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**Modules for Applied Economics and Data Science**

**Economics**

**wir821 - International Trade, Production and Change**

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<td>Credit points</td>
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<td>Workload</td>
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**Verwendbarkeit des Moduls**
- kein Abschluss European Studies in Global Perspectives > Society, Economy and Politics
- Master Applied Economics and Data Science (Master) > Economics
- Master's programme Business Administration: Management and Law (Master) > Kernmodule CHI
- Master's Programme Sustainability Economics and Management (Master) > Additional Modules

**Zuständige Personen**
- Trautwein, Hans-Michael (Module responsibility)
- Trautwein, Hans-Michael (Prüfungsberechtigt)
- Bitzer, Jürgen (Prüfungsberechtigt)
- Poppitz, Philipp (Prüfungsberechtigt)
- Trautwein, Hans-Michael (Module counselling)

**Prerequisites**
- keine

**Skills to be acquired in this module**
- Understanding of trade relations, international factor movements and corresponding balance-of-payments mechanisms.
- Capability to discuss structural change in global trade and productions in terms of formal models and case studies.
- Understanding of the causes and alternative strategies of economic integration in regional blocs.
- Understanding of the causes and alternative strategies of economic transformation in emerging markets.
- Ability to research data and evaluate the literature on specific aspects of international trade, production and structural change.

**Module contents**

The lectures and seminar papers address issues in the following subfields:
- international trade,
- international trade policies and regimes,
- geographical economics,
- foreign direct investment,
- labour migration,
- fragmentation of production,
- regulations of international trade and factor movements,
- development strategies,
- regional integration.

**Literaturempfehlungen**


Further references to specific topics and current literature will be given in the events.

**Links**

**Language of instruction**
- English

**Duration (semesters)**
- 1 Semester

**Module frequency**
- jährlich

**Module capacity**
- unlimited

**Reference text**
- Das Seminar wird in der Form eines Blockseminars abgehalten.
Es gibt eine Vorbesprechung Anfang des Semesters, in der die Themen vergeben werden.

<table>
<thead>
<tr>
<th>Modulevel / module level</th>
<th>Modulart / typ of module</th>
<th>je nach Studiengang Pflicht oder Wahlpflicht</th>
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<td>during term</td>
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wir823 - International Finance and Exchange Rate Economics

Module label  International Finance and Exchange Rate Economics
Modulkürzel  wir823
Credit points  6.0 KP
Workload  180 h

Verwendbarkeit des Moduls
- kein Abschluss European Studies in Global Perspectives > Society, Economy and Politics
- Master Applied Economics and Data Science (Master) > Economics
- Master's programme Business Administration: Management and Law (Master) > Basismodule
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule AFT - VWL

Zuständige Personen
- Trautwein, Hans-Michael (Module responsibility)
- Trautwein, Hans-Michael (Prüfungsberechtigt)
- Trautwein, Hans-Michael (Module counselling)

Prerequisites
- Understanding of exchange rates as strategic prices in open economies.
- Understanding of the interdependence of balance-of-payments constraints and exchange rates.
- Capability to discuss different models of exchange rate determination.
- Ability to research data and evaluate the literature on specific aspects of financial market globalization and strategies of exchange-rate policy.
- Understanding of the history of fixed-exchange-rate systems.
- Ability to relate the importance of historical experience in international monetary and financial economics.

Skills to be acquired in this module
- Understanding of exchange rates as strategic prices in open economies.
- Understanding of the interdependence of balance-of-payments constraints and exchange rates.
- Capability to discuss different models of exchange rate determination.
- Ability to research data and evaluate the literature on specific aspects of financial market globalization and strategies of exchange-rate policy.
- Understanding of the history of fixed-exchange-rate systems.
- Ability to relate the importance of historical experience in international monetary and financial economics.

Module contents
The lectures address the following issues:

- exchange rates and the balance of payments,
- open-economy macroeconomics,
- exchange rate determination,
- international financial markets,
- fixed-exchange-rate systems,
- currency crises,
- optimum currency areas and monetary integration,
- choice of exchange rate regime,
- financial market regulation.

In the seminar students will present papers on general and topical issues (theoretical models, policy strategies, case studies) in the fields of financial market globalization and exchange-rate policy.

Literatureempfehlungen
Selected chapters from:
And other specific readings for the seminar papers.

Links
Language of instruction  English
Duration (semesters)  1 Semester
Module frequency  jährlich
Module capacity  unlimited
Reference text
- Mitarbeit in Vorlesung und Seminar ist Pflicht für den Erwerb eines Leistungsnachweises.
- Das Seminar wird in der Form eines Blockseminars abgehalten.
- Es gibt eine Vorbesprechung Anfang des Semesters, in der die Themen vergeben werden.
<table>
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<td>Präsenzzeit Modul insgesamt</td>
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</table>
wir873 - Applied Economics

Module label  Applied Economics
Modulkürzel  wir873
Credit points  6.0 KP
Workload  180 h

Verwendbarkeit des Moduls
- Master Applied Economics and Data Science (Master) > Economics
- Master's Programme Sustainability Economics and Management (Master) > Additional Modules

Zuständige Personen
- Bitzer, Jürgen (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

Prerequisites
The students are able to:
- develop an empirical research project,
- collect the required data,
- carry out an econometric analysis,
- interpret, discuss and present the results.

Module contents
The module consists of a lecture and a seminar. In the lecture, the students develop their research project and present their work process. In the bloc seminar, the students present their results and discuss them.

Literaturempfehlungen

Links
Languages of instruction  German, English
Duration (semesters)  1 Semester
Module frequency  jährlich
Module capacity  unlimited

Modullevel / module level
Modulart / typ of module  je nach Studiengang Pflicht oder Wahlpflicht

Lehr-/Lernform / Teaching/Learning method

Vorkenntnisse / Previous knowledge

Examination  Prüfungszeiten  Type of examination
Final exam of module  vary according to type of examination  term paper or seminar paper and presentation or written exam or oral exam or portfolio or project paper

Form of instruction  Comment  SWS  Frequency  Workload of compulsory attendance
Lecture  2
Seminar  2

Präsenzzeit Modul insgesamt  56 h
**wir874 - Advanced Microeconomics**

**Module label**  
Advanced Microeconomics

**Modulkürzel**  
wir874

**Credit points**  
6.0 KP

**Workload**  
180 h

**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Economics
- Master's programme Business Administration: Management and Law (Master) > Basismodule
- Master's programme Business Administration: Management and Law (Master) > Kernmodule CHI
- Master's programme Social Sciences (Master) > Wahlpflichtmodule

**Verwendbarkeit des Moduls anderer Institute und Departments**

**Zuständige Personen**
- Helm, Carsten (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Lehrenden, Die im Modul (Module counselling)

**Prerequisites**
keine

**Skills to be acquired in this module**
Students
- understand the importance of incentive systems for economic processes and can analyze the effects of incentive systems;
- have a firm knowledge in game theory and contract theory, and can address questions in the context of scientific discussion;
- are able to apply methods from game theory and contract theory largely independently to the analysis of situations in which agents interact strategically;
- are able to design incentive schemes – on their own and in teams – and to acquire knowledge on their own for this purpose and, to present their results, and to defend them in the scientific discourse.

**Module contents**
The first part of the module covers game theory. Game theory is an important method in economics to analyze strategic interactions of agents, e.g., on markets, in organizations or in bargaining situations. The second part of the module covers contract theory that – according to the Nobel laureate Kenneth Arrow – has been „the most important development in economics in the last forty years“. We work out the fundamentals of screenings, signaling and moral hazard and apply them to different topics, e.g., from labor economics, economic organization and management, law and economics as well as industrial economics.

In both parts, there is a tutorial. Here students largely independently apply the acquired knowledge to different situations of strategic interaction in economics and present their results.

**Literaturempfehlungen**

**Links**
http://www.fiwi.uni-oldenburg.de/

**Language of instruction**
English

**Duration (semesters)**
1 Semester

**Module frequency**
jährlich

**Module capacity**
unlimited

**Modulelevel / module level**
je nach Studiengang Pflicht oder Wahlpflicht

**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**

**Examination**

**Prüfungszeiten**
At the end of the lecture period.

**Type of examination**
exam

**Form of instruction**

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**Links**
http://www.fiwi.uni-oldenburg.de/
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<td>Workload</td>
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**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Economics
- Master's Programme Water and Coastal Management (Master) > Socioeconomics

**Verwendbarkeit des Moduls**

**Zuständige Personen**
- Bitzer, Jürgen (Module responsibility)
- Böhringer, Christoph (Module responsibility)
- Helm, Carsten (Module responsibility)
- Trautwein, Hans-Michael (Module responsibility)
- Huse, Cristian (Module responsibility)
- Gören, Erkan (Module responsibility)
- Asane-Otoo, Emmanuel (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Lehrenden, Die im Modul (Module counselling)

**Prerequisites**

**Skills to be acquired in this module**

Students have the opportunity to take an economics module of their choice (worth 6 CP) at the master's level. This can also take place at another university or during studies abroad.

Students are required to:

- independently engage with a topic using scientific methods,
- independently research and make use of current academic literature,
- integrate their topic into an academic discussion.

**Module contents**

This is dependent upon the module chosen.

**Literaturempfehlungen**

**Links**

**Languages of instruction**

**Duration (semesters)** 1 Semester

**Module frequency** halbjährlich

**Module capacity** unlimited

**Modullevel / module level**

**Modulart / typ of module** je nach Studiengang Pflicht oder Wahlpflicht

**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**

**Examination**

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<td>term paper or presentation or written exam or oral exam or portfolio.</td>
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**Form of instruction**

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**Präsenzzeit Modul insgesamt** 56 h
wir878 - Public Economics and Market Design

**Module label**
Public Economics and Market Design

**Modulkürzel**
wir878

**Credit points**
6.0 KP

**Workload**
180 h

**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Economics
- Master's programme Social Sciences (Master) > Wahlpflichtmodule anderer Institute und Departments
- Master's Programme Sustainability Economics and Management (Master) > Additional Modules
- Master's Programme Water and Coastal Management (Master) > Socioeconomics

**Zuständige Personen**
- Lehrenden, Die im Modul (Module counselling)
- Helm, Carsten (Module counselling)
- Helm, Carsten (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

**Prerequisites**
none

**Skills to be acquired in this module**
The students are able
- to understand sources of market failures and government failures
- understand taxing and spending activities of governments
- understand the distinction between normative and positive perspectives in the evaluation of government policy
- to apply economic methods to current issues in public economics
- present their research result in the form of written papers and oral presentations

**Module contents**
The course covers key concepts of public economics, which studies how government taxing and spending activities affect the economy – economic efficiency and the distribution of income and wealth.

