will gain theoretical knowledge and understanding behind social media, text mining, network theory and network metrics will learn how to analyze and summarize data from a variety of web sources (e.g., Facebook, Twitter, blogs and forums) will learn how to apply the skills in a few chosen application areas e.g., role analysis, sentiment and behaviour analysis. |
| | | The lecture videos will be available via StudOn. Presence is required for two mid-term presentations (not graded) and the final presentation (graded). |
| 7 | Recommended prerequisites | Students should have a basic familiarity with data mining and data analytics methods and tools. The Business Intelligence lecture offered by the Information Systems II Chair each SS (or similar introductory lecture in Data Analytics) is a prerequisite to attend the course. One of the tools which will be used in the seminar is RapidMiner (also installed on the computers in the PC Labs at Wiso) |
| 8 | Integration in curriculum | Third semester Registration is mandatory. Places are limited. Please inform yourselves about the registration process on the homepage of the Chair of Information Systems II. |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems Data & Knowledge (Electives) Master International Information Systems (from 2016/17): Module in the section Information Systems – Services, Processes, and Intelligence II (Electives) Master Marketing: Wahlpflichtbereich der Modulgruppe "Management" Master FACT: Vertiefungsbereich (Modulgruppe Interdisziplinäre Module) Master IBS: Wahlbereich |
| 10 | Method of examination | Project work and presentation (Projektarbeit und Präsentation) |
| 11 | Grading procedure | Project work (50%) and presentation (50%) (Projektarbeit (50%) und Präsentation (50%)) The project work (mid-term tasks/open questions) are individual work while the final project presentation is evaluated as a group. |
| 12 | Module frequency | Each WS |
| 13 | Workload | Lecture: 30 h Exercise: 50 h Self-study: 70 h |

| 14 | Module duration | 1 semester |
|----|-----------------------------------|--|
| 15 | Teaching and examination language | English |
| 16 | (Recommended) reading | All relevant material will be provided during the seminar. For students that want to gain deeper understanding of social intelligence, recommendations will be given by the lecturers. |

Platform strategies (PS)

| 1 | Module name IIS57110 | Platform strategies | 5 ECTS |
|---|-------------------------|---|--------|
| 2 | Courses/lectures | Platform strategies | 5 ECTS |
| | IIS-71102 | | |
| | IIS-71103 | | |
| 3 | Lecturers | Prof. Möslein and colleagues | |
| | | Prof. Srinivasan, guest lecturer from IIMB, India | |

| 4 | Module coordinator | Prof. Möslein | | |
|-----|---------------------------|--|--|--|
| 5 | Contents | The course builds on the platform and network aspects in core strategy | | |
| 3 | Contents | and aims to highlight the specific strategies for firms operating in multi- | | |
| | | sided-markets. The course will cover most relevant concepts around plat- | | |
| | | forms such as network effects, and how network effects impact/ create | | |
| | | new business models. Core issues around platform-mediated network | | |
| | | firms, such as standards, pricing, envelopment, and competition dynam- | | |
| | | ics will be discussed. | | |
| | | The course will be taught through a set of cases that ensures that partici- | | |
| | | pants appreciate the multi-dimensional nature of managing in network | | |
| | | businesses. | | |
| 6 | Learning objectives and | The students | | |
| | skills | can identify and unravel the business problem in a case study and | | |
| | | actively take part in class discussions | | |
| | | can describe platform intermediation in two sided markets, platform | | |
| | | dominance and Winner-takes-all dynamics | | |
| | | can develop strategies for creating platform mediated networks and | | |
| | | understand pricing in these businesses | | |
| 7 | Recommended prerequi- | None | | |
| | sites | | | |
| 8 | Integration in curriculum | Third semester | | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the | | |
| | | section Information Systems – Data & Knowledge (Elective) | | |
| | | Master International Information Systems (from 2016/17): Module in the section Information Systems – Innovation and Value Creation II (Elec- | | |
| | | tive) | | |
| | | Master Marketing: Wahlpflichtbereich der Modulgruppe "Management" | | |
| 10 | Method of examination | Project report: Students develop a business plan about a platform busi- | | |
| | | ness idea | | |
| | | Handout: Students develop an essay about a platform of their choice, dis- | | |
| | | cuss key concepts encountered during the lectures and apply them to the | | |
| | | chosen platform. | | |
| 11 | Grading procedure | -Project report (50%) and Handout (50%) | | |
| 12 | Module frequency | Each WS | | |
| 13 | Workload | Attendance: 30 h | | |
| | | Independent study: 120 h | | |
| 14 | Module duration | 1 semester | | |
| 15 | Teaching and examination | English | | |
| | language | | | |
| 16 | (Recommended) reading | Klemperer, P. 2005. Network effects and switching costs. In | | |
| | | Durlauf, S.N. & Blume, L.E. (Eds.), The new palgrave dictionary | | |
| | | of Economics, Palgrave Macmillan. | | |
| | | • Eisenmann T., Parker, G., & Van Alstyne, M. 2006. Strategies for | | |
| | | two-sided markets. Harvard Business Review Oct. 2006. | | |
| | | Hidding, G.J., Williams, J. & Sviokla, J.J. 2011. How platform | | |
| i . | 1 | leaders win, Journal of Business Strategy, 32, 2, 29-37. | | |

• Suarez, F.F. & Kirtley, J. 2012. Dethroning an established platform, MIT Sloan Management Review, Summer 2012.

The following books are suggested for the advanced reader on the basics on network economics.

- Shy O. 2001. The Economics of Network Industries, Cambridge University Press: Cambridge, England.
- Gawer A, Cusumano M. 2002. Platform Leadership: How Intel, Microsoft, and Cisco Drive Industry Innovation. Harvard Business School Press: Boston, MA.
- Evans D, Hagiu, A, Schmalensee, R. 2006. Invisible Engines: How Software Platforms Drive Innovation and Transform Industries, MIT Press, Boston, MA.

^{*} The cases for each lecture are to be decided.

Deep Vision Systems (DVS)

| 1. | Module name IIS-57045 | Development of deep vision systems | 5 ECTS |
|----|--------------------------|--|----------|
| 2. | Courses/lectures | Lecture (2,5 SWS): Development of deep vision systems Exercise (2,5 SWS): Development of deep vision systems | 2,5 ECTS |
| | | | 2,5 ECTS |
| 3. | Lecturers | Prof. Dr. Patrick Zschech, Prof. Dr. Mathias Kraus, and assistants | |

| 4. | Module coordinator | Prof. Dr. Patrick Zschech |
|-----|--------------------------------|---|
| | | |
| 5. | Contents | Computer vision systems try to mimic human capabilities of visual perception to support time-consuming and labor-intensive tasks like the recognition, localization, and tracking of critical objects. Nowadays, such systems increasingly rely on methods and tools from the field of machine learning to automatically extract useful information from images that can be utilized for decision support and business automation purposes. This course provides the necessary fundamentals for the development of modern vision systems based on machine learning. The particular focus is on deep neural networks and their capabilities of automated feature learning. More specifically, we consider different types of network architectures, look at the steps of image labelling and data preparation, discuss crucial hyperparameters and evaluation criteria, and review other related aspects, such as 3D vision, hybrid intelligence, and explainable arti- |
| | | ficial intelligence. The course has a strong practical focus. At the beginning of the semester, all fundamentals are provided in lecture sessions and hands-on exercises. Afterwards, students are encouraged to work (in groups) on real projects to apply the methods and concepts learned during the teaching sessions. The results are presented and discussed at the end of the semester. |
| 6. | Learning objectives and skills | The students understand the challenges for developing vision-based systems, understand the basic principles of machine learning and deep neural networks in the realm of image processing, explain the general pipeline of computer vision systems based on deep neural networks, know about state-of-the art techniques at the intersection of computer vision and machine learning, apply technologies for automated image processing in a practical setting, compare and evaluate different system configurations, work in groups and present their results together, develop skills in collaborative interaction with peers. |
| 7. | Recommended prerequisites | Basic knowledge in data analysis techniques, statistics, and machine learning. Basic programming skills, preferably in Python. The number of participants is limited. Please see website for details on the application process. |
| 8. | Integration in curriculum | Second or third semester |
| 9. | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Data & Knowledge (Elective) Master International Information Systems (from 2016/17): Module in the section Information Systems – Extension Courses (Elective) |
| 10. | Method of examination | Project report and presentations, partly in groups (Projektarbeit und Präsentation, z.T. in Gruppenarbeit) |

| 11. | Grading procedure | Project report (80%) and presentation (20%) |
|-----|--------------------------|---|
| | | (Projektarbeit (80%) und Präsentation (20%)) |
| 12. | Module frequency | Each semester (without guarantee) |
| 13. | Workload | Contact hours: 75 h |
| | | Independent study: 75 h |
| 14. | Module duration | 1 semester |
| 15. | Teaching and examination | English |
| | language | |
| 16. | (Recommended) reading | All relevant material will be provided during the course. |

Digital Business

Digital change management (DCM)

| 1 | Module name IIS-56210 | Digital change management | 5 ECTS |
|---|--------------------------|---|----------------------|
| 2 | Courses/lectures | Lecture (2 SWS): Digital change management Excercise (2 SWS): Digital change management | 2,5 ECTS 2,5 ECTS |
| 3 | Lecturers | Prof. Dr. Sven Laumer | |

| 4 | Module coordinator | Prof. Dr. Sven Laumer |
|----|--|---|
| 5 | Contents | Lecture: This module provides an organizational and social perspective of the digital transformation. It introduces theories and methods to analyze, visualize, and discuss challenges of the acceptance of the digital transformation. Case study: Using research methods (interviews, surveys) students should investigate a digital transformation project and analyze its design and acceptance. The results should be presented as an own case study (case study paper, presentation). The case study is conducted as group work. |
| 6 | Learning objectives and skills | Students can analyze, visualize and discuss consequences of the digital transformation for individuals and organizations as well as its implementation challenges. Students are able to design an implementation project to focus especially on end-users. |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | Second or forth semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Digital Business (Core Course or Elective) Master International Information Systems (from 2016/17): Module in the section Information Systems – Extension Courses (Elective) Master Management: Vertiefungsbereich |
| 10 | Method of examination | Lecture: written examination (60 Minutes) Exercise: case study, the case study is done as a group |
| 11 | Grading procedure | Lecture: 50% of module score Excercise: 50% of module score, evaluated as a group |
| 12 | Module frequency | Sommersemester |
| 13 | Workload | Lecture: 40h, Excercise:40h, Self-study: 70h |
| 14 | Module duration | 1 Semester |
| 15 | Teaching and examina- tion language | Teaching: English Examination: English |
| 16 | Recommended reading | Alter, S. (2013). Work System Theory: Overview of Core Concepts, Extensions, and Challenges for the Future. Journal of the Association for Information Systems, 14 (2), 72-121 Kotter, J.P. (2005). Out Iceberg is Melting. St.Martin's Press, Kotter, J.P. (2010). Leading Change, Harvard Business Press Venkatesh, V., Morris, M., Davis, G., and Davis, F. D. 2003. "User acceptance of information technology: toward a unified view," MIS Q (27:3), pp. 425–478. |

Innovation and leadership (luL)

| 1. | Module name IIS-57053 | Innovation and leadership | 5 ECTS |
|----|--|-----------------------------------|--------|
| 2. | Courses/lectures IIS70508 IIS70509 | Innovation and leadership (4 SWS) | 5 ECTS |
| 3. | Lecturers | Prof. Möslein and colleagues | |

| 4. | Module coordinator | Prof. Möslein | |
|-----|-----------------------------------|--|--|
| 5. | Contents | The lecture focuses on the challenges of leading and communicating innovation and change in IT enabled companies and networked organizations. Based upon that, creating a sustainable innovative environment is a leadership task. In order to succeed at this task, leaders must develop innovative abilities to deal with the challenges inherent in a business environment characterized by fluid, unstructured and changing information. The aim of this course is thereby twofold. First, the course delineates and describes different yet emerging innovation tools, organizing them into a coherent set of classes. Each class of tools is described using a set of up-to-date business cases that depict the current status of the information systems. The second aim of this course is to get an overview of how to structure leadership systems towards innovation, how leaders can motivate to foster innovative thinking and what new forms of innovation (e.g. open innovation) mean for the definition of leadership. In doing so, this lecture represents an Idea Transformation Class as students are encouraged not only to merely develop, but to actively deploy | |
| | | specifically developed concepts. | |
| 6. | Learning objectives and skills | will understand and explore the theories and practicalities of leadership in open innovation contexts. will gain knowledge on leading and communicating innovation and translate it in leadership behavior in real case contexts. will learn to assess, reflect and feedback the impact of practical leadership for innovation | |
| 7. | Recommended prerequisites | Basic understanding of innovation management Basic understanding of management processes First experience in team projects | |
| 8. | Integration in curriculum | First semester | |
| 9. | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Digital Business (Core Course or Elective) Master International Information Systems (from 2016/17): Module in the section Information Systems – Innovation and Value Creation I (Core Course) Master Marketing: Wahlpflichtbereich der Modulgruppe "Management" Master Management: Vertiefungsbereich | |
| 10. | Method of examination | Lect/Ex: Research project (tw. In Gruppenarbeit) and Presentation (Vorlesung/Übung: Projektarbeit (tw. In Gruppenarbeit) und Präsentation) | |
| 11. | Grading procedure | Lect/Ex: Research project (tw. In Gruppenarbeit) (100%) and Presentation (passed) (Vorlesung/Übung: Projektarbeit (tw. In Gruppenarbeit) (100%) und Präsentation (bestanden)) | |
| 12. | Module frequency | Each WS | |
| 13. | Workload | Attendance: 45 h Self-study: 105 h | |
| 14. | Module duration | 1 semester | |
| 15. | Teaching and examination language | English | |
| 16. | (Recommended) reading | Huff, Möslein & Reichwald: Leading Open Innovation; 2013 MIT Press,ISBN-13: 978-0262018494 | |

Advanced service management (ASM)

| 1 | Module name IIS57085 | Advanced service management | 5 ECTS |
|---|------------------------------|--|--------|
| 2 | Courses/lectures IIS70839 | Lecture: Advanced service management Exercise: Advanced service management | 5 ECTS |
| 3 | Lecturers | Prof. Bodendorf and colleagues | |

| 4 | Module coordinator | Prof. Bodendorf | |
|----|-----------------------------------|--|--|
| 5 | Contents | Lecture and exercise: This module consists of two parts. Part one of the module provides an overview of service science. Characteristics of service design, production, and deployment are presented. The second part focuses on service businesses, such as finance, commerce, logistics, tourism, education, entertainment, healthcare and industrial services. Digital products and value added services are discussed as well as service engineering and service technologies (e.g., self service systems, multimedia, and security Systems). | |
| 6 | Learning objectives and skills | The students | |
| 7 | Recommended prerequisites | None | |
| 8 | Integration in curriculum | Second semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Digital Business (Core Course or Elective) Master International Information Systems (from 2016/17): Module in the section Information Systems – Services, Processes and Intelligence I or II (Core Course or Elective) Master Marketing: Wahlpflichtbereich der Modulgruppe "Management" Master Management: Vertiefungsbereich Master Wirtschaftspädagogik, Studienrichtung I: Wahlbereich Master Sozialökonomik: Vertiefungsbereich Master Arbeitsmarkt und Personal: Wahlbereich Master FACT: Vertiefungsbereich (Modulgruppe Interdisziplinäre Module) Master Economics: Wahlbereich Master IBS: Wahlbereich | |
| 10 | Method of examination | Written examination, 90 minutes (Klausur, 90 Minuten) | |
| 11 | Grading procedure | 100% of exam score (100% der Klausurnote) | |
| 12 | Module frequency | Each SS | |
| 13 | Workload | Attendance: 60 h + Self-study: 90 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examination language | English | |
| 16 | (Recommended) reading | All relevant material will be provided during the lecture. | |

Organizing for digital transformation (ODT)

| 1 | Module name IIS56421 | Organizing for digital transformation | 5 ECTS |
|----|--|--|--------|
| 2 | Courses/lectures IIS64211 IIS64212 | Organizing for digital transformation (4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Möslein and colleagues | |
| 4 | Module coordinator | Prof. Möslein | |
| 5 | Contents | The course focusses on dynamics in organizational transformation driven through information technology (IT) and consists of two parts. The first part introduces the topic from an industrial perspective and explores the re-organization of value streams in the course of the digital transformation. Teaching in this part includes contributions from a German automotive company. Students will work in a project-oriented mode for half the lecture and then present their results. The second part takes the perspective of academic research on the organization of the digital transformation. It introduces different theoretical frameworks to gain a deeper understanding of the phenomenon and explores its implications for global business structures. Students write a short essay to show what they have learned. Together, the lecture allows the students to gain theoretical knowledge on the digital transformation and acquire practical problem-solving skills as well to work effectively on innovative projects in the field. | |
| 6 | Learning objectives and skills | The students are familiar with different theories of works systems and service systems and their practical application know more about the contribution of information technology in managing complex innovation activities have an improved understanding of the global IT Industry and various strategies that are used can identify and unravel the business problem in a case study and actively take part in class discussions | |
| 7 | Recommended prerequisites | - general knowledge of digital technology and their economic applications - basic understanding of simple software applications - first experience with team projects | |
| 8 | Integration in curriculum | Second or fourth semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Digital Business (Elective) Master in International Information Systems (from 2016/17): Module in the section Information Systems – Innovation and Value Creation II (Elective) Master IBS: elective courses (Wahlbereich) Master in Management: Vertiefungsbereich | |
| 10 | Method of examination | Presentation and seminar paper (Präsentation und Seminarar | beit) |
| 11 | Grading procedure | Presentation (30%) and seminar paper (70%) (Präsentation (30%) und Seminararbeit (70%)) | |
| 12 | Module frequency | Each SS, starting in SS 2022 | |
| 13 | Workload | Attendance: 60 h + Independent study: 90 h | |
| 14 | Module duration | duration 1 semester | |
| 15 | Teaching and examina- tion language | English | |

Managing global projects (MGP) + Managing information technology (MIT)

| 1 | Module name IIS57060 | Managing global projects and information technology | 5 ECTS |
|---|--|--|----------------------|
| 2 | Courses/lectures IIS70603 IIS70604 | Lect1/Ex1: Managing information technology (2 SWS) Lect2/Ex2: Managing global projects (2 SWS) | 2,5 ECTS 2,5 ECTS |
| 3 | Lecturers | Prof. Amberg and colleagues | |

| 4 | Module coordinator | Prof. Amberg |
|---|--------------------------------|--|
| 5 | Contents | Lect1/Ex1: The traditional role of the Chief Information Officer (CIO) as gatekeeper of technology and protector of corporate information asset activities is changing. Next to the daily duties to keep the IT operations and projects running – often facing shrinking budget constraints – an enterprise IT manager becomes an important business partner in supporting the transformation of the traditional business to the digital age. The course has a strong focus on the role of IT within different types of enterprises and highlights IT from two different angles: IT as organizational function and IT as driver of organizational transformation. The lecture is divided into two parts (1) IT Management in enterprises (2) IT-driven business models |
| | | Lect2/Ex2: Increasing globalization of business operations and the high importance of project structures for global operations force companies worldwide to develop and strengthen their capabilities for managing global projects. Therefore, future professionals capable of successfully coordinating projects across multiple countries and cultures will have excellent career prospects. To prepare students for the task of managing global projects, the course will focus on the following topics: • Characteristics and organization of global projects • Cultural influences (effects and remedies) • Controlling of globally distributed projects • Challenges of IS outsourcing/offshoring projects For each of these topics, students will be given an introduction to the topic (knowledge transfer) and then work on real-world examples to gain deeper insights into the topic (knowledge application). In addition, students will work in teams on a project during the semester. |
| 6 | Learning objectives and skills | Lect1/Ex1: The students describe and explain key IT Management models explain and evaluate design options of an IT organization and challenges of the CIO explain main organizational IT cost categories and tasks of managing IT costs describe components of a (digital) business model evaluate (digital) business models understand the impact of new technologies, such as Big Data Technologies, on value creation Lect2/Ex2: |

| | | The main goal of the course is to familiarize students with the foundations of successful management in global IT-projects. The students will: |
|----|--|---|
| 7 | Recommended prerequisites | Lect1/Ex1: None Lect2/Ex2: Basic knowledge on project management principles and techniques |
| 8 | Integration in curriculum | Third semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Digital Business (Elective) Master in International Information Systems (from 2016/17): Module in the section Information Systems – IT Management I or II (Core Course or Elective) |
| 10 | Method of examination | Lect1/Ex1: Written assignment (100%) (Vorlesung 1/ Übung 1: Hausarbeit (100%)) Lect2/Ex2: Presentation (33,33%), class participation (33,33%) and discussion paper (33,33%) (Vorlesung 2/ Übung 2: Diskussionspapier (2 mal 1 Seite – 33,33%), Diskussionsbeitrag (33,33%), Präsentation (2x15 Minuten – 33,33%) |
| 11 | Grading procedure | Lect1/Ex1: 50% of module score (Vorlesung 1/ Übung 1: 50 % der Modulnote) Lect2/Ex2: 50% of module score (Vorlesung 2/ Übung 2: 50 % der Modulnote) |
| 12 | Module frequency | Each WS |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | English |
| 16 | (Recommended) reading | Lect1/Ex1: Carr, N. G. (2003): IT doesn't matter. Harvard Business Review, 81(5), 41–9, 128. Christensen, C. M., & Overdorf, M. (2000). Meeting the Challenge of Disruptive Change. Harvard Business Review, 78(2), 66–76. Lect2/Ex2: Binder J.: Global Project Management: Communication, Collaboration and Management Across Borders. Gower Publishing Ltd, ISBN: 0566087065. |

Service innovation (SI)

| 1 | Module name IIS-57241 | Service innovation | 5 ECTS |
|---|--|---|--------|
| 2 | Courses/lectures IIS72411 IIS72412 | Service innovation | 5 ECTS |
| 3 | Lecturers | Prof. Dr. Roth, Prof. Dr. Möslein, and colleagues | |

| 4 | Module coordinator | Prof. Möslein | |
|----|--|---|--|
| 5 | Contents | Services now account for over 80% of all transactions in developed economies, but typically receive much less R&D attention than products. Developing service innovations demands a clear strategy from businesses with four interlocking core elements: search, selection, implementation and evaluation of innovative concepts. If even one of these phases is not been clearly thought through, the entire innovation process is likely to collapse. This course focuses on successful approaches, methods, tools and efforts to develop service innovations. Further information can be found on www.wi1.fau.de . | |
| 6 | Learning objectives and skills | The students can: learn about items, notions, characteristics and special features in innovation management for services, service design methods and cases. learn to judge and discuss innovation management tasks and alternative solutions with respect to the specialties of services. experience methods of service design by themselves in interactive lectures, gain a feeling for suitable methods and learn to reflect different effects. apply their knowledge and competences in solving cases and thereby analyze selected issues of managing, developing and innovating services. work together in international small work groups, present their results in English, give feedback to other students' work and discuss different solution approaches. | |
| 7 | Recommended prerequisites | Basic understanding of product and service business processes General knowledge on management and strategy Openness to work interactively and in interdisciplinary and international teams | |
| 8 | Integration in curriculum | Second semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Digital Business (Elective) Master in International Information Systems (from 2016/17): Module in the section Information Systems – Innovation and Value Creation II (Elective) Master Management: Vertiefungsbereich Master Wirtschaftspädagogik, Studienrichtung I: Wahlbereich Master Sozialökonomik: Vertiefungsbereich Master Arbeitsmarkt und Personal: Wahlbereich Master Economics: Wahlbereich Master IBS: core course (Pflichtbereich) | |
| 10 | Method of examination | Seminar paper and presentation (Seminararbeit und Präsentation) | |
| 11 | Grading procedure | Seminar paper (partly group work) (70%) and presentation (partly group work) (30%) | |
| 12 | Module frequency | SS | |
| 13 | Workload | Contact hours: 30 h Independent study: 120 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examina- tion language | English | |
| 16 | (Recommended) reading | Specific literature will be listed in the course | |

Create your fintech startup (FinTech)

| 1 | Module name MIM-57381 | Create your fintech startup | 5 ECTS |
|---|--------------------------|---|--------|
| 2 | Courses/lectures | Lecture and case studies (2 SWS): Create your fintech startup Practice session (2 SWS): Create your fintech startup | 5 ECTS |
| 3 | Lecturers | Prof. Dr. Steffi Haag | |

| 4 | Module coordinator | Prof. Dr. Steffi Haag | |
|-----|--|--|--|
| 5 | Contents | Students explore the entrepreneurial process using a learning by doing | |
| | Coments | methodology in the fintech industry. | |
| | | The lecture and case studies sessions provide and discuss tools and | |
| | | methods of creating, visualizing, and analyzing digital business models | |
| | | (e.g., business model canvas, lean startup, design thinking). In a group project, students transfer and apply those tools to the fintech | |
| | | industry by creating, planning, and pitching their own fin-/insurtech | |
| | | startup ideas. | |
| 6 | Learning objectives and | Students | |
| | skills | can model, analyze, and discuss digital business models and its components | |
| | | can assess the specific opportunities for and challenges of fin-/in- surtech businesses | |
| | | can create, plan, and implement novel fintech startups | |
| | | can pitch their fintech idea in front of peers and experts | |
| | | can present, assess, and give feedback to novel fintech business models | |
| | | can collaborate with peers of different competences. | |
| 7 | Recommended Prerequisi- | None. | |
| | tes | The number of participants is limited. Please see website for details on | |
| 8 | Integration in | the application process! 2nd or 4th semester | |
| 0 | curriculum | 21id of 4th Semester | |
| 9 | Module compatibility Master International Information Systems (from 2018/19): Mo | | |
| | | section Information Systems – Digital Business (Elective) | |
| | | Master International Information Systems (from 2016/17): Module in the | |
| | | section Information Systems – Extension Courses (Elective) | |
| | | Master FACT: Vertiefungsbereich (Modulgruppe Interdisziplinäre Module) | |
| | | Master International Business Studies: Elective course – Free specializa- | |
| | | tion module (Area studies: Europe) | |
| | | Master Management: Vertiefungsbereich Master in Economics: free elective modules | |
| | | Master in Marketing: Wahlmodul in der Modulgruppe "Management" | |
| | | Master Wirtschaftsingenieurwesen | |
| | | Master Arbeitsmarkt und Personal: Wahlbereich | |
| | | Master Wirtschaftspädagogik, Studienrichtung I: fachwissenschaftlicher | |
| | | Pflichtbereich; Studienrichtung II: fachwissenschaftlicher Wahlbereich | |
| | | Master Sozialökonomik: freier Vertiefungsbereich | |
| 10 | Method of examination | Businessplan and presentations in groups | |
| 11 | Grading procedure | Businessplan (40%), online presentations (50%), class participation (10%) | |
| 12 | Module frequency | Each SS | |
| 13 | Workload | Contact hours: 60 h | |
| 4 4 | Madula dunation | Independent study: 90 h | |
| 14 | Module duration | 1 Semester, in blocked sessions | |
| 15 | Teaching and examination language | English | |
| | | | |

| 16 | , | Al-Debei, M. M.; Avison, D. (2010): Developing a unified framework of the |
|----|---------|--|
| | reading | business model concept. European Journal of Information Systems, 19, |
| | | 359-376. |
| | | Blank, S.; Dorf, B. (2012): The Startup Owner's Manual: The Step-By- |
| | | Step Guide for Building a Great Company, K & S Ranch |
| | | Dorfleitner, G., Hornuf, L., Schmitt, M., Weber, M. (2017): Definition of |
| | | fintech and Description of the fintech Industry, in G. Dorfleitner et al., |
| | | fintech in Germany, Springer International Publishing, DOI 10.1007/978- |
| | | 3-319-54666-7_2 |
| | | Osterwalder, A; Pigneur, Y. (2010): Business Model Generation: A Hand- |
| | | book for Visionaries, Game Changers, and Challengers, John Wiley & |
| | | Sons |
| | | Osterwalder, A; Pigneur, Y.; Bernarda, G; Smith, A. (2014): Value Propo- |
| | | sition Design: How to Create Products and Services Customers Want, |
| | | John Wiley & Sons |
| | | Ries, E. (2011): The Lean Startup: How Constant Innovation Creates |
| | | Radically Successful Businesses, Portfolio Penguin, London. |
| | | Further literature is provided in the course sessions. |

