JOHANNES GUTENBERG UNIVERSITÄT MAINZ

# MODULE GUIDE

# MASTER OF SCIENCE IN QUANTITATIVE DECISION MAKING IN ECONOMICS AND MANAGEMENT

Last edited: November 2023

## *Content*

# STUDY PROGRAM

**The study program is divided into the following areas:**

1. Core Modules

2. Elective Modules - Specialization

3. Elective Modules - Free Part

4. Research Module

5. Research Colloquium

**The following must be completed**

- Six core modules totalling 36 credit points,

- at least five specialization modules totalling 30 credit points (max. 7 modules - 42 credit points)

- one research module with a total volume of 12 credit points,

- a research colloquium with a total volume of 5 credit points and

- a Master's thesis with a total volume of 25 credit points.

Modules with a total maximum of 12 credit points can be taken from the free part (min. 0 credit points).

The tutorial module can only be completed once.

If examination is to be done in a module during the lecture period (e.g. assignments, papers, presentations), the registration for the examination takes place during the course registration (=implicit exam registration).

# 1. CORE MODULES (36 ECTS)

All core modules must be completed.

## Mathematics/Statistics

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.B98.6010 | 180 h | 1 Semester | 1. Semester | 6 ECTS |

| | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| 1. | Mathematics/Statistics | | | |
| | a) Lecture (03.B98.6010, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.B98.6015, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

This course provides a formal foundation in math, statistics, and probability theory used in the program "Quantitative Decision Making in Economics and Management." Students should be familiar with the formal approaches and should be able to transfer the methods and findings to economic problems. The course enables students to understand the derivations of methods and findings in later courses. After passing this module, students should be able to apply the formal methods.

**4. Content**

The following topics are taught in an application-oriented way.

- Functions for the description of economic phenomena and their optimization.
- An introduction to linear algebra (notation and operations) used for the representation of data and systems of linear equations.
- A discussion of the probability theory (random variables, expectations, convergence) as foundation for statistical inference.
- Methods for the estimation of unknown parameters (OLS, MLE, Bayes) and their statistical properties.

**Applicability of the Module**

As a compulsory module in M. Sc. in Quantitative Decision Making in Economics and Management.

**5. Recommended Participation Requirements**

None.

**6. Prerequisites**

None.

**7. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

None.

**8.3. Module exam**

Exam (60 min).

**8. Value in the Final Score**

6/120 Credit Points.

**9. Periodicity**

Every Winter Semester.

**10. Module Representative and full-time Lecturers**

Prof. Dr. Klaus Wälde, Dr. Constantin Weiser.

**11. Further Information**

Language: English.

Literature: References will be provided by the course outlines that can be downloaded from JOGU-StINe.

# Programming

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.B98.6020 | 180 h | 1 Semester | 1. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Programming | | | |
| | a) Lecture (03.B98.6020, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.B98.6025, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

After passing this module, students should be able to …

- know basic structures in a programming language (loops, recursion, if-statements, variables & data types, …)
- read and formulate algorithms and do simples analyzes (complexity, runtime)
- write simple computer programs in Python
- apply basic rules of software quality control (clean coding, testing, documentation)
- delimit programming paradigms (functional prog., object-oriented prog.)
- implement libraries for special purpose (data analysis, visualization, machine learning, etc.)
- run the development cycle for a concrete (small size) programming project
- work in groups on medium size projects (version control system; methods & tools for cooperative work)

**4. Content**

1. Algorithms
   - 1.1. Structure
   - 1.2. Development
   - 1.3. Analyzes
2. Introduction to Python
3. Software development process
4. Case-Study 1: clean coding
   - 4.1. Version control system (git)
   - 4.2. Basic rules for clean coding
   - 4.3. Documentation
   - 4.4. Testing and Software quality control
5. Case-Study 2: complex project
   - 5.1. modules and libraries
   - 5.2. graphical user interface
   - 5.3. web-programming
   - 5.4. database connections
   - 5.5. basic data analysis & visualization

**5. Applicability of the Module**

As a compulsory module in M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

None.

**8.3. Module exam**

Term paper.

**9. Value in the Final Score**

6/120 Credit Points.

| | |
|---|---|
| 10. | **Periodicity** |
| | Every Winter Semester. |
| 11. | **Module Representative and full-time Lecturers** |
| | Dr. Constantin Weiser. |
| 12. | **Further Information** |
| | Language: English.<br>Literature: Literature: References will be provided by the course outlines that can be downloaded from JOGU-StINe. |

# Econometrics of Cross Section and Panel Data

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.B98.6030 | 180 h | 1 Semester | 1. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Econometrics of Cross Section and Panel Data | | | |
| | a) Lecture (03.B98.6030, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.B98.6035, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

After the course, students should be able to use a standard econometrical software package (like Stata) for data cleaning and to perform regression and postestimation analysis. Students should have an understanding of the principles of econometrics, of linear regression analysis, of specification issues, of panel data methods, of the concept of causality, of the potential causes of endogeneity and of some ways to remedy it. Students should be able to perform a Monte Carlo analysis to investigate the properties of estimators in certain contexts.

**4. Content**

The course will equip the students with a methodological toolbox for conducting basic empirical analysis. We will follow a two-pillar concept by combining methodological lectures with empirical examples and programming implementations in the computer lab using Stata. We will begin by reviewing some basic principles of econometrics and move on to the linear regression methodology and then to panel data methods. The course also covers specification issues, econometric solutions for endogeneity in the explanatory variable as well as an introduction to the treatment effect framework.