Lecture: After introducing the theory and methodology of public economics, we discuss a historical and theoretical overview of the public sector. We then focus on departures from efficiency (especially asymmetric information), taxation issues (including tax evasion, fiscal federalism and tax competition among independent jurisdictions), and the intertemporal issue of social security (especially pension system).

Seminar: covers current issues in public economics, e.g. reform of health care or pension system.

**Literatureempfehlungen**

**Links**
http://www.fiwi.uni-oldenburg.de/

**Languages of instruction**
German, English

**Duration (semesters)**
1 Semester

**Module frequency**
jährlich

**Module capacity**
30

**Reference text**
The seminar will be conducted as a block seminar

**Modullevel / module level**
Pflicht o. Wahlpflicht / compulsory or optional

**Modulart / typ of module**
Lecture and seminar

**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**
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**Präsenzzeit Modul insgesamt**  56 h
### wir901 - Environmental Economics

<table>
<thead>
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<tr>
<td>Environmental Economics</td>
<td>wir901</td>
<td>6.0 KP</td>
<td>180 h</td>
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#### Verwendbarkeit des Moduls
- Master Applied Economics and Data Science (Master) > Economics
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule NM-VWL
- Master's Programme Computing Science (Master) > Module aus anderen Studiengängen
- Master's Programme Environmental Modelling (Master) > Mastermodule
- Master's Programme Sustainability Economics and Management (Master) > Basic and Accentuation Modules

#### Zuständige Personen
- Helm, Carsten (Module counselling)
- Lehrenden, Die im Modul (Module counselling)
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Helm, Carsten (Module responsibility)

#### Prerequisites
- Keine

#### Skills to be acquired in this module
- Know and be able to apply fundamental concepts and figures of thought in environmental economics; be able to analyse and evaluate environmental problems and solution approaches; practice scientific methods and the ability to discuss; be able to classify environmental economics in the context of interdisciplinary sustainability research.

#### Module contents
- Economic analysis of environmental impacts (property rights, external effects, market failure); ethical aspects of environmental economics, instruments of environmental policy (tradable permits, taxes, subsidies, liability law); innovation and adaptation of new technologies; international environmental problems.

#### Literatureempfehlungen

#### Links
- Language of instruction: English
- Duration (semesters): 1 Semester
- Module frequency: Annually
- Module capacity: unlimited
- Modulart / typ of module: je nach Studiengang Pflicht oder Wahlpflicht
- Lehr-/Lernform / Teaching/Learning method: Vorlesung und Übung / Lecture and exercise

#### Vorkenntnisse / Previous knowledge

<table>
<thead>
<tr>
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<th>Prüfungszeiten</th>
<th>Type of examination</th>
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<tbody>
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<td>At the end of the lecture period</td>
<td>Written exam; bonus through solution of exercises</td>
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#### Präsenzzeit Modul insgesamt
- 56 h
### wir889 - Applied Environmental Economics

<table>
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<td>6.0 KP</td>
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<tr>
<td>Workload</td>
<td>180 h</td>
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**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Economics
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule NM-VWL
- Master's Programme Environmental Modelling (Master) > Mastermodule
- Master's Programme Sustainability Economics and Management (Master) > Akzentmodule

**Zuständige Personen**
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Huse, Cristian (Module responsibility)
- Huse, Cristian (Module counselling)

**Prerequisites**
- Be able to conceptually understand and apply key empirical tools used by any economist (and other professionals) in Environmental, Energy, and Transport Economics.
- Be able to perform and critically evaluate an empirical analysis.

**Module contents**
- Econometric methods (discrete choice); Welfare analysis; Valuation; Types of data; Cost-benefit analysis.

**Literaturempfehlungen**

**Links**
- Language of instruction: English
- Duration (semesters): 1 Semester

**Module frequency**
- Module capacity: 60
- Module level / module level: MM (Mastermodul / Master module)
- Modularart / typ of module: Pflicht o. Wahlpflicht / compulsory or optional

**Lehr-/Lernform / Teaching/Learning method**
- Lecture

**Vorkenntnisse / Previous knowledge**
- Examination: Prüfungszeiten
- Type of examination: At the end of the lecture period
- Final exam of module: Portfolio

**Form of instruction**
- Lecture

**SWS**
- 4

**Frequency**
- SoSe oder WiSe

**Workload Präsenzzeit**
- 56 h
**wir890 - Climate Economics**

**Module label**
Climate Economics

**Modulkürzel**
wir890

**Credit points**
6.0 KP

**Workload**
180 h

**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Economics
- Master’s Programme Environmental Modelling (Master) > Mastermodule
- Master's Programme Sustainability Economics and Management (Master) > Additional Modules

**Zuständige Personen**
- Böhringer, Christoph (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Riesenbeck, Lukas (Module counselling)

**Prerequisites**
This course aims at giving students an understanding of reasons, objectives and economic instruments for climate policy. Students first get acquainted with the natural science of the climate where anthropogenic greenhouse gas emissions constitute the source of man-made climate change. The latter is then explained from an economic perspective as a global environmental externality calling for environmental regulation to avoid substantial market failures. Game theoretic analysis of international negotiations and agreements provides key insights about the fundamental problems of free-riding and efficient climate policy design. Beyond theoretical propositions, the lecture will critically discuss past and contemporary climate policies such as the Kyoto Protocol, the Paris Agreement, or the EU Emissions Trading System.

**Module contents**
- Natural science of climate change; environmental externalities and market failures; environmental regulation (emission taxes, standards, tradable permits, etc.); international environmental agreements; critical appraisal of climate policy implementation.

**Literatureempfehlungen**


**Links**
- Language of instruction: English
- Duration (semesters): 1 Semester
- Module frequency: Annual
- Module capacity: 30
- Modullevel / module level: MM (Mastermodul / Master module)
- Modulart / typ of module: Wahlpflicht / Elective

**Vorkenntnisse / Previous knowledge**
Microeconomics

**Examination**
- Prüfungszeiten: At the end of the lecture period
- Type of examination: Written exam (max. 120min)

**Form of instruction**
- **Lecture**
  - Comment: SWS
  - Frequency: SoSe oder WiSe
  - Workload of compulsory attendance: 28

- **Seminar**
  - Comment: SWS
  - Frequency: SoSe oder WiSe
  - Workload of compulsory attendance: 28

**Präsenzzeit Modul insgesamt**
56 h
**wir893 - Development Economics**

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**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Economics
- Master's Programme Sustainability Economics and Management (Master) > Additional Modules

**Zuständige Personen**
- Bitzer, Jürgen (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Bitzer, Jürgen (Module counselling)

**Prerequisites**
- Econometrics, Economic Growth

**Skills to be acquired in this module**

The students are able:
- to identify and discuss empirical challenges in research on developing countries
- to understand, summarize, and discuss recent research studies in development economics
- evaluate strategies to reach sustainable economic development discussed in the public and politics
- participate in a discussion on the topic, developing a well-grounded position and problem solving strategy
- to present current research to and discuss it verbally and in written form
- to identify gaps in the literature on developing countries

**Module contents**
The module introduces the students to the current challenges of developing countries and the strategies to overcome them. The module will focus on the empirical research on developing countries, addressing the reasons for the sluggish development as well as the applied approaches to foster economic development. In the lecture the empirical methods used in development economics will be discussed. In the seminar current research papers on topics like poverty, conflicts, foreign aid, health, human capital and institutions in developing countries will be discussed.

**Literaturempfehlungen**

**Links**
- Language of instruction: English
- Duration (semesters): 1 Semester
- Module frequency: Yearly
- Module capacity: unlimited
- Modulelevel / module level: MM (Mastermodul / Master module)
- Modular / typ of module: Pflicht o. Wahlpflicht / compulsory or optional
- Lehr-/Lernform / Teaching/Learning method: Lecture and seminar
- Vorkenntnisse / Previous knowledge: Econometrics, Economic Growth

**Examination**
- Prüfungszeiten: At the end of the lecture period
- Type of examination: Formal presentation with written elaboration and discussion

**Form of instruction**
- Lecture: 2 SWS, SoSe oder WiSe 28
- Seminar: 2 SWS, SoSe oder WiSe 28
- Präsenzzeit Modul insgesamt: 56 h
## wir895 - Industrial Organization

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### Verwendbarkeit des Moduls
- Master Applied Economics and Data Science (Master) > Economics
- Master's programme Business Administration: Management and Law (Master) > Basismodule
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule UF - VWL
- Master's Programme Sustainability Economics and Management (Master) > Akzentmodule

### Zuständige Personen
- Huse, Cristian (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Huse, Cristian (Module counselling)

### Prerequisites
**Skills to be acquired in this module**
Be able to conceptually understand, critically evaluate, and apply methods used economists to study the behaviour of firms, consumers, and their interaction.

**Module contents**
- Econometric methods; models of firm behaviour; models of consumer behaviour; regulation; applications.