Praxisseminar: Innovative Versicherungsprodukte (PSV)

| 1 | Modulbezeichnung FACT-52580 | Praxisseminar: Innovative Versicherungsprodukte (Seminar: Innovative insurance products) | 5 ECTS |
|---|---|---|--|
| 2 | Lehrveranstaltungen | S: Entwicklung und Vermarktung innovativer Versicherungs- produkte (4 SWS) (Development and marketing of innovative insurance products) | |
| 3 | Lehrende | Prof. Gatzert und Mitarbeiter/innen / Prof. Steul-Fischer und Mitarbeiter/innen | |
| 4 | Modulverantwortliche/r | Prof. Gatzert / Prof. Dr. Steul-Fischer | |
| 5 | Inhalt | Das interdisziplinäre Praxisseminar - veranstaltet von dem Le Versicherungswirtschaft und Risikomanagement und dem Lel BWL, insb. Versicherungsmarketing sowie einem Praxispartnetlt den Studierenden praxisnahe Kenntnisse zu (Produkt-) Er gen und der Vermarktung von innovativen Versicherungsprod Versicherungsunternehmen. | hrstuhl für er - vermit- ntwicklun- |
| 6 | Lernziele und Kompeten- zen | Studierende können: - eigenständig innovative Versicherungsprodukte konzipieren - Risiken identifizieren und die Risikosituation bewerten - innovative Vermarktungskonzepte entwickeln - anhand einer Abschlusspräsentation wesentliche Inhalte vor | |
| 7 | Empfohlene Vorausset- zungen für die Teilnahme | Grundlegende Kenntnisse der Versicherungswirtschaft sind hilfreich. Die Anmeldung erfolgt per E-Mail an <u>katrin.osterried</u> (beschränkte Teilnehmerzahl- Auswahl auf Basis der Studien und des Lebenslaufs) | |
| 8 | Einpassung in Musterstu- dienplan | 3. Semester | |
| 9 | Verwendbarkeit des Moduls | Master International Information Systems (from 2018/19): Mosection Information Systems – Digital Business (Elective) Master International Information Systems (from 2016/17): Mosection Information Systems – Extension Courses (Elective) Master FACT: Vertiefungsbereich (Modulgruppe Finance and Master Management: Vertiefungsbereich (Modulgruppe Sons Master Wirtschaftsingenieurwesen: Wahlbereich (Grundlagen Master Marketing mit Studienbeginn ab WS17/18: Wahlmodudulgruppe "Interdisziplinäre Module" Master Marketing mit Stuvor WS17/18: Wahlmodul in der Modulgruppe "Sonstiges" | dule in the Insurance) tiges) FACT) I in der Mo- |

| 10 | Studien- und Prüfungs- | - Seminararbeit (15-20 Seiten) und Präsentation (15-30 Minuten, inklu- |
|----|---------------------------|---|
| | leistungen | sive Protokoll zur Präsentation) in Gruppenarbeit. |
| | | Es handelt sich um eine einheitliche Prüfung, bei der die einzelnen Teil- |
| | | leistungen untrennbar miteinander verbunden sind. Für das Bestehen des |
| | | Moduls müssen nach § 19 Abs. 1 Satz 4 MPOWIWI in der jeweils gelten- |
| | | den Fassung alle Teilleistungen in demselben Semester bestanden wer- |
| | | den. Wegen des untrennbaren Bezugs der Teilleistungen aufeinander ist |
| | | abweichend von § 25 Abs. 1 Satz 2 MPOWIWI eine Wiederholung nur ei- |
| | | ner der nicht bestandenen Teilleistungen nicht möglich. Das Nichtbeste- |
| | | hen einer der Teilleistungen erfordert die Wiederholung der gesamten |
| | | Prüfung. |
| 11 | Berechnung Modulnote | Seminararbeit (50%) und Präsentation (50%) |
| 12 | Turnus des Angebots | Jedes Semester |
| 13 | Arbeitsaufwand | Präsenzzeit: 60 h + Eigenstudium: 90 h |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und Prü- | Deutsch |
| | fungssprache | |
| 16 | (Vorbereitende) Literatur | Wird in der Veranstaltung bekannt gegeben |

Digital transformation project (DTP)

| 1 | Module name IIS-57171 | Digital transformation project | 5 ECTS |
|---|--|---|--------|
| 2 | Courses/lectures IIS71711 IIS71712 | Digital transformation project (2+2 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Dr. Roth, Prof. Dr. Möslein, and colleagues | |

| 4 | Module coordinator | Prof. Möslein | |
|---|--------------------------------|--|--|
| 5 | Contents | In this module, students will focus on developing and evaluating solutions for organizational challenges in the context of digital transformation. In doing so, they work together with organizations from various industries and gain in-depth experience in solving organizational problems using a systematic design science research process. Moreover, they will get familiar with empirical research methods and improve their presentation as well as writing skills. | |
| 6 | Learning objectives and skills | The students possess comprehensive, detailed, and specialized problem solving skills in the context of digital transformation can independently plan and carry out design science research processes can situationally identify, collect and analyze relevant organizational data are familiar with the topic of digital transformation and its effects on organizational stakeholders | |
| 7 | Recommended prerequisites | None | |
| 8 | Integration in curriculum | First semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Digital Business (Elective) Master International Information Systems (from 2016/17): Module in the section Customized Introduction to IIS (Management) | |

| | | Master in Management: Vertiefungsbereich Master Marketing: Wahlpflichtbereich der Modulgruppe "Management" |
|----|--|---|
| 10 | Method of examination | Seminar paper and presentation (Seminararbeit und Präsentation) |
| 11 | Grading procedure | Seminar Paper (partly group work) (70%) and presentation (partly group work) (30%) |
| 12 | Module frequency | Each SS |
| 13 | Workload | Attendance: 60 h Self-study: 90 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | English |
| 16 | (Recommended) reading | Presented in class |

Patenting for Innovation (PFI)

| 1 | Module name IIS-57172 | Patenting for innovation | 5 ECTS |
|---|--------------------------|---|--------|
| 2 | Courses/lectures | Patenting for innovation | 5 ECTS |
| 3 | Lecturers | Dr. Grill, Prof. Möslein and colleagues | |

| 4 | Module coordinator | Prof. Möslein | |
|----|--|--|--|
| 5 | Contents | Intellectual Properties (IPs) in general and especially patents play an im- | |
| | | portant role in innovation in any Hightech society. This topic is multi-faceted and can be accessed from different viewpoints: business, politics, legal | |
| | | framework, organization, etc. In this course, we will focus on: | |
| | | - the introduction to IPs and patents in general, | |
| | | the role of IPs and patents in research, development and (open) in- novation, | |
| | | the patent exploitation through licensing contracts and patent pools, the patent policies in the European Union, China and USA. | |
| 6 | Learning objectives and | The students: | |
| | skills | learn to understand the role of patenting in the innovation process, gain deeper insights into the roles of IP in various types of businesses, study the role of IP and patents in different regions and contexts (Asia, United States, Europe). | |
| 7 | Recommended prerequisites | None | |
| 8 | Integration in curriculum | Third semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the sec- | |
| | | tion Information Systems – Digital Business (Elective) | |
| | | Master in International Information Systems (from 2016/17): Module in the section Information Systems – Innovation and Value Creation II (Elective) | |
| | | Master International Business Studies: elective course | |
| | | Master Management: Vertiefungsbereich | |
| 10 | Method of examination | Seminar paper (Seminararbeit) | |
| 11 | Grading procedure | Seminar paper (100%) (Seminararbeit) | |
| 12 | Module frequency | Each WS | |
| 13 | Workload | Contact hours: 30 h | |
| | | Independent study: 120 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examina- tion language | English | |
| 16 | (Recommended) reading | Literature will be announced and distributed in the first sessions. | |

Electronic Human Resources Management (EHRM)

| 1 | Module name IIS- 57086 | Electronic human resources management | 5 ECTS |
|---|---------------------------|---|--------|
| 2 | Courses/lectures | Electronic human resources management (E-HRM) | 5 ECTS |
| 3 | Lecturer | Prof. Dr. Sven Laumer | |

| 4 | Module coordinator | Prof. Dr. Sven Laumer |
|----|--------------------------------|--|
| | | |
| 5 | Contents | This course focuses on the use and development of digital technologies for the management of human resources in an organizational context. The lecture and the content provided will address theories, methods and digital technologies and provide students with the necessary knowledge for the identification ("discovery"), design ("development"), diffusion ("diffusion") and evaluation ("impact") of digital innovations in human resource management. This phase of knowledge transfer uses an e-learning module, which combines different media. In the context of the application of the knowledge transfered, students are instructed to lead discussions on exercises or case studies. For this purpose, problems from the practice of human resources work are described and students should discuss them with the theories and methods presented or develop suggestions for the use of digital technologies. In the context of knowledge implementation, students are accompanied by a case study analysis to apply the theories and methods. In the virtual design, the case study of the FAUBank will be used in the course for this purpose. |
| | | Agenda: - Part A: Technical basics of E-HRM - Part B: Social Media in HRM - Part C: Data-driven approaches and their use with HR - Part D: Challenges and opportunities of E-HRM |
| 6 | Learning objectives and skills | The general learning and qualification objective of the module is to enable students to gain knowledge about the use and development of digital technologies in human resources management, to explain the effects of digital technologies on human resources management (HRM) and to design digital innovations for HRM. |
| 7 | Recommended prerequisites | Registration via the vhb (www.vhb.org) is necessary to gain access to the StudOn course. |
| 8 | Integration in curriculum | First or third term |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Digital Business (Elective) Master in International Information Systems (from 2016/17): Module in the section Information Systems – IT Management II (Elective) Master Arbeitsmarkt und Personal: Elective Master Wirtschaftspädagogik, Studienrichtung I: Elective Master Wirtschaftspädagogik, Studienrichtung II: Zweitfach Wirtschaftsinformatik Erweiterungsprüfung Berufliche Schulen/Studienfach Wirtschaftspädagogik |
| 10 | Method of examination | Lec/Ex: Written examination 90 minutes |
| 11 | Grading procedure | Lec/Ex: 100% of exam score |
| 12 | Module frequency | Summer and winter term (Start in winter term 2020/2021!) |

| Workload | Lecture: 40h |
|--------------------------|---|
| | Excercise: 40h |
| | Independent study: 70h |
| Module duration | 1 Semester |
| Teaching and examination | German and English |
| language | |
| (Recommended) reading | References are provided during the lectures |
| | Module duration Teaching and examination language |

Judgment in decision making and evidence-based management (JUDMEM)

| 1 | Module name IIS- 56216 | Judgment in decision making and evidence-based management | 5 ECTS |
|----|--------------------------------|--|--|
| 2 | Courses/lectures | Lecture (2 SWS): Judgment in decision making and evi- | 5 ECTS |
| _ | Godingo, iostaros | dence-based management | 0 2010 |
| 3 | Lecturers | Prof. Dr. Verena Tiefenbeck | |
| 4 | Module coordinator | Prof. Dr. Verena Tiefenbeck | |
| 6 | Learning objectives and skills | While today's companies and individuals have access to more data, most decisions are taken on limited and imperfect inform sequently, various fields require their practitioners to have an derstanding of judgment and decision-making. Examples incluvelopment of user interfaces and marketing strategies, hiring crisis intervention, as well as policy-making in education, healt social services. This course examines how people make choic situations, probabilities, and decision options. The focus is on between rational decision-making, and the psychological principuide decision behavior. The course reviews common heuristitive errors and systematic biases that help us to make reasona accurate decisions in some areas, but may crucially misguide ers. We will develop tools to detect and mitigate systematic coases and we will identify strategies that tap into these insights proved decision-making in diverse real-world contexts, both in everyday-life situations and complex managerial decision envious tudent are able to • describe key psychological processes involved in judg decision making. • explain when and why those processes lead to (more curate and inaccurate judgments. • identify and describe common judgment and decision and biases. • apply the acquired knowledge to examples and proble business and public policy. • explain the methodology (experiments and field studies study judgment and decision making and apply it to neworld applications. • critically reflect upon the way how they and others tak decisions in daily life. • work together in international small work groups, sum takeaways from behavioral studies, and present their | nation. Con- in-depth un- ide the de- decisions, thcare, or ces, judge the contrast ciples that cs, cogni- able and us in oth- ignitive bi- for im- simple fronments. gment and or less) ac- heuristics ems from es) used to ew real- e common marize key |
| 7 | Recommended prerequisi- | English. None | |
| | tes | Cooperation to the company of the co | |
| 8 | Integration in curriculum | Second or forth semester | 10/47) |
| 9 | Module compatibility | Master International Information Systems (from 2018/19 + 201 Elective in the section Digital Business | 16/17): |
| 10 | Method of examination | Master Wirtschaftsingenieurwesen: Allgemeines Wahlmodul Change due to Corona situation: | |
| | | Written exam and project (creating a short educational video clip) | |
| 11 | Grading procedure | Change due to Corona situation: Written exam (60%), project (40%) | |
| 12 | Module frequency | Each summer term | |
| 13 | Workload | Contact hours: 30 h Independent study: 120 h | |

| 14 | Module duration | 1 semester |
|----|-----------------------------------|--|
| 15 | Teaching and examination language | English |
| 16 | (Recommended) reading | All relevant material will be provided during the seminar. |

Architectures & Development

Designing technology (DT)

| 17 | Module name IIS-57073 | Designing technology | 5 ECTS |
|----|--|------------------------------|--------|
| 18 | Courses/lectures IIS70732 IIS70733 | Designing technology | 5 ECTS |
| 19 | Lecturers | Prof. Möslein and colleagues | |

| , | | | |
|----|--------------------------------|--|--|
| 20 | Module coordinator | Prof. Möslein | |
| 21 | Contents | This course aims to teach students on how to design innovative artifacts to extend human and organizational capabilities, following the design science paradigm. Understanding the design science paradigm and its application will enable students to develop knowledge on the management and use of information technology for managerial purposes and effectively communicate this knowledge. Students will also be introduced to innovation technologies in the context of artificial intelligence and augmented reality that can link and enable different types of innovation technologies across the boundaries of sociotechnical systems. They will also be introduced to social and technological theories and literature such as systems theory, communication theory and basics of open innovation and user innovation. Students will use this knowledge on current technologies and theory to work on a (design science) project that solves human or organizational problems. The course requires analytical thinking, where students can identify and clearly articulate problems that they would like to solve and the process of solution finding. While existing technical knowledge from students is welcome, it is not a prerequisite for the course. Students can also contribute by conducting theoretical/empirical research, along with developing IT artifacts. To conclude, the course offers a balance between creativity and scientific thinking, which can be of immense help to students seeking to learn either skill or both. | |
| 22 | Learning objectives and skills | The students: can develop knowledge on the management and use of information technology for managerial purposes can differentiate between and assess the most important developments on the Web. develop a research design for a design science project. discuss theories, as well as the design and the progress of their project. | |
| 23 | Recommended prerequisites | Basic knowledge of web technologies (i.e. basic html or understanding of web technology in general) or knowledge of empirical methods to evaluate designed artifacts | |
| 24 | Integration in curriculum | Third semester | |
| 25 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Architectures & Development (Core Course or Elective) Master in International Information Systems (from 2016/17): Module in the section Information Systems – Innovation and Value Creation II (Elective) | |
| 26 | Method of examination | Lect/Ex: Research project (70%) and written assignments (30%) (Vorlesung/ Übung: Projektarbeit (70%) und Hausarbeit (30%)) | |

| 27 | Grading procedure | Lect/Ex: Research project (70%) and written assignments (30%) (Vorlesung/ Übung: Projektarbeit (70%) und Hausarbeit (30%)) | |
|----|--|--|--|
| 28 | Module frequency | Each WS | |
| 29 | Workload | Contact hours: 30 h Independent study: 120 h | |
| 30 | Module duration | 1 semester | |
| 31 | Teaching and examina- tion language | English | |
| 32 | (Recommended) reading | Baldwin, C. Y., & Clark, K. B. (2004). Modularity in the Design of Complex Engineering Systems. In <i>Complex Engineered Systems Understanding Complex Systems</i> , 175–205. Kroes, P. (2010). Engineering and the dual nature of technical artefacts. <i>Cambridge Journal of Economics</i> , 34 (1), 51–62.Hevner, A. R., March, S. T., Park, J. & Ram, S. (2004). Design Science in Information Systems Research. <i>MIS Quarterly: Management Information Systems</i> , 28 (1), 75-106. Fichman, R., Dos Santos, B., & Zheng, Z. (2014). Digital Innovation as a Fundamental and Powerful Concept in the Information Systems Curriculum. <i>MIS Quarterly: Management Information Systems</i> , 38, 329–353. Hevner, A.R., 2007. A Three Cycle View of Design Science Research. Scand. J. Inf. Syst. © Scand. J. Inf. Syst. 19, 87–92. Peffers, K., Tuunanen, T., Rothenberger, M.A., Chatterjee, S., 2007. A Design Science Research Methodology for Information Systems Research. J. Manag. Inf. Syst. 24, 45–78. | |

Managing enterprise-wide IT architectures (MEITA)

| 1 | Module name IIS-57030 | Managing enterprise-wide IT architectures | 5 ECTS |
|---|--|--|----------------------|
| 2 | Courses/lectures IIS70303 and IIS70302 | Lecture.: Fundamentals of enterprise-wide IT architecture management (2 SWS) Exercise: Case study seminar (2 SWS) | 2,5 ECTS 2,5 ECTS |
| 3 | Lecturers | Prof. Amberg and colleagues | |

| 4 | Module coordinator | Prof. Amberg | |
|---|--------------------------------|---|--|
| 5 | Contents | Lecture: Fundamentals of Enterprise-Wide IT Architecture Management The lecture "Fundamentals of Enterprise-Wide IT Architecture Management" provides the fundamentals of business process management and the underlying IT architecture. The course has a strong focus on concepts of business-IT-alignment e.g., service oriented architectures, cloud computing, and enterprise-wide IT systems as well as important paradigms to (re-) design enterprise IT architectures. Case Study Seminar Managers and business leaders in the field of information technology must make decisions with limited information and a swirl of business activities going on around them. They are required to evaluate options, make choices, and find solutions to the challenges they face every day. In this seminar, students will take on the perspective of a decision-maker by analyzing and discussing complex management challenges illustrated in different case studies from leading business schools. | |
| 6 | Learning objectives and skills | Lecture: Fundamentals of Enterprise-Wide IT Architecture Management Students • know about the major differences of process and workflow management, • know about the main models of IT Service Management and Business-IT Alignment, • can understand the impact of Big Data Technologies on Value Creation,can assess and implement different types of Big Data Systems, • can explain the major differences of automated communication concepts like EDI, XML and EDIFCAT, • can assess process standardization in different environments. Case Study Seminar Students should • know about real-world challenges in the area of IT management, as well as methods for analyzing case studies, • be able to apply the vocabulary, theory, and methods they have learned in the lecture, • be able to develop solutions to business problems, as well as defend their solutions and discuss them critically in a group setting • be able to present solutions to case study problems in English. | |
| 7 | Recommended prerequisites | None | |
| 8 | Integration in curriculum | Second semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Architectures & Development (Core Course or Elective) | |

| | | Master in International Information Systems (from 2016/17): Module in the section Information Systems – IT Management I or II (Core Course or Elective) |
|----|--|---|
| 10 | Method of examination | Lecture: written examination 60 minutes (100%) (Vorlesung: Klausur, 60 Minuten) Case Study Seminar: Presentation (33,33%), class participation (33,33%) and discussion paper (33,33%) (Präsentation (2 x 15 Minuten – 33,33%), Diskussionsbeitrag (2 x 90 Minuten – 33,33%), Diskussionspapier (2 x 1 Seite – 33,33%) |
| 11 | Grading procedure | Lecture: 50% of module score (Vorlesung: 50% der Modulnote) Case Study Seminar: 50% of module score (Seminar: 50% der Modulnote) |
| 12 | Module frequency | Each SS |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | English |
| 16 | (Recommended) reading | Lecture: Rood, M. A. Enterprise architecture: Definition, content, and utility, in Proceedings of the Third Workshop on: Enabling Technologies: Infrastructure for Collaborative Enterprises, 1994, pp. 106-111. Case Study Seminar: Ellet, W. The Case Study Handbook: How to Read, Discuss, and Write Persuasively About Cases. Harvard Business Review Press, 2007. |

Process analytics (PA)

| | 1 | Module name IIS-54760 | Process analytics (PA) | 5 ECTS |
|---|---|--------------------------|--|--------|
| | 2 | Courses/lectures | Process analytics (4 SWS) | 5 ETCS |
| I | 3 | Lecturers | Sandra Zilker, Willi Trang, Prof. Dr. Martin Matzner | |

| 4 | Module coordinator | Prof. Dr. Martin Matzner | |
|----|---------------------------|--|--|
| 5 | Contents | The course deals with data-driven analysis of business processes. There- | |
| | | fore, different technical, organizational and business aspects of process | |
| | | improvement are discussed with Process Mining being at the center of at- | |
| | | tention. | |
| | | The module has a strong practical focus and encourages students to apply | |
| | | methods and concepts learned during the lecture. | |
| | | In the group project the students will apply their knowledge using state-of-the-art process mining tools (e.g., Celonis). | |
| 6 | Learning objectives and | The students | |
| | skills | capture the concepts around process improvement and recognize the | |
| | Skiiio | potentials for organizations | |
| | | understand technical aspects of data-driven process analysis | |
| | | know about state-of-the art technologies for process mining | |
| | | apply technologies for data extraction and analysis in a practical setting | |
| | | analyze a business process and develop a business case for process improvements | |
| | | work in groups and present their results together | |
| 7 | Recommended prerequisi- | Beneficial: | |
| | tes | Basic understanding of business processes and process nota- tions / | |
| | | modelling (see Advanced process management) | |
| 8 | Integration in curriculum | First or third semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the | |
| 9 | Wodule companionity | section Information Systems – Architectures & Development (Core | |
| | | Course or Elective) | |
| | | Master International Information Systems (from 2016/17): Module in the | |
| | | section Information Systems – Extension Courses (Elective) Master FACT: Vertiefungsbereich (Modulgruppe Interdisziplinäre Module) | |
| 10 | Method of examination | written examination (60 minutes) and group presentations | |
| | | , | |
| 11 | Grading procedure | Written examination (30%) and group presentation (70%) | |
| 12 | Module frequency | Each WS | |
| 13 | Workload | Contact hours: 60 h | |
| | | Independent study: 90 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examination | English | |
| | language | | |
| 16 | (Recommended) reading | None | |

User experience in a business context (UXB)

| 1 | Module name IIS-57451 | User experience (UX) in a business context | 5 ECTS |
|---|--------------------------|--|--------|
| 2 | Courses/lectures | Lecture (2 SWS): UX in a business context Practice session (2 SWS): UX in a business context | 5 ECTS |
| 3 | Lecturers | Prof. Dr. Steffi Haag | |

| 4 | Module coordinator | Prof. Dr. Steffi Haag |
|----|--------------------------------|--|
| 5 | Contents | Organizations have started to realize that designing and maintaining great user experience (UX) is the best way to build trust, retention, and loyalty of staff and customers alike. The lecture • teaches the key concepts, methods, and approaches that help de- |
| | | sign, measure, and manage total UX across the organization and drive value propositions of digital business models. • discusses established and new methods of UX research for (further) |
| | | developing digital technologies. • introduces frameworks to build and lead teams of UX researchers, designers, engineers, product managers. |
| | | employs case studies to transfer and discuss the application of UX design, research, and management in practice. |
| | | In the practice sessions, (groups of) students practically apply UX research methods and tools (e.g., user journeys) to investigate users' experiences in interaction with state-of-the-art digital technology prototypes, and to deduce implications for product and organizational strategy, development, and design. The results are presented towards peers and/or experts from research and industry. |
| 6 | Learning objectives and skills | Students can define, discuss, and apply the concepts, methods, and tools of analyzing and managing the experiences users perceive in interaction |
| | | with new digital technologies of organizations. Students are able to measure and analyze user experiences of novel technologies and infer recommendations for technology and policy design and development. |
| | | Students can present user research results towards peers. Students develop skills in collaborative interaction with peers. |
| 7 | Recommended Prerequisites | None. The number of participants is limited. Please see website for details on the application process! |
| 8 | Integration in curriculum | 1st or 3rd semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Architectures & Development (Core Course or Elective) |
| | | Master International Information Systems (from 2016/17): Module in the section Information Systems – Extension Courses (Elective) |
| | | Master FACT: Vertiefungsbereich (Modulgruppe Interdisziplinäre Module) |
| | | Master International Business Studies: Elective course - Free specializa- |
| | | tion module (Area studies: Europe) |
| | | Master Management: Vertiefungsbereich Master Marketing: Wahlmodul in der Modulgruppe "Management" |
| | | Master Wirtschaftsingenieurwesen |
| 10 | Method of examination | Project report and presentations, partly in groups |
| 11 | Grading procedure | Project report (30%), online presentations (70%) |
| 12 | Module frequency | Each WS |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h |
| 14 | Module duration | 1 Semester |

| | Teaching and examination language | English |
|----|-----------------------------------|--|
| 16 | (Recommended) | Relevant literature is provided during the course. |
| | reading | |

Advanced process management (APM)

| 1 | Module name IIS-57083 | Advanced process management | 5 ECTS |
|---|------------------------------|--|--------|
| 2 | Courses/lectures IIS70817 | Lecture: Advanced process management (2 SWS) Exercise: Advanced process management (2 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Bodendorf and colleagues | |

| 4 | Module coordinator | Prof. Bodendorf | |
|----|--|--|--|
| 5 | Contents | Lecture and Exercise: This course is about strategic business process planning and business IT alignment. Additionally, it covers business process analysis, planning, engineering, monitoring and controlling. Furthermore, it provides a comprehensive understanding of workflow management systems, service-oriented architectures, intelligent agents and assistants as well as process portals. | |
| 6 | Learning objectives and skills | The students select suitable process architectures and organizational structures within the scope of business process management. can model, analyze, and implement (with the aid of IT) complex processes. independently transfer business process management concepts to new use cases. solve weekly exercises to deepen the understanding of the lecture contents | |
| 7 | Recommended prerequisites | None | |
| 8 | Integration in curriculum | First or third semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Architectures & Development (Elective) Master International Information Systems (from 2016/17): Module in the section Information Systems – Services, Processes and Intelligence II (Elective) Master Management: Vertiefungsbereich Master Wirtschaftsingeneurswesen Master International Production Engineering and Management Informatik Nebenfach Betriebswirtschaftslehre Master FACT: Vertiefungsbereich Master IBS: Wahlbereich | |
| 10 | Method of examination | Written examination 90 minutes (Klausur 90 Minuten) | |
| 11 | Grading procedure | 100% of exam score (100% der Klausurnote) | |
| 12 | Module frequency | Each WS | |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examina- tion language | English | |
| 16 | (Recommended) reading | Fundamentals of Business Process Management, Springer, ISBN 978-3-642-33142. For more information see http://www.wi2.fau.de | |

Case solving seminar (CSS)

| 1 | Module name IIS-57250 | Case solving seminar | 5 ECTS |
|---|---------------------------|--------------------------------|--------|
| 2 | Courses/lectures IIS70101 | Case solving seminar (4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Bodendorf and colleagues | |

| 4 | Module coordinator | Prof. Bodendorf |
|----|-----------------------------------|--|
| 5 | Contents | The course relies on cases to understand and solve problems in real business situations. Students may work in teams and apply their theoretical knowledge in solving the cases. This will provide the students an opportunity to develop key skills such as communication, group working and problem solving skills. |
| 6 | Learning objectives and skills | The students can independently analyze and solve problems in real-world situations. conduct the discussion of complex problem-solving approaches in groups and present their work results. |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | Third semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Architectures & Development (Elective) Master in International Information Systems (from 2016/17): Module in the section Customized Introduction to IIS (Management) |
| 10 | Method of examination | Seminar paper (Seminararbeit) and presentation (Präsentation) |
| 11 | Grading procedure | Seminar paper 100% (Seminararbeit 100%) and presentation passed (Präsentation bestanden) |
| 12 | Module frequency | Each semester |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examination language | English |
| 16 | (Recommended) reading | All relevant material will be provided during the seminar. |

Designing Gamified Systems (DGS)

| 1 | Module name IIS-57046 | Designing gamified systems (DGS) | 5 ECTS |
|---|--------------------------|---|--------|
| 2 | Courses/lectures | Lecture + Capstone Project (4 SWS) | 5 ETCS |
| 3 | Lecturers | Prof. Dr. Benedikt Morschheuser, industry partners (e.g. from Daimler AG) | |

| 4 | Module coordinator | Prof. Dr. Benedikt Morschheuser |
|---|--------------------------------|---|
| 5 | Contents | Driven by the rising popularity of (video) games, technology, business and society are increasingly influenced and penetrated by games and trends of the gaming industry. One of the probably most important phenomena of this multi-faceted development is "gamification", which addresses the use of design principles and features from games in information systems, process or service design. |
| | | Gamification's popularity stems from the notion that games are a pinnacle form of hedonic information systems and thus are particularly effective in invoking intrinsic motivation and experiences such as autonomy, mastery, flow, immersion, relatedness and overall enjoyment. Across industries, marketers, designers and developers are thus using gamification as a design approach when engineering digital products and services with the purpose of inducing gameful experiences, influencing human motivation and even change behavior in various contexts. |
| | | This course teaches the key concepts, design patterns, and approaches of motivational, hedonic (i.e. games and video games), social and gamified information systems. offers deep insights into advanced concepts and theoretical foundations of game design, motivational psychology, and information system design. introduces methods and frameworks for designing gamified systems and managing gamification projects. discusses latest research findings and the potential impact of gamification on society, economy and everyday life. |
| | | Capstone Project: The course is complemented with a practical design project, where students in a team select and apply design methods & techniques in order to create a prototype of a gamified / hedonic information system. Within this project the students can apply knowledge and skills acquired in this lecture and their studies in a challenging context. The results are presented towards peers and/or experts from research and/or industry. |
| 6 | Learning objectives and skills | The students gain knowledge in understanding the underlying design principles of gamified and hedonic information systems and are able to analyze and discuss such systems. The students learn state-of-the-art methods, techniques and tools for successfully conducting gamification projects and are able to select and apply them. The students train their creativity and prototyping skills. Further they can improve their collaboration and presentation skills. |
| 7 | Recommended prerequisites | Motivation to work in an international and interdisciplinary group on a challenging topic. Creativity, prototyping skills, or development experiences can be helpful. The number of participants is limited. Please see website for details on |
| | | the application process! |

| 8 | Integration in curriculum | First, second, third and fourth semester |
|----|-----------------------------------|---|
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Information Systems – Architectures & Development (Elective) Master International Information Systems (from 2016/17): Module in the section Information Systems – Extension Courses (Elective) Master Wirtschaftsingenieurwesen (Elective) Master Elektrotechnik-Elektronik-Informationstechnik (Elective) Master Information and Communication Technology (Elective) |
| 10 | Method of examination | Project report that needs to be presented: The students create a project report (max. 20 pages, partly group work), which describes the developed prototype of a gamified or hedonic information system (e.g. a gamified app, information system or a game). The report is presented together with the developed prototype in a presentation. |
| 11 | Grading procedure | Project report: 40% of module score (partly group work) Presentation of the project report: 60% of module score (partly group work) |
| 12 | Module frequency | SS |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examination language | English |
| 16 | (Recommended) reading | Koivisto, J & Hamari, J. (2019). The rise of motivational information systems: A review of gamification research. International Journal of Information Management, 45. pp. 191-210. Morschheuser, B., Hassan, L., Werder, K., Hamari, J. (2018). How to design gamification? A method for engineering gamified software. Information & Software Technology, 95. pp. 219-237. Radoff, J. (2011). Game On: Energize Your Business with Social Media Games. Wiley, USA. Salen, K. (2004). Rules of play: game design fundamentals. MIT Press, Cambridge, USA. further literature will be made available in the lecture. |

Study Abroad Courses

| 1 | Module name IIS-57262 | Study abroad courses (Information systems) | 1) |
|---|--------------------------|--|----|
| 2 | Courses/lectures | Study abroad courses (Information systems) | 1) |
| 3 | Lecturers | Staff at exchange university | |

| 4 | Module coordinator | Prof. Bodendorf, Prof. Möslein, Prof. Amberg |
|----|-----------------------------------|---|
| 5 | Contents | Courses students will be attending during the exchange semester in one of the partner universities or others should fit into the area Information systems thus extending the student's knowledge and competencies in this field of study. The suitability of the courses will be assessed by the programme coordinator. |
| 6 | Learning objectives and skills | Students acquire additional knowledge and competencies in their field of study |
| 7 | Recommended prerequisites | Learning agreement |
| 8 | Integration in curriculum | Third semester |
| 9 | Module compatibility | Master International Information Systems: Module in the section Information Systems (Elective) |
| 10 | Method of examination | In accordance with exam regulations of the exchange university |
| 11 | Grading procedure | In accordance with grading key and credits of the course |
| 12 | Module frequency | In accordance with the curriculum of the exchange university |
| 13 | Workload | In accordance with the specific course and the credits of the course |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examination language | Tbd in the course |
| 16 | (Recommended) reading | Tbd in the course |

¹) 5, 10 or 15 ECTS

V Informatics

The Informatics part is made up of "Core Courses" and "Electives" worth 15 ECTS each. Students have to earn 5 ECTS in the Core Courses of each of the subject areas "Data & Knowledge", "Digital Business" and "Architectures & Development". Within the electives students can freely combine different modules of these subject areas" and the extension courses. Some modules are included in the core courses as well as in the electives. These modules can only be taken once, either as a core or an elective course.