**5. Applicability of the Module**

As a compulsory module in M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

Problem sets.

**8.3. Module exam**

Exam (60 min).

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Winter Semester.

**11. Module Representative and full-time Lecturers**

Prof. Dr. Thorsten Schank

**12. Further Information**

Language: English.

Literature: Angrist & Pischke (2008) Mostly Harmless Econometrics. Wooldridge (2013) Introductory Econometrics. Wooldridge (2010) Econometrics of Cross Section and Panel Data.

# Management Science/Operations Research

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.996.3110 | 180 h | 1 Semester | 1. Semester | 6 ECTS |

| | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| 1. | Management Science/Operations Research (03.996.3110) | | | |
| | a) Lecture (compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

2. **Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

3. **Qualification Goals/Learning Outcomes/Competencies**

The course provides advanced knowledge in logistics planning. The aim is to impart the ability to grasp and model practical problems of logistics planning, to model them and to independently develop solutions using scientific models and methods or to accompany such processes in an advisory capacity.

4. **Content**

Central topics in the field of logistics planning are covered. The course is designed as a basic course and provides the fundamental models and methods as they are needed in more advanced courses of logistics management. Many important economic and technical decision problems are so complex that they cannot be solved e.g. analytically by evaluating a formula. The course teaches models and methods for decision support from the field of optimization, which serve for a better description, analysis, planning, and control of corresponding processes. Areas of application are production and logistics, but also quality assurance, marketing, investment and financial planning, project planning, telecommunication, health care, banks and insurance companies, in technical applications and in the natural and social sciences.

5. **Applicability of the Module**

As a compulsory module in M. Sc. in Quantitative Decision Making in Economics and Management.
As an elective module in M. Sc. in Management.
As an elective module in M. Sc. in Accounting and Finance.
As an elective module in M. Sc. in International Economics and Public Policy.
As an elective module in M. Sc. in M. Sc. und M. Ed. Wirtschaftspädagogik.
As an elective module in M. Sc. in Wirtschaftswissenschaftliche Informatik.

6. **Recommended Participation Requirements**

None.

7. **Prerequisites**

None.

8. **Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**
None.
**8.3. Module exam**
Exam (60 min).

9. **Value in the Final Score**

6/120 Credit Points.

10. **Periodicity**

Every Winter Semester.

11. **Module Representative and full-time Lecturers**

Prof. Dr. Stefan Irnich.

12. **Further Information**

Language: English.
Literature: (parts are provided via Moodle).

# Economic Decision Making and Strategic Interaction

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03. B98.6040 | 180 h | 1 Semester | 1. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Economic Decision Making and Strategic Interaction | | | |
| | a) Lecture (03.B98.6040, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.B98.6045, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

After the course, students should:
- have a good understanding of different models of asymmetric information, in particular in terms of models of "adverse selection, signaling, screening", "moral hazard" and "mechanism design" and their applications
- have reviewed key concepts of game theory (in the area of static games with complete information) and have a good understanding of several new concepts in game theory (e.g. games with imperfect information)
- be able to apply the relevant models to concrete scenarios and cases (applications in the areas of industrial organization, information economics, labor economics, economics of education, public economics and behavioral economics)

**4. Content**

The course will provide an introduction into the important microeconomic topics of asymmetric information, in particular "adverse selection, signaling and screening", "moral hazard" and "incentives and mechanism design" and teach/review the necessary tools in game theory. Applications in the areas of industrial organization, information economics, labor economics, economics of education, public economics and behavioral economics are discussed.

**5. Applicability of the Module**

As a compulsory module in M. Sc. in Quantitative Decision Making in Economics and Management.
As an elective module in M. Sc. in International Economics and Public Policy.
As an elective module in M. Sc. in Management.
As an elective module in M. Sc. in Accounting and Finance.

**6. Recommended Participation Requirements**

Microeconomics and game theory at the bachelor level.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

None.

**8.3. Module exam**

Exam (60 min).

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Winter Semester.

**11. Module Representative and full-time Lecturers**

Dr. Stefanie Brilon

**12. Further Information**

Language: English.
Literature: Mas-Colell, Whinston, Green "Microeconomic Theory", chapters 7/8/9 on game theory, chapter 13 on adverse selection, chapter 14.A and 14.B on moral hazard, chapter 23 on mechanism design.
Lecture slides and further information will be made available at the beginning of the course.

# Academic Skills

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.B98.6060 | 180 h | 1 Semester | 2. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Academic Skills | | | |
| | a) Small group: Foundations of Scientific Working (03.B98.6060, compulsory) | 2 SWS/21 h | 69 | 3 ECTS |
| | b) Small group: Individual Skills (03.B98.6065, compulsory) | 2 SWS/21 h | 69 | 3 ECTS |

**Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**Qualification Goals/Learning Outcomes/Competencies**

a) Foundations of Scientific Working: students learn how to work in a scientific way. They acquire skills to pose an interesting research question, to systematically search for the relevant existing literature on a research topic, to utilize this literature in the correct way, students learn the steps of carrying out an empirical project in a structured way, to write a scientific paper, to prepare a presentation and to present the results in front of an audience.
b) Individual Skills: students acquire personal skills which will help them to organize their studies and which will also be very valuable in their later profession. Students will enhance their personal skills to contribute effectively to the progress within a group.