### Literaturempfehlungen

### Links
- Language of instruction: English
- Duration (semesters): 1 Semester
- Module frequency: 30
- Modulniveau / module level: MM (Mastermodul / Master module)
- Modulart / typ of module: Pflicht o. Wahlpflicht / compulsory or optional
- Lehr-/Lernform / Teaching/Learning method: Lecture and exercise

### Vorkenntnisse / Previous knowledge

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**Präsenzzeit Modul insgesamt**
56 h
**Module label**
Topics in Industrial Organization

**Modulkürzel**
wir922

**Credit points**
6.0 KP

**Workload**
180 h

**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Economics

**Zuständige Personen**
- Asane-Otoo, Emmanuel (Module responsibility)
- Bitzer, Jürgen (Module responsibility)
- Böhringer, Christoph (Module responsibility)
- Gören, Erkan (Module responsibility)
- Helm, Carsten (Module responsibility)
- Huse, Cristian (Module responsibility)
- Trautwein, Hans-Michael (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

**Prerequisites**

**Skills to be acquired in this module**
Students have the opportunity to take an economics module of their choice (worth 6 CP) at the master's level. This can also take place at another university or during studies abroad. Students are required to:

- independently engage with a topic using scientific methods
- independently research and make use of current academic literature
- integrate their topic into an academic discussion

**Module contents**
This is dependent upon the module chosen.

**Literaturempfehlungen**

**Links**

**Language of instruction**
English

**Duration (semesters)**
1 Semester

**Module frequency**
bi-annualy

**Module capacity**
unlimited

**Modullevel / module level**
MM (Mastermodul / Master module)

**Modulart / typ of module**
Wahlpflicht / Elective

**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**

**Examination**
Prüfungszeiten
Type of examination

**Final exam of module**
1 seminar paper or
1 formal presentation or
1 written examination or
1 oral examination or
1 portfolio or
1 project report

**Form of instruction**
Comment
SWS
Frequency
Workload of compulsory attendance

| Lecture | 2 | SoSe oder WiSe | 28 |
| Seminar | 2 | SoSe oder WiSe | 28 |

**Präsenzzeit Modul insgesamt**
56 h
**wir751 - Study Abroad I**

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- **Verwendbarkeit des Moduls**
  - Master Applied Economics and Data Science (Master) > Economics
  - Master's programme Business Administration: Management and Law (Master) > Ergänzungsmodule - Auslandsstudium

- **Zuständige Personen**
  - Lehrenden, Die im Modul (Prüfungsberechtigt)
  - Bitzer, Jürgen (Module responsibility)
  - Bitzer, Jürgen (Module counselling)

- **Prerequisites**
  - According to the specification of the foreign university

- **Skills to be acquired in this module**
  - According to the specification of the foreign university

- **Module contents**
  - According to the specification of the foreign university

- **Literaturempfehlungen**
  - According to the specification of the foreign university

- **Links**
  - According to the specification of the foreign university

- **Languages of instruction**

- **Duration (semesters)**
  - 1 Semester

- **Module frequency**

- **Module capacity**
  - unlimited (According to the specification of the foreign university)

- **Modullevel / module level**
  - MM (Mastermodul / Master module)

- **Modulart / typ of module**

- **Lehr-/Lernform / Teaching/Learning method**
  - According to the specification of the foreign university

- **Vorkenntnisse / Previous knowledge**
  - According to the specification of the foreign university

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**Präsenzzeit Modul insgesamt**

0 h
**wir752 - Study Abroad II**

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**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Economics
- Master's programme Business Administration: Management and Law (Master) > Ergänzungsmodule - Auslandsstudium

**Zuständige Personen**
- Bitzer, Jürgen (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Bitzer, Jürgen (Module counselling)

**Prerequisites**
- According to the specification of the foreign university

**Skills to be acquired in this module**
- According to the specification of the foreign university

**Module contents**
- According to the specification of the foreign university

**Literaturempfehlungen**
- According to the specification of the foreign university

**Language of instruction**
- German

**Duration (semesters)**
- 1 Semester

**Module frequency**
- unlimited

**Module capacity**
- unlimited

**Modulart / typ of module**
- MM (Mastermodul / Master module)

**Lehr-/Lernform / Teaching/Learning method**
- According to the specification of the foreign university

**Vorkenntnisse / Previous knowledge**
- According to the specification of the foreign university

**Examination**
- Prüfungszeiten
- Type of examination
- Final exam of module
- According to the specification of the foreign university
- According to the specification of the foreign university

**Form of instruction**
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**Präsenzzeit Modul insgesamt**
- 0 h
### wir753 - Study Abroad III

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**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Economics

**Zuständige Personen**
- Bitzer, Jürgen (Module responsibility)
- Lehrende, die im Modul (Prüfungsberechtigt)
- Bitzer, Jürgen (Module counselling)

**Prerequisites**
According to the specification of the foreign university

**Skills to be acquired in this module**
According to the specification of the foreign university

**Module contents**
According to the specification of the foreign university

**Literaturempfehlungen**
According to the specification of the foreign university

**Links**
According to the specification of the foreign university

**Language of instruction**
German

**Duration (semesters)**
1 Semester

**Module frequency**

**Module capacity**
unlimited

**Modullevel / module level**
MM (Mastermodul / Master module)

**Modulart / typ of module**

**Lehr-/Lernform / Teaching/Learning method**
According to the specification of the foreign university

**Vorkenntnisse / Previous knowledge**
According to the specification of the foreign university

### Examination

<table>
<thead>
<tr>
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### Final exam of module
According to the specification of the foreign university

### Form of instruction

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**Präsenzzeit Modul insgesamt**
0 h
wir760 - Computable General Equilibrium Analysis

Module label: Computable General Equilibrium Analysis
Module code: wir760
Credit points: 6.0 KP
Workload: 180 h

Verwendbarkeit des Moduls:
- Master Applied Economics and Data Science (Master) > Economics
- Master's Programme Sustainability Economics and Management (Master) > Additional Modules

Zuständige Personen:
- Böhringer, Christoph (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Böhringer, Christoph (Module counselling)

Prerequisites: None

Skills to be acquired in this module:
During the course work students will learn how to set up computable general equilibrium (CGE) models step-by-step using the GAMS software (General Algebraic Modeling System) and apply them to actual policy issues of broader interest.

Module contents:
This course provides a practical guideline to CGE modeling. We start with the formulation of a simple stylized CGE model for open economies and lay out how such a model can be matched (calibrated) to empirical data. We will then discuss several refinements of our prototype model to investigate contemporary policy issues such as environmental tax reforms or trade restrictions (e.g. the implementation of import tariffs and quotas). The single country model will be subsequently extended towards a multi-region model framework which accommodates to investigate in appropriate detail the economic impacts of multilateral policy initiatives such as trade policy reforms or international climate agreements.

Literatureempfehlungen

Links

Language of instruction: English
Duration (semesters): 1 Semester
Module frequency: jährlich/annual
Module capacity: 14
Module level / module level: MM (Mastermodul / Master module)
Moduleart / typ of module: Wahlpflicht / Elective

Lehr-/Lernform / Teaching/Learning method

Vorkenntnisse / Previous knowledge: Intermediate microeconomics

Examination

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Form of instruction

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Präsenzzeit Modul insgesamt: 56 h
# Empirical Methods

**wir875 - Forecasting Methods**

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**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Empirical Methods
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule UF - VWL
- Master's Programme Business Informatics (Master) > Module der Wirtschafts- und Rechtswissenschaften (Master)
- Master's Programme Computing Science (Master) > Module aus anderen Studiengängen

**Zuständige Personen**
- Stecking, Ralf Werner (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

**Prerequisites**
With successful completion of the course, students shall:
- be aware of and be able to evaluate quantitative forecasting methods,
- be able to select adequate methods in relevant fields of application, like time series and classification analysis,
- be able to run computer-aided analyses and to interpret the results properly.

**Module contents**
Various aspects of quantitative forecasting methods such as:
- Time series components,
- Trend and seasonal methods,
- Stationarity,
- Multivariate forecasting methods,
- Autoregressive and moving average processes,
- Box-Jenkins method.

**Literaturempfehlungen**

**Links**
- Language of instruction: English
- Duration (semesters): 1 Semester
- Module frequency: halbjährlich
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### wir887 - Advanced Econometrics

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<td>Huse, Cristian (Module responsibility)</td>
</tr>
<tr>
<td></td>
<td>Lehrenden, Die im Modul (Prüfungsberechtigt)</td>
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<td>Huse, Cristian (Module counselling)</td>
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<tr>
<td>Prerequisites</td>
<td></td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>Be able to conceptually understand, critically evaluate, and apply methods used in the statistical analysis of data.</td>
</tr>
<tr>
<td>Module contents</td>
<td>Introduction to statistical software; Econometrics review; Econometrics and statistical learning methods (Classification, Resampling, Model selection and regularization, Nonlinear models, Tree-based methods, Unsupervised learning); Applications to Economics.</td>
</tr>
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<td></td>
<td>Papers to be assigned in due course</td>
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<td>Lecture and exercise</td>
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<td>Vorkenntnisse / Previous knowledge</td>
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<td>Examination</td>
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<td>Prüfungszeiten</td>
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<tr>
<td>Type of examination</td>
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<td>Final exam of module</td>
<td>At the end of the lecture period</td>
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<tr>
<td>Portfolio</td>
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<td>Form of instruction</td>
<td>Comment</td>
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<td>Lecture</td>
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<td>Seminar</td>
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*Language of instruction: English*

*Module frequency: 1 Semester*

*Module capacity: 30*

*Modullevel / module level: MM (Mastermodul / Master module)*

*Modulart / typ of module: Pflicht o. Wahlpflicht / compulsory or optional*

*Lehr-/Lernform / Teaching/Learning method: Lecture and exercise*

*Vorkenntnisse / Previous knowledge:*

*Examination:*

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*Final exam of module: At the end of the lecture period*
**wir888 - Applied Econometrics Using GIS Techniques**

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<td>Gören, Erkan (Module responsibility)</td>
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<tr>
<td>Skills to be acquired in this module</td>
<td>This course provides an introduction to some fundamental geo-processing operations using ArcGIS that are most relevant for economics research. The broad term GIS encompasses a set of tools (both software and hardware) to collect, store, visualize and analyze spatial data from the real world. GIS techniques allow economists to use data on geography and weather as sources of exogenous variation for estimating the causal impact of a wide range of treatments (e.g., infrastructure, mass media, slave trade, land suitability for agriculture, and terrain ruggedness). Satellite images from the earth's surface, which can be analyzed with geo-processing tools in GIS, allow economists to construct geo-spatial indicators (e.g., temporal changes in the intensity of night-time light and patterns of deforestation) that more closely reflect the local actors and underlying mechanisms of interest.</td>
</tr>
<tr>
<td>Module contents</td>
<td>Gain practical experience with the implementation of geo-processing tools using ArcGIS. Application of GIS programming tools that are most relevant for economics research through replication of various pieces of empirical economics research papers. A non-exhaustive list of geo-processing tools using ArcGIS includes performing mathematical functions on spatial data, the calculation of geographic distances between various forms of spatial units, aggregating geospatial data within polygons, and drawing maps. Introduction to map projection and geographic coordinate systems. Introduction to programming in Python for the purpose of automation and replication of geo-processed spatial datasets. Acquire the necessary data management skills to export spatial data in a suitable file format that can be directly imported into standard econometric software packages such as Stata.</td>
</tr>
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**Languages of instruction**

German, English
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**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**

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<td>Mündliche Prüfung oder Klausur oder Referat oder Projektbericht</td>
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**Form of instruction**

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<th>Frequency</th>
<th>Workload of compulsory attendance</th>
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<tr>
<td>Seminar</td>
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<td>SoSe oder WiSe</td>
<td>28</td>
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</table>

**Präsenzzzeit Modul insgesamt**

56 h
**Module label**  
Complex Data Analysis

**Modulkürzel**  
wir891

**Credit points**  
6.0 KP

**Workload**  
180 h

**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Empirical Methods
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule AFT - Methoden
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule NM - Methoden
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule UF - Methoden
- Master's Programme Sustainability Economics and Management (Master) > Additional Modules

**Zuständige Personen**
- Stecking, Ralf Werner (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

**Prerequisites**

**Skills to be acquired in this module**
With successful completion of the course, students shall be able to analyze complex empirical data sets, like aggregated data, privacy constrained data, distance information, distributions, tables, symbolic or granular data. Students will also learn to handle issues of big data challenges: large number of cases or variables, unknown dependencies, redundancy, missing values, small or no variance. In this course students will learn theoretical aspects of complex data analysis, as well as practical applications for real data sets with statistical software packages.