The graph below shows the available options for the Core Courses and Electives.

Der Bereich Informatics besteht aus "Core Courses" (Kernbereich) und "Electives" (Wahlbereich) mit jeweils 15 ECTS. Die Studierenden müssen jeweils 5 ECTS aus den Kernbereichen der Gebiete "Data & Knowledge", "Digital Business" und "Architectures & Development" einbringen. Im Wahlbereich können die Studierenden verschiedene Module dieser Gebiete und der Extension Courses frei kombinieren. Manche Module werden sowohl im Kernbereich als auch im Wahlbereich angeboten. Diese Module können nur einmal belegt werden, entweder als Core Course oder als Elective Course.

Die nachfolgende Grafik zeigt die angebotenen Module im Kern- und Wahlbereich.

| Data & Knowledge | | <u>Digital Business</u> | | Architectures & Development | |
|------------------|------------------|-------------------------|-------------------|-----------------------------|--------------------------|
| Core Course | Elective | Core Course | Elective | Core Course | Elective |
| <u>Info</u> | <u>Vis</u> | | <u>HCI</u> | SWE-G | L+Kons |
| <u>DW</u> · | <u>+ TS</u> | <u>OSS-0</u> | COSS-VUE | PC | DIS |
| Intro | <u>pPR</u> | | DSES | <u>SF</u> | <u>PM</u> |
| OSS-NY | YT-VUE | | <u>HumSecPri</u> | | <u>TSWS</u> |
| | MW-VU | | <u>ForensInf</u> | | <u>OOAD</u> |
| | <u>SaM 1</u> | | CryptoCur | | <u>ADAP</u> |
| | <u>SaM 2</u> | | <u>EinflTSec</u> | | <u>ARCH</u> |
| | <u>PR</u> | | <u>IT-Modern</u> | | SoSys3 |
| | OSS-NYT- PROJ | | <u>InnoLab</u> | | SWE-ZUV |
| | <u>AppVis</u> | | AMOS-PO | | SWE-GL + DP |
| | <u>KI I</u> | | <u>FoundCrypt</u> | | <u>SWE-</u> GL+SWE-PR |
| | <u>KI II</u> | | | | SWE-PR+DP |
| | <u>PA</u> | | | | SWE-VV |
| | <u>DL</u> | | | | <u>EBTEIS</u> |
| | OSS-SAKI- VUE | | | | |

Data Warehhousing and Transaction Systems

| 1 | Module name | Data warehhousing und Transaktionssysteme | 5 ECTS |
|---|------------------|---|--------|
| | 237521 | (Data warehousing and transaction systems) | |
| 2 | Courses/lectures | Lecture: Data warehousing und Transaktionssysteme | |
| 3 | Lecturers | Transaction Systems: Prof. Richard Lenz | |
| | | Data Warehousing: Prof. Thomas Ruf | |

| 4 | Module coordinator | Prof. Thomas Ruf, Prof. Richard Lenz |
|---|--------------------------------|---|
| 5 | Contents | DW: Das "Data Warehouse" ist sowohl im theoretischen Bereich der Datenbankforschung als auch in der praktischen Anwendung in der Wirtschaft ein wichtiges Thema. Die Hauptaspekte der Vorlesung liegen dabei in der Diskussion der unterschiedlichen Architekturansätze, der zugehörigen Datenmodelle und der verarbeitungstechnischen Grundlagen. Weiterhin wird auf aktuelle Techniken wie ROLAP und MOLAP oder Aggregatbildung, -verwendung und -haltung eingegangen. Die Vorlesung ist geprägt von einer Mischung aus theoretischen Grundlagen und Anwendungen neuer Forschungsergebnisse. Dabei berichten Praktiker aus Unternehmen zum einen von ihren Erfahrungen bei dem Aufbau eines "Warehouses" und stellen zum anderen den Stand der Technik in einschlägigen Data-Warehouse- Systemen dar. |
| | | TAS: Transactions are the core mechanism to guarantee database consistency in the presence of failures. The lecture introduces the cornerstones of the Transaction Concept and related techniques and system architectures. Topics are: Reconstructing the Transaction Model Advanced Transaction Models Queued transaction processing Implementing the ACID properties of transactions: Concurrency control, logging and recovery TP Monitors: TRPC, Architecture of TP Monitor, Transaction Manager |
| | | This course generalizes the transaction concept from its traditional database system domain to the broader context of client-server computing. The course begins by defining basic terminology and concepts. The role of a transaction processing system in application design, implementation, and operation is covered. Subsequent lectures cover the theory and practice of implementing locking, logging, and the more generic topic of implementing transactional resource managers. |
| 6 | Learning objectives and skills | DW: Die Studierenden • kennen verschiedene Anwendungsgebiete des Data Warehousing und charakterisieren diese; • modellieren multidimensionale Datenbanken; |

entwickeln ein Grundverständnis für die Abbildung multidimensionaler Datenstrukturen in Datenbanken und bewerten die Vorund Nachteile der verschiedenen Ansätze in konkreten Anwendungssituationen; setzen grundlegende Verfahren der Datenauswertung in Data Warehouse-Systemen für konkrete Anwendungssituationen ein; erläutern die Architektur und den Betrieb technischer Data Warehouse-Systeme und erläutern die sich hieraus ergebenden Implikationen im Betrieb solcher Systeme; erklären die von Praxisvertretern vorgestellten Einsatzszenarien und Systemansätzen für DataWarehouse-Systeme; schätzen aktuelle Entwicklungen im Themengebiet ein. TAS: Die Studierenden: erklären die Zielsetzungen und Grenzen transaktionaler Systeme: unterscheiden verschiedene erweiterte Transaktionsmodelle: erläutern wie die Verfügbarkeit verteilter transaktionaler Systeme durch "Queued Transactions"verbessert werden kann; erklären typische Nebenläufigkeitsanomalien; erläutern mit konkreten Beispielen was Wiederherstellbarkeit und Striktheit bedeuten: erklären Ziele und Funktionsweise von Sperrverfahren, hierarchischen Sperrverfahren und zusätzlichen Sperrmodi; erläutern Isolationsstufen zur Abschwächung des Synchronisationsaufwands; erklären die grundlegenden Aufgaben und Funktionen eines "Recovery Managers"; unterscheiden verschiedene Klassen von Wiederherstellungsalgorithmen; erklären Zweck und Funktionsweise von "Checkpoints"und "Fuzzy Checkpoints"; erklären im Detail wie das Zwei-Phasen Freigabeprotokoll funktioniert: erläutern Ziele und Funktionsweise des Drei-Phasen-Freigabeprotokolls und Paxos-Commit; rläutern die Funktionsweise verteilter Transaktionssysteme auf der Basis der standardisierten Schnittstellen in X-Open/DTP. 7 Recommended prerequisi-Konzeptionelle Modellierung Implementierung von Datenbanksystemen 8 Integration in curriculum 2./4. semester 9 Module compatibility Master IIS Core Course Data&Knowledge 10

| 11 | Method of examination | Data Warehousing und Transaktionssysteme (DWTAS) (Prüfungsnum- |
|----|--------------------------|---|
| | | mer: 237521) |
| | | (englische Bezeichnung: Data warehousing and transaction systems) |
| | | Prüfungsleistung, mehrteilige Prüfung |
| | | Anteil an der Berechnung der Modulnote: 100% |
| | | weitere Erläuterungen: |
| | | DW wird geprüft in einer Klausur von 60 Minuten |
| | | TAS wird mündlich geprüft in ca. 30 Minuten. |
| | | Prüfungssprache: Deutsch |
| 12 | Grading procedure | 50% DW & 50% TAS |
| 13 | Module frequency | Each sommer semester |
| 14 | Workload | Contact hours: 60 h |
| | | Independent study: 90 h |
| 15 | Module duration | 1 Semester |
| 16 | Teaching and examination | English (TAS) and German (DW) |
| | language | |
| 17 | (Recommended) reading | - |

Information Visualization (InfoVis)

| 1 | Modulbezeichnung | Informationsvisualisierung | 5 ECTS |
|---|---------------------|---|--------|
| | 299892 | Information visualization | |
| 2 | Lehrveranstaltungen | Vorlesung zur Informationsvisualisierung Übung zur Informationsvisualisierung | |
| 3 | Lehrende | Dr. Grosso | |

| 4 | Modulverantwortliche/r | Dr. Grosso |
|----|--|---|
| | | |
| 5 | Inhalt | Aufgrund der rasanten Entwicklung der Informationstechnologie sind wir mit einer noch nie dagewesenen Flut an Daten konfrontiert: 250.000.000 Fotos werden täglich auf Facebook geladen Weltweit finden 130.000.000 VISA-Transaktionen statt Täglich werden über 500 Millionen Tweets gesendet Informationsvisualisierung befasst sich mit der graphischen Darstellung abstrakter Daten, die keine räumliche Struktur aufweisen. Die Visualisierung abstrakter Daten nutzt visuelle Metaphern und Interaktion, um Information aus den Daten zu extrahieren. Typische Anwendungsszenarien |
| | | sind die Analyse von Finanztransaktionen oder sozialen Netzwerken, Bio- informatik, Geographie, Textanalyse oder Visualisierung von Software- Quellcode. |
| | | In dieser Vorlesung werden unterschiedliche Techniken vorgestellt, um verschieden Arten von Daten zu visualisieren. Insbesondere werden folgende Themen behandelt: Graphen und Netzwerke Dynamische Graphen |
| | | Hierarchien und Bäume Multivariate Daten Time-Series Daten Textvisualisierung |
| | | Visualisierung Biologischer Daten |
| 6 | Lernziele und Kompetenzen | Die Studierenden: |
| | | - listen und identifizieren die unterschiedlichen Algorithmen der In- formationsvisualisierung |
| | | - veranschaulichen die Methoden zur Visualisierung von Graphen und Netzwerke und bestimmen ihre Unterschiede |
| | | - klassifizieren Algorithmen zur Visualisierung multivariater Daten und er- klären ihrer Funktionsweise |
| | | erklären und charakterisieren Techniken für die Text-Visualisierung und veranschaulichen die Methoden zur Visualisierung zeitabhängiger Daten lernen Visualisierungswerkzeuge kennen und wenden diese zur Lösung praxisrelevanten Aufgaben der Informationsvisualisierung |
| | | - sind in der Lage, die vorgestellten Algorithmen der Informationsvisuali- sierung in JavaScript zu implementieren |
| 7 | Empfohlene Voraussetzungen für die Teilnahme | Algorithmik kontinuierlicher Systeme |
| 8 | Einpassung in Musterstudienplan | 3. Semester |
| 9 | Verwendbarkeit des Moduls | Master International Information Systems (from 2018/19): Module in the section Informatics – Data & Knowledge (Core Course or Elective) Master in International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) |
| 10 | Studien- und Prüfungsleistungen | Klausur (90 Min.) Klausur in elektronischer Form mit einem Anteil im Antwort-Wahl-Verfahren |
| | i . | |

| 11 | Berechnung Modulnote | VORL: 100% der Modulnote |
|----|---------------------------|--|
| 12 | Turnus des Angebots | Jährlich im Wintersemester |
| 13 | Arbeitsaufwand | Präsenzzeit: 60h |
| | | Eigenstudium: 90h |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und | Deutsch |
| | Prüfungssprache | |
| 16 | (Vorbereitende) Literatur | Robert Spence: Information Visualization: Design for Interaction |
| | | Stuart K. Card, Jock Mackinlay, Ben Shneiderman: Readings in Information Visualization – Using Vision to Think |
| | | Benjamin B. Bederson, Ben Shneiderman: The Craft of Information Visualization – Readings and Reflections |

Introduction to pattern recognition (IntroPR)

| 1 | Module name 902664 | Introduction to pattern recognition | 5 ECTS |
|---|-----------------------|---|--------|
| 2 | Courses/lectures | Lecture: Introduction to pattern recognition (3 SWS) Exercise: Introduction to pattern recognition (1 SWS) | |
| 3 | Lecturers | Vincent Christlein | |

| 4 | Module coordinator | Andreas Maier |
|---|-------------------------|---|
| 5 | Contents | The goal of this lecture is to familiarize the students with the overall pipeline of a pattern recognition system. The various steps involved from data capture to pattern classification are presented. The lectures start with a short introduction, where the nomenclature is defined. Analog-to-digital conversion is discussed with a focus on how it impacts further signal analysis. Commonly used preprocessing methods are then described. A key component of pattern recognition is feature extraction. Thus, several techniques for feature computation will be presented including Walsh transform, Haar transform, linear predictive coding (LPC), wavelets, moments, principal component analysis (PCA) and linear discriminant analysis (LDA). The lectures conclude with a basic introduction to classification. The principles of statistical, distribution-free and non-parametric classification approaches will be presented. Within this context we will cover Bayesian and Gaussian classifiers, as well as artificial neural net- |
| 6 | Learning objectives and | works. The students |
| | skills | explain the general pipeline of a pattern recognition system understand sampling, the sampling theorem, and quantization apply methods to decompose signals into sine and cosine functions apply various vector quantization methods apply histogram equalization and histogram stretching compare different thresholding methods apply the principle of maximum likelihood estimation to Gaussian probability density functions understand linear shift-invariant filters and convolution apply various low- and high-pass filters, as well as non-linear filters (homomorphic transformations, cepstrum, morphological operations, rank operations) apply various normalization methods understand the curse of dimensionality explain various heuristic feature extraction methods, e.g. projection to orthogonal bases (Fourier transform, Walsh/Hadamard transform, Haar transform), Linear Predictive Coding, geometric moments, feature extraction via filtering, wavelets) understand analytic feature extraction methods, e.g. Principal Component Analysis, Linear Discriminant Analysis define the decision boundary between classes compare different objective functions for feature selection explain the principles of statistical classification (optimal classifier, cost functions, Bayes classifier) understand different classifiers (Gauss classifier, polynomial classifier, non-parametric classifiers such as k-nearest neighbor classifier, Parzen windows, neural networks) and compare them w.r.t. their decision boundaries, their computational complexity, etc. |

| | | use the programming language Python to apply the presented pat- |
|----|---------------------------|--|
| | | tern recognition techniques |
| | | get to know practical applications and apply the presented algo- |
| | | rithms to problems in practice |
| 7 | Recommended prerequisi- | A pattern recognition system consists of the following steps: sensor data |
| | tes | acquisition, pre-processing, feature extraction, and classification/machine |
| | | learning. This course focuses mainly on the first three steps and is the |
| | | basis of our master courses (Pattern Recognition and Pattern Analysis). |
| 8 | Integration in curriculum | 3. semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the |
| | | section Informatics – Data & Knowledge (Core Course or Elective) |
| | | Master International Information Systems (from 2016/17): Module in the |
| | | section Informatics Extension Courses (Elective) |
| | | Master Marketing: Wahlpflichtbereich der Modulgruppe "Data Science" |
| | | Master Marketing: Wahlpflichtbereich der Modulgruppe "Methoden" (gül- |
| | | tig für Studierende mit Studienbeginn bis WS 2016/17) |
| 10 | Method of examination | Oral examiniation (30 min) |
| 11 | Grading procedure | 100% of the exam grade |
| 12 | Module frequency | Each winter semester |
| 13 | Workload | Contact hours: 60 h |
| | | Independent study: 90 h |
| 14 | Module duration | 1 Semester |
| 15 | Teaching and examination | English |
| | language | |
| 16 | (Recommended) reading | lecture slides |
| | | Heinrich Niemann: Klassifikation von Mustern, 2. überarbeitete Auflage, |
| | | 2003 |
| | | Sergios Theodoridis, Konstantinos Koutroumbas: Pattern Recognition, |
| | | 4th edition, Academic Press, Burlington, 2009 |
| | | Richard O. Duda, Peter E. Hart, David G. Stock: Pattern Classification, |
| | | 2nd edition, John Wiley & Sons, New York, 2001 |
| | | 2nd edition, John Wiley & Sons, New York, 2001 |

Nailing your thesis (OSS-NYT-VUE)

| 1 | Module name 480491 | Nailing your thesis (OSS-NYT-VUE) | 5 ECTS |
|---|-----------------------|-----------------------------------|--------|
| 2 | Courses/lectures | Nailing your thesis (4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Riehle | |

| 4 | Module coordinator | Prof. Riehle, M.B.A. |
|----|--------------------------------|---|
| 5 | Contents | This course teaches students how to perform scientific research for their final thesis or a research paper. The goal is to prepare students for a Bachelor or Master research thesis. The course covers the following topics: Science and society The research process Exploratory research Confirmatory research Writing a thesis/paper The scientific community Students can choose one or both of two components: VUE (lecture + exercise), 4 SWS, 5 ECTS. VUE combines lectures with homework and exercises. VUE is run as a 3h block. PROJ (small research project), 2 SWS, 5 ECTS. In PROJ, students perform a small research project, either individually or in teams. The available projects will be presented at the beginning of the course. Students perform the research, write a paper, and hold a presentation about their work. The overall schedule can be found at https://goo.gl/VqoFO . Please sign up for the course on StudOn (link accessible through schedule spreadsheet) as soon as possible. |
| 6 | Learning objectives and skills | Understand how to perform research Understand how to write a research thesis |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | NYT can be taken in these variants: • VUE (4 SWS, 5 ECTS) • PROJ (4 SWS, 5 ECTS) • VUE + PROJ (8 SWS, 10 ECTS) NYT is available to Informatik (Bachelor und Master), Wirtschaftsinformatik (Bachelor) and IIS (Master) students. NYT is also available to other degree programs, see UnivIS. NYT is available as an (ungraded) Schlüsselqualifikation. |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Data & Knowledge (Core Course or Elective) or Master International Information Systems (from 2016/17 + 2018/19): Module in the section Seminar International Information Systems or Master International Information Systems (from 2016/17): Module in the section Informatics Applied Software Engineering I or II (Core Course of Elective) |
| 10 | Method of examination | In-class participationHomework assignments |

| 11 | Grading procedure | Classwork (40%) + homework (60%) |
|----|--|--------------------------------------|
| 12 | Module frequency | Every two semesters |
| 13 | Workload | 60h in class, 90h pre- and post-work |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | English |
| 16 | (Recommended) reading | See http://nythesis.com |

Nailing your thesis (OSS-NYT-PROJ)

| 1 | Module name 580491 | Nailing your thesis (OSS-NYT-PROJ) | 5 ECTS |
|---|-----------------------|------------------------------------|--------|
| 2 | Courses/lectures | Nailing your thesis (4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Riehle | |

| 4 | Module coordinator | Prof. Riehle, M.B.A. |
|--------|---|---|
| 5 | Contents | This course teaches students how to perform scientific research for their final thesis or a research paper. The goal is to prepare students for a Bachelor or Master research thesis. The course covers the following topics: Science and society The research process Exploratory research Confirmatory research Writing a thesis/paper The scientific community Students can choose one or both of two components: VUE (lecture + exercise), 4 SWS, 5 ECTS. VUE combines lectures with homework and exercises. VUE is run as a 3h block. PROJ (small research project), 2 SWS, 5 ECTS. In PROJ, students perform a small research project, either individually or in teams. The available projects will be presented at the beginning of the course. Students perform the research, write a paper, and hold a presentation about their work. The overall schedule can be found at https://goo.gl/VqoFO . Please sign up for the course on StudOn (link accessible through schedule spreadsheet) as soon as possible. |
| 6 7 | Learning objectives and skills Recommended prerequi- | Understand how to perform research Understand how to write a research thesis None |
| | sites | |
| 8 | Integration in curriculum | NYT can be taken in these variants: • VUE (4 SWS, 5 ECTS) • PROJ (4 SWS, 5 ECTS) • VUE + PROJ (8 SWS, 10 ECTS) NYT is available to Informatik (Bachelor und Master), Wirtschaftsinformatik (Bachelor) and IIS (Master) students. NYT is also available to other degree programs, see UnivIS. NYT is available as an (ungraded) Schlüsselqualifikation. |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Data & Knowledge (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Applied Software Engineering II (Elective) |
| 10 | Method of examination | Project work |
| 11 | Grading procedure | Project work (100%) |
| 12 | Module frequency | Every two semesters |
| | | |

| 13 | Workload | 150h project work |
|----|--|-------------------------|
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | English |
| 16 | (Recommended) reading | See http://nythesis.com |

Simulation and modeling I (SaM 1)

| 1 | Module name | Simulation und Modellierung 1 | 5 ECTS |
|---|------------------|---|----------|
| | TEC 97090 | Simulation and modeling 1 | |
| 2 | Courses/lectures | Simulation and modeling 1 (Vorlesung) | 2,5 ECTS |
| | | Exercises to simulation and modeling 1 (Übung) | 2,5 ECTS |
| | | Supervised computer hours for simulation and modeling 1 | |
| | | (Übung) | |
| 3 | Lecturers | Prof. German | |
| | | | |

| 1 | Modulo coordinater | Drof Cormon |
|----|---|--|
| 4 | Module coordinator | Prof. German |
| 5 | Contents | Overview of the various kinds of simulation discrete simulation (computational concepts, simulation of queuing systems, simulation in Java, professional simulation tools) required probability concepts and statistics, modeling paradigms (e.g., event/process oriented, queuing systems, Petri nets, UML statecharts) input modeling (selecting input probability distributions) random number generation (linear congruential generators and variants, generating random variates) output analysis (warm-up period detection, independent replications, result presentation) continuous and hybrid simulation (differential equations, numerical solution, hybrid statecharts) |
| | | • simulation software, case studies, parallel and distributed simulation. |
| 6 | Learning objectives and skills | Students gain knowledge about methods and realization possibilities of discrete simulation with an outlook on other types of simulation gain knowledge of statistical aspects of simulation that are important for practice apply statistical methods for analysis and evaluation of input and output data gain hands-on experience with commercial simulation tools gain experience in simulation in various fields of application (including computer networks, manufacturing systems, material flow systems) independently develop simulation models on the basis of sample tasks using different modeling paradigms can work in groups cooperatively and responsibly |
| 7 | Recommended prerequisites | basic programming skills, preferably in Java, mathematics skills in analysis, such as taught in the first semester in applied mathematics |
| 8 | Integration in curriculum | Third semester |
| 9 | Module compatibility Method of examination | Master International Information Systems (from 2018/19): Module in the section Informatics – Data & Knowledge (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) Written exam (90minutes) (Klausur (90 Minuten)) |
| | | Erfolgreiche Teilnahme an der Übung ist Voraussetzung für die Teilnahme an der Prüfung. Bei geringer Teilnehmerzahl (< 20) erfolgt die Prüfung mündlich. |
| 11 | Grading procedure | Written exam (100%) |
| 12 | Module frequency | Each winter term |
| 13 | Workload | 60 hours in class 90 hours self study |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examination language | English (bei Bedarf auch Deutsch) |
| 16 | (Recommended) reading | Law, "Simulation Modeling and Analysis", 5th ed., McGraw Hill, 2014 |

Simulation and modeling II (SaM 2)

| 1 | Module name | Simulation und Modellierung 2 | 7,5 ECTS |
|---|------------------|---|----------|
| | 502170 | Simulation and modeling 2 | |
| 2 | Courses/lectures | Simulation and modeling 2 (Vorlesung) | 2,5 ECTS |
| | | Simulation and modeling 2 exercises (Übung) | 5 ECTS |
| 3 | Lecturers | Prof. German | |

| 4 5 | Module coordinator | Prof. German |
|--------|--------------------------------|--|
| 5 | | Tiol. Commun |
| | Contents | The class is project-oriented: participants conduct one larger simulation project in a team (3-4 students). The simulation project covers all typical phases including project planning, requirements analysis, data collection, input modeling, conceptual modeling, verification, validation, simulation runs, output analysis, result presentation and documentation. The lecture covers: - simulation project management, presentation, and documentation techniques - detailed simulation project case studies, - advanced topics in simulation such as variance reduction techniques, rare event simulation, parallel and distributed simulation, standards-based simulation, and combination of simulation with testing. The project teams also present their results in the lectures. The exercises are used for team meetings. Implementations, simulation runs, etc. can be performed on computing facilities of the Computer Science 7 Group with commercial/academic simulation packages (e.g., AnyLogic/OM-neT++/ns-3/SimTAny) in reserved computer hours. Possible projects encompass but are not restricted to: elevators, university canteen (Mensa), crossing with traffic lights, gas station, supermarket, hospital emergency reception, flexible manufacturing system, houses or neighborhood with renewable energy systems, battery powered devices. Own project ideas |
| | | are possible and welcome. |
| 6 | Learning objectives and skills | Students get hands-on experience in applying the theory of "Simulation and Modelling I" and in realizing simulation studies skills in using professional (both commercial and/or academic) simulation software skills in project and team work training in simulation project management, presentations, documentation knowledge of advanced topics in simulation such as variance reduction, distributed simulation, validation techniques |
| 7 | Recommended prerequisites | Simulation and Modeling I |
| 8 | Integration in curriculum | 4. Semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Data & Knowledge (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) |
| 10 | Method of examination | Oral examination (30 minutes) (mündliche Prüfung (30 Minuten)) |
| 11 | Grading procedure | Oral exam (100%) |
| 12 | Module frequency | Each summer term |
| 13 | Workload | 60 hours in class 90 hours self study |

| 14 | Module duration | 1 semester |
|----|--------------------------|---|
| 15 | Teaching and examination | English |
| | language | |
| 16 | (Recommended) reading | Law, "Simulation Modeling and Analysis", 5th ed., McGraw Hill, 2014 |