**Content**

a) Foundations of Scientific Working: searching and accessing literature, reference management, citation styles, structure of a scientific paper, scientific writing styles, conventions of form and style of a scientific paper (regression tables etc.), presentation of a scientific paper, tools for carrying out an empirical project like the organization of data, version control, pre-analysis plans, organizing a repository.
b) Individual Skills: active participation in the offered course which covers topics like: (intercultural) conflict management, project management, rhetorical skills, time and self-management for students, voice training

**Applicability of the Module**

As a compulsory module in M. Sc. in Quantitative Decision Making in Economics and Management.

**Recommended Participation Requirements**

None.

**Prerequisites**

None.

**Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

None.

**8.3. Module exam**

Portfolio (Evaluation: passed/failed).
The module examination (portfolio) consists of performances from both courses of the module. To successfully participate in the module examination, students need to register for both courses of the module.

**Value in the Final Score**

6/120 Credit Points.

**Periodicity**

Every Summer Semester.

**Module Representative and full-time Lecturers**

Prof. Dr. Florian Hett, Prof. Dr. Thorsten Schank, Prof. Dr. Reyn van Ewijk.

| | **Further Information** |
|---|---|
| | Language: English.<br>Literature:<br>- Bailey, Stephen (2020): Academic Writing for International Students of Business and Economics. 3rd edition. London, New York: Routledge Taylor & Francis Group.<br>- Boland, Angela et al. (2017): Doing a Systematic Review. A Student's Guide. 2nd Edition. Los Angeles: SAGE Publications.<br>- Chaubey, Varanya (2017): The Little Book of Research Writing.<br>- Pianos, Tamara et al. (2014): Erfolgreich recherchieren - Wirtschaftswissenschaften. Berlin, Boston: Walter de Gruyter. https://doi.org/10.1515/9783110301007 |

# 2. SPECIALIZATION (AT LEAST 30 ECTS)

At least 5 specialization modules totalling 30 credit points must be completed.

## 2.1. Econometrics

### Microeconometrics A: Causal inference & advanced techniques

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.B98.6110 | 180 h | 1 Semester | 2. Semester | 6 ECTS |

| | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| 1. | Microeconometrics A: Causal inference & advanced techniques | | | |
| | a) Lecture (03.B98.6110, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.B98.6115, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

After the course, students should:

- understand how econometricians try to investigate causal relations by use of natural experiments
- have a thorough understanding of a set of advanced methods and techniques that are regularly applied by econometricians, including instrumental variables, regression discontinuities and several others
- be able to apply these techniques on actual data using the program Stata
- be able to understand, and critically analyze scientific papers using these econometric analysis techniques

**4. Content**

Students will advance their knowledge of how econometricians deal with the causality issue (i.e. estimating causal relations when true experiments are not possible). You will learn in detail about several important methods from the "econometric toolkit" and apply these yourself using the program Stata. You will furthermore learn how these methods are used in practice by reading, and critically discussing, scientific articles.

**5. Applicability of the Module**

As an elective module in the specialization area in M. Sc. in Quantitative Decision Making in Economics and Management.
As an elective module in M. Sc. in International Economics and Public Policy.

**6. Recommended Participation Requirements**

Advanced Econometrics or equivalent.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

None.

**8.3. Module exam**

Exam (60 min) or term-paper (50%) with presentation (50%).

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Usually every Summer Semester.

**11. Module Representative and full-time Lecturers**

Prof. Dr. Reyn van Ewijk.

| 12. | **Further Information** |
|---|---|
| | Language: English.<br>Literature: References will be provided via JOGU-StINe. |

# Microeconometrics B: Limited dependent variables and sample selection

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.B98.6120 | 180 h | 1 Semester | 2. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Microeconometrics B: Limited dependent variables and sample selection | | | |
| | a) Lecture (03.B98.6120, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.B98.6125, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

Many economic variables which we try to explain are limited in some way or whether they are observed depends on the outcome on another variable. Students learn the appropriateness of OLS in such contexts and also get familiar with alternative (non-linear) models which address the shortcomings of OLS. Students learn the assumptions of these models and how to interpret the obtained estimates. Students learn how to use Stata to apply theses non-linear models.

**4. Content**

Binary outcome models, corner solution models, censored and truncated regression models, count data models, sample selection corrections, multinominal response models, implementation in Stata.

**5. Applicability of the Module**

As an elective module in the specialization area in M. Sc. in Quantitative Decision Making in Economics and Management.
As an elective module in M. Sc. in International Economics and Public Policy.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

None.

**8.3. Module exam**

Exam (60 min).

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Summer Semester.

**11. Module Representative and full-time Lecturers**

Prof. Dr. Thorsten Schank

**12. Further Information**

Language: English.
Literature: Wooldridge (2013) Introductory Econometrics. Wooldridge (2010) Econometrics of Cross Section and Panel Data.

# Advanced Time Series Analysis

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.B98.6210 | 180 h | 1 Semester | 2. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Advanced Time Series Analysis | | | |
| | a) Lecture (03.B98.6210, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.B98.6215, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

2. **Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

3. **Qualification Goals/Learning Outcomes/Competencies**

After passing this module, students should be able to …

- enumerate fields of application of time series analysis in scientific and practice
- explain the Bayesian approach in statistics and to differentiate it from the frequentists approach
- name, characterize and differentiate dynamic time series models
- formulate mathematically a simple dynamic linear model
- choose and apply an appropriate method for the computation of the posterior distribution
- implement model in a statistical software by hand (coding) and using a pre-build software solution

4. **Content**

The course is application-oriented and covers the following formal content in a problem-based learning environment.