**Module contents**
Principal Component Analysis, Correspondence Analysis, Cluster Analysis, Linear Discriminant Analysis, Multidimensional Scaling, CART, Symbolic Data Analysis

**Literaturempfehlungen**

**Links**

**Languages of instruction**  
German, English

**Duration (semesters)**  
1 Semester

**Module frequency**  
1 Semester

**Module capacity**  
unlimited

**Modullevel / module level**  
MM (Mastermodul / Master module)

**Modulart / typ of module**  
je nach Studiengang Pflicht oder Wahlpflicht

**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**

**Examination**  
Prüfungszeiten

**Final exam of module**  
Am Ende der Vorlesungszeit
Klausur oder Mündliche Prüfung oder Hausarbeit oder Referat

**Form of instruction**  
Comment  
SWS  
Frequency  
Workload of compulsory attendance

| Lecture | 2 | SoSe oder WiSe | 28 |
| Seminar | 2 | SoSe oder WiSe | 28 |

**Präsenzzeit Modul insgesamt**  
56 h
## Computational Economics

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<td>Master's programme Social Sciences (Master) &gt; Wahlpflichtmodule anderer Institute und Departments</td>
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<td>Master's Programme Sustainability Economics and Management (Master) &gt; Additional Modules</td>
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<td>Böhringer, Christoph (Module responsibility)</td>
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<td>Riesenbeck, Lukas (Module counselling)</td>
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<td>Schürer, Laura (Module counselling)</td>
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<tr>
<td>Skills to be acquired in this module</td>
<td>Computer-based simulations play a key role for quantifying the economic impacts of policy reforms. Among numerical simulation methods, computable partial equilibrium (CPE) models are widely used in applied economic analysis. These models build on microeconomic theory for describing supply and demand behavior of economic agents on markets. Students will learn how to program such models and apply them to the impact assessment of trade, fiscal, or environmental policies.</td>
</tr>
<tr>
<td>Module contents</td>
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<tr>
<td></td>
<td>In the course, we start from basic microeconomic theory to describe the supply-side and demand-side responses on economic markets triggered by regulatory policy measures such as taxes or subsidies. We then translate simple theoretical models into computable partial equilibrium (CPE) models and use empirical data for model parametrization. Subsequently, the CPE models are used to quantify the economic efficiency impacts and the economic incidence of policy instruments such as taxes, subsidies, standards or quotas. For the implementation of the simulation models on the students' PC we will learn a powerful state-of-the-art modeling language called GAMS (Generic Algebraic Modeling System) which initially had been developed for World Bank economists. The fundamental strength of GAMS lies in the ease with which algebraic models in economics and management (or other sciences) can be formulated and solved. Students enrolled to the course will receive a free GAMS license. For the examination, the students will be requested to adapt a basic market model towards a policy issue of their choice and provide a small written essay (max. 10 pages) on their applied analysis. For this, the students can team up in groups with 2 people and hand in their essay until the end of the summer semester.</td>
</tr>
<tr>
<td>Literatureempfehlungen</td>
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<td>Pflicht o. Wahlpflicht / compulsory or optional</td>
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<td>Lectures and exercises</td>
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<td>Vorkenntnisse / Previous knowledge</td>
<td>Microeconomics</td>
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<td>Lecture</td>
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wir894 - Econometrics of Policy Evaluation

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**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Empirical Methods
- Master's programme Business Administration: Management and Law (Master) > Basismodule
- Master's Programme Sustainability Economics and Management (Master) > Basic and Accentuation Modules

**Zuständige Personen**
- Huse, Cristian (Module responsibility)
- Huse, Cristian (Module counselling)

**Prerequisites**

**Skills to be acquired in this module**

Be able to conceptually understand and apply key empirical methods used by any economist (and other professionals) in the evaluation of policies. Be able to perform and critically evaluate an empirical analysis.

**Module contents**

Econometric methods (Causality, Randomization, Regression discontinuity, Difference-in-differences, topics in Microeconometrics); applications.

**Literaturempfehlungen**


**Links**

**Language of instruction**

English

**Duration (semesters)**

1 Semester

**Module frequency**

**Module capacity**

60

**Modullevel / module level**

MM (Mastermodul / Master module)

**Modulart / typ of module**

Pflicht o. Wahlpflicht / compulsory or optional

**Lehr-/Lernform / Teaching/Learning method**

Lecture

**Vorkenntnisse / Previous knowledge**

**Examination**

Prüfungszeiten

Type of examination

Final exam of module

At the end of the lecture period

Portfolio

**Form of instruction**

Lecture

**SWS**

4

**Frequency**

SoSe oder WiSe

**Workload Präsenzzeit**

56 h
This course provides an introduction to spatial econometrics modelling that are particularly appropriate to analyse real-world phenomenons of spatial dependence among geographically proximate units. With successful completion of the course, students shall be able to identify spatial diffusion processes across various empirical settings and to have a thorough understanding in the application, estimation, and interpretation of the relevant spatial regression models.

Module contents

- The formal expression of spatial dependence.
- Modelling, estimation, and interpretation of spatial econometric models for cross-sectional, panel, and dynamic spatial panel data.
- Gain practical experience with the implementation of spatial econometric models using appropriate econometrics software packages.

Literatureempfehlungen


Links

Language of instruction: English
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited
Modulart / typ of module: MM (Mastermodul / Master module)

Vorkenntnisse / Previous knowledge

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Form of instruction | Comment | SWS | Frequency | Workload of compulsory attendance |
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Präsenzzeit Modul insgesamt: 56 h
Data Science
inf535 - Computational Intelligence I

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**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Data Science
- Master's Programme Business Informatics (Master) > Akzentsetzungsmodule der Informatik
- Master's Programme Computing Science (Master) > Angewandte Informatik
- Master's Programme Engineering of Socio-Technical Systems (Master) > Embedded Brain Computer Interaction
- Master's Programme Engineering of Socio-Technical Systems (Master) > Human-Computer Interaction
- Master's Programme Engineering of Socio-Technical Systems (Master) > Systems Engineering
- Master's Programme Environmental Modelling (Master) > Mastermodule

**Zuständige Personen**
- Kramer, Oliver (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

**Prerequisites**

**Skills to be acquired in this module**

**Professional competence:**
The students:
- recognise optimisation problems
- implement simple algorithms of heuristic optimisation
- critically discuss solutions and selection of methods
- deepen previous knowledge of analysis and linear algebra

**Methodological competence**
The students:
- deepen programming skills
- apply modelling skills
- learn about the relation between problem class and method selection

**Social competence**
The students:
- cooperatively implement content introduced in lecture
- evaluate own solutions and compare them with those of their peers

**Self-competence**
The students:
- evaluate own skills with reference to peers
- realize personal limitations
- adapt own problem solving approaches with reference to required method competences

**Module contents**
Computational Intelligence comprises intelligent and adaptive methods for optimisation and learning. The module "Computational Intelligence I" concentrates on methods for evolutionary optimisation and heuristic approaches. The exercises introduce and deepen practical aspects of the implementation and algorithmic design, also taking into account application aspects.

**Overview of Content:**
- foundations of optimisation
- genetic algorithms and evolution strategies
- parameter control and self-adaptation
- runtime analysis
- swarm algorithms
- constrained optimisation
- multi-objective optimisation
- meta-modeling

**Literature recommendations**


**Links**

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**Lehr- / Lernform  / Teaching / Learning method**

**Vorkenntnisse / Previous knowledge**

- Grundlagen der Statistik

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Präsenzzeit Modul insgesamt 56 h
## inf536 - Computational Intelligence II

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<td>Workload</td>
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<tr>
<td>Zuständige Personen</td>
<td>Kramer, Oliver (Module responsibility)  &lt;br&gt;Lehrenden, Die im Modul (Prüfungsberechtigt)</td>
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<tr>
<td>Skills to be acquired in this module</td>
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</table>

In the lecture "Convolutional Neural Networks" you will learn the basics of Convolutional Neural Networks, from methodological understanding to implementation.

**Professional competence**

The Students:

- will learn Deep Learning expertise, which are essential qualifications as AI experts and Data Scientists.

**Methodological competence**

The Students:

- learn the methods mentioned as well as the implementation in Python, Numpy and Keras.

**Social competence**

The Students:

- are encouraged to discuss the taught content in groups and work together to implement the programming tasks in the exercises.

**Self-competence**

The Students:

- are guided to conduct independent research on advanced methods as the teaching field changes dynamically.

### Module contents

Students learn the basics of machine learning and in particular the topics of dense layers, cross-entropy, backpropagation, SGD, momentum, Adam, batch normalization, regularization, convolution, pooling, ResNet, DenseNet, and convolutional SOMs.