Middleware - Cloud computing (MW-VU)

| 1 | Modulbezeichnung | Middleware - Cloud Computing V+Ü | 5 ECTS |
|---|---------------------|---|----------|
| | MSC 44585 | Middleware - Cloud Computing L+E | |
| 2 | Lehrveranstaltungen | Middleware - Cloud Computing | 2,5 ECTS |
| | | (Vorlesung, 2 SWS, Dozent: DrIng. Tobias Distler) | |
| | | Übungen zu Middleware - Cloud Computing | 2.5 ECTS |
| | | (Übung, 2 SWS, Dozent: DrIng. Tobias Distler) | |
| 3 | Lehrende | DrIng. Distler | |
| | | | |

| 1 | Modulyorantwortlishs/r | Dr. Ing Dietlor |
|---|------------------------------|--|
| 4 | Modulverantwortliche/r | DrIng. Distler |
| | Inhalt | Überblick Cloud Computing Grundlagen verteilter Programmierung (Web Services/SOAP/REST) Virtualisierung als Basis für Cloud Computing Infrastructure as a Service (IaaS) am Beispiel von Eucalyptus und Amazon EC2 Verteilte Programmierung für datenlastige Cloud-Anwendungen Skalierbare Verarbeitung von großen Datenmengen Interoperabilität und Multi-Cloud Computing Fehlertoleranz und Sicherheit im Kontext von Cloud Computing |
| | | Aktuelle Forschungstrends (z.B. einbruchstolerante Systeme) |
| 5 | Lernziele und Kompetenzen | Die Studierenden nennen unterschiedliche Ausprägungen von Cloud-Computing. erläutern verschiedene Cloud-Architekturen. stellen Vor- und Nachteile von Cloud-Computing gegenüber. beschreiben die Bestandteile des SOAP-Nachrichten-Frameworks und ihre jeweiligen Funktionen. unterscheiden die Herangehensweisen bei der Entwicklung von SOAP- im Vergleich zu REST-Anwendungen. organisieren den Austausch von Informationen in einer verteilten Anwendung unter Verwendung eines Verzeichnisdienstes. wenden WSDL zur Beschreibung von Web-Services an. erproben die automatische Erzeugung von Proxy-Objekten auf Basis von WSDL-Beschreibungen. entwickeln eigene auf Web-Services basierende Anwendungen. erläutern die Anforderungen an ein virtualisiertes System. beschreiben die für die Virtualisierung eines Systems erforderlichen Kriterien. vergleichen zwischen unterschiedlichen Virtualisierungstechniken und -ebenen. schildern den Aufbau und die Funktionsweise von Xen und Linux-VServer. erproben das Einrichten eines Abbilds für eine virtuelle Maschine. entwickeln einen Dienst zur Speicherung von Schlüssel-Wert-Paaren. skizzieren die Architektur einer Infrastruktur-Cloud sowie die Aufgabenbereiche hierfür zentraler Komponenten am Beispiel von Eucalyptus. erproben das Bereitstellen von Anwendungen in einer Infrastruktur-Cloud. zeigen die Grundlagen Software-definierter Netzwerke am Beispiel von Onix und B4 auf. bewerten verschiedene im Bereich Cloud-Computing zum Einsatz kommende Datenspeichersysteme (Google File System, Bigtable, Windows Azure Storage, Amazon Dynamo) hinsichtlich der Kriterien Verfügbarkeit, Konsistenz und Partitionstoleranz. erläutern eine auf Vektoruhren basierende Methode zur Auflösung im Zusammenhang mit letztendlicher Konsistenz auftretender Konfli |
| | | Windows Azure Storage, Amazon Dynamo) hinsichtlich der Kriterien Verfügbarkeit, Konsistenz und Partitionstoleranz. erläutern eine auf Vektoruhren basierende Methode zur Auflösung im |

| | | erkunden das Bereitstellen selbst entwickelter Dienste mittels Do- | |
|----|--------------------------------------|--|--|
| | | cker. | |
| | | erstellen ein Framework zur parallelen Bearbeitung von Daten nach dem Vorbild von MapReduce. | |
| | | konzipieren eigene MapReduce-Anwendungen zur Verarbeitung | |
| | | strukturierter Rohdaten. | |
| | | diskutieren die Fehlertoleranzmechanismen in Google MapReduce. diskutieren die Abbildung von Big Letin Branzagen auf MapReduce. | |
| | | skizzieren die Abbildung von Pig-Latin-Programmen auf MapReduce. schildern die grundsätzliche Funktionsweise von Systemen zur Küh- | |
| | | lung von Datenzentren mittels Umgebungsluft. | |
| | | beschreiben das Grundkonzept einer temperaturabhängigen Lastver- | |
| | | teilung von Prozessen in einem Datenzentrum. | |
| | | stellen diverse Ansätze zur Erhöhung der Energieeffizienz von Map- | |
| | | Reduce-Clustern gegenüber. unterscheiden die Architekturen und Funktionsweisen der Koordinie- | |
| | | rungsdienste Chubby und ZooKeeper. | |
| | | entwickeln einen eigenen Koordinierungsdienst nach dem Vorbild | |
| | | von ZooKeeper. | |
| | | ermitteln die Konsistenzeigenschaften der eigenen Koordinierungs- dienstimplementierung. | |
| | | erschließen sich die mit der Implementierung passiv replizierter Systems verbunden en Brohlemetiken. | |
| | | teme verbundenen Problematiken. • erläutern unterschiedliche Ansätze zur Reduzierung bzw. Tolerierung | |
| | | von Tail-Latenz. | |
| | | skizzieren das Grundkonzept von Erasure-Codes. | |
| | | beschreiben den Aufbau eines auf die Clouds mehrerer Anbieter ge- | |
| | | stützten Datenspeichersystems. | |
| | | entwickeln einen Mechanismus zur Erkennung und Beseitung von Überlastsituationen für virtuelle Maschinen in einer Infrastruktur- Cloud am Beispiel von Amazon EC2. | |
| | | erläutern den Einsatz passiver Replikation zur Bereitstellung von | |
| | | Fehlertoleranzmechanismen für virtuelle Maschinen am Beispiel von | |
| | | Remus. | |
| | | schildern die Grundlagen der Migration von virtuellen Maschinen. unterscheiden zwischen Ausfalltoleranz und byzantinischer Fehlerto- | |
| | | leranz. | |
| | | bewerten die Qualität einer aktuellen Publikation aus der Fachliteratur. | |
| | | erschließen sich typische Probleme (Nebenläufigkeit, Konsistenz, | |
| | | Skalierbarkeit) und Fehlerquellen bei der Programmierung verteilter | |
| | | Anwendungen.können in Kleingruppen kooperativ arbeiten. | |
| | | können ihre Entwurfs- und Implementierungsentscheidungen kom- | |
| | | pakt präsentieren und argumentativ vertreten. | |
| | | reflektieren ihre Entscheidungen kritisch und leiten Alternativen ab. | |
| | | können offen und konstruktiv mit Schwachpunkten und Irrwegen um- geben. | |
| 6 | Empfohlene | gehen. Gute Programmierkenntnisse in Java | |
| | Voraussetzungen für die Teilnahme | 13 | |
| 7 | Einpassung in Musterstudienplan | Ab 1. Semester | |
| 8 | Verwendbarkeit des | Master International Information Systems (from 2018/19): Module in the | |
| | Moduls | section Informatics – Data & Knowledge (Elective) | |
| | | Master International Information Systems (from 2016/17): Module in the | |
| 9 | Studien- und | section Informatics Extension Courses (Elective) Erfolgreiche Bearbeitung aller Übungsaufgaben (Bewertung jeweils mit | |
| 9 | Prüfungsleistungen | "ausreichend") und ca. 20-minütige mündliche Prüfung. | |
| 10 | Berechnung Modulnote | Mündliche Prüfung (100%) | |
| 11 | Turnus des Angebots | Jährlich (WS) | |
| 12 | Arbeitsaufwand | Präsenzzeit: 60 Std, Eigenstudium: 90 Std. | |
| 13 | Dauer des Moduls | 1 Semester | |

| 14 | Unterrichts- und Prüfungssprache | Deutsch |
|----|-------------------------------------|--|
| 15 | (Vorbereitende) Literatur | Mache Creeger. Cloud computing: An overview. Queue Distributed Computing, 7(5), 2009. Michael Armbrust, Armando Fox, Rean Griffith, Anthony D. Joseph, Randy Katz, Andy Konwinski, Gunho Lee, David Patterson, Ariel Rabkin, Ion Stoica, and Matei Zaharia. Above the clouds: A Berkeley view of cloud computing. Technical Report UCB/EECS-2009-28, EECS Department, University of California, Berkeley, 2009. Michael Armbrust, Armando Fox, Rean Griffith, Anthony D. Joseph, Randy Katz, Andy Konwinski, Gunho Lee, David Patterson, Ariel |
| | | Rabkin, Ion Stoica, and Matei Zaharia. A view of cloud computing. Communications of the ACM, 53(4):5058, 2010. |

Pattern recognition (PR)

| 1 | Module name MSC 44130 | Pattern recognition | 5 ECTS |
|---|--------------------------|---------------------------------------|--------|
| 2 | Courses/lectures | Lecture: Pattern recognition (3 SWS) | |
| | | Exercise: Pattern recognition (1 SWS) | |
| 3 | Lecturers | Elmar Nöth, Sebastian Käppler | |

| 4 | Module coordinator | Andreas Maier |
|----|-----------------------------------|--|
| 5 | Contents | Mathematical foundations of machine learning based on the following classification methods: Bayesian classifier Logistic Regression Naive Bayes classifier Discriminant Analysis norms and norm dependent linear regression Rosenblatt's Perceptron unconstraint and constraint optimization Support Vector Machines (SVM) kernel methods Expectation Maximization (EM) Algorithm and Gaussian Mixture Models (GMMs) Independent Component Analysis (ICA) Model Assessment |
| 6 | Learning objectives and skills | AdaBoost Students understand the structure of machine learning systems for simple patterns, explain the mathematical foundations of selected machine learning techniques, apply classification techniques in order to solve given classification tasks, evaluate various classifiers with respect to their suitability to solve the given problem |
| 7 | Recommended prerequisites | Well grounded in probability calculus, linear algebra/matrix calculus The attendance of our bachelor course 'Introduction to Pattern Recognition' is not required but certainly helpful. |
| 8 | Integration in curriculum | 3. semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Data & Knowledge (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) Master Marketing: Wahlpflichtbereich der Modulgruppe "Data Science" Master Marketing: Wahlpflichtbereich der Modulgruppe "Methoden" (gültig für Studierende mit Studienbeginn bis WS 2016/17) |
| 11 | Method of examination | Oral examiniation (30 min) |
| 12 | Grading procedure | 100% of the exam grade |
| 13 | Module frequency | Each winter semester |
| 14 | Workload | Contact hours: 60 h and independent study: 90 h |
| 15 | Module duration | 1 Semester |
| 16 | Teaching and examination | English |
| 17 | language (Recommended) reading | Richard O. Duda, Peter E. Hart, David G. Stock: Pattern Classification, 2nd edition, John Wiley&Sons, New York, 2001 Trevor Hastie, Robert Tobshirani, Jerome Friedman: The Elements of Statistical Learning - Data Mining, Inference, and Prediction, 2nd edition, Springer, New York, 2009 Christopher M. Bishop: Pattern Recognition and Machine Learning, Springer, New York, 2006 |

Pattern analysis (PA)

| 1 | Module name | Pattern recognition | 5 ECTS |
|---|------------------|------------------------------------|--------|
| 2 | Courses/lectures | Lecture: Pattern analysis (3 SWS) | |
| | MSC 44120 | Exercise: Pattern analysis (1 SWS) | |
| 3 | Lecturers | Christian Riess | |

| 4 | Module coordinator | Andreas Maier | |
|----|---------------------------------|--|--|
| 5 | Contents | Based on the lecture Pattern Recognition, this lecture introduces the design of pattern analysis systems as well as the corresponding fundamental mathematical methods. The lecture comprises: an overview over regression and classification, in particular the method of least squares and the Bayes classifier clustering methods: soft and hard clustering classification and regression trees and forests parametric and non-parametric density estimation: maximum-likeli- | |
| | | hood (ML) estimation, maximum-a-posteriori (MAP) estimation, histograms, Parzen estimation, relationship between folded histograms and Parzen estimation, adaptive binning with regression trees mean shift algorithm: local maximization using gradient ascent for non-parametric probability density functions, application of the mean shift algorithm for clustering, color quantization, object tracking linear and non-linear manifold learning: curse of dimensionality, various dimensionality reduction methods: principal component analysis (PCA), local linear embedding (LLE), multidimensional scaling (MDS), isomaps. Laplacian eigenmaps | |
| | | isomaps, Laplacian eigenmaps Gaussian mixture models (GMM) and hidden Markov models (HMM): expectation maximization algorithm, parameter estimation, computation of the optimal sequence of states/Viterbi algorithm, forward-backward algorithm, scaling Bayesian networks | |
| | | Markov random fields (MRF): definition, probabilities on undirected graphs, Hammersley-Clifford theorem, cliques, clique potentials, examples for MRF-based image pre-processing and processing of image sequences Markov random fields and graph cuts: sub-modular functions, global | |
| 6 | Loorning objectives and | optimization with graph cut algorithms, application examples The students | |
| 6 | Learning objectives and skills | explain the discussed methods for classification, prediction, and analysis of patterns, define regression and classification tasks as optimization problems, | |
| | | compare and analyze methods for manifold learning and select a suited method for a given set of features and a given problem, | |
| | | compare and analyze methods for probability density estimation and select a suited method for a given set of features and a given problem, apply non-parametric probability density estimation to pattern analy- | |
| | | sis problems, apply dimensionality reduction techniques to high-dimensional feature spaces, | |
| | | explain statistic modeling of feature sets and sequences of features, explain statistic modeling of statistical dependencies, | |
| | | implement presented methods in MatLab or Python, supplement autonomously the mathematical foundations of the presented methods by self-guided study of the literature, discuss the social impact of applications of pattern analysis solutions | |
| 7 | Recommended prerequi- | discuss the social impact of applications of pattern analysis solutions. Pattern Recognition | |
| 8 | sites Integration in curriculum | 4. semester | |
| 9 | Module compatibility | 1. GOITIGOGO | |
| 10 | , | Master International Information Systems (from 2018/19): Module in the section Informatics – Data & Knowledge (Elective) | |

| | | Master International Information Systems (from 2016/17): Module in the |
|----|--------------------------|---|
| | | section Informatics Extension Courses (Elective) |
| 11 | Method of examination | Oral examiniation (30 min) |
| 12 | Grading procedure | 100% of the exam grade |
| 13 | Module frequency | Each summer semester |
| 14 | Workload | Contact hours: 60 h and independent study: 90 h |
| 15 | Module duration | 1 Semester |
| 16 | Teaching and examination | English |
| | language | |
| 17 | (Recommended) reading | Richard O. Duda, Peter E. Hart und David G. Stork: Pattern Classifica- |
| | | tion, Second Edition, 2004 |
| | | Christopher Bishop: Pattern Recognition and Machine Learning, Springer Verlag, Heidelberg, 2006 |
| | | Antonio Criminisi and J. Shotton: Decision Forests for Computer Vision |
| | | and Medical Image Analysis, Springer, 2013 |
| | | Kevin P. Murphy: Machine Learning: A Probabilistic Perspective, MIT |
| | | Press, 2012 |
| | | papers referenced in the lecture |

Künstliche Intelligenz I (KI I)

| 1 | Modulbezeichnung 535405 | Künstliche Intelligenz I (Artificial intelligence I) | 7.5 ECTS |
|---|----------------------------|--|----------|
| 2 | Lehrveranstaltungen | Künstliche Intelligenz I – Vorlesung (4 SWS) Künstliche Intelligenz I – Übung (2 SWS) | 7.5 ECTS |
| 3 | Lehrende | Prof. Dr. Michael Kohlhase | |

| 4 | Modulverantwortliche/r | Prof. Dr. Michael Kohlhase |
|----|---|--|
| 5 | Inhalt | Dieser Kurs beschäftigt sich mit den Grundlagen der Künstlichen Intelligenz (KI), insbesondere formale Wissensrepräsentation, Heuristische Suche, Automatisches Planen und Schliessen unter Unsicherheit. |
| 6 | Lernziele und Kompeten- zen | Fach- Lern- bzw. Methodenkompetenz Wissen: Die Studierenden lernen grundlegende Repräsentationsformalismen und Algorithmen der Künstlichen Intelligenz kennen. Anwenden: Die Konzepte werden an Beispielen aus der realen Welt angewandt (Übungsaufgaben). Analyse: Die Studierenden lernen die über die modellierung in der Maschine menschliche Intelligenzleistungen besser einzuschätzen. Sozialkompetenz Die Studierenden arbeiten in Kleingruppen zusammen um kleine Projekte zu bewältigen |
| 7 | Empfohlene Vorausset- zungen für die Teilnahme | |
| 8 | Einpassung in Musterstu- dienplan | 3. Semester |
| 9 | Verwendbarkeit des Moduls | Master International Information Systems (from 2018/19): Module in the section Informatics – Data & Knowledge (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) Studierende müssen KI I und KI II absolvieren, ansonsten kann das Modul nicht verbucht werden! |
| 10 | Studien- und Prüfungs- leistungen | Klausur (90 Minuten) (Written examination: 90 minutes) |
| 11 | Berechnung Modulnote | 100% der Klausurnote (Bonuspunkte durch Übungsaufgaben) |
| 12 | Turnus des Angebots | Winter Semester |
| 13 | Arbeitsaufwand | Präsenzzeit: 90 Std. Eigenstudium: 135 Std. |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und Prü- fungssprache | Deutsch und Englisch |
| 16 | (Vorbereitende) Literatur | Stuart Russell und Peter Norvig: Artificial Intelligence: A Modern Approach. Prentice Hall, 3rd edition, 2009. |

Künstliche Intelligenz II (KI II)

| 1 | Module name | Artificial intelligence II | 7.5 ECTS |
|---|------------------|--|----------|
| 2 | Courses/lectures | Lecture: Artificial intelligence II (4 SWS) Exercise: Artificial intelligence II (2 SWS) | 7.5 ECTS |
| 3 | Lecturers | Prof. Dr. Michael Kohlhase | |

| 4 | Module coordinator | Prof. Dr. Michael Kohlhase |
|----|-----------------------------------|--|
| 5 | Contents | This course covers the foundations of Artificial Intelligence (AI), in particular reasoning under uncertainty, machine learning and (if there is time) natural language understanding. This course builds on the course Artificial Intelligence I from the preceding winter semester and continues it. |
| 6 | Learning objectives and skills | Technical, Learning, and Method Competencies: Knowledge: The students learn foundational representations and algorithms in AI. Application: The concepts learned are applied to examples from the real world (homeworks). Analysis: By modeling human cognitive abilities, students learn to assess and understand human intelligence better. Social Competencies: Students work in small groups to solve the machine learning challenge/competition. |
| 7 | Recommended prerequisites | Course Artificial intelligence I |
| 8 | Integration in curriculum | 2./4. Semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Data & Knowledge (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) Students must complete both KI I and KI II, otherwise the module cannot be credited! |
| 10 | Method of examination | Written examination (90 minutes) |
| 11 | Grading procedure | Exam (100%) |
| 12 | Module frequency | Each summer term |
| 13 | Workload | Class: 90h Self-study: 135h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examination language | German or English |
| 16 | (Recommended) reading | The course follows the following textbook: Stuart Russell and Peter Norvig: Artificial Intelligence: A Modern Approach. Prentice Hall, 3rd edition, 2009. |

Applied visualization (AppVis)

| 1 | Module name | Applied visualization | 5 ECTS |
|----|---|--|---|
| 2 | Courses/lectures | Vorlesung: Applied visualization (2 SWS) Übung: Applied visualization (2 SWS) | |
| 3 | Lecturers | Dr. Grosso | |
| 4 | Module coordinator | Dr. Grosso | |
| 5 | Contents | Visualization includes all aspects related to the visual prepara ally large data sets from technical or scientific experiments an tion. For a better understanding and a meaningful representat plex phenomena, methods from interactive computer graphics plied. This lecture introduces basic algorithms and data structives an overview of available software tools and common data the lecture covers the following topics: • scenarios for visualization | d simula- ion of com- are ap- ures and |
| | | meshes and data representation methods for 2D scalar and vector fields methods for 3D scalar and vector fields methods for multivariate data volume rendering with iso-surfaces | |
| 6 | Learning objectives and skills | Students have a deep understanding of the process of visual process large data sets from scientific experiments and simulations can explain and apply fundamentals algorithm and data st scientific visualization to common practical problems are familiar with standard software tools in the area of scientific visualization can carry out simple research projects requiring methods alization of scientific data are able to implement simple algorithms for the visualization tific data from common science and engineering application | ructures of entific data for the visuon of scien- |
| 7 | Recommended | Algorithmen und Datenstrukturen | |
| 8 | prerequisites Integration in curriculum | 2. oder 4. Semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Mod section Informatics – Data & Knowledge (Elective) Master International Information Systems (from 2016/17): Mod section Informatics Extension Courses (Elective) | |
| 10 | Method of examination | Written examination (90 Min.) (Klausur, 90 Minuten) | |
| 11 | Grading procedure | 100% of exam score | |
| 12 | Module frequency | Each summer term | |
| 13 | Workload | Class: 60h Self-study: 90h | |
| 14 | Module duration | 1 Semester | |
| 15 | Teaching and examination language | English | |
| 16 | (Recommended) reading | M. Ward, G.G. Grinstein, D. Keim, Interactive Data Visualizations, Techniques, and Applications, Taylor & Francis, 2010 AC. Telea, Data Visualization: Principles and Practice, AK Pet C.D. Hansen and C.R. Johnson, Visualization Handbook, Aca Press, 2004 | ers, 2008 |

| | G.M. Nielson, H. Hagen, H.Müller, Scientific Visualization, IEEE Com- |
|--|---|
| | puter Society Press, Los Alamitos, 1997 |

Deep Learning (DL)

| 17 | Module name UMI 901895 | Deep learning | 5 ECTS |
|----|--------------------------------|---|---|
| | | | |
| 18 | Courses/lectures | Vorlesung: Deep Learning (2 SWS) Übung: Deep Learning Exercises (2 SWS) | |
| 19 | Lecturers | Andreas Maier, Tobias Würfl, Vincent Christlein, Lennart Husvogt | |
| 20 | Module coordinator | Andreas Maier | |
| 21 | Contents | Deep Learning (DL) has attracted much interest in a wide range cations such as image recognition, speech recognition and art gence, both from academia and industry. This lecture introduce elements of neural networks and deep learning, it comprises: • (multilayer) perceptron, backpropagation, fully connected networks • loss functions and optimization strategies • convolutional neural networks (CNNs) • activation functions • regularization strategies • common practices for training and evaluating neural networks visualization of networks and results • common architectures, such as LeNet, Alexnet, VGG, Gotor recurrent neural networks (RNN, TBPTT, LSTM, GRU) • deep reinforcement learning • unsupervised learning (autoencoder, RBM, DBM, VAE) • generative adversarial networks (GANs) • weakly supervised learning • applications of deep learning (segmentation, object detections speech recognition,) | ificial intelli- es the core I neural vorks |
| | | The accompanying exercises will provide a deeper understand | ding of the |
| | | workings and architecture of neural networks. | |
| 22 | Learning objectives and skills | explain the different neural network components, compare and analyze methods for optimization and regord neural networks, compare and analyze different CNN architectures, explain deep learning techniques for unsupervised / servised and weakly supervised learning, explain deep reinforcement learning, explain different deep learning applications, implement the presented methods in Python, autonomously design deep learning techniques and proimplement them, effectively investigate raw data, intermediate results an Deep Learning techniques on a computer, autonomously supplement the mathematical foundation presented methods by self-guided study of the literatu discuss the social impact of applications of deep learn tions. | mi-super- ototypically d results of ns of the re, |

| 23 | Recommended prerequisites | Introduction to Pattern Recognition |
|----|-----------------------------------|---|
| 24 | Integration in curriculum | From 2. Semester |
| 25 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Data & Knowledge (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) Master Marketing: Wahlpflichtbereich der Modulgruppe "Data Science" Master Marketing: Wahlpflichtbereich der Modulgruppe "Methoden" (gültig für Studierende mit Studienbeginn bis WS 2016/17) |
| 26 | Method of examination | Oral examination (30 Min.) (mündl. Prüfung, 30 Minuten) |
| 27 | Grading procedure | 100% of exam score |
| 28 | Module frequency | Each term (SS + WS) |
| 29 | Workload | Class: 60h Self-study: 90h |
| 30 | Module duration | 1 Semester |
| 31 | Teaching and examination language | English or German |
| 32 | (Recommended) reading | Ian Goodfellow, Yoshua Bengio, Aaron Courville: Deep Learning. MIT Press, 2016. Christopher Bishop: Pattern Recognition and Machine Learning, Springer Verlag, Heidelberg, 2006 Yann LeCun, Yoshua Bengio, Geoffrey Hinton: Deep learning. Nature 521, 436–444 (28 May 2015) |

Software-Anwendungen mit KI (OSS-SAKI-VUE)

| 33 | Module name | Software-Anwendungen mit KI | 5 ECTS | |
|----|--------------------------------|--|-------------|--|
| 24 | Courses/leatures | Variance Coffee and Annuard Consumer St. VI (2 CMC) | | |
| 34 | Courses/lectures | Vorlesung: Software-Anwendungen mit KI (2 SWS) Übung: Software-Anwendungen mit KI (2 SWS) | | |
| 35 | Lecturers | Dirk Riehle | | |
| 36 | Module coordinator | Dirk Riehle | | |
| 37 | Contents | Dieser Kurs lehrt fortgeschrittene Methoden des maschinellen Lernens resp. der künstlichen Intelligenz anhand von vier nicht-trivialen Anwendungsbeispielen mit realen Daten aus der Industrie. | | |
| | | Jedes der vier Beispiele stellt eine umfangreiche Hausaufgabe für Studierende dar, in der unterschiedliche Problemarten (Korrelation, Klassifikation, etc.) mit unterschiedlichen Methoden (Clustering, Bayesian Networks, etc.) in unterschiedlichen Fachgebieten (Automobilindustrie, Finanzindustrie, etc.) kombiniert werden. Jede Aufgabe wird von einem dazugehörigen Industriepartner mitbetreut. | | |
| | | Die vier Beispiele werden nacheinander abgearbeitet und strukturieren die Kurszeit in vier gleich große Abschnitte von jeweils drei Wochen, von denen jeder Abschnitt dieselbe Struktur hat: | | |
| | | Vorbereitung auf den anstehenden Abschnitt durch Wiederholung relevanter Literatur | | |
| | | Einführung in das Problem; Diskussion von Bibliotheken und Vorgehen zur Problemlösung | | |
| | | Wiederholte Diskussion (zwei weitere Sitzungen) des Problems und der Herangehensweise | | |
| | | Abgabe der Problemlösung, bestehend aus Erläuterung sowie Quelltext und Ergebnissen | | |
| | | Die Programmierung findet in Python statt. | | |
| | | Es wird erwartet, dass Studierende aktiv mitarbeiten, sich etwaige fehlende Grundlagen selbst aneignen, und die technischen Aufgaben eigenständig lösen werden. | | |
| | | Der Zeitplan ist unter https://goo.gl/5ynxcQ einsehbar. Bitte re Sie sich für den Kurs auf StudOn (Verweis über Zeitplan verfü | • | |
| 38 | Learning objectives and skills | Erwerb praktischer Kompetenz in der Anwendung von ML und den auf reale industrielle Daten | | |
| 39 | Recommended | Grundlagenveranstaltungen in maschinellem Lernen und künstlicher In- | | |
| | prerequisites | telligenz | | |
| 40 | Integration in curriculum | Ab dem 2. Semester | | |
| 41 | Module compatibility | Master International Information Systems (from 2018/19): Mod section Informatics – Data & Knowledge (Elective) | dule in the | |
| | | Master International Information Systems (from 2016/17): Mod section Informatics Extension Courses (Elective) | dule in the | |
| 42 | Method of examination | Portfolio | | |
| 43 | Grading procedure | Portfolio (100%) | | |
| | | <u> </u> | | |

| 44 | Module frequency | Jedes Sommersemester |
|----|--------------------------|----------------------|
| 45 | Workload | Präsenzzeit: 60h |
| | | Eigenstudium: 90h |
| 46 | Module duration | 1 Semester |
| 47 | Teaching and examination | Deutsch |
| | language | |
| 48 | (Recommended) reading | - |

Commercial Open Source Startups (VUE) (OSS-COSS-VUE)

| 1 | Module name 93184 | Commercial open source startups (VUE) (OSS-COSS-VUE) | 5 ECTS |
|---|----------------------|--|--------|
| 2 | Courses/lectures | Commercial open source startups (VUE) (OSS-COSS-VUE) | 5 ECTS |
| 3 | Lecturers | Prof. Riehle, M.B.A. | |

| 4 | Module coordinator | Prof. Riehle |
|----|---------------------------|--|
| 5 | Contents | This course teaches students how the software industry works, how commercial open source works, and how to spin-off from the university. It consists of four main components: • The software industry |
| | | Commercial open source |
| | | Open source projects |
| | | University spin-offs |
| | | Class is run as two 90min blocks, one for the lecture, and one for the exercises. |
| | | Schedule and sign-up are available at https://oss.cs.fau.de/oss-coss-course. Please sign up for the course on StudOn (available through previous link) as soon as possible. |
| 6 | Learning objectives and | - Understand the software industry and its players |
| | skills | - Understand commercial open source startups |
| | | - Learn how to get an open source project off the ground |
| | | - Learn how to spin-off a startup from university |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | Informatik-Master and Wirtschaftsinformatik-Master (IIS): All semesters Other Master degree programs |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Digital Business (Core Course or Elective) Master International Information Systems (from 2016/17): Module in the section Informatics – Applied Software Engineering I or II (Core Course or Elective) |
| 10 | Method of examination | Portfolio (Class quizzes: 10%, Project work: 10% (Graded by deliverables, see course slides), Project presentation: 10%, Final project report: 20%, Oral exam: 50% (Can be dropped, if you and we agree)) |

| 11 | Grading procedure | Portfolio (100%) |
|----|--|---|
| 12 | Module frequency | Each winter term |
| 13 | Workload | Contact hours: 60h Self-study: 90h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | English |
| 16 | (Recommended) reading | See https://oss.cs.fau.de/oss-coss-course |

Human computer interaction (HCI)

| 1 | Module name 645618 | Human computer interaction | 5 ECTS |
|----------|-----------------------------------|--|-------------|
| 2 | Courses/lectures | Vorlesung: Human computer interaction (3 SWS) | |
| _ | - Courses, 1881 and 1881 | Übung: Human computer interaction (1 SWS) | |
| 3 | Lecturers | Björn Eskofier | |
| | Module coordinator | • | |
| 4 | | Björn Eskofier | |
| 5 | Contents | Aim of the lecture is to teach basic knowledge of concepts, principles, models, methods and techniques for developing highly user-friendly Human Computer Interfaces. Beyond traditional computer system the topic of modern user interfaces is also discussed in the context of automobile and intelligent environments, mobile devices and embedded systems. This lecture addresses the following topics: Introduction to the basics of Human Computer Interaction Design principles and models for modern user interfaces and interactive systems Information processing of humans, perception, motor skills, properties and skills of the users Interaction concepts, metaphors, standards, norms and style guides In- and output devices, design space for interactive systems Analysis-, design- and development methodologies and tools for easy to use user interfaces Prototypic implementation of interactive systems Architectures for interactive systems, User Interface Toolkits and components | |
| 6 | Learning objectives and skills | Acceptance, evaluation methods and quality assurance Students develop an understanding for models, methods and concepts in the field of Human-Computer Interaction. They learn different approaches for designing, developing and evaluating User Intefaces and their advantages and disadvantages. Joining the course enalbes students to understand and execute a development process in the area of Human-Computer Interaction. Student will be able to do an UI evaluation by learning basics about Informationprocessing, perception and motoric skills of the user. Additionally, appropriate evaluation method as well as acceptance | |
| 7 | Recommended prerequisites | and quality assurance aspects will be learned. None | |
| 8 | Integration in curriculum | 2. or 4. Semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Mod | dule in the |
| 10 | | section Informatics – Digital Business (Core Course or Elect Master International Information Systems (from 2016/17): Mod section Informatics Extension Courses (Elective) | - |
| 11 | Method of examination | Written exam (90 minutes) | |
| 12 | Grading procedure | 100% of exam grade | |
| 13 | Module frequency | Each summer semester | |
| 14 | Workload | Contact hours: 60 h | |
| 4.5 | Madula describer | Independent study: 90 h | |
| 15 | Module duration | 1 Semester | |
| 16 | Teaching and examination language | German or English | |
| 17 | (Recommended) reading | None | |
| <u> </u> | , , | | |