- "Why time series analysis?"
- Simple dynamic Models
  - .1. Rolling regression
  - .2. Exponential smoothing
- State-Space-Representation
  - .1. Bayesian approach in statistics
  - .2. Formal model
  - .3. Filter, smoother and parameter estimation
- Numerical Methods
  - .1. Numerical integration
  - .2. Particle-Filter
  - .3. General Monte-Carlo methods

**Applicability of the Module**

As an elective module in the specialization area in M. Sc. in Quantitative Decision Making in Economics and Management.

5. **Recommended Participation Requirements**

Probability theory, technical affinity (programming).

6. **Prerequisites**

7. **Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

None.

**8.3. Module exam**

Term paper.

8. **Value in the Final Score**

6/120 Credit Points.

9. **Periodicity**

Every Summer Semester.

| | |
|---|---|
| 10. | **Module Representative and full-time Lecturers** |
| | Dr. Constantin Weiser. |
| 11. | **Further Information** |
| | Language: English.<br>Literature: Literature: References will be provided by the course outlines that can be downloaded from JOGU-StINe. |

# Introduction to Computational Statistics and Data Analysis

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.897.3240 | 180 h | 1 Semester | 2. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Introduction to Computational Statistics and Data Analysis (03.897.3240) | | | |
| | a) Lecture (03.897.3240, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.897.3245, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

After passing this module, students should be able to …

- enumerate and distinguish topic areas
- reflect verbal and formal basic concepts and methods
- develop an application scenario given an economic problem
- enumerate common software packages key features
- implement an analysis using a statistical software package
- make a qualified choice of analysis methods

**4. Content**

This module provides booth a wide-ranging overview of different areas of this field and for some topics a deep discussion of theory and practical usage.

(1) Introduction
- algorithms and programming
- introduction to a software package

(2) Numerical methods
- optimization
- differentiation / integration

(3) Sampling/Resampling methods
- Monte Carlo simulation / bootstrap
- Markov-Chain Monte Carlo

(4) Data analysis
- data wrangling and visualisation
- classification (Nearest-Neighbour, CART, ...)
- dimension reduction (principal component analyses, ...)
- machine learning (neural networks, support-vector machines, …)

**5. Applicability of the Module**

As elective module in M. Sc. in International Economics and Public Policy.
As an elective module in M. Sc. in Management.
As an elective module in M. Sc. in Accounting and Finance.
As an elective module in the specialization area in M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Recommended Participation Requirements**

Basic statistic course (parameter estimation & hypothese testing).
Basic knowledge in programming.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

None.

**8.3. Module exam**

Exam (60 min) or term paper.

| | |
|---|---|
| 9. | **Value in the Final Score** |
| | 6/120 Credit Points. |
| 10. | **Periodicity** |
| | Every Summer Semester. |
| 11. | **Module Representative and full-time Lecturers** |
| | Dr. Constantin Weiser |
| 12. | **Further Information** |
| | Language: English.<br>The target group is interested in technical and formal aspects of empirical science, especially in recent developments ranging from computationally intensive methods to explorative methods for huge data sets.<br>Literature: References will be provided via JOGU-StINe |

# Economic Analysis of Micro Data

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.897.3281 | 180 h | 1 Semester | 3. Semester | 6 ECTS |

| | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Economic Analysis of Micro Data | | | |
| | a) Lecture (03.897.3281, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.897.3286, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

2. **Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

3. **Qualification Goals/Learning Outcomes/Competencies**

After successful accomplishment of the course students are supposed
-to master a solid and broad methodological knowledge in the area of econometrics with an emphasis on the empirical implementation;
- to be equipped with empirical toolkit required for empirical analysis in varying fields as it is conducted by government agencies, monetary authorities or investment banks;
-to understand and critically assess the modern empirical research literature in the respective area;
-to be able to carry out empirical analyses on their own at an advanced level.

4. **Content**

The course discusses specific methodologies and problems from the respective field and presents and critically assesses empirical applications.

5. **Applicability of the Module**

As elective module in M. Sc. International Economics and Public Policy.
As an elective module in M. Sc. in Management.
As an elective module in M. Sc. in Accounting and Finance.
As an elective module in the specialization area in M. Sc. in Quantitative Decision Making in Economics and Management.

6. **Recommended Participation Requirements**

None.

7. **Prerequisites**

None.

8. **Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**
None.
**8.3. Module exam**
Term paper (85%) and presentation (15%).

9. **Value in the Final Score**

6/120 Credit Points.

10. **Periodicity**

Every Winter Semester.

11. **Module Representative and full-time Lecturers**

Prof. Dr. Thorsten Schank.

12. **Further Information**

Language: English.
Literature: Scientific papers provided in the course.

# Data Governance

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.B98.6140 | 180 h | 1 Semester | 3. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Data Governance | | | |
| | a) Lecture (03.B98.6140, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.B98.6145, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

By the end of the course, students will…

- be aware of the importance of managing and sharing data, know different possible data sources and what data management entails
- know the data life cycle, its individual steps and be able to apply it to their own projects
- know the contents of a data management plan, how to write a data management plan, how to implement a plan into data management activities and understand the FAIR data principles
- know about different sources of information for the discovery of research data
- have learned how to find data and evaluate it in terms of reusability for research
- be aware of the key aspects regarding formatting, organizing and transforming data
- be aware that there are legal and ethical responsibilities regarding data management as well as data rights
- know the importance of data security, the distribution and maintenance of access rights as well as methods for increasing the protection of their data
- know methods for increasing the protection of data
- have learned advanced strategies for data management with Stata
- be able to identify different levels of documentation for data, know metadata standards and their importance as well as where to find them
- be familiar with the terms Metadata, controlled vocabulary and authority files
- know common standards for data citation and understand persistent identifiers
- be aware of the risk of handling data carelessly, know strategies for a secure backup and the requirements for long-term archiving
- know about benefits and barriers of data publication, repositories and ways of publishing data
- have produced a publication-ready data set including documentation and metadata

**4. Content**

In our digital age, (micro) data becomes more important in a rising number of areas and sectors. Therefore, securing standards of proper curation and management of data is more urgent than ever. This course gives a broad introduction into the wide array of knowledge and competences needed for this vital part of working with data. These include data types, data life-cycle, data management plans, documentation and metadata, storage and backup, access control, data publication and the re-use of research data.