### Literatureempfehlungen

- Deep Learning by Aaron C. Courville, Ian Goodfellow und Yoshua Bengio
**Links**

<table>
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**Module level / module level**

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**Lehr-/Lernform / Teaching/Learning method**

| V + Ü |

**Vorkenntnisse / Previous knowledge**

| nützliche Vorkenntniss: Lineare Algebra, Stochastik |

**Examination**

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<th>Type of examination</th>
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<td>written exam, e-exam</td>
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**Form of instruction**

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**Präsenzzeit Modul insgesamt**

| 56 h |

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inf604 - Business Intelligence I

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**Verwendbarkeit des Moduls**

- Master Applied Economics and Data Science (Master) > Data Science
- Master of Education Programme (Vocational and Business Education) Computing Science (Master of Education) > Akzentsetzungsbereich
- Master's Programme Business Informatics (Master) > Akzentsetzungsmodule Bereich Wirtschaftsinformatik
- Master's Programme Business Informatics (Master) > Akzentsetzungsmodule der Informatik
- Master's Programme Computing Science (Master) > Angewandte Informatik
- Master's Programme Engineering of Socio-Technical Systems (Master) > Embedded Brain Computer Interaction
- Master's Programme Engineering of Socio-Technical Systems (Master) > Human-Computer Interaction
- Master's Programme Engineering of Socio-Technical Systems (Master) > Systems Engineering

**Zuständige Personen**

- Marx Gómez, Jorge (Prüfungsberechtigt)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

**Prerequisites**

**Skills to be acquired in this module**

**Objective of the module/skills:**

Current module provides basics of business intelligence with focus on enterprises and strong emphasis on data warehousing technologies. Students of the course are provided with knowledge, which reflects current research and development in a data analytic domain.

**Professional competence**

The students:

- name and recognize the role of business intelligence as past of daily business process
- being able to analyse advantages and disadvantages of different approaches and methods of the data analytics and being able to apply them in simple case studies
- obtain theoretical knowledge about data collection and modelling processes, including most applicable approaches and best practices

**Methodological competence**

The students:

- being able to execute typical tasks of business intelligence, and also being able to deepen knowledge on different approaches and methods
- gain a hands on experience and being able to understand advantages and disadvantages of different methods and being able to use obtained knowledge in most efficient ways

**Social competence**

The students:

- build solutions based on case studies given to the group, for example solving the issue of a factless fact table
- discuss solutions on a technical level
- present obtained case studies solutions as part of the exercises

**Self-competence**

The students:

- critically review provided data and information

**Module contents**

Data warehouse technology together with business intelligence are increasingly being used by business in order to get better decision support and enrich ongoing processes with data-rich decisions. Data warehouse technology enables an integration of data from heterogeneous sources, whether business
intelligence builds data processing on top of it. For instance, business intelligence allows to build reporting on very large volumes of data (including historical) coming primarily from data warehouse.

As part of the current module following contents are taught:

- Definition and scope of business intelligence.
- Procedures and objectives of data warehousing.
- Process of extracting, transforming and loading (ETL) of data.
- Phases of data modelling, data capturing and reporting in conjunction with a plausible case studies/scenarios.
- Prospects for further and evolving topics for business intelligence (e.g. Adaptive Business Intelligence, In-Memory Computing, etc.)
- Introduction to Data Mining.
- Case studies based practical exercises and assessments in order to impart practical knowledge.

**Literature recommendations**


**Links**

- [http://www.wi-ol.de](http://www.wi-ol.de)
- Languages of instruction: German, English
- Duration (semesters): 1 Semester
- Module frequency: jährlich
- Module capacity: unlimited
- Modullevel / module level: AS (Akzentsetzung / Accentuation)
- Modulart / typ of module: Wahlpflicht / Elective

**Exam**

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**Präsenzzeit Modul insgesamt**

56 h
inf607 - Business Intelligence II

**Module label**  
Business Intelligence II

**Modulkürzel**  
inf607

**Credit points**  
6.0 KP

**Workload**  
180 h

**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Data Science
- Master’s Programme Business Informatics (Master) > Akzentsetzungsmodul Bereich Wirtschaftsinformatik
- Master’s Programme Business Informatics (Master) > Akzentsetzungsmodul der Informatik
- Master’s Programme Computing Science (Master) > Angewandte Informatik
- Master’s Programme Engineering of Socio-Technical Systems (Master) > Embedded Brain Computer Interaction
- Master’s Programme Engineering of Socio-Technical Systems (Master) > Human-Computer Interaction
- Master’s Programme Engineering of Socio-Technical Systems (Master) > Systems Engineering

**Zuständige Personen**
- Marx Gómez, Jorge (Prüfungsberechtigt)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

**Prerequisites**

**Skills to be acquired in this module**
Current module provides advanced business intelligence, data science with focus on enterprises and strong emphasis on big data and data analytics. Students of the course are provided with knowledge, which reflects current research and development in a data analytics domain.

**Professional competence**
The students:
- name and recognize the role of data analytics / data science as part of a daily business process in a particular company
- able to organize from management perspective data analysis project
- being able to analyse advantages and disadvantages of different approaches and methods and being able to apply them in simple case studies
- obtain theoretical knowledge about data collection and modelling processes, including state of the art approaches and available best practices

**Methodological competence**
The students:
- being able to execute typical tasks of data analysis, and also being able to proceed deeper with respect to different approaches and methods
- gain a hands on experience and being able to understand advantages and disadvantages of different methods and being able to use obtained knowledge

**Social competence**
The students:
- build solutions based on case studies given to the group, for example design of regression model based on provided dataset
- discuss solutions on a technical level
- present obtained case studies solutions as part of the exercises

**Self-competence**
The students:
- critically review provided offered information

**Module contents**
After current course students will get advanced knowledge in the domains such as business intelligence and data analytics. Besides that, students will have a chance to have a deeper look into related technical fields such as InMemory Computing, Data Mining and Machine Learning, Big Data Processing with Distributed Systems (e.g. Apache Hadoop / Spark) from both, research and
practical, perspectives. Students will be provided with real-world experience
gather from business intelligence and data science related projects. Materials
of the course are believed to be justified with current demands of data analytics
market. Thus, providing students with relevant knowledge in order to give them
advantages in future job.

**Literatureempfehlungen**

- Jürgen Cleve, Uwe Lämmel (2014): "Data mining" (Deutsch)
- Max Bramer (2013): "Principles of data mining" (English)
- Ian Witten, Eibe Frank, Mark Hall (2011): "Data mining : practical
machine learning tools and techniques" (English)
- Jure Leskovec, Anand Rajaraman, Jeffrey Ullman (2014): "Mining of
massive datasets" (English)

**Links**

http://www.wi-ol.de/

**Languages of instruction**

German, English

**Duration (semesters)**

1 Semester

**Module frequency**

jährlich

**Module capacity**

unlimited

**Modullevel / module level**

AS (Akzentsetzung / Accentuation)

**Modulart / typ of module**

je nach Studiengang Pflicht oder Wahlpflicht

**Lehr-/Lernform / Teaching/Learning method**

SE nach Ankündigung zu Beginn der Veranstaltung (2 SWS V + 2 SWS Ü oder
Blockseminar)

**Vorkenntnisse / Previous knowledge**

**Final exam of module**

At the end of the lecture period

Written exam (max. 120 min.)

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**Präsenzzeit Modul insgesamt**

56 h
inf980 - Introduction to Computer Science for Natural Science Students

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Verwendbarkeit des Moduls

- Bachelor's Programme Biology (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Biology (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Business Administration and Law (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Business Administration and Law (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Business Informatics (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Business Informatics (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Computing Science (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Computing Science (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Economics and Business Administration (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Economics and Business Administration (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Education (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Education (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Engineering Physics (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Engineering Physics (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Environmental Science (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Environmental Science (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Intercultural Education and Counselling (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Intercultural Education and Counselling (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Mathematics (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Mathematics (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Physics (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Physics (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Physics, Engineering and Medicine (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Physics, Engineering and Medicine (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Social Studies (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Social Studies (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Sustainability Economics (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Bachelor's Programme Sustainability Economics (Bachelor) > Säule "Überfachliche Professionalisierung"
- Bachelor's Programme Sustainability Economics (Bachelor) > Wahlpflichtbereich
- Dual-Subject Bachelor's Programme Art and Media (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme Art and Media (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme Biology (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme Biology (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme Chemistry (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme Chemistry (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme Computing Science (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme Computing Science (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme Dutch Linguistics and Literary Studies (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme Dutch Linguistics and Literary Studies (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme Economic Education (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme Economic Education (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme Economics and Business Administration (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme Economics and Business Administration (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme Elementary Mathematics (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme Elementary Mathematics (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme English Studies (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme English Studies (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme Gender Studies (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme Gender Studies (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme General Education (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme General Education (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme German Studies (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme German Studies (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme History (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme History (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-subject bachelor's programme Low German (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-subject bachelor's programme Low German (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme Material Culture: Textiles (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme Material Culture: Textiles (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme Mathematics (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
- Dual-Subject Bachelor's Programme Mathematics (Bachelor) > Säule "Überfachliche Professionalisierung"
- Dual-Subject Bachelor's Programme Music (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"
Fach-Bachelor Pädagogisches Handeln in der Migrationsgesellschaft (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"

Dual-Subject Bachelor's Programme Slavic Studies (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"

Dual-Subject Bachelor's Programme Social Studies (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"

Dual-Subject Bachelor's Programme Special Needs Education (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"

Dual-Subject Bachelor's Programme Sport Science (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"

Dual-Subject Bachelor's Programme Technology (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"

Fach-Bachelor Pädagogisches Handeln in der Migrationsgesellschaft (Bachelor) > PP "Medieninformatik für Studierende musisch-künstlerischer Fächer"

Fach-Bachelor Pädagogisches Handeln in der Migrationsgesellschaft (Bachelor) > Säule "Überfachliche Professionalisierung"

Master Applied Economics and Data Science (Master) > Data Science

Master's Programme Environmental Modelling (Master) > Mastermodule

Zuständige Personen
- Vogel-Sonnenschein, Ute (Module responsibility)
- Vogel-Sonnenschein, Ute (Prüfungsberechtigt)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

Prerequisites
Diese Modul wendet sich an Studierende in Studiengängen außerhalb der Informatik. Studierende des Departments für Informatik der Bachelor- und Master-Studiengänge Informatik und Wirtschaftsinformatik gehören nicht zur Zielgruppe.