The AMOS project (PSWT-AMOS)

| 1 | Module name MSC 71921 + MSC 71931 | The AMOS project (PSWT-AMOS) | 5 ECTS or 10 ECTS |
|---|--------------------------------------|--|-------------------------|
| 2 | Courses/lectures | Lecture and exercise: The AMOS project (2 + 2 SWS) (PSWT-AMOS) | 5 ECTS or 10 ECTS |
| 3 | Lecturers | Prof. Riehle, M.B.A. | |

| 4 | Module coordinator | Prof. Riehle |
|---|--------------------------------|--|
| 5 | Contents | The AMOS Project teaches agile methods (Scrum and XP) and open source software development using a single semester-long project. Topics covered are: • Agile methods and related software development processes • Scrum roles, process practices, including product and engineering management • Technical practices like refactoring, continuous integration, and test-driven development • Principles and best practices of open source software development The project is a software development project in which student teams work with an industry partner who provides the idea for the project. This is a practical hands-on experience. Students can play one of two primary roles: • Product owner. In this function, a student defines, prioritizes, communicates, and reviews requirements. The total effort adds up to 5 ECTS. • Software developer. In this function, a student estimates their effort for requirements and implements them. The total effort adds up to 10 ECTS. Students will be organized into teams of 5-7 people, combining product owners with software developers. An industry partner will provide requirements to be worked out in detail by the product owners and to be realized by the software developers. The available projects will be presented at the beginning of the course. AMOS projects are run as shared projects, in which all participants contribute and get to participate in the project results. Read more at https://wp.me/pDU66-2p4. Class is run as a 4 hour block with a 90min lecture followed by a guided 90min project coaching session. Rooms and times for project meetings are assigned in the beginning of the semester. For the schedule see http://goo.gl/BZpU8. The schedule spreadsheet contains a link to the StudOn course section. To get a chance for a seat in the course, please sign-up on StudOn at least two weeks before classes start. We expect to inform you the week before whether you got a seat in the course or not. |
| 6 | Learning objectives and skills | Understanding of software products and software development in an industry context Understanding of agile methods, in particular Scrum and Extreme Programming Understanding of open source software development and its underlying principles Practical hands-on experience with a Scrum process and XP technical practices |
| 7 | Recommended prerequisites | General: PSWT-PSWT Product owner role: OSS-PROD Software developer role: OSS-ADAP |

| 8 | Integration in curriculum | Informatik-Master and Wirtschaftsinformatik-Master (IIS): All semesters Other Master degree programs | |
|----|--|---|--|
| 9 | Module compatibility | 5 ECTS Lecture + Exercises (product owner role): Master International Information Systems (from 2018/19): Module in the section Informatics – Digital Business (Elective) Master in International Information Systems (from 2016/17): Module in the section In-formatics – Applied Software Engineering I or II (Core Course or Elective) - 10 ECTS Lecture + Exercise (developer role): Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) Master in International Information Systems (from 2016/17): Module in the section Informatics – Applied Software Engineering II (Elective) | |
| 10 | Method of examination | - In-class participation - Project work | |
| 11 | Grading procedure | 5 ECTS version: Class work (20%) + project work (80%) 10 ECTS version. 5 ECTS version (50%) + project work (50%) | |
| 12 | Module frequency | Irregular | |
| 13 | Workload | 5 ECTS version: 60h in class + 90h project work 10 ECTS version. ECTS version + 150h project work | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examina- tion language | English, occasionally German | |
| 16 | (Recommended) reading | See http://goo.gl/BZpU8 | |

Innovationslabor für Wearable und Ubiquitous Computing (InnoLab)

| 1 | Module name 615628 | Innovationslabor für Wearable und Ubiquitous Computing (Innovation lab for wearable and ubiquitous computing) | 10 ECTS |
|---|-----------------------|---|---------|
| 2 | Courses/lectures | Praktikum: Innovationslabor für Wearable und Ubiquitous Computing (InnoLab) | 10 ECTS |
| 3 | Lecturers | Björn Eskofier, Markus Zrenner, Nils Roth | |

| 4 | Module coordinator | Prof. Eskofier | |
|----|--|--|--|
| 5 | Contents | Mini-computers documenting our rhythm of life, EKG-Sensors tracing every detail or glasses, that transfer us into another reality are amongst the technologies we are meanwhile facing in our everyday lives. At the Innovation Lab for Wearable and Ubiquitous Computing students develop such technologies and learn about the possibilities and requirements to build a start-up. The Lab is funded by the Center of Digitalization Bavaria (ZD.B). By applying agile development methods (Scrum), teams of 5 to 8 students develop prototypes of products within the wearable and ubiquitous computing field. Participating students have open access to the Innovation Lab, which provides them with everything they need to develop their prototypes. The project ideas originate from cooperating companies or the students themselves. Besides the great practical experience gained during development, students also learn about entrepreneurship. There will be tutorials covering design thinking, market analysis, management of development processes, securing intellectual property, and business plan creation. | |
| 6 | Learning objectives and skills | Ideation, Design Thinking Patent Research, Markt Analysis Agile Development Methods (Scrum) Prototyping Securing Intellectual Property Introduction to Entrepreneurship, Startup Financing | |
| 7 | Recommended prerequisites Integration in curriculum | Topic assignment and finding appointments take place in the first week of the semester. Registration until October 15th via StudOn. Seminar places by first come, first serve, the order of the registration is decisive. Afterwards, there is a waiting list. The course can also be attended by students of the mentioned fields (Bachelor 5th semester or higher, all Master students). For other study programs or information to ECTS distributions, please contact Matthias Zürl (Matthias.Zuerl@fau.de). More information to course can be found at our website: https://www.mad.tf.fau.de/research/projects/innovation-lab-for-wearable-and-ubiquitous-computing Second semester | |
| 2 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Digital Business (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) | |
| 10 | Method of examination | Presentation (50%), Practical work (50%) | |
| 11 | Grading procedure | Presentation (50%), Practical work (50%) | |
| 12 | Module frequency | Each summer and winter term | |
| 13 | Workload | Contact hours: 60 h + Independent study: 90 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examination language | | |
| 16 | (Recommended) reading | All relevant material will be provided during the lecture. | |

Datenschutz, Compliance und Elektronische Signaturen (DSES)

| 1 | Modulbezeichnung 829281 | Datenschutz, Compliance und Elektronische Signaturen | 5 ECTS |
|---|----------------------------|---|----------------------|
| 2 | Lehrveranstaltungen | V: Datenschutz und Compliance (2 SWS) V: Electronic signatures (ES) (2 SWS) | 2,5 ECTS 2,5 ECTS |
| 3 | Lehrende | Prof. Tielemann (DATEV, Lehrbeauftragter) | |

| 4 | Modulverantwortliche/r | Prof. Tielemann |
|---|--|---|
| 5 | Inhalt | DS: Die Vorlesung führt in die Grundlagen der EU Grundschutzverordnung ein. Es werden datenschutzrelevanter Begriffe erklärt, gesellschaftliche Reflexion zum Datenschutz und Datenhandel gemeinsam erarbeitet und weitere Datenschutzregelungen gesichtet. Ziel der VL ist es, Problembewusstsein zum Thema Datenschutz zu ermöglichen und Maßnahmen zur Verbesserung des Datenschutzniveaus zu erarbeiten. Alle Teilnehmer sind aufgerufen sich in der VL an einer gesellschaftspolitischen Diskussion zum Thema Datenschutz zu beteiligen. Der Begriff Compliance umfasst weitläufig das gesetzeskonforme Verhalten im Alltag, insbesondere auch bei dem Betrieb von IT-Systemen. Es werden die Disziplinen eines Compliance-Frameworks vorgestellt und einzelne Themen (z. B. die Risikoanalyse) vertieft. |
| | | ES: Die Vorlesung gibt einen Überblick über die relevanten gesetzlichen Regelungen wie die Verordnung (EU) Nr. 910/2014 über elektronische Identifizierung und Vertrauensdienste für elektronische Transaktionen im Binnenmarkt (EIDAS). Eine Reihe technischer Interpretationen der gesetzlichen Vorgaben werden vorgestellt. Dies sind u. a. Signaturerstellungseinheit (Smart Card), Zertifikatsproduktion, Trustcenter, Registrierungsund Auslieferungsprozesse, Signatursicherheitsniveaus sowie Zertifikatsauskunfts- und Zeitstempelsysteme. Es werden vertrauensbildende Maßnahmen und Evaluierungsmethoden bei der SW-Erstellung wie ITSEC und Common Criteria im Zertifizierungsprozess besprochen. Neben beispielhaften Anwendungen der elektronischen Signatur- und Zeitstempelkomponenten werden eine Einführung in relevante Standards (IETF, CEN) und aktuelle Problemstellungen (z. B. E-Government, elektronischer Rechtsverkehr, virtuelle Poststelle, beweissichere Archivierung) gegeben. |
| | Lernziele und Kompetenzen | Die Teilnehmer - erwerben aktuelles und grundlegendes Verständnis - lernen die gesetzlichen und technischen Randbedingungen kennen - reflektieren Aufwand, Komplexität und Nutzen von elektronischen Signaturen. |
| 6 | Empfohlene Voraussetzungen für die Teilnahme | Grundlagen von Datenbanksystemen – im Umfang der Module KonzMod und DBS im Bachelorstudium Informatik oder des Moduls DBNF in anderen Studiengängen |
| 7 | Einpassung in Musterstudienplan | Master Informatik: Beginn im zweiten und Abschluss/Prüfung im dritten Fachsemester Master International Information Systems: Beginn im zweiten und Abschluss/Prüfung im dritten Fachsemester |

| 8 | Verwendbarkeit des Moduls | eine Hälfte des Wahlpflichtmoduls "Informatik II" oder "Informatik III" im Master-Studiengang Informatik (über zwei Semester) eine Hälfte des Wahlpflichtmoduls "Informatik IV" im Master-Studiengang Informatik (über zwei Semester) Wahlpflichtmodul "Informatik VII" im Master-Studiengang Informatik (über zwei Semester) Wahlpflichtmodul "Informatik VIII" im Master-Studiengang Informatik (über zwei Semester) Wahlpflichtmodul "Vertiefung Datenbanksysteme A" Master International Information Systems (from 2018/19): Module in the section Informatics – Digital Business (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) |
|----|-------------------------------------|--|
| 9 | Studien- und Prüfungsleistungen | DS: schriftliche Klausur (60 Minuten) ES: schriftliche Klausur (60 Minuten) |
| 10 | Berechnung Modulnote | DS (50%) und ES (50%) |
| 11 | Turnus des Angebots | Jährlich, im Sommersemester (DS) und im anschließenden Wintersemester (ES) |
| 12 | Arbeitsaufwand | Präsenzzeit: 54 Eigenstudium: 96 d.h. je Vorlesung ca. 1h pro Woche Nachbereitung im laufenden Semester und ca. 60h Prüfungsvorbereitung in der vorlesungsfreien Zeit; erfolgt keine begleitende Nachbereitung sind ca. 90h für die Prüfungsvorbereitung einzukalkulieren |
| 13 | Dauer des Moduls | Zwei Semester, beginnend im Sommersemester mit DS |
| 14 | Unterrichts- und Prüfungssprache | Deutsch |
| 15 | (Vorbereitende) Literatur | Keine |

Einführung in die IT-Sicherheit (EinfITSec + Ü)

| 1 | Modulbezeichnung MSC 46311 | Einführung in die IT-Sicherheit Introduction to IT security | 5 ECTS |
|---|-------------------------------|--|--------|
| 2 | Lehrveranstaltungen | V: Angewandte IT-Sicherheit Ü: Einführung in die IT-Sicherheit (2+2) | 5 ECTS |
| 3 | Lehrende | Prof. Freiling | |

| 4 | Modulverantwortliche/r | Prof. Freiling |
|----|--|--|
| 5 | Inhalt | Die Vorlesung gibt einen einführenden Überblick über Konzepte und Methoden der IT-Sicherheit und eignet sich als Einstieg in das Vertiefungsgebiet "IT-Sicherheit" an der FAU. Themen (unter anderem): IT-Sicherheit vs. physische Sicherheit, Identifizierung und Authentifizierung, grundlegende Muster von Unsicherheit in technischen Systemen, grundlegende Abwehrmechanismen, ausgewählte Beispiele aus dem Bereich Systemsicherheit, Netzwerksicherheit und Softwaresicherheit. In der Übung werden die Themen der Veranstaltung beispielhaft eingeübt. Themen (unter anderem): "lock picking", "social engineering", ausnutzen von Softwareschwachstellen |
| 6 | Lernziele und Kompetenzen | Teilnehmer erwerben einen Überblick über Konzepte und Methoden aus dem Bereich der IT-Sicherheit und können diese im Kontext der Informatik und der Lebenswirklichkeit anhand von Beispielen einordnen und erläutern. Die Studierenden können die wichtigsten Arten von Softwareschwachstellen in Programmen erkennen und benennen. Sie können außerdem erläutern, wie man diese Schwachstellen ausnutzt und welche technischen und organisatorischen Maßnahmen geeignet sind, diese Schwachstellen zu vermeiden. Die Studierenden lernen, die Wirksamkeit von IT-Sicherheitsmechanismen im gesellschaftlichen Kontext und in Kenntnis professioneller Strukturen der Cyberkriminalität aus technischen, ethischen und rechtlichen Perspektiven zu bewerten. |
| 7 | Empfohlene Voraussetzungen für die Teilnahme | Keine |
| 8 | Einpassung in Musterstudienplan | Drittes Semester |
| 9 | Verwendbarkeit des Moduls | Master International Information Systems (from 2018/19): Module in the section Informatics – Digital Business (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) |
| 10 | Studien- und Prüfungsleistungen | Klausur (60 Minuten) |
| 11 | Berechnung Modulnote | Klausur (100%) |
| 12 | Turnus des Angebots | jährlich im Wintersemester |
| 13 | Arbeitsaufwand | Präsenzzeit: 60 h Eigenstudium: 90 h |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und Prüfungssprache | Deutsch |
| 16 | (Vorbereitende) Literatur | Dieter Gollmann: Computer Security. 3. Auflage, Wiley, 2010. Joachim Biskup: Security in Computing Systems. Springer, 2008. Weitere Literatur wird in der Vorlesung bekanntgegeben |

Human factors in security and privacy (HumSecPri + Ü)

| 1 | Module name 658644 | Human factors in security and privacy | 5 ECTS |
|---|-----------------------|--|----------------------|
| 2 | Courses/lectures | Vorlesung: Human factors in security and privacy Übung: Human factors in security and privacy | 2,5 ECTS 2,5 ECTS |
| 3 | Lecturers | Dr. Benenson | |

| 4 | Module coordinator | Dr. Benenson |
|---|--------------------------------|---|
| 5 | Module coordinator Contents | Dr. Benenson This course provides insights into how security and privacy measures can fail to protect the users, and why this happens. Special attention is paid to complex environments such as companies, governmental organizations or hospitals. A number of guest talks from practitioners and researchers highlight some of the issues in greater depth. The course covers the following topics: • Terminology of security and privacy, technical and non-technical protection measures • Development and testing of usable security mechanisms (encryption and authentication tools, security policies, security warnings) • Risk perception and decision making in security and privacy context (usage of security software, reaction to security warnings, divulging information in social media) • Economics approach to security and privacy decision making (traditional and behavioral economics) • Trade-offs between the national security and surveillance (psychology behind the EU data retention directive and NSA programs) • Psychological principles of cyber fraud (scams, phishing, social engineering) • Security awareness and user education • Interplay of safety and security in complex systems • Research methods in human factors (qualitative vs. quantitative research, usability testing, experimental design, survey design, interviews) The exercises aim at deepening the understanding of the topics and are highly relevant for oral examinations. We plan to conduct approximately eight exercises per semester; the rest of the exercises is reserved for the guest talks. A typical exercise consist of two parts: (1) For each topic, the students receive a homework assignment consisting of practical exercises. (2) For each topic, the students receive 1-3 papers to read for the next exercise. The papers will be discussed in the class with the teaching assistant. |
| 6 | Learning objectives and skills | The main goal of this course is to develop a mindset that naturally takes into account typical psychological and physical characteristics of the users. When developing or evaluating security- and privacy-enhancing technologies or policies, the students are able to: • critically appraise technological solutions or policies for likely human factors issues in design and usage • choose appropriate techniques for evaluation • develop and test improvements |
| | | More precisely, after the successful completion of the course the students are able to: |

| | | identify main research questions in the area of human factors in security and privacy demonstrate specific difficulties in developing and testing of usable security mechanisms compare different approaches to the development of usable security | |
|----------|-------------------------------------|--|--|
| | | demonstrate specific difficulties in developing and testing of usable security mechanisms | |
| | | • | |
| | | features | |
| | | apply elements of user-centered design to development and evaluation of security- and privacy-enhancing techniques | |
| | | contrast the approaches of traditional and behavioral economics to the explanation of security- and privacy-related behavior | |
| | | illustrate the influence of the psychological risk perception principles (especially under- and overestimation of risk) on security and privacy decision making | |
| | | argue advantages and disadvantages of mass surveillance and other kinds of mass data collection for security and privacy of citizens | |
| | | explain main psychological principles behind the cyber fraud illustrate specific difficulties in awareness campaigns and user train- | |
| | | ing in the realms of security and privacy critically appraise design and results of published user studies | |
| | | plan and conduct small user studies | |
| | | scan research papers and other materials for important points that | |
| | | clarify and deepen course contents | |
| | | develop well-founded personal opinions on the course topics and de- | |
| | | fend them in the class discussions | |
| 7 | Recommended prerequisites | Basic knowledge in the area of IT security and privacy, such as security goals (CIA), basic protection mechanisms (symmetric and asymmetric cryptography, digital ceritificates and signatures, SSL/TLS, authentication) is required. This knowledge can be acquired through the attendance of the module "Angewandte IT Sicherheit" or similar modules. | |
| 8 | Integration in curriculum | Zweites Semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the | |
| | | section Informatics – Digital Business (Elective) Master International Information Systems (from 2016/17): Module in the | |
| | | section Informatics Extension Courses (Elective) | |
| | Method of examination | Klausur (90 Minuten) | |
| 11 12 | Grading procedure Module frequency | Klausur (100%) jährlich im Sommersemester | |
| | Workload | Präsenzzeit: 60 h und Eigenstudium: 90 h | |
| 14 | Module duration | 1 Semester | |
| | Teaching and examination | Deutsch (Vorlesungsfolien und Materialien auf Englisch, Übungsaufga- | |
| _ | language | ben auf Deutsch; Abgabe der Übungsaufgaben, Vortrag und Prüfung können auf Wunsch auf Englisch erfolgen) | |
| 16 | (Recommended) reading | L. F. Cranor, S. Garfinkel. Security and usability: designing secure systems that people can use. O'Reilly Media, Inc., 2005. Schneier, Bruce. "Beyond fear." Copernicus Book, 2003. Anderson, Ross. Security engineering. 2 nd edition, John Wiley & Sons, 2008. | |

IT-Modernisierung

| 1 | Modulbezeichnung 716516 | IT-Modernisierung (IT modern) | 5 ECTS |
|---|----------------------------|--------------------------------------|--------|
| 2 | Lehrveranstaltungen | Vorlesung: IT-Modernisierung (4 SWS) | |
| 3 | Lehrende | PD Peter Wilke | |

| 4 | Billio di ul como más com mático do o lo | DD Daton Willia |
|---|--|--|
| 4 | Modulverantwortliche/r | PD Peter Wilke |
| 5 | Inhalt | IT-Modernisierung beschäftigt sich mit dem Ersatz alter Software- und/oder Hardware. Software im kommerziellen Bereich hat eine typische Lebensdauer von über 25 Jahren, damit ist klar, dass diese keine der mo- mentan oder zukünftig zur Verfügung stehenden Möglichkeiten nutzt oder nutzen kann, denn "damals" waren Single-CPUs der Standard und Ver- netzung unbekannt. Durch das hohe Investionsvolumen ist eine Neu-Programmierung prak- tisch immer wirtschaftlich nicht sinnvoll und technisch oft unmöglich, da gar nicht genügend Programmierer zur Verfügung stehen. Die Software hat aber einen hohen Reifegrad erreicht, so dass sich die Frage stellt, ob man diese nicht automatisiert auf neue Technologien umstellen kann. Dieses Modul beleuchtet nun exemplarisch, auf welchen Feldern Bedarf besteht, wie der Stand der Technik ist, und welche zukünftigen Fragestel- lungen sich abzeichnen. Die Studierenden werden durch Übungsaufgaben mit den "alten" Pro- grammiersprachen wie Cobol, Assembler, Fortran uä. vertraut gemacht, und bearbeiten selbstständig kleine Migrations-Aufgaben. Als Dozenten werden erfahrene Spezialisten aus der Industrie über ihre Fragestellun- gen und Ansätze berichten. Momentane Planung (Stand Juli 2016, Themen nicht zwingend in dieser Reihenfolge): Einleitung Überblick Aufbau (Architektur) eines Rechenzentrums DB2 unter z/OS Exkursion DATEV Rechenzentrum RZ Konsolidierung Cobol Grundlagen, RD/z, TSO/ISPF, JCL System z Hardware Grundlagen Java am Host Mainframe Programmierung Legacy-Anwendungen in einer Cloud-Architektur, CICS Modernisierung Internationalisierung: Unicode im Rechenzentrum Praxisbericht IT-Betrieb (Aufgabenstellung) |
| | | Praxisbericht IT-Betrieb |
| 6 | Lernziele und Kompeten- zen | |
| 7 | Empfohlene Vorausset- | / |
| | zungen für die Teilnahme | |
| 8 | Einpassung in Musterstu- dienplan | 2. oder 4. Semester |

| 9 | Verwendbarkeit des Mo- | Master International Information Systems (from 2018/19): Module in the |
|----|---------------------------|--|
| 10 | duls | section Informatics – Digital Business (Elective) |
| | | Master International Information Systems (from 2016/17): Module in the |
| | | section Informatics Extension Courses (Elective) |
| 11 | Studien- und Prüfungs- | Mündliche Prüfung (30 min) |
| | leistungen | |
| 12 | Berechnung Modulnote | 100% der Prüfungsnote |
| 13 | Turnus des Angebots | Jedes Sommersemester |
| 14 | Arbeitsaufwand | Präsenzzeit: 60h |
| | | Eigenstudium: 90h |
| 15 | Dauer des Moduls | 1 Semester |
| 16 | Unterrichts- und Prü- | Deutsch |
| | fungssprache | |
| 17 | (Vorbereitende) Literatur | / |

Cryptocurrencies (CryptoCur)

| 1 | Module name 566245 | Cryptocurrencies | 5 ECTS |
|---|-----------------------|-------------------------------------|--------|
| 2 | Courses/lectures | Praktikum: Cryptocurrencies (4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Schröder | |

| 4 | Module coordinator | Prof. Schröder | |
|----|-----------------------------------|---|--|
| 5 | Contents | Cryptographic e-cash Blockchain Bitcoin Protocol Nakamoto Consensus Bitcoin Community and Politics Alternative Mining Approaches Alternative Coins: Ethereum, Anonymous Payments, Zero-Knowledge Cash Other state-of-the-art topic related to cryptocurrencies | |
| 6 | Learning objectives and skills | Verstehen Die Studierenden kennen die wesentlichen Eigenschaften digitaler Währungen und können diese auch vergleichen. Analysieren Die Studierenden können digitale Währungen untersuchen und überprüfen, ob diese die grundlegenden Eigenschaften einer digitalen Währung erfüllen. Evaluieren (Beurteilen) Die Studierenden können unterschiedliche digitalen Währung miteinander vergleichen und je nach Anwendung einen geeigneten Kandidaten ermitteln. | |
| 7 | Recommended prerequisites | Only basic knowledge in cryptography or computer security is assumed. It would be ideal if you have done a cryptography and/or security class at FAU or during your previous studies somewhere else. Motivated students without this background are also welcome to the course. However, we would expect some more spirited efforts from you. | |
| 3 | Integration in curriculum | Second semester | |
| 4 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Digital Business (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) | |
| 10 | Method of examination | Oral examination, 30 minutes (mündliche Prüfung, 30 Minuten) | |
| 11 | Grading procedure | The grade consists to 35% of grades for exercise sheets and to 65% of the grade for a programming project (to be defined) developed by the end of the course (in groups of at most 3 students). | |
| 12 | Module frequency | Each summer term | |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examination language | English | |
| 16 | (Recommended) reading | All relevant material will be provided during the lecture. | |

Foundations of Cryptocurrencies (FoundCrypt)

| 1 | Module name 566245 | Foundations of Cryptocurrencies | 5 ECTS |
|---|-----------------------|---|--------|
| 2 | Courses/lectures | Foundations of Cryptocurrencies (4 SWS) | 5 ECTS |
| 3 | Lecturers | Felix Freiling | |

| 4 | Module coordinator | Felix Freiling | |
|----|-----------------------------------|---|--|
| 5 | Contents | introduction to cryptography and cryptocurrencies distributed systems, system and failure models, distributed algorithms reliable broadcast logical time and causal broadcast consensus and total order broadcast Byzantine agreement Bitcoin protocols Nakamoto consensus Bitcoin mining Ripple and Payment networks Redactable blockchain | |
| 6 | Learning objectives and skills | The students will learn to understand current protocols behind cryptocurrencies like Bitcoin analyse their properties and assess their weaknesses assess the properties of new cryptocurrencies from the literature | |
| 7 | Recommended prerequisites | Interest in cryptography | |
| 5 | Integration in curriculum | Second semester | |
| 6 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Digital Business (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) | |
| 10 | Method of examination | Oral examination, 30 minutes (mündliche Prüfung, 30 Minuten) | |
| 11 | Grading procedure | Oral examination, 100% (mündliche Prüfung, 100%) | |
| 12 | Module frequency | Each summer term | |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examination language | English | |
| 16 | (Recommended) reading | All relevant material will be provided during the lecture. | |

Forensische Informatik (ForensInf)

| 1 | Modulbezeichnung 792501 | Forensische Informatik | 5 ECTS |
|---|-----------------------------------|--------------------------------------|--------|
| 2 | Lehrveranstaltungen | V/UE: Forensische Informatik (4 SWS) | 5 ECTS |
| 3 | Lehrende | Prof. Freiling | |

| | Manufacture and the last of | Duck Fuelling |
|----|---|---|
| 4 | Modulverantwortliche/r | Prof. Freiling |
| 5 | Inhalt | Forensische Informatik befasst sich mit der Sammlung, Aufbereitung und Analyse digitaler Beweismittel zur Verwendung vor Gericht. Ausgangspunkt ist jeweils der Verdacht auf einen Computereinbruch oder eine Straftat, die mit Hilfe von digitalen Geräten vorgenommen worden ist. Diese Vorlesung gibt einen Überblick über die Methoden der forensischen Informatik aus einer wissenschaftlichen Perspektive. Der Schwerpunkt liegt auf der Analyse von Dateisystemen. Ziel der Vorlesung ist nicht die Ausbildung von Forensik-Praktikern, sondern die Vermittlung von Kenntnissen, die es einem erlauben, Forschung im Bereich Computerforensik zu betreiben. Voraussichtliche Themen: • Definition forensische Informatik • Der forensische Prozess und seine wissenschaftliche Fundierung • Rechtliche Rahmenbedingungen • Sichern von Festplatten • Analyse verschiedener Dateisysteme (FAT32, NTFS, Ext2/Ext3) • Tools |
| 6 | Lernziele und Kompeten- zen | Die Studierenden können Termini und Methoden der digitalen Forensik in die Entwicklung der forensischen Wissenschaften einordnen. Die Studierenden können die wesentlichen Datenstrukturen verschiedener Dateisysteme erklären. Sie können die für forensische Zwecke wesentlichen Datenstrukturen lokalisieren und geeignete Werkzeuge zu ihrer Analyse auswählen und anwenden. Die Studierenden können digitale Spuren konkreter Fallkonstellationen durch Anwendung von Werkzeugen rekonstruieren, analysieren, interpretieren und dokumentieren. Sie lernen ihre Untersuchungsergebnisse zu präsentieren und gegenüber kritischen Nachfragen zu verteidigen. |
| 7 | Empfohlene Vorausset- zungen für die Teilnahme | Keine |
| 7 | Einpassung in Musterstu- dienplan | 2. oder 4. Semester |
| 8 | Verwendbarkeit des Moduls | Master International Information Systems (from 2018/19): Module in the section Informatics – Digital Business (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics Extension Courses (Elective) |
| 10 | Studien- und Prüfungs- leistungen | Mündliche Prüfung (30 Minuten) |
| 11 | Berechnung Modulnote | Mündliche Prüfung (100%) |
| 12 | Turnus des Angebots | Jährlich im Sommersemester |
| 13 | Arbeitsaufwand | Präsenzzeit: 60 h Eigenstudium: 90 h |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und Prü- fungssprache | Deutsch |
| 16 | (Vorbereitende) Literatur | Keine |

Architectures & Development

Constructive phases of software engineering (SWE-GL-Konstr +Ü)

| 1 | Module name MSC 71302 | Constructive phases of software engineering | 5 ECTS |
|---|--------------------------|---|--------|
| 2 | Courses/lectures | Foundations of software engineering (lectures + courses, 4 SWS, first 2 months of the semester) | 5 ECTS |
| 3 | Lecturers | Prof. Saglietti | |

| 4 | Module coordinator | Prof. Saglietti |
|----|--|--|
| 5 | Contents | This module addresses a broad spectrum of scientific engineering principles and alternative approaches during the conception and the development of large-scale, complex software systems. They provide a comprehensive overview on constructive techniques in modern software engineering. |
| 6 | Learning objectives and skills | Students familiarize with several alternative development approaches and tools differing in their degree of rigor and cost and thus suitable to different types of software projects, depending a. o. on the project size, the company structure or the reliability requirements. |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | Second semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Core Course or Elective) Master International Information Systems (from 2016/17): Module in the section Informatics – Software Engineering I or II (Core Coure or Elective) |
| 10 | Method of examination | 90-minute written examination (schriftl. Prüfung (90 min) |
| 11 | Grading procedure | Exam: 100% of module score (Prüfung: 100% der Modulnote) |
| 12 | Module frequency | Each SS |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | German or English |
| 16 | (Recommended) reading | None |