**5. Applicability of the Module**

As an elective module in the specialization area in M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

| | |
|---|---|
| 8. | **Forms of Examinations** |
| | **8.1. Active Participation**<br><br>**8.2. Coursework**<br>None.<br>**8.3. Module exam**<br>Term paper or presentation. |
| 9. | **Value in the Final Score** |
| | 6/120 Credit Points. |
| 10. | **Periodicity** |
| | Every Winter Semester. |
| 11. | **Module Representative and full-time Lecturers** |
| | Prof. Dr. Thorsten Schank, Katharina Werhan |
| 12. | **Further Information** |
| | Language: English.<br>Literature: Corti, L., Van den Eynden, V., Bishop, L. and Woollard, M. 2019. Managing and sharing research data: A guide to good practice. 2nd. ed. Sage Publishing.<br>A list of required and recommended further readings will be provided at the start of the course. |

# Official Statistics and Survey Methods

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.B98.6130 | 180 h | 1 Semester | 3. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Official Statistics and Survey Methods | | | |
| | a) Lecture (compulsory, 03.B98.6130) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (compulsory, 03.B98.6135) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

After passing this module, students should be able to …

- Know some of the guidelines of German official statistics
- Name some of the most registers used by German official statistics, describe the structure, contents and ways to access data
- Name the main surveys in German official statistics, discuss the methodological background and quality standards met
- Name different sampling strategies in the context of the most important surveys conducted by DESTATIS, discuss strengths and weaknesses, know consequences for a valid interpretation
- Discuss, apply and evaluate estimation techniques in the context of sampling strategies and their precision (standard errors) and biases
- Explain and apply different strategies of imputation in the presence of missing values

**4. Content**

- Official statistics:
  General background
- Registers in official statistics:
  Business register, dwelling register, register based census
- Surveys in official statistics:
  Census, microcensus, Sample survey of Income and expenditure, survey of income tax, survey of earnings …
- Methodology sampling 1:
  Non-random sampling vs random, simple random sampling, quota sampling
- Methodology sampling 2:
  Stratification, Neyman-Tschuprov, Cluster-sampling, multi-stage sampling, other allocation algorithms
- Estimation techniques:
  Horwitz-Thompson, GREG, small area estimation
- Variance estimation:
  Concept of standard error and bias, bootstrapping, available software
- Imputation methods
  Heuristic methods, multiple imputation

**5. Applicability of the Module**

As an elective module in the specialization area in M. Sc. in Quantitative Decision Making in Economics and Management. .

**6. Recommended Participation Requirements**

Basic statistic course (parameter estimation & hypothese testing)

**7. Prerequisites**

| | |
|---|---|
| 8. | **Forms of Examinations** |
| | **8.1. Active Participation**<br><br>**8.2. Coursework**<br>None.<br>**8.3. Module exam**<br>Term paper. |
| 9. | **Value in the Final Score** |
| | 6/120 Credit Points. |
| 10. | **Periodicity** |
| | Every Winter Semester |
| 11. | **Module Representative and full-time Lecturers** |
| | Dr. Andreas Berg |
| 12. | **Further Information** |
| | Language: English.<br>Literature: Will be provided at the beginning of the course. |

# Informations- und Datenschutzrecht

| Modul-Kennnummer (JOGU-StINe) | Arbeitsaufwand (workload) | Moduldauer (laut Studienverlaufsplan) | Regelsemester (laut Studienverlaufsplan) | Leistungspunkte (LP) |
|---|---|---|---|---|
| M.03.135.650 | 180 h | 1 Semester | 3. Semester | 6 LP |

| | Lehrveranstaltungen/Lehrformen | Kontaktzeit | Selbststudium | Leistungspunkte |
|---|---|---|---|---|
| 1. | Informations- und Datenschutzrecht (03.135.14133) | | | |
| | Vorlesung (Pfl) | 3 SWS/31,5 h | 148,5 h | 6 LP |

**2. Gruppengrößen**

Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualifikationsziele/Lernergebnisse/Kompetenzen**

Die Vorlesung soll den Studierenden Kenntnisse im Datenschutzrecht sowie im öffentlichen Informationsrecht (insb. Bereitstellung amtlicher Informationen) vermitteln. Die Studierenden sollen datenschutzrelevante Sachverhalte einordnen und anhand der rechtlichen Vorgaben bewerten können.

**4. Inhalte**

Teil 1: Datenschutzrecht (Rechtsquellen und verfassungsrechtliche Grundlagen, Grundbegriffe und Schutzkonzepte, Datenverarbeitungsregelungen, Betroffenenrechte, Rechtsfolgen von Datenschutzverstößen, Datenschutzkontrolle)
Teil 2: Öffentliches Informationsrecht (Verfassungsrechtliche Grundlagen, Informationsfreiheitsrecht, proaktives staatliches Informationshandeln).