Skills to be acquired in this module

Module contents
- Computer representation of information
- formal languages, grammar and automata
- basic data structures;
- problem solving paradigms, algorithms and complexity;
- programming in the small (Language: Python)
- basic concepts of data bases

Literaturempfehlungen
see literature lists in StudIP

Links
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inf040 - Introduction to Data Science

Module label
Introduction to Data Science

Modulkürzel
inf040

Credit points
6.0 KP

Workload
180 h

Verwendbarkeit des Moduls

- Bachelor's Programme Business Informatics (Bachelor) > Akzentsetzungsbereich Praktische Informatik und Angewandte Informatik
- Bachelor's Programme Computing Science (Bachelor) > Akzentsetzungsbereich - Wahlpflichtbereich
- Bachelor's Programme Sustainability Economics (Bachelor) > Wahlpflichtbereich
- Master Applied Economics and Data Science (Master) > Data Science
- Master of Education Programme (Gymnasium) Computing Science (Master of Education) > Abschlussmodul more...
- Master of Education Programme (Gymnasium) Computing Science (Master of Education) > Wahlpflichtmodule (Praktische Informatik)
- Master of Education Programme (Gymnasium) Computing Science (Master of Education) > Wahlpflichtmodule (Theoretische Informatik)
- Master of Education Programme (Hauptschule and Realschule) Computing Science (Master of Education) > Mastermodule
- Master of Education Programme (Vocational and Business Education) Computing Science (Master of Education) > Akzentsetzungsbereich
- Master's Programme Computing Science (Master) > Praktische Informatik

Zuständige Personen

- Wingerath, Wolfram (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

Prerequisites

Skills to be acquired in this module

The module teaches fundamentals from the field of Data Science, covering purposes, challenges, and common best practices.

Professional competences

The students

- have knowledge of basic concepts, problems and solution approaches from the field of Data Science.
- are able to justify the choice of specific data analysis methods for a given problem
- include possible imponderables in the analysis when evaluating analysis results

Methodological competences

The students

- are able to translate questions from a specific domain into a feasible analysis
- work on Data Science tasks to expand their understanding of the different approaches and methods.

Social competences

The students

- discuss approaches and problems encountered in smaller and larger groups

Self competences

The students

- reflect on their actions when identifying possible solutions and critically question their own results

Module contents

Data Science is an interdisciplinary science at the intersection of statistics,
This course is designed to provide a practical introduction to the field of Data Science by teaching theoretical principles while also applying them practically. Topics covered range from data collection and preparation (data sources & formats, data cleaning, data bias), mathematical foundations (statistical distributions, correlation analysis, significance) and methods for visualization (tables & plots, histograms, best practices) to the development of models for classifying or predicting values (linear regression, classification, clustering).

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At the end of the lecture period or by arrangement with the instructor.

Form of instruction | Comment | SWS | Frequency | Workload of compulsory attendance |
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### inf962 - Fundamental Competencies in Computing Science III: Algorithms and Computational Problem Solving

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</table>
  - Master Applied Economics and Data Science (Master) > Data Science  
  - Master's Programme Engineering of Socio-Technical Systems (Master) > Fundamentals/Foundations |
| Zuständige Personen |  
  - Vogel-Sonnenschein, Ute (Module responsibility)  
  - Lehrenden, Die im Modul (Prüfungsberechtigt) |

#### Prequisites

Skills to be acquired in this module:
The students acquire a thorough understanding of the fundamental methods of computer science in general and the use of algorithms for computational problem solving in particular. They learn how structure problems, model problems and solutions, and develop and implement computational solutions. Within the curriculum of the MSc EngSTS, this course provides students featuring a BSc in psychology or related subjects with fundamental skills in computational problem solving that are necessary for mastering subsequent courses in computer science.

**Professional competences:**
The students understand concepts for representing information computationally, they know pertinent data structures and algorithms and can argue about their complexity, and they are acquainted with formal concepts like automata and formal languages as a means of modeling.

**Methodological competences:**
The students are able to analyze problems from their application domain, to conceive computational solutions, and to estimate the effort involved in their realization and execution. They are able to evaluate alternative computational representations of data and problems and to draw informed conclusions for subsequent decisions in design and implementation.

**Social competences:**
The students:

**Self-competences:**
The students are able to critically reflect fundamental design decisions in algorithms and data structures.

#### Module contents

Computer representation of information; formal languages, grammar and automata; basic data structures; algorithms and complexity; programming in the small.

#### Literaturempfehlungen

#### Links

**Language of instruction**

**Duration (semesters)**
1 Semester

**Module frequency**

**Module capacity**
unlimited

**Reference text**

This course is part of the base curriculum of the MSc program "Engineering of Socio-Technical Systems". It provides students featuring a background in psychology with skills in computational problem solving as necessary for mastering subsequent courses in computer science. This course is not intended for students with a background in computer science.

**Modullevel / module level**

**Modulart / typ of module**

**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**

**Examination**

**Final exam of module**

At the end of the lecture period

**Type of examination**

Hands-on exercises and written exam or Hands-on exercises and oral exam
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Specialization
inf007 - Information Systems I

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Verwendbarkeit des Moduls
- Bachelor's Programme Business Informatics (Bachelor) > Aufbaucurriculum - Pflichtbereich
- Bachelor's Programme Computing Science (Bachelor) > Aufbaumodule
- Bachelor's Programme Economics and Business Administration (Bachelor) > Studienrichtung Wirtschaftsinformatik
- Dual-Subject Bachelor's Programme Computing Science (Bachelor) > Aufbaumodule (60 KP)
- Master Applied Economics and Data Science (Master) > Specialization
- Master of Education Programme (Vocational and Business Education) Computing Science (Master of Education) > Pflichtbereich

Zuständige Personen
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Wingerath, Wolfram (Module responsibility)

Prerequisites
Skills to be acquired in this module
- This module introduces the core concepts, languages and architectures of databases. In software systems these concepts are important.

Professional competence
The students:
- name the core concepts of the languages and architectures of databases (especially)
- select data models
- integrate structuring concepts of information systems in their designs

Methodological competence
The students:
- design database systems appropriately
- analyse problems from the field of database-supported information systems and solve them appropriately

Social competence
The students:
- enhance their ability to work in a team

Self-competence
The students:
- reflect their problem-solving behaviour with regard to the information processing concepts

Module contents
- Relational data models
- Relational algebra and its implementation in SQL (the standard of databases)
- Database design on different abstractions (conceptual and logical design)
- Normalisation - Data base architectures
- Distributed and active databases
- Object-oriented, object-related and XML-based database systems

Literaturempfehlungen
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**Information Systems II**

- **Module label**: Information Systems II
- **Modulkürzel**: inf008
- **Credit points**: 6.0 KP
- **Workload**: 180 h

**Verwendbarkeit des Moduls**
- Bachelor's Programme Business Informatics (Bachelor) > Aufbaucurriculum-Wahlbereich Praktische Informatik
- Bachelor's Programme Computing Science (Bachelor) > Akzentsetzungsbereich - Wahlbereich Informatik
- Bachelor's Programme Economics and Business Administration (Bachelor) > Studienrichtung Wirtschaftsinformatik
- Master Applied Economics and Data Science (Master) > Specialization
- Master of Education Programme (Gymnasium) Computing Science (Master of Education) > Wahlpflichtmodule (Praktische Informatik)
- Master's Programme Business Informatics (Master) > Akzentsetzungsmodule der Informatik

**Zuständige Personen**
- Grawunder, Marco (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

**Prerequisites**

**Skills to be acquired in this module**

**Professional competence**
The students:
- Know further concepts, languages and architectures of databases
- Analyse advanced information processing tasks
- Analyse complex requirements of information systems appropriately
- Realize information requirements and gather relevant information

**Methodological competence**
The students:
- Propose concrete processing principles for special application classes
- Reflect specific technologies' consequences and proceedings

**Social competence**
The students:

**Self-competence**
The students:
- Reflect their problem-solving behaviour with regard to extended information processing concepts

**Module contents**

- Implementation of databases (architecture, index structures, query processing and optimization)
- Data integration and data analysis (data integration, data warehouses, data mining)
- Information retrieval
- Parallel databases

**Literaturempfehlungen**

**Suggested reading:**
- Härder, T., Rahm, E.: Datenbanksysteme - Konzepte und Techniken der Implementierung, Morgan Kaufmann
Links

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**Präsenzzeit Modul insgesamt**

| Präsenzzeit Modul insgesamt | 56 h |
**inf109 - Information Systems III**

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**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Specialization
- Master's Programme Business Informatics (Master) > Akzentsetzungsmodule der Informatik
- Master's Programme Computing Science (Master) > Praktische Informatik

**Zuständige Personen**
- Grawunder, Marco (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

**Prerequisites**
- Information Systems I
- Information Systems II
- JAVA

**Skills to be acquired in this module**

**Professional competence**
The students:
- describe concepts, languages and architectures of database systems
- discuss state-of-the-art database research topics
- analyse information processing tasks and implement solutions appropriately

**Methodological competence**
The students:
- propose concrete processing requirements for special application classes
- assess the consequences of techniques and approaches
- perform supervised research in the field of information systems
- analyse and reflect complex information system requirements
- realize information demands and accordingly gather aim-oriented information

**Social Competencies**
The students:
- solve problems partially in small groups
- present solution proposals in front of the exercise group
- discuss their different solution proposals within the exercise group

**Self-competences**
The students:
- accept constructive criticism
- reflect on their proposed solution considering the taught methods

**Module contents**
This module is a continuation of the content of information systems I and of information systems II. It deepens and extends the contents of the preceding modules and focuses mainly on current research questions. A special focus lies on concept of distributed data management.

**Literaturempfehlungen**
- Özsu, M. Tamer; Valduriez, Patrick, Principles of distributed database systems
- Rahm/Saake/Sattler: Verteiltes und Paralleles Datenmanagement, Springer
- Paper from SIGMOD, VLDB or ICDE

**Links**

**Language of instruction**
German

**Duration (semesters)**
1 Semester

**Module frequency**
Winter semester

**Module capacity**
unlimited
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- Informationssysteme II  
- JAVA |

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Präsenzzeit Modul insgesamt 56 h
inf510 - Energy Information Systems

Module label: Energy Information Systems
Modulkürzel: inf510
Credit points: 6.0 KP
Workload: 180 h

Verwendbarkeit des Moduls:
- Master Applied Economics and Data Science (Master) > Specialization
- Master's Programme Business Informatics (Master) > Akzentsetzungsmodul der Informatik
- Master's Programme Computing Science (Master) > Angewandte Informatik
- Master's Programme Environmental Modelling (Master) > Mastermodule

Zuständige Personen:
- Lehnhoff, Sebastian (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

Prerequisites:
No participant requirements

Skills to be acquired in this module:
The students will learn different approaches to integrate distributed facilities, the regulatory framework, relevant standards and architecture concepts of energy management systems and will be able to apply this knowledge.