Process-oriented information systems (POIS)

| 1 | Module name 675090 | Process-oriented information systems | 5 ECTS |
|---|-----------------------|---|----------------------|
| 2 | 2 Courses/lectures | Lect: Process-oriented information systems (2 SWS) Ex: Process-oriented information systems (2 SWS) | 2,5 ECTS 2,5 ECTS |
| 3 | 3 Lecturers | Dr. Stiehl (SAP, Lehrbeauftragter) | |

| 4 | Module coordinator | Prof. Lenz | |
|---|--------------------------------|--|--|
| 5 | Contents | In a globalized world enterprises are facing tough challenges as changes are permanently accompanying them. As a consequence companies have to adapt their differentiating business processes in even shorter timeframes. If they do not follow these changes, they are threatening their existence. Ideally the company's IT department can help in overcoming those challenges by taking their part in implementing the company's strategy as fast as possible. Unfortunately the key question remains unanswered: How can an IT department ensure the fast implementation of new strategic processes so that they become a key pillar for a company? This course will address the question from different angles and will come up with solutions which primarily rely on the following three pillars: • a business-process-driven methodology for deriving the essential parts/artifacts of the resulting business application; • a sustainable and flexible architecture for process-driven applications separating the problem space in several layers; • the general use of BPMN (Business Process Model and Notation) for modeling as well as implementing all processes (business processes as well as technical integration processes) of a process-driven application. As the topic is closely related to service-oriented architecture (SOA), the course will also briefly touch the basic technologies and concepts in the SOA domain (e.g. XML, Web Services, SOAP, UDDI registries, repositories, WSDL). | |
| 6 | Learning objectives and skills | Goals of the course: Identify the use case for process-oriented information systems. Understand the complexity and challenges of process-oriented information systems. Understand the need for a sustainable methodology and architecture to address the challenges. Learn how to separate functionalities in different layers and how to implement each of those layers to keep the flexibility companies require. Use the BPMN (Business Process Model and Notation) standard for modeling and implementing all kinds of processes within a process-oriented application. Embrace the heterogeneous IT landscape in companies which has grown over several years. Learn how the flexibility of applications can be increased by using business rules management systems (BRMS) and analytical applications. | |
| 7 | Recommended prerequisites | Lecture eBusiness Technologies (EBT). | |
| 8 | Integration in curriculum | Second semester | |
| 9 | Module compatibility | Master Computer Science: 5-ECTS-module in major field of study "Database Systems" Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Core Course or Elective) | |

| | T | T | |
|----|--|---|--|
| | | Master in International Information Systems (from 2016/17): Module in the section Informatics – Data Management I or II (Core Course or Elective) | |
| 10 | Method of examination | 60-minute written examination | |
| 11 | Grading procedure | Exam: 100% (100% der Klausurnote) | |
| 12 | Module frequency | Each SS | |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h | |
| 14 | Module duration | 1 Semester | |
| 15 | Teaching and examina- tion language | English | |
| 16 | (Recommended) reading | Freund, Jakob; Rücker, Bernd (German version): Praxishandbuch BPMN 2.0. 4., aktualisierte Auflage. München: Hanser, 2012. Freund, Jakob; Rücker, Bernd (English Version): Real-Life BPMN: Using BPMN 2.0 to Analyze, Improve, and Automate Processes in Your Company. 2nd Edition. CreateSpace Independent Publishing Platform, 2014 Göpfert, Jochen; Lindenbach, Heidi: Geschäftsprozessmodellierung mit BPMN 2.0: Business Process Model and Notation. Oldenbourg Verlag, 2013. Josuttis, Nicolai: SOA in Practice: The Art of Distributed System Design. O'Reilly, 2007. Hohpe, Gregor; Woolf, Bobby: Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions. Addison-Wesley, 2010. Silver, Bruce: BPMN Method and Style: A structured approach for business process modeling and implementation using BPMN 2.0. 2nd Edition. Cody-Cassidy Press, 2011 Stiehl, Volker (German version): Prozessgesteuerte Anwendungen entwickeln und ausführen mit BPMN: Wie flexible Anwendungsarchitekturen wirklich erreicht werden können. Heidelberg: dpunkt.verlag, 2013. Stiehl, Volker (English version): Process-Driven Applications with BPMN. Springer, 2014 | |

Fehlertolerierende Softwarearchitekturen (SWE-FT)

| 1 | Module name 869140 | Fehlertolerierende Softwarearchitekturen | 5 ECTS |
|---|-----------------------|--|--------|
| 2 | Courses/lectures | Fehlertolerierende Softwarearchitekturen (lectures + courses, 4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Saglietti | |

| 4 | Module coordinator | Prof. Saglietti |
|----|--|---|
| 5 | Contents | This module addresses redundant approaches supporting the tolerance of sporadic software failures during operation. |
| 6 | Learning objectives and skills | The students will acquire knowledge on constructive approaches to software fault tolerance, particularly concerning the optimization of the architectural aspects involved (form and degree of redundancy, properties of adjudication mechanisms) on qualitative and quantitative analysis techniques for the assessment of redundant computer systems, including in particular diverse software systems. |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | Third semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics – Software Engineering II (Elective) |
| 10 | Method of examination | 30-minute oral examination (mündl. Prüfung (30 min)) |
| 11 | Grading procedure | Exam: 100% of module score (Prüfung: 100% der Modulnote) |
| 12 | Module frequency | Each WS |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | German or English |
| 16 | (Recommended) reading | None |

Applied Software Engineering Master-Projekt (OSS-PROJ)

| 1 | Module name 93141 | Applied Software Engineering Master-Projekt | 10 ECTS |
|---|----------------------|---|---------|
| 2 | Courses/lectures | Applied Software Engineering Master-Projekt | 10 ECTS |
| 3 | Lecturers | Prof. Dirk Riehle | |

| 4 | Module coordinator | Prof. Dirk Riehle | |
|----|--|--|--|
| 5 | Contents | This module lets students fulfill their degree program's project obligation by performing a project in software engineering and/or open source. We prefer that you use one of our existing courses for your project obligation, but are willing to have you for a one-off topic if none of our courses fit. Project topics should be in the domain of (applied) software engineering and may or may not include open source software as a topic. The work result is most likely a new software component, but this depends on the specific topic we agreed upon. | |
| 6 | Learning objectives and skills | Students learn to program a software component as part of one of our projects Students learn to work with a lead programmer in a continuous delivery process | |
| 7 | Recommended prerequisites | None | |
| 8 | Integration in curriculum | Second/third semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) | |
| 10 | Method of examination | Project work: 100% of the final grade | |
| 11 | Grading procedure | Project work: 100% of the final grade | |
| 12 | Module frequency | SS+WS | |
| 13 | Workload | Contact hours: 0 h Independent study: 300 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examina- tion language | English | |
| 16 | (Recommended) reading | None | |

eBusiness technologies und Evolutionäre Informationssysteme (EBTEIS)

| 1. | Modulbezeichnung | eBusiness technologies und evolutionäre Informations- | 5 ECTS |
|----|---------------------|--|----------|
| | 710850 | systeme | |
| | | (E-business technologies and Evolutionary information sys- | |
| | | tems) | |
| 2. | Lehrveranstaltungen | V: eBusiness technologies (2 SWS) | 2,5 ECTS |
| | _ | V: Evolutionäre Informationssysteme (2 SWS) | 2,5 ECTS |
| 3. | Lehrende | Dr. Irmert, Dr. Neumann (Lehrbeauftragte), Prof. Lenz | |
| | | | |

| 4. | Modulverantwortliche/r | Prof. Dr. Richard Lenz |
|----|------------------------------|---|
| 5. | Inhalt | EBT: |
| | | Überblick und Einblick in die wichtigsten Themen des Bereichs e-Business: Von den Anwendungen bis zu den Implementierungen Vorgehen: Klassifikation, Ordnung von Techniken und Methoden; Bewertung Einführung: eBusiness als Anwendung, Definition der Integration, B2B Integration, Realisierung von eBusiness-Anwendungen (WAA, WPA) Architektur: Grundlagen des Webs, HTTP-/Web-/Application Server Implementierung: Markup Languages (HTML, XML), Enterprise Java Beans, J2EE, DB-Zugriffstechniken, Web Services EIS: Grundlagen rechnergestützter Informationssysteme und Organisatorisches Lernen Erfolgsfaktoren für IT-Projekte Software-Wartung vs. Software-Evolution Architekturmodelle Grundprinzipien evolutionärer Systeme Anwendungsintegration |
| | | Datenqualität in Informationssystemen |
| 6. | Lernziele und Kompetenzen | EBT: Die Studierenden - identifizieren die wichtigsten Themen des Bereichs eBusiness, von den Anwendungen bis zu den Implementierungen - verstehen Zusammenhänge der B2B Integration und der Realisierung von eBusiness-Anwendungen - wiederholen Grundlagen des Webs - vergleichen technische Eigenschaften von HTTP-, Web- und Application Servern - vergleichen Markup Languages (HTML, XML) - unterscheiden Ansätze zur Schema-Modellierung wie DTD und XML Schema und erkennen die unterschiedliche Leistungsfähigkeit - verstehen Methoden zur evolutionsfähigen Gestaltung von Datenstrukturen in XML - unterscheiden Vorgehen bei der Datenhaltung und verschiedene Ansätze für den Datenbankzugriff - verstehen Objekt-relationale Mapping Frameworks am Beispiel von Hibernate und JPA - verstehen Komponentenmodelle wie Enterprise JavaBeans (EJB) aus dem JEE Framework - unterscheiden das EJB Komponentenmodell von den OSGi Bundles und den Spring Beans - verstehen und unterscheiden grundlegende Web Service Techniken wie SOAP und WSDL - unterscheiden Herangehensweisen zur dynamischen Generierung von Webseiten - verstehen grundlegende Eigenschaften eines Java-basierten Front-End-Frameworks am Beispiel von JSF |

- verstehen grundlegende Eigenschaften von Service-orientierten Architekturen (SOA)
- verstehen agile Vorgehensmodelle zur Software-Entwicklung am Beispiel von Scrum
- unterscheiden agile Verfahren wie Scrum von iterativ-inkerementellen Verfahren wie RUP
- verstehen die Wichtigkeit von Code-Beispielen um die praktische Anwendbarkeit des theoretischen Wissens zu veranschaulichen.
- können die Code-Beispiele eigenständig zur Ausführung bringen und die praktischen Erfahrungen interpretieren und bewerten
- gestalten eigene Lernprozesse selbständig.
- schätzen ihre eigenen Stärken und Schwächen im Hinblick auf die unterschiedlichen Architektur-Schichten ein (Benutzerinteraktion, Applikationslogik, Schnittstellenintegration, Datenbanksysteme)
- identifizieren eine eigene Vorstellung als zukünftige Software-Architekten und können die eigene Entwicklung planen
- reflektieren durch regelmäßige fachbezogene Fragen des Dozenten Ihre eigene Lösungskompetenz.

EIS:

Die Studierenden:

- definieren die Begriffe "Informationssysteme", "evolutionäre Informationssyste" und "organisatorisches Lernen"
- grenzen die Begriffe "Wissen" und "Information" gegeneinander ab
- charakterisieren die in der Vorlesung erläuterten Formen der organisatorischen Veränderung
- erklären das SEKI Modell nach Nonaka und Takeuchi
- nennen Beispiele für die in der Vorlesung behandelten Formen der Wissensrepräsentation in IT-Systemen
- nennen typische Erfolgs- und Risikofaktoren für große IT-Projekte
- erklären die Kraftfeldtheorie nach Kurt Lewin
- unterscheiden Typen von Software gemäß der Klassifikation nach Lehman und Belady
- unterscheiden die in der Vorlesung vorgestellten Arten der Software Wartung
- benennen die Gesetzmäßigkeiten der Software-Evolution nach Lehman und Belady
- bewerten die in der Vorlesung vorgestellten Vorgehensmodelle zur Softwareerstellung im Kontext der E-Typ-Software
- nennen die in der Vorlesung vorgestellten Aspekte der Evolutionsfähigkeit von Software
- erklären, wie die in der Vorlesung vorgestellten Methoden zur Trennung von Belangen beitragen
- erklären das Konzept des "Verzögerten Entwurfs"
- erklären die Vor- und Nachteile generischer Datenbankschemata am Beispiel von EAV und EAV/CR
- charakterisieren die in der Vorlesung vorgestelten Architekurkonzepte
- grenzen die in der Vorlesung vorgestellten Integrationsanforderungen gegeneinander ab
- erklären wie Standards zur Systemintegration beitragen und wo die Grenzen der Standardisierung liegen
- erklären das Prinzip eines Kommunikationsservers und der nachrichtenbasierten Integration
- erklären den Begriff "Prozessintegration"
- definieren den Begriff "Enterprise Application Integration" (EAI)
- unterscheiden die in der Vorlesung vorgestellten Integrationsansätze
- erklären die in der Vorlesung vorgestellten Dimensionen der Datenqualität
- unterscheiden die grundlegenden Messmethoden für Datenqualität

| | | · · · · · · · · · · · · · · · · · · · |
|----------|---------------------------|--|
| | | - erklären das Maßnahmenportfolio zur Verbesserung der Daten- |
| | | qualität nach Redman |
| | | - benennen die in der Vorlesung vorgestellten Methoden zur Ver- |
| <u> </u> | | besserung der Datenqualität |
| 7. | Empfohlene | Module "Algorithmen und Datenstrukturen" (wg. Objektorientierung), |
| | Voraussetzungen für die | "Konzeptionelle Modellierung" (wg. Datenmodellierung und UML), "Soft- |
| | Teilnahme | wareentwicklung in Großprojekten" (wg. Entwurfsmustern und IT-Vorge- |
| | | hensmodellen), "Systemprogrammierung" (wg. Betriebssystem-Architek- |
| | | tur), "Berechenbarkeit und formale Sprachen" (als Grundlage für XML) |
| | | und "Rechnerkommunikation" (wg. Transferprotokollen), "Datenbanksysteme" – ggf. parallel (wg. Schichtenarchitektur und Transaktionen). Die |
| | | relevanten Inhalte können ggf. auch in anderen Modulen erworben wor- |
| | | den sein. |
| 8. | Einpassung in | drittes Semester |
| Ο. | Musterstudienplan | unities Semester |
| 9. | Verwendbarkeit des | Master International Information Systems (from 2018/19): Module in the |
| Э. | Moduls | section Informatics – Architectures & Development (Elective) |
| | Modulo | Master in International Information Systems (from 2016/17): Modul im Be- |
| | | reich Informatics – Data Management I oder II (Core Course oder Elec- |
| | | tive). |
| 10. | Studien- und | mündliche Prüfung (30 Minuten) |
| | Prüfungsleistungen | , , , , , , , , , , , , , , , , , , , |
| 11. | Berechnung Modulnote | Ergebnis der mündlichen Prüfung |
| 12. | Turnus des Angebots | jährlich, im Wintersemester |
| 13. | Arbeitsaufwand | Präsenzzeit: 60h (4h x 15) |
| | | Eigenstudium: 90h (2h x 15 + 60h) |
| | | ca. 2h pro Woche Nachbereitung im laufenden Semester und ca. 60h |
| | | Prüfungsvorbereitung in der vorlesungsfreien Zeit; erfolgt keine beglei- |
| | | tende Nachbereitung, sind ca. 90h für die Prüfungsvorbereitung einzukal- |
| | | kulieren. |
| 14. | Dauer des Moduls | 1 Semester |
| 15. | Unterrichts- und | Deutsch |
| 40 | Prüfungssprache | EDT. |
| 16. | (Vorbereitende) Literatur | EBT: |
| | | Michael Merz: E-Commerce und E-Business. 2. Aufl. Dpunkt Verlag, 2002 |
| | | Craig Larman: Applying UML and Patterns. 3rd ed. Prentice Hall, 2004 |
| | | Dan Pilone, Russ Miles: Head First Software Development. 1. Aufl. |
| | | O'Reilly Media, 2007 |
| | | Rod Johnson: Expert One-on-one J2EE Design and Development. Wiley |
| | | & Sons, 2003 |
| | | Bernd Müller: JBoss Seam. 1. Aufl. Hanser Fachbuch, 2007 |
| | | Craig Walls, Ryan Breidenbach: Spring in Action. 2. Aufl. Manning Publi- |
| | | cations, 2007EIS: |
| | | Nandish Patel: Adaptive Evolutionary Information Systems. Idea Group |
| | | Publishing, 2003. |
| | I | 1. dolloring, 2000. |

Software-Projektmanagement (PSWT-SPM)

| 1 | Module name 312443 | Software-Projektmanagement (PSWT-SPM) | 5 ECTS |
|---|-----------------------|--|--------|
| 2 | Courses/lectures | Lect: Software project management (4 SWS) (PSWT-SPM) | 5 ECTS |
| 3 | Lecturers | Prof. Hindel | |

| 4 | Module coordinator | Prof. Hindel |
|---|--------------------------------|--|
| 5 | Contents | Zahlreiche Statistiken zeigen: Nur wenige Software-Projekte werden erfolgreich (hinsichtlich Zeit-, Budget- und Funktionsvorgaben) abgeschlossen. Sehr viele Projekte werden nur mit erheblichen Defiziten zu Ende gebracht, noch viel zu viele scheitern gänzlich. Oft liegen die Gründe im ungenügenden Projektmanagement. Die Vorlesung gibt einen Überblick zu grundlegenden Disziplinen des Projektmanagements und zeigt deren Wirkungsweisen an Hand von Praxisbeispielen. |
| | | Gliederung: 1. Einführung Grundbegriffe des Projektmanagements, unterschiedliche Projektgrößen, unterschiedliche Projektarten, Erfolg und Misserfolg in Projekten 2. Projektstart und Planung, Kickoff-Meeting, Anforderungssammlung, Projektstrukturplan, Aufwandsschätzung, Aktivitäten-, Ressourcenund Kostenplan 3. Projektkontrolle und Steuerung, Fortschrittsüberwachung, Besprechungen, Berichte, Änderungsmanagement 4. Personalmanagement, Der Faktor Mensch, Teamwork, Führungsgrundsätze, Gesprächsstrategien, Konflikte lösen 5. Änderungsmanagement Konfigurationen, Änderungswünsche, Change Control Board, Built- und Release-Mechanismen 6. Qualitäts- und Risikomanagement Qualitätsplan, Audits und Reviews, Risikoermittlung, Risikobewertung und Verfolgung, Gegenmaßnahmen 7. Reifegrad Modelle und Standards CMMI, SPiCE, ISO9001, ISO/IEC12207 |
| 6 | Learning objectives and skills | kennen die Grundbegriffe des Projektmanagements unterscheiden unterschiedliche Projektgrößen, unterschiedliche Projektarten verstehen die Ursachen für Erfolg und Misserfolg in Projekten planen selbständig Projekte und organisieren das Kickoff-Meeting erstellen Anforderungen, Projektstrukturplan, Aufwandsschätzung, Aktivitäten-, Ressourcen- und Kostenplan verstehen Projektkontrolle und Steuerung, Fortschrittsüberwachung, Besprechungen, Berichte, Änderungsmanagement kennen die Grundzüge des Personalmanagements (Der Faktor Mensch, Teamwork, Führungsgrundsätze, Gesprächsstrategien, Konflikte lösen) planen und steuern Änderungsmanagement (Konfigurationen, Änderungswünsche, Change Control Board, Built- und Release-Mechanismen) setzen Qualitäts- und Risikomanagement ein (Qualitätsplan, Audits und Reviews, Risikoermittlung, Risikobewertung und Verfolgung, Gegenmaßnahmen) kennen die wichtigsten Reifegrad Modelle und Standards (CMMI, SPiCE, ISO9001, ISO/IEC12207) |

| 7 | Recommended prerequisites | Praktische Softwaretechnik |
|----|--|---|
| 8 | Integration in curriculum | Drittes Semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Core Course or Elective) Master International Information Systems (from 2016/17): Module in the section Informatics – Applied Software Engineering I or II (Core Course or Elective) |
| 10 | Method of examination | Aktive Mitarbeit in der Übung über Hausaufgaben und Kolloquium. |
| 11 | Grading procedure | 100% der Modulnote |
| 12 | Module frequency | Jedes Wintersemester |
| 13 | Workload | Präsenzeit: 60 h Eigenstudium: 90 h |
| 14 | Module duration | 1 Semester |
| 15 | Teaching and examina- tion language | Deutsch |
| 16 | (Recommended) reading | Hindel et al.: "Basiswissen Software-Projektmanagement", 3.Auflage, dpunkt.verlag 2009, ISBN 978-3-89864-561-4 |

Testing of software systems (TSWS)

| 1 | Modulbezeichnung 189989 | Testing of software systems | 5 ECTS |
|---|----------------------------|-------------------------------------|--------|
| 2 | Lehrveranstaltungen | Testing of software systems (4 SWS) | 5 ECTS |
| 3 | Lehrende | DrIng. Dussa-Zieger DrIng. Oster | |

| 4 | Modulverantwortliche/r | Prof. Riehle |
|----|--|--|
| 4 | Modulverantworthche/i | FIOI. Nieme |
| 5 | Inhalt | Grundlagen (Motivation, Testprozess, Psychologie) Testen im Softwarelebenszyklus (Teststufen) Integrationstest (big-bang, bottom-up, top-down, u.a.) Testarten (functional=black, strukturell=white, modellbasiert) Statische Analysen, Reviews u.a. Testmanagement (TMMI/TPI, Team/Personal-Aspekte) Werkzeuge Risikomanagement Testbewertung (Mutationsanalyse) Statistisches Testen (Zuverlässigkeitswachstum, Probabilistischer Test) Formale Methoden (Model Checking, Theorem Proving) |
| 6 | Lernziele und Kompetenzen | Beherrschen der grundlegenden Terminologie. Fähigkeit, eigenständig Testprozesse zu definieren und aufzusetzen. Verständnis der Vor- und Nachteile unterschiedlicher Test- und Analysestrategien. Über die Grundlagen der Software-Qualitätssicherung hinausgehende Methoden und Werkzeuge kennenlernen, die insbesondere auch für sicherheitskritische Softwaresysteme von Bedeutung sind. |
| 7 | Empfohlene Voraussetzungen für die Teilnahme | Es wird empfohlen, das Modul "Praktische Softwaretechnik" vorher zu belegen. Die relevanten Inhalte können ggf. auch in anderen Modulen erworben worden sein. |
| 8 | Einpassung in Musterstudienplan | Zweites Semester |
| 9 | Verwendbarkeit des Moduls | BA CE: Technisches Wahlfach Informatik MA CE: Wahlpflichtfach Informatik BA Informatik: Wahlpflichtmodul der Vertiefungsrichtung Software Engineering, im 5. oder 6. Semester MA Informatik: Wahlpflichtmodul der Vertiefungsrichtung Software Engineering Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) Master International Information Systems (from 2016/17): Modul im Bereich Informatics – Applied Software Engineering II (Elective) BA IuK: Wahlfach 5. oder 6. Semester Zukünftig auch MA IuK |
| 10 | Studien- und Prüfungsleistungen | 30 Min. mündliche Prüfung |
| 11 | Berechnung Modulnote | 100 % der Modulnote |

| 12 | Turnus des Angebots | jedes SS |
|----|-------------------------------------|---|
| 13 | Arbeitsaufwand | Präsenzzeit: 60 h Eigenstudium: 90 h |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und Prüfungssprache | Deutsch (bei Bedarf auch Englisch) |
| 16 | (Vorbereitende) Literatur | Keine |

Analysis and design with UML (PSWT-OOAD)

| 1 | Module name 510375 | Analysis and design with UML (PSWT-OOAD) | 5 ECTS |
|---|-----------------------|--|--------|
| 2 | Courses/lectures | Analysis and design with UML (Lecture with exercises, 4 SWS) (PSWT-OOAD) | 5 ECTS |
| 3 | Lecturers | Prof. Kips, Martin Jung | |

| 4 | Module coordinator | Prof. Kips | |
|----|--|--|--|
| 5 | Contents | In recent years OMG ("Object Management Group") has established UML ("Unified Modeling Language") as the world wide accepted standard for analysis and design of object oriented software. A broad repertoire of graphical and textual methods enables the user to express the requirements for the system to be developed and to define the static and dynamic properties in a semi-formal way. The lecture will introduce syntax and semantics of the UML in detail. Furthermore, students will learn how UML can be used during all phases of a "typical" software development process. For this purpose, the different diagram types and notation elements of UML are introduced step by step and used in a continuous application example. | |
| 6 | Learning objectives and skills | overview of all relevant UML notation elements accompanied with an informal introduction to their semantics establishing a basic understanding of the UML metamodel approach introduction of a typical methodology for developing an object oriented analysis and design model based on UML notation using a non-trivial real world problem example establishing a well founded understanding of relations between the various levels of an UML based system model | |
| 7 | Recommended prerequisites | Successful completion of the module "Praktische Softwaretechnik". The prerequisites for taking this module may also have been acquired in other modules. | |
| 8 | Integration in curriculum | Second semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics – Applied Software Engineering I or II (Core Course or Elective) | |
| 10 | Method of examination | 30min. oral examination (30 minütige mündliche Prüfung) | |
| 11 | Grading procedure | 100 % of module score (100% der Modulnote) | |
| 12 | Module frequency | each SS | |
| 13 | Workload | Contact hours time: 60 h Self study: 90 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examina- tion language | German | |
| 16 | (Recommended) reading | Rumbaugh, J.; Booch, G.; Jacobson, I.: The Unified Modeling Language Reference Manual, AddisonWesley, 2004 Hitz, M.; Kappel, G.; Kapsammer, E.; Retschitzegger, W.: UML @ work , 3., aktualisierte und überarbeitete Auflage, dpunkt-Verlag, 2005 | |

| |
|---|
| Winter, M.: Methodische objektorientierte Softwareentwicklung, dpunkt- Verlag, 2005 Störrle, H.: UML 2 erfolgreich einsetzen, Addison-Wesley, 2007 • Rumpe, B.: Modellierung mit UML: Sprache, Konzepte und Methodik, Springer-Ver- lag, 2. Auflage, 2011 Seidl, M., Brandsteidl, M., Huemer, C., Kappek, G.: UML@classroom - Eine Einführung in die objektorientierte Modellierung, dpunkt-Verlag, 2012 Rupp, C.; Queins, S., et al. UML 2 glasklar: Praxiswissen für die UML-Mo- dellierung, Carl Hanser Verlag, 2012 |
| definering, Carrianser verlag, 2012 |

Advanced design and programming (OSS-ADAP)

| 1 | Module name 280491 | Advanced design and programming (OSS-ADAP) | 5 ECTS |
|---|-----------------------|--|--------|
| 2 | Courses/lectures | Lecture and exercise: Advanced design and programming (OSS-ADAP) (4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Riehle | |

| 4 | Module coordinator | Prof. Riehle |
|---|--------------------------------|--|
| 5 | Contents | Dieser Kurs wird auf Deutsch gehalten. This course teaches principles and practices of advanced object-oriented design and programming. It is a 4 SWS class with additional homework and self-study, totaling 5 ECTS. This is a hands-on course and students should be familiar with their Java IDE. Students learn the following concepts: • Class-Level • Method design • Class design • Classes and interfaces • Subtyping and inheritance • Implementing inheritance • Implementing inheritance • Design by contract • Collaboration-Level • Values vs. objects • Role objects • Type objects • Object creation • Collaboration-based design • Design patterns • Component-Level • Error handling • Meta-object protocols • Frameworks • Components • Domain-driven design • API evolution The running example is the photo sharing and rating software Wahlzeit, see https://github.com/dirkriehle/wahlzeit. Class is held as a three hour session with a short break in between. The class iterates over short lectures, discussion, and exercise chunks of 10-30min each. Students should bring a laptop with a working Java programming setup. The overall schedule can be found at http://goo.gl/bePPn. Please sign up for the course on StudOn (link accessiblethrough schedule spreadsheet) as soon as possible. |
| 6 | Learning objectives and skills | Students will learn to - recognize, analyse, and apply advanced concepts of object-oriented design and programming - work effectively with a realistic tool set-up, involving an IDE, config-mgmt, and a service hoster |

| 7 | Recommended prerequisites | INF-AuD |
|----|--|---|
| 8 | Integration in curriculum | During or after first semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) Master International Information Systems (2016/17): Module in the section Informatics – Applied Software Engineering II (Elective) |
| 10 | Method of examination | class participation (Teilnahme am Unterricht)homework provision (Hausarbeit) |
| 11 | Grading procedure | Classwork (40%) + homework (60%) |
| 12 | Module frequency | Each WS |
| 13 | Workload | 60h in class, 90h pre- and post-work |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | German |
| 16 | (Recommended) reading | See http://goo.gl/BZpU8 |

Software architecture (PSWT-ARCH)

| 1 | Module name 600674 | Software architecture (PSWT-ARCH) | 5 ECTS |
|---|-----------------------|--|--------|
| 2 | Courses/lectures | Software architecture (Lecture with exercises, 4SWS) (PSWT-ARCH) | 5 ECTS |
| 3 | Lecturers | Dr. Jung Prof. Riehle, M.B.A | |

| 4 | Module coordinator | Prof. Riehle, M.B.A |
|---|-----------------------------------|---|
| 5 | Contents | Die Architektur eines Softwaresystems beschreibt die wesentlichen Komponenten des Systems, ihre Beziehungen und Struktur, sowie das Verhalten und die Dynamik der Beziehungen und Struktur dieser Komponenten. Dieser Kurs vermittelt in einer Vorlesung zunächst die folgenden Aspekte von Softwarearchitektur: • Grundlegende Bausteine und ihre Beziehungen • Softwarearchitekturbeschreibungssprachen • Softwarearchitekturbeschreibungssprachen • Softwarearchitekturstile und -muster • Bibliotheken, Rahmenwerke und Plattformen • Formale sowie de-facto Industriestandards • Die Softwarearchitekturen von Beispielsystemen • Nicht technische Kriterien in der Architektur • Werkzeuge für Softwarearchitektur • Vorgehensmodelle der Softwarearchitektur • Architekturgetriebene Entwicklung • Die Rolle und Funktion der Softwarearchitektin Am Kurs kann in einer von zwei Varianten teilgenommen werden. In der 5-ECTS-Variante nehmen Studierende an der Vorlesung teil und reichen Hausaufgaben ein. Die 10-ECTSVariante erweitert die 5-ECTS-Variante um ein Projekt. Die Projekte werden von unseren Industriepartnern bereitgestellt. Hier dokumentieren, analysieren und bewerten Studierende die Softwarearchitektur eines realen Softwaresystems. Diese verschiedenen Aspekte werden im Laufe des Semesters inkrementell abgearbeitet und am Ende dem Industriepartner in einer Präsentation vorgestellt. ARCH projects are run as shared projects, in which all participants contribute and get to participate in the project results. Read more at https://wp.me/pDU66-2p4. Der Unterricht findet als 3h-Block während der Vorlesungszeit statt. Der Zeitplan befindet sich hier: http://goo.gl/ZXJjg. Der Zeitplan enthält auch einen Link auf den zur Veranstaltung gehörigen StudOn Kurs. Bitte registrieren Sie sich auf StudOn sobald wie möglich, um sicherzustellen, dass Sie einen Platz im Kurs erhalten werden. |
| | Learning objectives and skills | Ganzheitliches Verständnis des Konzepts "Softwarearchitektur" Befähigung zur Bewertung, Auswahl und Konstruktion problemangemessener Architekturen Kenntnis architekturgetriebener Entwicklungsmethodik und entsprechender Werkzeuge Kenntnis der typischen Verantwortlichkeiten und der Methodik eines Softwarearchitekten |
| | Recommended prerequisites | General: PSWT-PSWT |

| | T | | |
|----|--|--|--|
| 8 | Integration in curriculum | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics – Applied Software Engineering II (Elective) | |
| 9 | Module compatibility | 5 ECTS: Vorlesung + Übungen 10 ECTS: Projekt 10 ECTS: Vorlesung + Übungen | |
| 10 | Method of examination | Unterricht Hausaufgaben Mündliche Prüfung Projektarbeit | |
| 11 | Grading procedure | 5 ECTS: Unterricht (10%) + Hausaufgaben (40%) + mündliche Prüfung (50(%) 10 ECTS: 5 ECTS (50%) + Projektarbeit (50%) | |
| 12 | Module frequency | Alle zwei Semester (SS). Kurs wird im SS2021 nicht angeboten. | |
| 13 | Workload | 5 ECTS Version: 60h Unterricht + 90h Eigenarbeit 10 ECTS Version: 5 ECTS Version + 150h Projektarbeit | |
| 14 | Module duration | 1 Semester | |
| 15 | Teaching and examina- tion language | Deutsch | |
| 16 | (Recommended) reading | http://goo.gl/ou7mja | |

Software development in large projects (SoSy3 + Ü)

The module can be chosen as an elective only, if it has not yet been selected as a core module or as a customized introduction.