**5. Verwendbarkeit des Moduls**

Als Spezialisierungsmodul im M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Empfohlene Voraussetzung(en) für die Teilnahme**

**7. Zugangsvoraussetzung(en)**

Keine.

**8. Leistungsüberprüfungen**

**8.1. Aktive Teilnahme**

**8.2. Studienleistung(en)**
Keine.
**8.3. Modulprüfung**
Klausur (60 min) oder mündliche Prüfung (20 min).

**9. Stellenwert der Note in der Endnote**

6 von 120 Leistungspunkten.

**10. Häufigkeit des Angebots**

Jährlich im Wintersemester.

**11. Modulbeauftragte oder -beauftragter sowie hauptamtlich Lehrende**

Prof. Dr. Matthias Bäcker

**12. Sonstige Informationen**

Unterrichtssprache: Deutsch.

# Einführung in die Mehrebenen- und Panelanalyse

| Modul-Kennnummer (JOGU-StINe) | Arbeitsaufwand (workload) | Moduldauer (laut Studienverlaufsplan) | Regelsemester (laut Studienverlaufsplan) | Leistungspunkte (LP) |
|---|---|---|---|---|
| M.03.B98.6170 | 180 h | 1 Semester | 2./3. Semester | 6 LP |

| 1. | Lehrveranstaltungen/Lehrformen | Kontaktzeit | Selbststudium | Leistungspunkte |
|---|---|---|---|---|
| | Einführung in die Mehrebenen- und Panelanalyse mit Stata (02.149.16211) | | | |
| | Seminar (Pfl) | 2 SWS/21 h | 159 h | 6 LP |

**2. Gruppengrößen**

Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualifikationsziele/Lernergebnisse/Kompetenzen**

Die Studierenden

- kennen die zentralen Fragestellungen und Anwendungsbereiche mehrebenenanalytischer Verfahren sowie deren statistische und methodische Grundlagen
- können die methodischen Stärken und Schwächen der Mehrebenanalyse gegenüber anderen gängigen sozialwissenschaftlichen Analyseverfahren reflektieren und auf dieser Basis Entscheidungen über die Anwendung und Wahl eines geeigneten Mehrebenendesigns treffen
- sind in der Lage, Kontextbedingungen zu modellieren und grundlegende Mehrebenenanalysen im Statistikprogramm Stata durchzuführen und können dabei entsprechend der jeweiligen Forschungsfrage ein geeignetes Verfahren der Mehrebenenanalyse auswählen und Modelle spezifizieren
- kennen Anwendungsbereiche komplexerer mehrebenenanalytischer Verfahren und wissen, wo sie Ressourcen für die Umsetzung komplexerer Modelle finden
- wissen, in welchem Zusammenhang gruppierte bzw. Kontextdaten und Längsschnittdaten stehen und welche Berührungspunkte es zwischen Mehrebenenen- und Längsschnitt- bzw. Panelanalysen gibt
- können mehrebenanalytischen Anwendungen in der Fachliteratur nachvollziehen und kritisch beurteilen
- sind in der Lage die Ergebnisse der Mehrebenenanalyse vor dem Hintergrund der zu prüfenden Hypothesen richtig zu interpretieren und zu bewerten
- können gewonnene Forschungsergebnisse für eine wissenschaftliche Veröffentlichung aufbereiten, darstellen, präsentieren und wissenschaftlich verteidigen

**4. Inhalte**

Das Modul gibt eine Einführung in die Mehrebenenanalyse bzw. Analyse hierarchischer bzw. gruppierter Daten (auch multilevel analysis, mixed models, hierarchical models). Eine solche Datenstruktur liegt insbesondere dann vor, wenn einzelne Beobachtungen nicht unabhängig sind, sondern jeweils einem übergeordneten Kontext angehören (z.B. Schüler*innen in verschiedenen Schulklassen, Arbeitnehmer*innen in Unternehmen, Befragte unterschiedlicher Regionen). Dabei stellt die Erklärung von sozialen Kontexteffekten und Einflüssen auf verschiedenen Aggregatebenen häufig ein zentrales Forschungsinteresse in den Sozialwissenschaften dar. Neben der Vermittlung notwendiger methodischer und statistischer Grundlagen liegt der Schwerpunkt der Veranstaltung auf der anwendungs- und praxisorientierten Umsetzung mehrebenenanalytischer Fragestellungen mithilfe der Statistiksoftware Stata (hands-on). Im Mittelpunkt stehen lineare Modelle, es werden jedoch auch weiterführende Ansätze und Anwendungen der Analyse gruppierter/hierarchischer Daten behandelt (nicht-lineare Modelle, growth curve Modelle). Die Panelanalyse (Analyse von Längsschnittdaten) wird als ein Spezialfall der Mehrebenenanalyse aufgefasst werden und ebenfalls behandelt. Es werden inhaltliche und methodische Potenziale und Grenzen der vorgestellten Verfahren diskutiert.

**5. Verwendbarkeit des Moduls**

Als Spezialisierungsmodul im M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Empfohlene Voraussetzung(en) für die Teilnahme**

Kenntnisse der OLS-Regression, Kenntnisse des Statistik-Programms Stata .