Professional competence:
The students:
- develop and evaluate IT-architectures for energy management systems
- model objects of this domain appropriately
- model energy information systems
- realise and differentiate advanced tasks of decentralised energy management systems

Methodological competence:
The students:
- identify problems of energy management, analyse these problems systematically and provide solutions
- apply different simulation approaches of decentralised plants and consumers

Social competence:
The students:
- discuss solutions for energy management systems in the group
- develop use cases in teams
- present self-developed solutions

Self-competence:
The students:
- reflect their actions with regard to structuring and decomposing systems
- reflect their own use of power as a limited resource

Module contents:
This module provides the computer science basics for energy management. It provides the requirements of energy supply information systems with the focus on technical components and the requirements of decentralised and renewable energy plants.

These are:
- Architectures for energy information systems, e.g. SOA, Seamless Integration Architecture (IEC TC 57), OPC-UA
- Norms and standards of energy industry data models (CIM, 61850)
- Systematisation of energy information system requirements based on ontologies
- Development, analysis and adaption of energy industry reference models and processes
- Methods and technologies to support energy industry processes
- Methods and algorithms to support decision processes of the decentralised energy plants control
- Smart Grid plant communication, particularly for load management
- Methods for modelling and simulation of power supply system dynamics
**Literaturempfehlungen**

- Crastan V.: "Elektrische Energieversorgung II", Springer 2004

**Links**

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wir842 - Banking

Module label | Banking
---|---
Modulkürzel | wir842
Credit points | 6.0 KP
Workload | 180 h

Verwendbarkeit des Moduls
- Master Applied Economics and Data Science (Master) > Specialization
- Master of Education Programme (Vocational and Business Education) Economics and Business Administration (Master of Education) > Mastermodule
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule AFT - BWL
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule RdW - BWL
- Master's Programme Business Informatics (Master) > Module der Wirtschafts- und Rechtswissenschaften (Master)

Zuständige Personen
- Prokop, Jörg (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

Prerequisites
Upon completion of the module students will be able to explain the role financial institutions play in financial markets based on economic theory. They will have a sound knowledge of institutional and regulatory conditions under which financial institutions operate today, and they will be able to critically assess respective developments in the financial sector. Moreover, they will have developed a sound understanding of how banks are managed in a competitive environment.

Module contents
We will discuss theoretical foundations of financial intermediation in general, and of banking in particular as well as the economic, institutional, and regulatory context in which financial institutions operate today. Moreover, we will cover selected topics in the area of bank management and bank accounting.

Literaturrempfehlungen
- Berger / Molyneux / Wilson (Eds.): The Oxford Handbook of Banking, latest edition, Oxford University Press
- Tolkmitt: Neue Bankbetriebslehre, latest edition, Gabler

Further readings may be announced during the course.

Links
http://www.uni-oldenburg.de/fiwi_bbl/

Languages of instruction
German, English

Duration (semesters)
1 Semester

Module frequency
jährlich

Module capacity
unlimited

Modulelevel / module level
MM (Mastermodul / Master module)

Modular / typ of module
Wahlpflicht / Elective

Lehr-/Lernform / Teaching/Learning method

Vorkenntnisse / Previous knowledge

Examination | Prüfungszeiten | Type of examination
---|---|---
Final exam of module | typically at the end of the semester; potential mid-term examination dates will be announced in the first session | 1 term paper (Hausarbeit) or 1 written exam (Klausur) or 1 oral exam (mündliche Prüfung) or 1 Portfolio

Form of instruction
Lecture

SWS
4

Frequency

Workload Präsenzzzeit
56 h
wir843 - Financial Risk Management

Module label: Financial Risk Management
Module label: wir843
Credit points: 6.0 KP
Workload: 180 h

Verwendbarkeit des Moduls
- Master Applied Economics and Data Science (Master) > Specialization
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule AFT - BWL
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule RdW - BWL

Zuständige Personen
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Prokop, Jörg (Module responsibility)

Prerequisites
Skills to be acquired in this module
- The aim of the course is to provide students with a thorough knowledge of how to identify, classify, measure, and manage different types of financial business risks. In particular, we will discuss the properties and potential applications of derivatives in financial risk management. Upon completion of this module, students
  - will have a sound understanding of the concept of risk management, and will be able to distinguish different types of financial risks and risk management approaches;
  - will be able to devise hedging strategies, arbitrage strategies, and speculative strategies using financial derivatives such as futures contracts, forward contracts, options, and swaps;
  - will be able to consistently apply valuation models to determine theoretical prices of financial derivatives.
  - will be able to assess limitations of financial derivatives in risk management.

Module contents
- The course provides insights into the theory and practice of modern financial business risk management, including:
  - the concept of risk, types of financial risks, and approaches to risk measurement;
  - the mechanics of financial markets, including derivatives markets;
  - the properties of selected financial instruments, including financial derivatives such as forwards, futures, options, and swaps;
  - tools and techniques for managing financial risks.

Literatureempfehlungen
- Highly recommended readings:
  - Optional readings:

Further readings may be announced during the course.

Links
Language of instruction: English
Duration (semesters): 1 Semester
Module frequency: halbjährlich
Module capacity: unlimited
Modulart / typ of module: MM (Mastermodul / Master module)
Lehr-/Lernform / Teaching/Learning method: 2 VL oder 1 VL und 1 Ü
Vorkenntnisse / Previous knowledge
Examination: Prüfungszeiten
Type of examination
Final exam of module: typically at the end of the semester; potential midterm examination dates will be announced in the first session
1 term paper (Hausarbeit) or 1 written exam (Klausur) or 1 oral exam (mündliche Prüfung) or 1 Portfolio
Form of instruction: Lecture (ggf. mit Übung)
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Module label: Digital Transformation: Strategies and Sustainability  

Module code: wir886  

Credit points: 6.0 KP  

Workload: 180 h  
4 SWS (56h)  

Verwendbarkeit des Moduls:  
- Master Applied Economics and Data Science (Master) > Specialization  
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule NM-BWL  
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule RdW - BWL  
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule UF - BWL  
- Master's Programme Sustainability Economics and Management (Master) > Additional Modules  

Zuständige Personen:  
- Lehrenden, Die im Modul (Prüfungsberechtigt)  
- Hoppmann, Jörn (Module responsibility)  

Prerequisites:  
- The students should:  
  • know basic definitions, trends and application areas of digitalization  
  • be able to assess the economic effects of digitalization  
  • understand corporate strategies and business models in the context of digital transformation  
  • know how companies should design processes and structures to promote digitalization in organizations  
  • have an overview of social, legal and ethical aspects of digitalization  
  • assess the environmental impact of digitalization  
  • evaluate digital products, services and business models using ethical and sustainable guidelines  
  • independently develop proposals for the integration of ethical, social and ecological criteria in digitalization projects and processes  

Module contents:  
The module "Digital Strategy and Sustainability" provides insights into the role digitalization plays in companies and the associated social discourse. The digital transformation leads to the emergence of new business models, markets and forms of interaction. This requires comprehensive changes in strategic orientation as well as in business processes and structures. In addition, new regulations and standards are required at the societal level to meet the ethical, ecological, and societal challenges posed by digitalization. 
In the first part of the seminar, students are familiarized with the basics and application areas of digitalization as well as the economic, social, and ecological implications. Toward this end, important questions in the context of digital transformation will be raised and discussed drawing on company case studies. Exemplary questions that will be dealt with in this context are:  
- What are the technological drivers of digitalization and what trends can be observed?  
- What is the impact of digital transformation on industries and companies?  
- How can companies design strategies, business models, processes and structures to address the digital transformation?  
- What are the consequences of digitalization on a societal and legal level?  
- How does the digital transformation affect the natural environment?  
- How can social, ethical, and ecological aspects be integrated into digital products, services and business models?  
In the second part of the course, students will develop digital business models in teams under the guidance of experienced coaches, taking into account economic, ecological and social/ethical criteria. The results are presented to the other students and company representatives and will be summarized in a term paper. An important part of the term paper is the critical reflection of current methods used to develop digital business models with regard to sustainability criteria.  

Literaturempfehlungen:  

Links:  

Language of instruction: English
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<td>Das Modul sollte im 2. Semester besucht werden.</td>
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<td>2 Veranstaltungen aus Vorlesung, Seminar und Übung</td>
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<th>Prüfungszeiten</th>
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wir896 - Operations Management

Module label: Operations Management

Modulkürzel: wir896

Credit points: 6.0 KP

Workload: 180 h

Verwendbarkeit des Moduls
- Master Applied Economics and Data Science (Master) > Specialization
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule RdW - BWL
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule UF - BWL
- Master's Programme Business Informatics (Master) > Module der Wirtschafts- und Rechtswissenschaften (Master)

Zuständige Personen
- Busse, Christian (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

Prerequisites
Skills to be acquired in this module

Module contents
Die Vorlesung behandelt voraussichtlich folgende Themen: Nachfrageprognose, Prozessmanagement, Produktionsplanung, Ablaufplanung, Revenue Management, Behavioral Operations Management

Literaturempfehlungen

Links
https://www.uni-oldenburg.de/produktion

Language of instruction: English

Duration (semesters): 1 Semester

Module frequency: jährlich

Module capacity: unlimited

Modullevel / module level: MM (Mastermodul / Master module)

Modultyp / typ of module: Wahlpflicht / Elective

Lehr-/Lernform / Teaching/Learning method

Vorkenntnisse / Previous knowledge

Examination Prüfungszeiten Type of examination

Final exam of module Am Ende des Semesters Portfolio

Form of instruction Comment SWS Frequency Workload of compulsory attendance

Lecture 2 SoSe oder WiSe 28
Seminar 2 SoSe oder WiSe 28

Präsenzzeit Modul insgesamt: 56 h
wir898 - Strategic Sustainability Management

Module label: Strategic Sustainability Management
Modulkürzel: wir898
Credit points: 6.0 KP
Workload: 180 h

Verwendbarkeit des Moduls:
- Master Applied Economics and Data Science (Master) > Specialization
- Master's programme Business Administration: Management and Law (Master) > Kernmodule CHI
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule NM-BWL
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule RdW - BWL
- Master's Programme Business Informatics (Master) > Module der Wirtschafts- und Rechtswissenschaften (Master)
- Master's Programme Sustainability Economics and Management (Master) > Akzentmodule

Zuständige Personen:
- Hoppmann, Jörn (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Hoppmann, Jörn (Module counselling)

Prerequisites:
- The students should...
  - know and understand basic concepts, instruments and theories in the context of corporate sustainability and corporate social responsibility
  - be able to apply conceptual frameworks to analyze and critically question the sustainability of companies
  - develop options to improve the sustainability of companies and derive recommendations for their implementation in practice

Module contents:
The module "Strategic Sustainability Management" provides an overview of the debates on the role of firms for sustainable development from a strategic perspective. The first session will briefly introduce the historical debate on Corporate Sustainability and Corporate Social Responsibility and delineate important concepts. The following sessions will use concrete company case studies as a basis for a critical discussion of questions in the context of corporate sustainability that are of strategic importance for firms. Questions that will be discussed are, amongst others:

  - How can one determine whether a firm acts in a socially and ecologically sustainable way?
  - Which factors drive and hinder the diffusion of socially and ecologically superior solutions and companies in the market?
  - To which extent is there a conflict between firm and market growth on the one hand and sustainability on the other hand?
  - Which possibilities does a company have to deal with conflicts between social/ecological and economic goals?
  - How can existing firms and value chains be transformed toward sustainability?
  - What is the role of managers and boards of directors for organizational change toward sustainability?
  - How does the ownership and financial structure of firms influence their strategy toward sustainability?
  - In how far can cooperation and partnerships between organizations help integrate social and ecological aspects in 53 firms?