Das Modul kann nur dann im Wahlbereich verwendet werden, wenn es nicht bereits im Kernbereich oder in der Customized Introduction gewählt wurde.

| 1 | Module name TEC 31601 | Software development in large projects | 5 ECTS |
|---|--------------------------|--|--------|
| 2 | Courses/lectures | Software development in large projects (lectures + exercises, 4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Saglietti | |

| 4 | Module coordinator | Prof. Saglietti | |
|---|--------------------------------|---|--|
| 5 | Contents | Introduction to the single phases of software development: requirements analysis, specification, design, implementation, test, maintenance Exemplifying application of selected, representative techniques supporting the developments phases mentioned above Ergonomic principles for usage interfaces Object-oriented analysis and design with UML Design patterns as constructive, re-usable solutions to whole classes of problems Automatic support for code implementation from UML diagrams Testing strategies Re-factoring techniques supporting the maintenance phase | |
| 6 | Learning objectives and skills | On the basis of programming skills already acquired the students will learn systematic and structured approaches to deal with the complexity of "developing in the large", gain the capability of expressing complex problems in a well-defined way by means of appropriate specification languages, of analyzing such problems, as well as of deriving appropriate designs for their solution, get experience in the application of UML diagrams for the purpose of object-oriented analysis and design activities, get proficiency in re-using general design solutions by specialization of established design patterns, get acquainted with principles of the testing process, get familiar with re-factoring strategies aimed at increasing systematically software modifiability. | |
| 7 | Recommended prerequisites | None | |
| 8 | Integration in curriculum | Third semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics – Software Engineering I or II (Core Course or Elective) or | |

| | | Master in International Information Systems (2018/19 + 2016/17): Module in the section Customized Introduction to IIS (Informatics) |
|----|--|---|
| 10 | Method of examination | 90-minute written examination (schriftl. Prüfung (90 min) |
| 11 | Grading procedure | Exam: 100% (Klausurnote: 100%) |
| 12 | Module frequency | Each WS |
| 13 | Workload | Contact hours: 60h Independent study: 90h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | German or English |
| 16 | (Recommended) reading | None |

Software reliability (SWE-ZUV)

| 1 | Module name 357823 | Software reliability | 5 ECTS |
|---|-----------------------|--|--------|
| 2 | Courses/lectures | Software reliability (lectures + courses, 4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Saglietti | |

| 4 | Module coordinator | Prof. Saglietti |
|----|--|--|
| 5 | Contents | This module addresses quantitative approaches for the determination of the reliability degree achieved by a software system during and after testing. |
| 6 | Learning objectives and skills | Students learn systematic procedures allowing to estimate software reliability of conventional products during testing; such estimates offer support to the project manager for the purpose of determining the optimal time for product release. Students learn systematic procedures allowing to demonstrate the achievement of reliability and availability targets by well-founded statistical approaches as required by licensors of mission-critical software systems. |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | Second semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics – Software Engineering II (Elective) |
| 10 | Method of examination | 30-minute oral examination (mündl. Prüfung (30 min)) |
| 11 | Grading procedure | Exam: 100% of module score (Prüfung: 100% der Modulnote) |
| 12 | Module frequency | Each SS |
| 13 | Workload | Contact hours: 60 h Independent study: 90 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | German or English |
| 16 | (Recommended) reading | None |

Foundations of software engineering and Design patterns and anti-patterns (SWE-GL + Design patterns)

| 1 | Module name 113545 | Foundations of software engineering and Design patterns and anti-patterns | 10 ECTS |
|---|-----------------------|---|----------|
| 2 | Courses/lectures | Course 1: Foundations of software engineering (lectures + courses, 6 SWS) | 7,5 ECTS |
| | | Course 2: Design patterns and anti-patterns (seminar, 2 SWS, compulsory attendance) | 2,5 ECTS |
| 3 | Lecturers | Prof. Saglietti | |

| 4 | Module coordinator | Prof. Saglietti |
|----|--------------------------------|--|
| 5 | Contents | This module presents an extensive overview on software engineering throughout the complete software life-cycle, including technical (constructive and analytical approaches), as well as organizational measures (project management, software metrics), with particular emphasis on novel design technologies enhancing design re-usability by means of logical patterns. Course 1 addresses a broad spectrum of scientific engineering principles and approaches during the conception, development and analysis of large-scale, complex software systems, including human factors, software metrics for quality assurance and control, cost models and personnel management. Course 2 covers classical design patterns and anti-patterns in software development. Design patterns systematically describe general solutions for |
| | | recurring software design problems. They also offer a common vocabulary to software engineers, thus substantially facilitating their communication. On the other hand, anti-patterns describe poor, unfortunately typical solutions to software design problems for which preferable alternative solutions are presented. |
| 6 | Learning objectives and skills | Students familiarize with several alternative development, analysis and management approaches differing in their degree of rigor and cost and thus suitable to different types of software projects, depending a. o. on the project size, the company structure or the reliability requirements. In addition to learning modern software engineering techniques, the students will achieve and intensify their communicational skill in preparing and giving a technical talk as well as in contributing to the discussion with the members of the audience. |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | Second semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics – Software Engineering II (Elective) |
| 10 | Method of examination | Course 1: |
| | | |

| | | 90-minute written examination (Kurs 1: schriftl. Prüfung (90 min)) Course 2: 60-minute presentation and 15-minute oral examination (Kurs 2: Präsentation (60 min) und abschl. mündl. Prüfung (15 min)) |
|----|--|---|
| 11 | Grading procedure | Course 1: 75% Course 2: 13% presentation, 12% oral examination |
| 12 | Module frequency | Course 1: Each summer term Course 2: Each summer term (without guarantee) |
| 13 | Workload | Contact hours: 120 h Independent study: 180 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | German or English |
| 16 | (Recommended) reading | none |

Foundations of software engineering and Software engineering in practice (SWE-GL + SWE-PR)

| 1 | Module name 234129 | Foundations of software engineering and Soft-ware engineering in practice | 10 ECTS |
|---|-----------------------|--|----------------------|
| 2 | Courses/lectures | Course 1: Foundations of software engineering (lectures + courses, 6 SWS) Course 2: Software engineering in practice (practical exercises, 3 SWS) | 7,5 ECTS 2,5 ECTS |
| 3 | Lecturers | Prof. Saglietti | |

| 4 | Module coordinator | Prof. Saglietti | |
|----|--------------------------------|---|--|
| 5 | Contents | This module presents an extensive overview on software engineering throughout the complete software life-cycle, including technical (constructive and analytical approaches), as well as organizational measures (project management, software metrics), with particular emphasis on novel design technologies enhancing design re-usability by means of logical patterns. Course 1 addresses a broad spectrum of scientific engineering principles and approaches during the conception, development and analysis of large-scale, complex software systems, including human factors, software metrics for quality assurance and control, cost models and personnel management. During course 2 different CASE (Computer Aided Software Engineer- | |
| | | ing) tools are presented, covering all relevant aspects of analysis and development of complex software. The benefit of applying such tools in industrial-size projects are experienced by the attendees by solving typical problems arising in software projects both on their own and under supervision. | |
| 6 | Learning objectives and skills | Students familiarize with several alternative development, analysis and management approaches differing in their degree of rigor and cost and thus suitable to different types of software projects, depending a. o. on the project size, the company structure or the reliability requirements. Students familiarize with several software engineering tools differing in their degree of rigor and cost and thus suitable to different types of software projects, depending a. o. on the project size, the company structure or the reliability requirements. | |
| 7 | Recommended prerequisites | None | |
| 8 | Integration in curriculum | Second semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics – Software Engineering II (Elective) | |
| 10 | Method of examination | Course 1: 90-minute written examination (Kurs 1: schriftl. Prüfung (90 min)) Course 2: 60-minute examination using PC (Kurs 1: Prüfung (60 min) am Rechner) | |

| 11 | Grading procedure | Course 1: 75% of module score (Kurs 1: 75% der Modulnote) Course 2: 25% of module score (Kurs 2: 25% der Modulnote) |
|----|--|---|
| 12 | Module frequency | Course 1: Each summer term Course 2: Each semester (without guarantee) |
| 13 | Workload | Contact hours: 120 h Independent study: 180 h |
| 14 | Module duration | 1-2 semester |
| 15 | Teaching and examina- tion language | German or English |
| 16 | (Recommended) reading | none |

Test and Analysis Techniques for Software Verification and Validation (SWE-VV + $\ddot{\text{U}}$)

| 1 | Module name MSC 32001 | Software test and analysis (Verification and validation) | 5 ECTS |
|---|--------------------------|--|--------|
| 2 | Courses/lectures | Software test and analysis (Verification and validation) (lectures + exercises, 4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Saglietti | |

| 4 | Module coordinator | Prof. Saglietti |
|----|-----------------------------------|---|
| 5 | Contents | The module addresses the topic of analyzing and testing software systems, especially in case of embedded software applied to safety-relevant complex applications. Depending on the degree of reliability required, numerous techniques for testing and analysis at different levels of rigor are presented, addressing both approaches to detect faults during the development process (verification) and approaches to detect faults during the requirements phase (validation), thus covering the whole spectrum of verification and validation (so-called V & V). |
| 6 | Learning objectives and skills | The students will acquire knowledge on: system analysis: failure mode & effect, fault tree analysis risk analysis & safety classes according to international standards, testing strategies required for the certification of highly reliable software, in particular structural-based coverage criteria analysis techniques supporting automatic proofs of correctness or the automatic generation of counter-examples |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curricu- | Third semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) Master International Information Systems (from 2016/17): Module in the section Informatics – Software Engineering II (Elective) |
| 10 | Method of examination | 30-minute oral examination (mündl. Prüfung (30 min)) |
| 11 | Grading procedure | Exam: 100% (100% der Klausurnote) |
| 12 | Module frequency | Each WS |
| 13 | Workload | Contact hours: 60h Independent study: 90h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examination language | English (Exercises in German if required) |
| 16 | (Recommended) reading | None |
| | | |

Extension courses

Verteilte Systeme

| 1 | Modulbezeichnung | Verteilte Systeme-V+Ü | 5 ECTS |
|---|---------------------|---|----------|
| | 649073 | Distributed Systems – L+E | |
| 2 | Lehrveranstaltungen | Verteilte Systeme | 2,5 ECTS |
| | | (Vorlesung, 2 SWS, Dozent: DrIng. Tobias Distler) Übungen zu Verteilte Systeme | 2.5 ECTS |
| | | (Übung, 2 SWS, Dozent: DrIng. Tobias Distler) | |
| 3 | Lehrende | DrIng. Distler, DrIng. Kleinöder | |

| 4 | Modulverantwortliche/r | DrIng. Distler |
|----|--|---|
| 5 | Inhalt | Bestandsaufnahme, Beispiele Verteilter Systeme, Problembereiche, Client-Server-Systeme Grundlagen Fernaufrufe Effizienz Fehlertoleranz Replizierte Systeme Replikationstechniken Kommunikation innerhalb einer Replikatgruppe GeoreplikationVerteilte Algorithmen Synchronisation von Uhren - Gegenseitiger Ausschluss Wahl eines Anführerknotens Inhalt der Übungen: Implementierung eines Java-RMI-ähnlichen Fernaufrufystems(Dynamische Generierung von Proxies, Rückruf/Callback, RPC-Semantiken) Aktive Replikation von Diensten Lesen und Begutachten von Fachliteratur Verteilte Synchronisation |
| 6 | Lernziele und Kompetenzen | Die Studierenden - erwerben fundierte Kenntnisse über Grundlagen von verteilten Systemen - verstehen Zusammenhänge, die die verteilte Ausführung von Programmen in vernetzten Rechensystemen ermöglichen - erlernen die verteilte Programmierung in Java - entwickeln eine Middleware-Plattform zur Ausführung verteilter Programme |
| 7 | Empfohlene Voraussetzungen für die Teilnahme | Gute Programmierkenntnisse in Java |
| 8 | Einpassung in Musterstudienplan | Ab 1. Semester |
| 9 | Verwendbarkeit des Moduls | Master International Information Systems (from 2018/19 + 2016/17): Module in the section Informatics – Extension Courses (Elective) |
| 10 | Studien- und Prüfungsleistungen | Erfolgreiche Bearbeitung aller sechs Übungsaufgaben (Bewertung jeweils mit "ausreichend") und ca. 30-minütige mündliche Prüfung. |
| 11 | Berechnung Modulnote | Mündliche Prüfung 30 Minuten (100%) |
| 12 | Turnus des Angebots | Jährlich (SS) |
| 13 | Arbeitsaufwand | Präsenzzeit: 60 Std, Eigenstudium: 90 Std. |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und Prüfungssprache | Deutsch |
| 16 | (Vorbereitende) Literatur | George Coulouris, Jean Dollimore, Tim Kindberg, and Gordon Blair. <i>Distributed Systems: Concepts and Design</i> . Addison Weslie, fifth edition, 2011. |

| | Andrew S. Tanenbaum and Maarten van Steen. Distributed Systems: |
|--|---|
| | Principles and Paradigms (2nd Edition). Prentice-Hall, Inc., Upper Saddle |
| | River, NJ, USA, 2006. |

Rechnerkommunikation (RK)

| 1 | Modulbezeichnung | Rechnerkommunikation | 5 ECTS |
|---|---------------------|--------------------------------------|----------|
| | TEC-93150 | Computer communication | |
| 2 | Lehrveranstaltungen | Rechnerkommunikation (Vorlesung) | 2,5 ECTS |
| | | Rechnerkommunikation Übungen (Übung) | 2,5 ECTS |
| 3 | Lehrende | Prof. German | |

| 4 | Modulverantwortliche/r | Prof. German |
|----|--|--|
| 5 | Inhalt | Die Vorlesung vermittelt die Grundlagen der Rechnerkommunikation und durchläuft die Schichten des Internets: • Anwendungsschicht • Transportschicht • Netzwerkschicht • Verbindungsschicht • Physikalische Schicht Anschließend wird Sicherheit als übergreifender Aspekt behandelt. Die Übung beinhaltet praktische und theoretische Aufgaben zum Verständnis der einzelnen Schichten. |
| 6 | Lernziele und Kompetenzen | Die Studierenden erwerben Kenntnisse über zentrale Mechanismen, Protokolle und Architekturen der Rechnerkommunikation (Topologie, Schicht, Adressierung, Wegsuche, Weiterleitung, Flußkontrolle, Überlastkontrolle, Fehlersicherung, Medienzugriff, Bitübertragung) am Beispiel des Internets und mit Ausblicken auf andere Netztechnologien Kenntnisse über Sicherheit, Leistung und Zuverlässigkeit bei der Rechnerkommunikation praktische Erfahrung in der Benutzung und Programmierung von Rechnernetzen |
| 7 | Empfohlene Voraussetzungen für die Teilnahme | Keine |
| 8 | Einpassung in Musterstudienplan | 2. oder 4. Semester |
| 9 | Verwendbarkeit des Moduls | Master International Information Systems (from 2018/19 + 2016/17): Module in the section Informatics – Extension Courses (Elective) |
| 10 | Studien- und Prüfungsleistungen Berechnung Modulnote | Klausur (90 Minuten) Hausaufgaben (Übungsleistung) Klausur (100%) |
| 12 | Turnus des Angebots | jährlich im Sommersemester |
| 13 | Arbeitsaufwand | Präsenzzeit 60 Stunden Eigenstudium 90 Stunden |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und Prüfungssprache | Deutsch |
| 16 | (Vorbereitende) Literatur | Kurose, Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", 4th Ed., Addison Wesley, 2007 |

Kommunikationssysteme (KS-VÜ)

| 1 | Modulbezeichnung | Kommunikationssysteme | 5 ECTS |
|---|---------------------|--|----------|
| | MSC-43950 | Communication systems | |
| 2 | Lehrveranstaltungen | Kommunikationssysteme (Vorlesung) | 2,5 ECTS |
| | | Übungen zu Kommunikationssysteme (Übung) | 2,5 ECTS |
| 3 | Lehrende | Prof. German | |

| 4 | Modulverantwortliche/r | Prof. German |
|----|------------------------------------|---|
| | | |
| 5 | Inhalt | Aus Rechnerkommunikation ist der grundlegende Aufbau von IP-basierten Netzen bekannt, Inhalt von Kommunikationssysteme sind weitere Netztechnologien wie Leitungsvermittlung (ISDN, Sonet/SDH) und Netze mit virtueller Leitungsvermittlung (ATM, MPLS), Multimediakommunikation über paketvermittelte Netze (Streaming, RTP, H.323, SIP, Multicast), Dienstgüte in paketvermittelten Netzen (Integrated Services, RSVP, Differentiated Services, Active Queue Management, Policing, Scheduling), drahtlose und mobile Kommunikation (GSM, UMTS, Wimax, WLAN, Bluetooth, ZigBee u.a. Sensornetze, Mobile IP) sowie Kommunikation in der Fahrzeug- und Automatisierungstechnik. Weiterhin werden Verfahren zum Systemdesign behandelt: Spezifikation von Architekturen und Protokollen (SDL, MSC, ASN.1, UML), Analyseverfahren, Simulation, Messung, Test. In der Übung werden praktische Aufgaben im Labor durchgeführt: ein Labor enthält mehrere IP-Router, Switches und Rechner, IP-Telefone und Telefonie-Software für VoIP, es werden verschiedene Konfigurationen eingestellt und getestet. In weiteren praktischen Versuchen werden detaillierte Einblicke in die Protokolle der Mobilkommunikation |
| 6 | Lernziele und | gewonnen. |
| 6 | Kompetenzen | - Kenntnisse über Technologien bei der Leitungs- und Paketvermittlung in leitungsgebundenen und drahtlosen/mobilen Netzen |
| | | - praktische Erfahrung in der Konfiguration eines IP-Switch-Router-Net- |
| | | zes mit Multimediaverkehr sowie in der Programmierung vernetzter ein- |
| | | gebetteter Systeme |
| 7 | Empfohlene | Rechnerkommunikation |
| | Voraussetzungen für die | |
| | Teilnahme | 2 Compater |
| 8 | Einpassung in Musterstudienplan | 3. Semester |
| 9 | Verwendbarkeit des | Master International Information Systems (from 2018/19 + 2016/17): |
| | Moduls | Module in the section Informatics – Extension Courses (Elective) |
| 10 | Studien- und | Klausur (90 Minuten) |
| | Prüfungsleistungen | Erfolgreiche Teilnahme an der Übung ist Voraussetzung für die Teil- |
| | | nahme an der Prüfung. Bei geringer Teilnehmerzahl (< 20) erfolgt die |
| | | Prüfung mündlich. |
| 11 | Berechnung Modulnote | Klausur (100%) |
| 12 | Turnus des Angebots | jährlich im Wintersemester |
| 13 | Arbeitsaufwand | Präsenzzeit 60 Stunden |
| | | Eigenstudium 90 Stunden |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und | Deutsch |
| | Prüfungssprache | |
| 16 | (Vorbereitende) Literatur | Lehrbuch: Kurose, Ross, "Computer Networking: A Top-Down Approach |
| | | Featuring the Internet", 4th Ed., Addison Wesley, 2007 |

Dienstgüte von Kommunikationssystemen (DKS)

| 1 | Modulbezeichnung | Dienstgüte von Kommunikationssystemen | 5 ECTS |
|---|---------------------|---|----------|
| | 472330 | Quality of service of communication systems | |
| 2 | Lehrveranstaltungen | Dienstgüte von Kommunikationssystemen (Vorlesung) | 2,5 ECTS |
| | | Dienstgüte von Kommunikationssystemen Übungen (Übung) | 2,5 ECTS |
| 3 | Lehrende | Prof. German | |

| 4 | Modulverantwortliche/r | Prof. German |
|----|--|--|
| 5 | Inhalt | Zunächst wird ein Überblick über Systeme und Technologien zur Erzielung von Dienstgüte gegeben. Aufbauend auf der Lehrveranstaltung "Kommunikationssysteme" werden u.a. ATM, Integrated Services, Differentiated Services, MPLS, GPRS, UMTS, WLANs, Bluetooth und WIMAX auf diesen Aspekt hin untersucht. Dann werden unterschiedliche Methoden vorgestellt, mit denen Systeme bezüglich ihrer Dienstgüte bewertet und ausgelegt werden können: Messung (HW-, SW-, Hybrid-Monitoring, Benchmarks, Leistungstests), Analytische Modellierung (Warteschlangenmodelle, stochastische Prozesse, Petri-Netze) und Simulation (OPNET, ns2, OmNET++, formale Beschreibungstechniken). Ergänzend wird der Network Calculus vorgestellt, mit dem Garantien für Dienstgüteeigenschaften ermittelt werden können. Alle Methoden werden an Beispielen demonstriert. |
| 6 | Lernziele und Kompetenzen | Die Studierenden erwerben |
| 7 | Empfohlene Voraussetzungen für die Teilnahme | Kommunikationssysteme |
| 8 | Einpassung in Musterstudienplan | 4. Semester |
| 9 | Verwendbarkeit des Moduls | Master International Information Systems (from 2018/19 + 2016/17): Module in the section Informatics – Extension Courses (Elective) |
| 10 | Studien- und Prüfungsleistungen | Klausur (90 Minuten) Erfolgreiche Teilnahme an der Übung ist Voraussetzung für die Teilnahme an der Prüfung. Bei geringer Teilnehmerzahl (< 20) er-folgt die Prüfung mündlich. |
| 11 | Berechnung Modulnote | Klausur (100%) |
| 12 | Turnus des Angebots | jährlich im Sommersemester |
| 13 | Arbeitsaufwand | Präsenzzeit 60 Stunden Eigenstudium 90 Stunden |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und Prüfungssprache | Deutsch |
| 16 | (Vorbereitende) Literatur | Lehrbuch: Kurose, Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", 4th Ed., Addison Wesley, 2007 |

Fahrzeugkommunikation (FzK)

| 1 | Modulbezeichnung | Fahrzeugkommunikation | 5 ECTS |
|---|---------------------|---------------------------------------|----------|
| | 716033 | Vehicular networks | |
| 2 | Lehrveranstaltungen | Fahrzeugkommunikation (Vorlesung) | 2,5 ECTS |
| | | Fahrzeugkommunikation Übungen (Übung) | 2,5 ECTS |
| 3 | Lehrende | DiplInf. Eckhoff | |

| | Ma dedecamentes at Pata Lat | Dial lot Fallbott Dark Common |
|----|--------------------------------------|--|
| 4 | Modulverantwortliche/r | DiplInf. Eckhoff, Prof. German |
| 5 | Inhalt | Die Vorlesung "Fahrzeugkommunikation" [FzK] ist in zwei Blöcke gegliedert: Zunächst führt die Vorlesung in die fahrzeuginterne Vernetzung ein, behandelt Vernetzungsarchitekturen, Bussysteme und Steuergeräte, Fahrerassistenzfunktionen, Multimedia und Systemarchitekturen. Den Abschluss bilden Betrachtungen zu Security und Safety in der fahrzeuginternen Vernetzung. Als zweiten Block gibt die Vorlesung einen Überblick über Themen der externen Kommunikation von und mit Fahrzeugen, behandelt Systemarchitekturen zur Vernetzung von Fahrzeugen untereinander und mit Infrastruktur, Medienzugriffsverfahren verbreiteter Lösungen, Protokolle von Vehrkehrsinformationssystemen. Sie schließt wiederum mit Betrachtungen zu Safety und Security - erweitert um die in diesem Themengebiet besonders relevanten Fragestellungen rund um die Wahrung der Privatsphäre von Nutzern. Das Modul wird für einen Abschluss mit Studienschwerpunkt "Informatik in der Fahrzeugtechnik" anerkannt. Sie setzt Grundkenntnisse in Rechnerkommunikation voraus |
| | | und richtet sich so schwerpunktmäßig an Studierende aus Informatik, luK und CE ab dem 5. Semester. |
| 6 | Lernziele und | Ziel der Vorlesung ist es, Wissen anhand von Beispielen und Interaktion |
| 7 | Empfohlene | mit den Studierenden zu vermitteln. Im Rahmen der Übung werden Protokolle aus der internen Fahrzeug- kommunikation implementiert, analysiert und anschliessend evaluiert. An- schließend soll Wissen über die Simulation von Netzwerken durch selb- ständiges Arbeiten vermittelt werden. Es folgt eine Analyse von aktuellen Lösungen aus dem Bereich der Verkehrssimulation, die im nächsten Schritt mit der Netzwerksimulation gekoppelt wird, um Funknetzwerkpro- tokolle und -anwendungen mit der Mobilität von Fahrzeugen zu imple- mentieren und evaluieren. Darüber hinaus erstellen die Studierenden ei- genständig Lösungen für Anforderungen aus dem Bereich Car-2-X-Kom- munikation, bewerten diese auf ihre praktische Anwendbarkeit hin und entwerfen in Kleingruppen Verbesserungsvorschläge dazu. Keine |
| | Voraussetzungen für die Teilnahme | |
| 8 | Einpassung in Musterstudienplan | 2. oder 4. Semester |
| 9 | Verwendbarkeit des | Master International Information Systems (from 2018/19 + 2016/17): |
| 40 | Moduls Studion and | Module in the section Informatics – Extension Courses (Elective) |
| 10 | Studien- und Prüfungsleistungen | mündliche Prüfung (30 Minuten) |
| 11 | Berechnung Modulnote | Mündliche Prüfung (100%) |
| 12 | Turnus des Angebots | jährlich im Sommersemester |
| 13 | Arbeitsaufwand | Präsenzzeit 60 Stunden |
| | | Eigenstudium 90 Stunden |
| 14 | Dauer des Moduls | 1 Semester |

| 15 | Unterrichts- und | Deutsch |
|----|---------------------------|---------|
| | Prüfungssprache | |
| 16 | (Vorbereitende) Literatur | Keine |

Smart grids und Elektromobilität

| 1 | Modulbezeichnung | Smart grids und Elektromobilität | 5 ECTS |
|---|---------------------|---|----------|
| | 623734 | | |
| 2 | Lehrveranstaltungen | Smart grids und Elektromobilität (Vorlesung) | 2,5 ECTS |
| | | Übungen zu Smart grids und Elektromobilität (Übung) | 2,5 ECTS |
| 3 | Lehrende | Marco Pruckner | |

| 4 | Modulverantwortliche/r | Marco Pruckner | |
|----|---|---|--|
| | | | |
| 5 | Inhalt | Dieser Kurs dient als Einführung in den neuen multi-disziplinären Bereich Smart Grids. Dabei wird ein Überblick zu den wesentlichen neuen Aspekten moderner Technologien in Erzeugung, Übertragung und Verteilung gegeben. Zudem werden relevante Aspekte der Kommunikationstechnologien wiedergegeben, die zur intelligenten Koordinierung zwischen den verschiedenen Einheiten innerhalb des Stromnetzes eingesetzt werden. Neben einer Einführung der Konzepte der verschiedenen Komponenten des Smart Grids, einschließlich der Integration erneuerbarer Energien, Energiespeicher und Demand Side Management wird die Elektromobilität und die Integration von Elektrofahrzeugen in das Stromnetz einen weiteren Schwerpunkt dieses Kurses bilden. Die Vorlesung behandelt zentrale Fragestellungen zu Smart Grids und Elektromobilität: • Vision und Strategie für die elektrischen Netze der Zukunft • Smarte Erzeugung elektrischer Energie • Aufbau und Betrieb von Übertragungs- und Verteilungsnetzen • Informations- und Kommunikationstechnologien als Rückgrat des Smart Grids | |
| | | Technologien für das Laden von Elektrofahrzeugen Zusammenspiel von Elektrofahrzeugen und dem Energiesystem Umweltaspekte, einschließlich CO2-Emissionen | |
| 6 | Lernziele und Kompeten- | Die Studierenden | |
| | zen | unterscheiden Probleme und Herausforderungen die mit den künftigen Stromnetzen verbunden sind erfassen die Vorteile und die Anwendungsmöglichkeiten, die beim Einsatz von IKT im Stromnetz möglich sind, wie z.B. Demand Response analysieren verschiedene Probleme, die beim Einsatz von IKT im Stromnetz entstehen, z.B. Datenschutzprobleme erlernen verschiedene Technologien zur Erzeugung und Verteilung von Energie kennen kennen die Rolle von Elektromobilität sowie die speziellen Herausforderungen zur Integration von Elektrofahrzeugen in das bestehende bzw. zukünftige Stromnetz | |
| 7 | Empfohlene Vorausset- zungen für die Teilnahme | Keine | |
| 8 | Einpassung in Musterstu- dienplan | 3. Semester | |
| 9 | Verwendbarkeit des Moduls | Master International Information Systems (from 2018/19 + 2016/17): Module in the section Informatics – Extension Courses (Elective) | |
| 10 | Studien- und Prüfungs- leistungen | mündliche Prüfung (30 Minuten) unbenotete Studienleistung, zu erwerben durch erfolgreiche Teilnahme an den Übungen | |
| 11 | Berechnung Modulnote | Mündliche Prüfung (100%) | |
| 12 | Turnus des Angebots | jährlich im Sommersemester | |

| 13 | Arbeitsaufwand | Präsenzzeit 60 Stunden |
|----|---------------------------|-------------------------|
| | | Eigenstudium 90 Stunden |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und Prü- | Deutsch |
| | fungssprache | |
| 16 | (Vorbereitende) Literatur | Keine |