**7. Zugangsvoraussetzung(en)**

Keine.

| | |
|---|---|
| 8. | **Leistungsüberprüfungen** |
| | **8.1. Aktive Teilnahme**<br><br>**8.2. Studienleistung(en)**<br><br>**8.3. Modulprüfung**<br>Anfertigung einer empirischen Forschungsarbeit (Seminararbeit) auf Grundlage einer eigenständig umgesetzten mehrebenenanalytischen Fragestellung (Umfang 10-15 Seiten). |
| 9. | **Stellenwert der Note in der Endnote** |
| | 6 /120 Leistungspunkten. |
| 10. | **Häufigkeit des Angebots** |
| | Unregelmäßiges Angebot im Sommer- oder Wintersemester. |
| 11. | **Modulbeauftragte oder -beauftragter sowie hauptamtlich Lehrende** |
| | Prof. Dr. Natascha Nisic. |
| 12. | **Sonstige Informationen** |
| | Unterrichtssprache: Deutsch. |

# 2.2. Management Science and Business Intelligence

## Projekte in Intelligent Information Systems

| Modul-Kennnummer (JOGU-StINe) | Arbeitsaufwand (workload) | Moduldauer (laut Studienverlaufsplan) | Regelsemester (laut Studienverlaufsplan) | Leistungspunkte (LP) |
|---|---|---|---|---|
| M.03.996.3220 | 180 h | 1 Semester | 2. Semester | 6 LP |

| | Lehrveranstaltungen/Lehrformen | Kontaktzeit | Selbststudium | Leistungspunkte |
|---|---|---|---|---|
| 1. | Projekte in Intelligent Information Systems (03.996.3220) | | | |
| | a) Vorlesung (Pfl) | 2 SWS/21 h | 69 h | 3 LP |
| | b) Übung (Pfl) | 2 SWS/21 h | 69 h | 3 LP |

2. **Gruppengrößen**

Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

3. **Qualifikationsziele/Lernergebnisse/Kompetenzen**

In der Vorlesung "Intelligente Informationssysteme" beschäftigen wir uns mit Methoden der Künstlichen Intelligenz, welche in Informationssystemen eingesetzt werden können. Motivation für die Vorlesung ist, dass die Automation durch und in Informationssystemen in den nächsten Jahren noch einmal deutlich zunehmen wird. Voraussetzung für eine selbständige und automatisierte Abarbeitung von Aufgaben durch Informationssysteme sind Optimierungs-, Such- und Klassifikationsverfahren, welche automatisiert Daten verarbeiten und Entscheidungen vorbereiten oder treffen.

Im Rahmen der Vorlesung und integrierten Übung erwerben die Studierenden Wissen zu den Grundlagen von derartigen Systemen und wenden diese an kleineren praktischen Beispielen an. Relevante Bereiche hierbei sind die

- Modellierung von Problemen,
- unterschiedliche Arten von Suchverfahren,
- Maschinelles Lernen und Künstliche Neuronale Netze,
- unterschiedliche Arten von Optimierungsverfahren sowie die Grundlagen der Aussagenlogik.

4. **Inhalte**

- Fortgeschrittene Planungssysteme
- Modellbildung
- Exakte und heuristische Lösungsverfahren
- Evolutionäre Algorithmen
- Neuronale Netze
- Logik
- Agenten und Multiagentensysteme.

5. **Verwendbarkeit des Moduls**

Als Spezialisierungsmodul im M. Sc. in Management.
Als Wahlpflichtmodul im freien Teil des M. Sc. in Accounting and Finance.
Als Wahlpflichtmodul im freien Teil des M. Sc. in International Economics and Public Policy.
Als Wahlpflichtmodul im M. Sc. Wirtschaftspädagogik.
Als Wahlpflichtmodul im M. Sc. Wirtschaftswissenschaftliche Informatik.
Als Wahlpflichtmodul im Spezialisierungsbereich im M. Sc. in Quantitative Decision Making in Economics and Management.

6. **Empfohlene Voraussetzung(en) für die Teilnahme**

Keine.

7. **Zugangsvoraussetzung(en)**

Keine.

8. **Leistungsüberprüfungen**

**8.1. Aktive Teilnahme**

**8.2. Studienleistung(en)**
Keine.
**8.3. Modulprüfung**
Hausarbeit (50%) und Referat (50%)

| | |
|---|---|
| 9. | **Stellenwert der Note in der Endnote** |
| | 6 /120 Leistungspunkten. |
| 10. | **Häufigkeit des Angebots** |
| | Jährlich im Sommersemester. |
| 11. | **Modulbeauftragte oder -beauftragter sowie hauptamtlich Lehrende** |
| | Prof. Dr. Franz Rothlauf. |
| 12. | **Sonstige Informationen** |
| | Unterrichtssprache: Deutsch.<br>Empfohlene Literatur:<br>- Peter Norvig / Stuart Russell, Künstliche Intelligenz, Ein moderner Ansatz. 2. Auflage, Pearson Studium. |

# Projekte in Data Analytics

| Modul-Kennnummer (JOGU-StINe) | Arbeitsaufwand (workload) | Moduldauer (laut Studienverlaufsplan) | Regelsemester (laut Studienverlaufsplan) | Leistungspunkte (LP) |
|---|---|---|---|---|
| M.03.996.3282 | 180 h | 1 Semester | 3. Semester | 6 LP |

| 1. | Lehrveranstaltungen/Lehrformen | Kontaktzeit | Selbststudium | Leistungspunkte |
|---|---|---|---|---|
| | Projekte in Data Analytics (03.996.3282) | | | |
| | a) Vorlesung (Pfl) | 2 SWS/21 h | 69 h | 3 LP |
| | b) Übung (Pfl) | 2 SWS/21 h | 69 h | 3 LP |

**2. Gruppengrößen**

Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualifikationsziele/Lernergebnisse/Kompetenzen**

Die Studierenden erlernen mit Hilfe von Anwendungen in praktischen Szenarien Grundlagen im Bereich statistische Prognoseverfahren, Datamining Techniken, Business Intelligence, Business Analytics und Decision Support Systems, Umgang mit großen Datensätzen (Datenanalyse) und Keyword Advertising.