In addition to discussing these questions by drawing on company case studies, students will be introduced to the corresponding theoretical concepts and frameworks in the academic literature. Also, students will be given the opportunity to test different strategies for implementing sustainability in organizations during a simulation, which allows them to gain first-hand insights into the emerging challenges. Toward the end of the course, students will apply and deepen the knowledge they have gathered over the semester by writing a seminar thesis.

Literaturempfehlungen

Links
Languages of instruction: German, English
Duration (semesters): 1 Semester

64 / 72
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<table>
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<td>Pflicht o. Wahlpflicht / compulsory or optional</td>
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### Lehr-Lernform / Teaching/Learning method

#### Vorkenntnisse / Previous knowledge

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### Final exam of module

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### Präsenzzzeit Modul insgesamt

56 h
wir899 - Supply Chain Management

Module label | Supply Chain Management
Modulkürzel | wir899
Credit points | 6.0 KP
Workload | 180 h

Verwendbarkeit des Moduls
- Master Applied Economics and Data Science (Master) > Specialization
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule RdW - BWL
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule UF - BWL
- Master's Programme Business Informatics (Master) > Module der Wirtschafts- und Rechtswissenschaften (Master)

Zuständige Personen
- Busse, Christian (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

Prerequisites
In der zum Modul gehörigen Vorlesung werden vor allem formalanalytische Modelle erarbeitet, mit denen Probleme in Wertschöpfungsketten beschrieben und im Rahmen der Modellan nahmen optimiert werden können. Hiermit sollen die Studierenden eine Kompetenz zur unternehmensübergreifenden Analyse der gesamten Wertschöpfungskette (Supply Chain) erwerben, mit Hilfe derer sie diese nicht nur verstehen, sondern idealerweise auch verbessern können. Im begleitenden Seminar werden mithilfe von in Gruppen verfassten Hausarbeiten aktuelle Fragestellungen und Diskussionen im Supply Chain Management aufgearbeitet und bewertet. Das Seminar baut ergänzend zur Vorlesung auf konzeptioneller und empirischer Forschung auf. Hiermit lernen die Studierenden wissenschaftliche Diskurse zu praktisch relevanten und nur schwer modellierbaren Herausforderungen des Supply Chain Managements kennen. Ferner werden die Fähigkeiten zum wissenschaftlichen Arbeiten, zur Teamarbeit und zum Präsentieren vor großen Gruppen trainiert.

Module contents
Die Vorlesung behandelt voraussichtlich folgende Themen: Grundlagen der Supply Chain, Strategischer Fit, Netzwerk- und Standortplanung, Bestandsmanagement, Produkt- und Prozessdesign, Supply-Chain-Koordination, Vertragsdesign, Transport in der Supply Chain, Nachhaltiges Supply Chain Management

Literaturempfehlungen

Links
https://www.uni-oldenburg.de/produktion

Language of instruction | English
Duration (semesters) | 1 Semester
Module frequency | jährlich
Module capacity | unlimited
Modulelevel / module level | MM (Mastermodul / Master module)
Modulart / typ of module | Wahlpflicht / Elective

Vorkenntnisse / Previous knowledge

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Form of instruction | Comment | SWS | Frequency | Workload of compulsory attendance
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<th>Frequency</th>
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<td>Seminar</td>
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**wir921 - Sustainable Supply Chain Management**

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**Verwendbarkeit des Moduls**
- Master Applied Economics and Data Science (Master) > Specialization
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule NM-BWL
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule RdW - BWL
- Master's Programme Sustainability Economics and Management (Master) > Akzentmodule

**Zuständige Personen**
- Busse, Christian (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)
- Busse, Christian (Module counselling)

**Prerequisites**
By focusing on sustainability from an intra- and inter-organizational perspective, this module aims to equip students with an in-depth knowledge of the sustainability-related challenges and problems within supply chain management and suggests some tools for managing the same. It further seeks to capacitate students to understand and analyze the trade-offs and conflicts of targets within sustainable supply chain management. The content is closely linked to the latest research in the field, providing a theoretical understanding (within the lecture) while using real-world case examples (within the seminar) to develop a practical understanding simultaneously. Students will be able to connect theory with practice and get a taste of real-life corporate scenarios or lay a foundation for possible master theses. Further, working in groups will help students brush up their team management skills, and the final report shall accustom them to the intricacies of scientific writing.

**Module contents**
This masters-level module focuses on how firms could practically manage sustainability in its supply chains. Two broader perspectives, as detailed below, guide the coursework:

1) The material flow perspective approaches SSCM with sustainably managing physical flows and processes within a firm's operations and upstream (and downstream) supply chain links. Individual (lecture) sessions are built around the following topics: Introduction to Sustainability and Supply Chain Management; Introduction to Sustainable Supply Chain Management; Sustainable Product Development & Lean and Green; Workplace Health and Safety; Sustainable Transportation; Sustainable Warehousing & Sustainable Packaging; and Closed-Loop Supply Chain Management

2) The relationship perspective further adopts a more direct managerial viewpoint on inter-firm relations. Individual (lecture) sessions discuss the following topics: Stakeholder Management; Legitimacy, Decoupling & Greenwashing; Supply Chain Sustainability Risks; Sustainable Supplier Management; and Supply Chain Sustainability Dilemmas

Some of the theoretical perspectives discussed within the lecture sessions will be prepared by case studies of well-known companies such as Walmart, DHL, HP, Volkswagen, Lidl, and Apple.

**Literaturempfehlungen**
The lecture content has been developed from various research publications, rather than a textbook. Students are encouraged to read some of the original publications as amendments to the lecture. The case studies will mostly be based on professionally written cases. Scholarly publications/articles, as well as the case study documents, will be provided and discussed throughout the sessions.

**Links**

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<th>English</th>
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**Reference text**
This module is offered in the summer term. For a more detailed description of course content and organization, please note the syllabus that will be made.
available via Stud.IP before the beginning of the course.

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<td>Wahlpflicht / Elective</td>
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<td>Lehr-/Lernform / Teaching/Learning method</td>
<td>Lectures and seminar sessions will be completely intertwined</td>
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<td>There are no formal or informal prerequisites. Basic knowledge of business and management, corporate sustainability, and supply chain and operations management is advantageous. Familiarity with management theories and research methods will also help students.</td>
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wir806 - Information Technology Law

### Module label
Information Technology Law

### Modulkürzel
wir806

### Credit points
6.0 KP

### Workload
180 h

### Verwendbarkeit des Moduls
- Bachelor's Programme Business Informatics (Bachelor) > Wahlbereich Informatik, Kultur und Gesellschaft
- Bachelor's Programme Computing Science (Bachelor) > Wahlbereich Informatik, Kultur und Gesellschaft
- Master Applied Economics and Data Science (Master) > Specialization
- Master of Education Programme (Gymnasium) Computing Science (Master of Education) > Pflichtmodule
- Master of Education Programme (Hauptschule and Realschule) Computing Science (Master of Education) > Mastermodule more...
- Master of Education Programme (Vocational and Business Education) Computing Science (Master of Education) > Recht und Gesellschaft
- Master's programme Business Administration: Management and Law (Master) > Basismodule
- Master's programme Business Administration: Management and Law (Master) > Schwerpunktmodule RdW - Recht
- Master's Programme Business Informatics (Master) > Module der Wirtschafts- und Rechtswissenschaften (Master)
- Master's Programme Computing Science (Master) > Module aus anderen Studiengängen

### Zuständige Personen
- Rott, Peter (Module responsibility)
- Lehrenden, Die im Modul (Prüfungsberechtigt)

### Prerequisites
Skills to be acquired in this module
- Upon completion of the module, students will be able to:
  - deal with all legal questions arising from the use of information and communication technology in all sectors of society,
  - identify legal issues arising from the use of information and communication technology,
  - draft solutions for these legal questions.

### Module contents
- Internet law; IT contracts law

### Literaturempfehlungen
- Köhler, Fetzer, Recht des Internet, 8. Aufl., 2016
- Redeker, IT-Recht, 6. Aufl., 2017

### Links

### Language of instruction
German

### Duration (semesters)
1 Semester

### Module frequency
jährlich

### Module capacity
unlimited

### Modullevel / module level
je nach Studiengang Pflicht oder Wahlpflicht

### Lehr-/Lernform / Teaching/Learning method

### Vorkenntnisse / Previous knowledge

### Examination
Prüfungszeiten
Type of examination
- Final exam of module during term presentation and handout, written exam or oral exam

### Form of instruction
- Lecture 2 28
- Seminar 2 28

### Präsenzzeit Modul insgesamt
56 h
# Masterabschlussmodul

**mam - Master´s Degree Module**

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## Verwendbarkeit des Moduls
- Master Applied Economics and Data Science (Master) > Masterabschlussmodul

### Zuständige Personen

### Prerequisites

### Skills to be acquired in this module

### Module contents

### Literaturempfehlungen

### Links

### Languages of Instruction
- German, English

### Duration (semesters)
- 1 Semester

### Module frequency
- unlimited

### Modullevel / module level
- Abschlussmodul (Abschlussmodul / Conclude)

### Modulart / typ of module
- Pflicht / Mandatory

### Lehr-/Lernform / Teaching/Learning method

### Vorkenntnisse / Previous knowledge

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### Form of instruction

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### Frequency
- SoSe oder WiSe

### Workload Präsenzzzeit
- 28 h