Modellierung, Optimierung und Simulation von Energiesystemen (MOSES)

| 1 | Modulbezeichnung | Modellierung, Optimierung und Simulation von Energie- | 5 ECTS |
|---|---------------------|---|--------|
| | 337521 | systemen (MOSES) | |
| | | Modeling, Optimization and Simulation of Energy Systems | |
| 2 | Lehrveranstaltungen | V + Ü: Modellierung, Optimierung und Simulation von Energiesystemen (2+2 SWS) | 5 ECTS |
| 3 | Lehrende | Prof. Pruckner | |

| | Mandalana anti-alah | In the state of | |
|----|--|--|--|
| 4 | Modulverantwortliche/r | Prof. Pruckner | |
| 5 | Inhalt | In der Vorlesung Modellierung, Optimierung und Simulation von Energiesystemen werden systemtechnische Planungs- und Analysemethoden behandelt, die zur Lösung komplexer und interdisziplinärer Entscheidungsaufgaben in der Energiewirtschaft eingesetzt werden. Dabei werden die wichtigsten Methoden und Verfahren anhand praktischer Fragestellungen (z.B. Ausbau erneuerbarer Energien, Zunahme der Elektromobilität) aus der energiepolitischen Planung vermittelt und die Bewältigung technisch-ökonomischer Probleme verdeutlicht. Übersicht der Vorlesungsinhalte: • Einführung in die Energiewirtschaft und Systemtechnik • Systemtechnische Methoden der Energieplanung • Datenanalyse (Regressionsanalysen, Clusteranalyse, Zeitreihenanalyse) • Mathematische Optimierung (Lineare Programmierung, Gemischt-ganzzahlige lineare Programmierung, dynamische Optimierung) • Simulation (Diskrete Ereignissimulation, System Dynamics, agentenbasierte Simulation) • Input-Output-Analyse, Gleichgewichtsmodelle • Behandlung von Unsicherheiten • Energiemodelle • Kraftwerkseinsatzmodelle • Kraftwerkseinsatzmodelle • Kraftwerksausbaumodelle • Modelle für Energieversorgungsmodelle Zu den eingesetzten Tools zählen die Statistiksoftware R, AnyLogic und IpSolve. Vorkenntnisse im Umgang mit diesen Werkzeugen ist nicht zwingend erforderlich. In den Übungen werden Einführungen in die genann- | |
| 6 | Lernziele und Kompetenzen | ten Softwarepakete gegeben. Die Studierenden unterscheiden Probleme und Herausforderungen, die mit dem Energieumstieg verbunden sind, erfassen die Vorteile und die Anwendungsmöglichkeiten computergestützter Planungsmethoden im Energiebereich, analysieren verschiedene Problemstellungen und setzen Lösungen dafür um, erlernen verschiedene Methoden der Datenanalyse, Optimierung und Simulation | |
| 7 | Empfohlene Voraussetzungen für die Teilnahme | Keine | |
| 8 | Einpassung in Musterstudienplan | Drittes Semester | |
| 9 | Verwendbarkeit des Moduls | Master International Information Systems (from 2018/19 + 2016/17): Module in the section Informatics – Extension Courses (Elective) | |
| 10 | Studien- und Prüfungsleistungen | mündliche Prüfung unbenotete Studienleistung, zu erwerben durch erfolgreiche Teilnahme an den Übungen | |
| 11 | Berechnung Modulnote | mündliche Prüfung (100%) | |
| 12 | Turnus des Angebots | jährlich im Wintersemester | |

| 13 | Arbeitsaufwand | Präsenzzeit: 60 h |
|----|---------------------------|----------------------------------|
| | | Eigenstudium: 90 h |
| 14 | Dauer des Moduls | 1 Semester |
| 15 | Unterrichts- und | Deutsch |
| | Prüfungssprache | |
| 16 | (Vorbereitende) Literatur | Vorlesungsskript wird ausgegeben |

Seminar Applied Software Engineering (OSS-SEMI)

| 1 | Module name93186 | Seminar Applied Software Engineering | 5 ECTS |
|---|------------------|--------------------------------------|--------|
| 2 | Courses/lectures | Seminar Applied Software Engineering | 5 ECTS |
| 3 | Lecturers | Prof. Dirk Riehle | |

| 4 | Module coordinator | Prof. Dirk Riehle | |
|----|--|--|--|
| 5 | Contents | This module lets students fulfill their degree program's seminar obligation by fulfilling a seminar topic in software engineering and/or open source. We prefer that you use one of our existing courses for your seminar obligation, but are willing to have you for a one-off topic if none of our courses fit. Seminar topics should be in the domain of (applied) software engineering and may or may not include open source software as a topic. The work results are likely to be a written seminar thesis and presentation, but this depends on the specific topic we agreed upon. | |
| 6 | Learning objectives and skills | Students learn to analyze and summarize a software engineering topic and to present it in class | |
| 7 | Recommended prerequisites | None | |
| 8 | Integration in curriculum | Second/third semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19): Module in the section Informatics – Architectures & Development (Elective) | |
| 10 | Method of examination | Project presentation and project report | |
| 11 | Grading procedure | Project presentation: 20% of the final grade Final project report: 80% of the final grade | |
| 12 | Module frequency | SS, 1. Wdh. WS 2021/2022 | |
| 13 | Workload | Contact hours: 0 h Independent study: 150 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examina- tion language | English | |
| 16 | (Recommended) reading | None | |

Study abroad courses

| 1. | Module name IIS-57265 | Study abroad courses (Informatics) | 1) |
|----|--------------------------|------------------------------------|----|
| 2. | Courses/lectures | Study abroad courses (Informatics) | 1) |
| 3. | Lecturers | Staff at exchange university | |

| 4. | Module coordinator | Prof. Meyer-Wegener, Prof. Riehle, Prof. Saglietti, Prof. Eskofier | |
|-----|-----------------------------------|---|--|
| 5. | Contents | Courses students will be attending during the exchange semester in one of the partner universities or others should fit into the area Informatics thus extending the student's knowledge and competencies in this field of study. The suitability of the courses will be assessed by the programme coordinator. | |
| 6. | Learning objectives and skills | Students acquire additional knowledge and competencies in their field of study | |
| 7. | Recommended prerequisites | earning agreement | |
| 8. | Integration in curriculum | Third semester | |
| 9. | Module compatibility | Master in International Information Systems: Module in the section IIS Informatics (Elective) | |
| 10. | Method of examination | In accordance with exam regulations of the exchange university | |
| 11. | Grading procedure | In accordance with grading key and credits of the course | |
| 12. | Module frequency | In accordance with the curriculum of the exchange university | |
| 13. | Workload | In accordance with the specific course and the credits of the course | |
| 14. | Module duration | 1 semester | |
| 15. | Teaching and examination language | Tbd in the course | |
| 16. | (Recommended) reading | Tbd in the course | |

^{1) 5, 10} or 15 ECTS

VI Seminar International Information Systems

As part of the curriculum, the "Seminar International Information Systems" module is mandatory. Students have to choose one out of the offered options.

Das "Seminar International Information Systems"-Modul ist eine Pflichtveranstaltung. Die Studierenden müssen eine der Optionen absolvieren.

Interdisciplinary business seminar (IBS)

| 1 | Module name IIS-57200 | Interdisciplinary business seminar | 5 ECTS |
|---|--------------------------|------------------------------------|--------|
| 2 | Courses/lectures | Interdisciplinary business seminar | 5 ECTS |
| 3 | Lecturers | Prof. Bodendorf and colleagues | |

| 4 | Module coordinator | Prof. Bodendorf | |
|----|--|--|--|
| 5 | Contents | This seminar confronts students with real international IS business challenges in an interdisciplinary context. Students learn how to address realworld problems and to create application-oriented solutions based on sound methods rooted in robust theoretical frameworks and a well-founded evidence base. | |
| 6 | Learning objectives and skills | The students can independently define new usage-oriented problems in e-business, considering the economic impact on companies, and solve them with the aid of suitable methods. discuss problem-solving approaches in groups and present their work results. | |
| 7 | Recommended prerequisites | Command of English | |
| 8 | Integration in curriculum | Second or third semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19 + 2016/17): Module in the section Seminar International Information Systems | |
| 10 | Method of examination | Seminar paper and presentation (Seminararbeit und Präsentation) | |
| 11 | Grading procedure | Seminar paper (100%) and presentation (passed) (Seminararbeit (100%) und Präsentation (bestanden)) | |
| 12 | Module frequency | Each semester | |
| 13 | Workload | Attendance: 30 h Self-study: 120 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examina- tion language | English | |
| 16 | (Recommended) reading | Will be announced at the beginning of the course. | |

Nailing your thesis (NYT)

| 1 | Module name IIS-57190 | Nailing your thesis | 5 ECTS |
|---|--|--|----------------------|
| 2 | Courses/lectures IIS480491 IIS580491 | Lecture: Nailing your thesis (4 SWS) Exercise: Nailing your thesis (4 SWS) | 2,5 ECTS 2,5 ECTS |
| 3 | Lecturers | Prof. Riehle | |

| 4 | Module coordinator | Prof. Riehle, M.B.A. |
|----|--------------------------------|--|
| 5 | Contents | This course teaches students how to perform research work and how to publish the results. According to most Prüfungsordnungen Bachelor or Master theses have to be scientific work, and this class teaches students how to do so. The class consists of a 2 SWS lecture part and a 2 SWS exercise part. It is run as a 3h block with a short break in between. With homework and self-study, the course effort is 5 ECTS. If students pick up one of the offered research projects, total effort doubles to 10 ECTS (see Research Project Applied Software Engineering). The research project does not require additional time in class. |
| | | The lecture part covers the following topics: |
| 6 | Learning objectives and skills | Understand how to perform research Understand how to write a research thesis |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | Third semester Only possible, if the elective "Nailing your Thesis" has not been taken yet. |
| 9 | Module compatibility | Master International Information Systems (from 2018/19 + 2016/17): Module in the section Seminar International Information Systems |
| 10 | Method of examination | Student work comprises |

| | | class participation (aktive Teilnahme am Unterricht) student presentations (Präsentationen) For more information see http://wp.me/pDU66-DT |
|----|--|---|
| 11 | Grading procedure | Grades are based on linearly combining the individual grades from class participation and student presentations (Gewichtete Note aus der Teilnahme am Unterricht und den Präsentationen). |
| 12 | Module frequency | Every two semesters |
| 13 | Workload | 60h in class, 90h pre- and post-work |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | English |
| 16 | (Recommended) reading | See http://nythesis.com |

Value co-creation (VCC)

| 1 | Module name IIS-57220 | Value co-creation | 5 ECTS |
|---|------------------------------|------------------------------|--------|
| 2 | Courses/lectures IIS72201 | Value co-creation | 5 ECTS |
| 3 | Lecturers | Prof. Möslein and colleagues | |

| 4 | Module coordinator | Prof. Möslein |
|----|--|--|
| 5 | Contents | Producers of goods or service providers are not the only ones re-sponsible for the creation of value in business interactions. Various authors have lately turned the attention to the role of customers as co-creators. In this seminar, we will study the current literature on the topic and discuss it from a practical perspective. |
| 6 | Learning objectives and skills | The students: gain deeper insight into the theories of value co-creation. learn to work with scientific papers and apply the results. develop skills in collaborative interaction within the context of the seminar. |
| 7 | Recommended prerequisites | None |
| 8 | Integration in curriculum | Third semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19 + 2016/17): Module in the section Seminar International Information Systems |
| 10 | Method of examination | Seminar work and presentation (Präsentation, Seminararbeit) |
| 11 | Grading procedure | Seminar paper (50%) and presentation (50%) (Präsentation, Seminararbeit) |
| 12 | Module frequency | Each WS |
| 13 | Workload | Contact hours: 30 h Independent study: 120 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examina- tion language | English |
| 16 | (Recommended) reading | Literature will be announced and distributed in the first sessions. |

Research seminar on data management (RDM)

| 1 | Modulbezeichnung IIS-57180 | Research seminar on data management | 5 ECTS |
|---|-------------------------------|--|--------|
| 2 | Lehrveranstaltungen IIS71801 | Master-Seminar Datenmanagement (2 SWS) | 5 ECTS |
| 3 | Lehrende | Prof. Lenz, Mitarbeiter INF6 | |

| | | T | | |
|----|--------------------------------------|---|--|--|
| 4 | Modulverantwortliche/r | Prof. Lenz | | |
| 5 | Inhalt | Ein Seminar im Master-Studium soll die Fähigkeit vermitteln, sich anhand von Fachliteratur und Forschungsberichten über ein aktuelles Problem (hier aus dem Gebiet der Datenbanken) selbständig zu informieren, sich in einem mündlichen Vortrag von 30 Minuten damit auseinanderzusetzen und seine Auffassung dazu in einer Diskussion zu vertreten. Im Unterschied zu einem Bachelor-Seminar geht es auch noch darum, unterschiedliche Begriffsverwendungen zu erkennen und zu vereinheitlichen. (Im Bachelor-Seminar beschränkt sich die Fachliteratur auf wenige Quellen, u.U. sogar nur eine einzige, die eine einheitliche Begriffsbildung aufweisen.) Die systematische Vorgehensweise bei der Erarbeitung und Aufbereitung des Stoffs steht eindeutig im Vordergrund; im Vergleich dazu ist das Thema des Seminars nachrangig. | | |
| | | Für Studierende der Informatik ist die passive Beherrschung der englischen Sprache eine unabdingbare Voraussetzung. Deshalb sollten die englischsprachigen Quellen nach Möglichkeit nicht übersetzt, sondern im Original gelesen werden. Es zeigt sich immer wieder, dass Übersetzungen ohne ausreichendes Verständnis des Texts ohnehin unbrauchbar sind. Falls der Wunsch besteht, auch die aktive Beherrschung der englischen Sprache zu üben, kann der Seminarvortrag auf Englisch gehalten werden. | | |
| 6 | Lernziele und | Die Studierenden: | | |
| | Kompetenzen | arbeiten mit wissenschaftlicher Literatur; | | |
| | | vereinheitlichen unterschiedliche Begriffbildungen; | | |
| | | fassen ihre Exzerpte in einem Vortrag zusammen; | | |
| | | formulieren eine kurze Zusammenfassung des Vortrags (Ex- | | |
| | | tended Abstract) | | |
| | | vertreten ihre Auffassung in einer Diskussion Geberg auf Lader Sett vers in Demonstrationen vers | | |
| 7 | Empfahlana | führen ggf. relevante Software in Demonstrationen vor. Crundlagen von Beterhankenstemen im Herfang der Madula Konz M | | |
| 7 | Empfohlene | Grundlagen von Datenbanksystemen – im Umfang der Module KonzMod | | |
| | Voraussetzungen für die Teilnahme | und IDB im Bachelorstudium Informatik oder vergleichbarer Module | | |
| 8 | Einpassung in | 2. oder 3. Semester | | |
| | Musterstudienplan | 2. odor o. odinostor | | |
| 9 | Verwendbarkeit des | Master International Information Systems (from 2018/19 + 2016/17): | | |
| | Moduls | Module in the section Seminar International Information Systems | | |
| 10 | Studien- und | Ausarbeitung, Präsentationsfolien, Vortrag | | |
| | Prüfungsleistungen | | | |
| 11 | Berechnung Modulnote | 30% Ausarbeitung, 30% Präsentationsfolien, 40% Vortrag | | |
| 12 | Turnus des Angebots | unregelmäßig, Winter- oder Sommersemester | | |
| 13 | Arbeitsaufwand | Präsenzzeit: 2 x 15 = 30h | | |
| | | Vorbereitungszeit: 120h | | |
| 14 | Dauer des Moduls | 1 Semester | | |
| 15 | Unterrichts- und | Deutsch oder Englisch | | |
| | Prüfungssprache | | | |
| 16 | (Vorbereitende) Literatur | Bücher über wissenschaftliches Arbeiten (gibt es in sehr großer Zahl) | | |
| | ,, <u></u> | (g g g g g | | |

| DEININGER, Marcus ; LICHTER, Horst ; LUDEWIG, Jochen ; SCHNEI- |
|---|
| DER, Kurt: Studien-Arbeiten : ein Leitfaden zur Vorbereitung, Durchfüh- |
| rung und Betreuung von Studien-, Diplom- und Doktorarbeiten am Bei- |
| spiel Informatik. 2., durchges. Aufl., Zürich : vdf, Stuttgart : Teubner, |
| 1993 ISBN 3-519-12156-5 und 3-7281-1961-X. |

Internet of things and industrial services seminar (IoTISS)

| 1 | Module name IIS-54350 | Internet of things and industrial services seminar | 5 ECTS |
|---|--------------------------|--|--------|
| 2 | Courses/lectures | Internet of things and industrial services seminar (4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Matzner and assistants | |

| 4 | Module coordinator | Prof. Matzner | |
|----|-----------------------------------|---|--|
| 5 | Contents | Cyber-physical Systems (CPS) are physical products that are equipped with embedded hardware and software, that may interact with their environment through sensors and actuators, and that may be networked with remote computers. Examples are modern networked cars and production machines in the smart factory. CPS pave the way for new digital business models based on CPS-enabled service offerings. This seminar addresses the phenomenon of digital industrial services based on cyber-physical systems and the Internet-of-Things. | |
| 6 | Learning objectives and skills | will learn about different uses of CPS in digital industrial service systems. can adopt one of different research methods (literature-study, empirical or design research) in order to address a specific research question or research problem. will gain theoretical knowledge about digital industrial service systems based on cyber-physical systems and the Internet-of-Thingsas well as relevant technologies in this domain | |
| | | will train their research, writing, and presentation skills. | |
| 7 | Recommended prerequi- | will learn how to set up and conduct an IoT service project. | |
| | sites | None | |
| 8 | Integration in curriculum | Third semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19 + 2016/17): Module in the section Seminar International Information Systems Master FACT (Vertiefungsbereich, Modulgruppe Interdisziplinäre Module) Master WING (wirtschaftswissenschaftliche Modulgruppe M7) Master International Production Engineering and Management (International Elective Modules M6) | |
| 10 | Method of examination | Seminar paper (tw. in Gruppenarbeit) (20 ± 5 pages) Final presentation (tw. in Gruppenarbeit) (20 minutes) | |
| 11 | Grading procedure | Seminar paper (70%) Presentation (30%) | |
| 12 | Module frequency | Each semester | |
| 13 | Workload | Contact hours: 30 h Independent study: 120 h | |
| 14 | Module duration | 1 semester | |
| 15 | Teaching and examination language | English | |
| 16 | (Recommended) reading | All relevant material will be provided during the seminar. | |

Digitalization of work and life

| 1 | Module name IIS-56430 | Digitalization of work and life | 5 ECTS |
|---|--------------------------|--|--------|
| 2 | Courses/lectures | Seminar: Digitalization of work and life (4 SWS) | 5 ECTS |
| 3 | Lecturers | Prof. Dr. Sven Laumer | |

| 4 | Module coordinator | Prof. Dr. Sven Laumer |
|----|-----------------------------------|--|
| 5 | Contents | Digitalization provides opportunities for a better quality of life, new business models and efficient management. However, it also has a "dark" side, as people may be stressed or become addicted to digital technologies. As part of this research seminar, various research questions of digitalization in business and society are discussed and students carry out their own research project. To support their own research projects theories and methods of information systems research will be introduced. |
| | | The seminar is offered as a block seminar. An introduction is provided at the beginning of semester. Students work on their seminar thesis during the semester. The results are presented and discussed at the end of the semester during a block seminar. |
| 6 | Learning objectives and skills | The research seminar prepares students for a master's thesis, so that they are able to answer a concrete research question in the field of digital transformation by applying an information system's research method. |
| 7 | Recommended prerequisites | 12, number of participants is limited, please see website for details for the application process (no first come, first serve approach) |
| 8 | Integration in curriculum | Second or forth semester |
| 9 | Module compatibility | Master International Information Systems (from 2018/19 + 2016/17): Module in the section Seminar International Information Systems |
| 10 | Method of examination | Seminar paper and presentation |
| 11 | Grading procedure | Seminar paper (70%) and presentation (30%) |
| 12 | Module frequency | Summer term |
| 13 | Workload | Contact hours: 30 h Independent study: 120 h |
| 14 | Module duration | 1 Semester |
| 15 | Teaching and examination language | German, English on demand |
| 16 | Recommended reading | Grover, Varun. "Are we losing out with digitization?." Journal of Information Technology Case and Application Research 17.1 (2015): 3-7. Hess, Thomas, et al. "Digital Life as a Topic of Business and Information Systems Engineering?." Business & Information Systems Engineering 6.4 |
| | | (2014): 247-253. Legner, Christine, et al. "Digitalization: opportunity and challenge for the business and information systems engineering community." Business & information systems engineering 59.4 (2017): 301-308. Riedl, René, et al. "On the relationship between information management and digitalization." Business & Information Systems Engineering (2017): 1-8. |

User experience research (UXR)

| 1. | Module name IIS-57440 | User experience (UX) research seminar | 5 ECTS |
|-----|-----------------------------------|---|---|
| 2. | Courses/lectures | Seminar: User experience (UX) research (4 SWS) | 5 ECTS |
| 3. | Lecturers | Prof. Dr. Steffi Haag | |
| 4. | Module coordinator | Prof. Dr. Steffi Haag | |
| 5. | Contents | User experience (UX) research systematically analyzes users requirements in order to shed light on the process of designing riences users make in interaction with digital technologies and During the seminar, (groups of) students employ theories, contools, and methods (e.g., interviews, surveys, experiments) to search problems regarding users' cognitions, emotions, and be while interacting with state-of-the-art digital technologies and cations for technology development, corporate strategy, new be models, and innovations. Approach and results of the research are written down in a seminar paper, presented, and discussed peers and industry experts during blocked sessions. Topics are introduced and assigned in the first session. During mester, students work on their seminar thesis. The results are and discussed in the middle and at the end of the semester. | g the expe- d policies. ncepts, analyze re- behaviors derive impli- business th projects d with g the se- |
| 6. | Learning objectives and skills | Students can prepare and interpret different theoretical and no cal approaches to user research. They can analyze scientific literature to independently define search problems can use quantitative or qualitative research methods to an problems can write and review seminar papers can critically reflect, present, and discuss research design within the audience of the seminar can give adequate feedback to complex challenges develop skills in collaborative interaction with peers. | relevant re- |
| 7. | Recommended prerequisites | None The number of participants is limited. Please see website for of the application process! | details on |
| 8. | Integration in curriculum | 1.– 4. semester | |
| 9. | Module compatibility | Master International Information Systems (from 2018/19 + 20° dule in the section Seminar International Information Systems Master Wirtschaftsingenieurwesen Master in Management: Vertiefungsbereich "Value Creation & Transformation" oder "Entrepreneurship & Innovation" Master in International Business Studies: Free Specialization (FSM) | ι Digital |
| 10. | Method of examination | Seminar paper, presentation, and class participation, partly in | groups. |
| 11. | Grading procedure | Seminar paper (60%), presentation (30%), and class participa | ation (10%) |
| 12. | Module frequency | Each SS. | |
| 13. | Workload | Contact hours: 30h Independent study: 120h | |
| 14. | Module duration | 1 Semester, in blocked sessions | |
| 15. | Teaching and examination language | Irregularly, English or German. Please see website. | |
| 16. | (Recommended) reading | Relevant literature is provided during the seminar. | |

Designing Information Systems for Behavior Change (DIS)

| 1 | Module name IIS-57469 | Designing Information Systems for Behavior Change: Practical Applications | 5 ECTS |
|----|--------------------------------|---|---|
| 2 | Courses/lectures 74671 | Seminar: Designing Information Systems for Behavior Change: Practical Applications | 5 ECTS |
| 3 | Lecturers | Prof. Dr. Verena Tiefenbeck | |
| 4 | Module coordinator | Prof. Dr. Verena Tiefenbeck | |
| 5 | Contents | Information systems increasingly provide the necessary tools analyze, and communicate data about individuals both in orga and private contexts. This makes it possible to implement data havioral interventions using various devices including mobile press trackers, or electricity smart meters. While some of these successfully induce behavior change, others completely fail. Traintroduces students to key concepts from behavioral economic chology and how to use them to build effective applications for change in relevant domains including sustainability, healthcare hold spending. | nizational a-driven be- bhones, fit- e products he seminar cs and psy- r behavior |
| | | At the beginning of the semester, an introduction to the topic is and topics for the seminar thesis are assigned. During the sen dents work on their seminar thesis. The results are presented cussed at the end of the semester. | nester, stu- |
| 6 | Learning objectives and skills | The research seminar prepares students for a master's thesis, they are able to answer a concrete research question in the fie transformation. More specifically, students - Understand important behavioral theories - Get a first impression on theory testing - Relate the insights to practical challenges - Understand the limitations of the theories - Structure and plan a research-related assignment - Read and evaluate scientific publications - Write a scientific report - Use and cite literature sources - Present research findings to an audience | |
| 7 | Recommended prerequisites | None | |
| 8 | Integration in curriculum | Second or forth semester | |
| 9 | Module compatibility | Master International Information Systems (from 2018/19 + 201 dule in the section Seminar International Information Systems | 16/17): Mo- |
| 10 | Method of examination | Seminar paper and presentation | |
| 11 | Grading procedure | Seminar paper (70%), presentation (30%) Es handelt sich um eine einheitliche Prüfung, bei der die einze leistungen untrennbar miteinander verbunden sind. Für das Be Moduls müssen nach § 19 Abs. 1 Satz 4 MPOWIWI in der jew den Fassung alle Teilleistungen in demselben Semester besta den. Wegen des untrennbaren Bezugs der Teilleistungen aufe abweichend von § 25 Abs. 1 Satz 2 MPOWIWI eine Wiederhoner der nicht bestandenen Teilleistungen nicht möglich. Das Nen einer der Teilleistungen erfordert die Wiederholung der ge Prüfung. | estehen des reils gelten- anden wer- einander ist lung nur ei- lichtbeste- |

| 12 | Module frequency | Each summer term |
|----|--------------------------|----------------------------|
| 13 | Workload | Contact hours: 30 h |
| | | Independent study: 120 h |
| 14 | Module duration | 1 semester |
| 15 | Teaching and examination | English |
| | language | |
| 16 | (Recommended) reading | Will be announced in class |

VII Master thesis

- As part of the curriculum "Master thesis" is a mandatory module.
- Das Modul "Masterarbeit" ist verpflichtender Bestandteil des Curriculums.

Master Thesis

| 1 | Modulbezeichnung IIS1999 | Masterarbeit (Master's thesis) | 30 ECTS |
|---|-----------------------------|---|---------|
| 2 | Lehrveranstaltungen | Masterarbeit | 30 ECTS |
| 3 | Lehrende | Prof. Amberg / Prof. Bodendorf / Prof. Möslein / Prof. Matzner / Prof. Laumer / Prof. Harth / Prof. Haag / Prof. Tiefenbeck / Prof. Zschech / Prof. Morschheuser / Prof. Kraus / Prof. Riehle / Prof. Saglietti / Prof. Freiling / Prof. Tielemann / Prof. Kleinöder / Prof. German / Dr. Grosso / Prof. Eskofier / Prof. Philippsen / Prof. Lenz / Prof. Maier | |

| | | , | |
|----|--|--|--|
| 4 | Modulverantwortliche/r | Prof. Bodendorf stellvertretend für die Dozierenden im Studiengang | |
| 5 | Inhalt | Die Masterarbeit beinhaltet das Verfassen einer konzeptionellen oder empirischen Arbeit zu einem Thema aus dem Bereich Wirtschaftsinformatik. Die Masterarbeit sollte einen Bezug zu internationalen Aspekten der Wirtschaftsinformatik herstellen. | |
| 6 | Lernziele und Kompetenzen | Die Studierenden sind in der Lage, innerhalb einer vorgegebenen Frist ein Thema bzw. eine Fragestellung aus dem Bereich Wirtschaftsinformatik selbstständig mit wissenschaftlichen Methoden zu bearbeiten sowie die Erkenntnisse prägnant aufzuarbeiten und kompetent zu interpretieren. | |
| 7 | Empfohlene Voraussetzungen für die Teilnahme | Voriger Besuch der Veranstaltungen des 13. Semesters Mit der Anmeldung zur Masterarbeit im Studiengang International Information Systems muss ein Nachweis über den bereits absolvierten oder den geplanten verpflichtenden Auslandsaufenthalt erbracht werden. | |
| 8 | Einpassung in Musterstudienplan | 4. Semester | |
| 9 | Verwendbarkeit des Moduls | Master International Information Systems | |
| 10 | Studien- und Prüfungsleistungen | Masterarbeit: schriftliche Arbeit | |
| 11 | Berechnung Modulnote | Masterarbeit 100% | |
| 12 | Turnus des Angebots | Nach Maßgabe des jeweiligen Lehrstuhls | |
| 13 | Arbeitsaufwand | Präsenzzeit: 0 h Eigenstudium: 900 h | |
| 14 | Dauer des Moduls | 6 Monate | |
| 15 | Unterrichts- und Prüfungssprache | Deutsch oder Englisch | |
| 16 | (Vorbereitende) Literatur | Aktuelle Forschungsliteratur | |
| _ | | | |