**4. Inhalte**

Klassischerweise wird der Begriff Decision Support System (DSS) als computergestütztes Planungs- und Informationssystem definiert, welches die Entscheidungsvorbereitung auf den Führungsebenen vorbereitet bzw. unterstützt, jedoch die Entscheidung nicht selbst trifft. Vor dem Hintergrund der rasanten Entwicklung in der IT sowie der flächendeckenden Verbreitung des Internets scheint diese Definition vielfach überholt zu sein, da eine Vielzahl von Decision Support Systems heutzutage völlig autonom und oftmals in Echtzeit nicht ausschließlich strategische, sondern auch operative Entscheidungen treffen (z.B. Finanztransaktionen im Investmentbanking, Real Time Bidding im Online Marketing oder Airline Revenue Management Systeme).

Das übergeordnete Ziel dieser Veranstaltung ist die Entwicklung eines (operativen) Decision Support Systems am Anwendungsfall des Suchmaschinenmarketings (oder Keyword Advertising). Die Vorlesung ist daher in zwei Hauptteile gegliedert. Nach einem einführenden Teil zu DSS und angrenzenden Themenbereichen wie Business Intelligence, Data Warehousing oder Data Mining, richtet der zweite Teil der Vorlesung den Fokus auf das Thema Suchmaschinenmarketing, (Keyword-) Auktionen und Bidmanagement.

Das Ziel der begleitenden Übungen ist es in Gruppenarbeit ein DSS zu entwickeln, das für ein vorgegebenes Portfolio von Keywords die „optimale" Bietstrategie bestimmt. Die entwickelten Systeme treten unter realistischen Bedingungen im Rahmen eines Keyword Advertising Simulation-Programms gegeneinander an und dem Gewinner wird ein Preis in Aussicht gestellt.

Keywords:
- Decision-Making Process
- Decision Support Systems and concepts
- Data Mining, Predictive Analytics
- Business Intelligence and Data Warehousing
- Keyword Advertising and Bidmanagement
- Stochastic Simulation
- Game Theory: Generalized First/Second Price Auction

**5. Verwendbarkeit des Moduls**

Als Spezialisierungsmodul im M. Sc. in Management.
Als Wahlpflichtmodul im freien Teil des M. Sc. in Accounting and Finance.
Als Wahlpflichtmodul im freien Teil des M. Sc. in International Economics and Public Policy.
Als Wahlpflichtmodul im M. Sc. Wirtschaftspädagogik.
Als Wahlpflichtmodul im M. Sc. Wirtschaftswissenschaftliche Informatik.
Als Wahlpflichtmodul im M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Empfohlene Voraussetzung(en) für die Teilnahme**

Grundlagenkenntnisse in Statistik/Stochastik und Operations Research sowie ein vorheriger Besuch der Veranstaltung EDV. Kenntnisse im Umgang mit der Programmiersprache R sind von Vorteil, werden aber im Rahmen der Übungen vermittelt.

**7. Zugangsvoraussetzung(en)**

Keine.

| | |
|---|---|
| 8. | **Leistungsüberprüfungen** |
| | **8.1. Aktive Teilnahme**<br><br>**8.2. Studienleistung(en)**<br>Keine.<br>**8.3. Modulprüfung**<br>Hausarbeit (50%) und Referat (50%). |
| 9. | **Stellenwert der Note in der Endnote** |
| | 6 /120 Leistungspunkten. |
| 10. | **Häufigkeit des Angebots** |
| | Jährlich im Wintersemester. |
| 11. | **Modulbeauftragte oder -beauftragter sowie hauptamtlich Lehrende** |
| | Prof. Dr. Franz Rothlauf. |
| 12. | **Sonstige Informationen** |
| | Unterrichtssprache: Deutsch. |

# Datenbanken

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.08.079.575 | 180 h | 1 Semester | 2. Semester | 6 LP |

| 1. | Courses | Kontaktzeit | Selbststudium | Leistungspunkte |
|---|---|---|---|---|
| | Datenbanken I (08.079.228) | | | |
| | a) Lecture (Compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (Compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

Databases are a key technology in practical and applied computer science. Database management systems play an increasingly central role for businesses as a large part of companies' and user data are stored inside and managed by databases. Students will learn the principles of database management systems and how to use them. Special emphasis is placed on modelling and database design. In addition, focus is on learning the standard database language SQL which will enable students to apply the knowledge they have acquired in practice.
In summary, after completing this course, students should be able to:
- design, create and query relational databases to retrieve information.
- explain the theoretical foundations of the relational model: in particular, the relational algebra and the relational design theory (normal forms, dependencies, and decomposition),
- to consider the practical aspects in the application, the use of index structures, the processing and optimization of queries, the concepts of transaction management and concurrency control.

**4. Content**

- Introduction to database management systems
- Database modelling with the entity-relationship model
- Relational model and relational algebra
- Structured query language (SQL)
- Database design theory and normalization
- Data integrity, constraints and triggers
- Physical data organization and database indices
- Querying processing and optimization
- Transaction management and recovery
- Concurrency control.

**5. Applicability of the Module**

As an elective module in the Free part of M. Sc. in Accounting and Finance.
As an elective module in the Free Part of M. Sc. in Management.
As an elective module in the specialization area of M.Sc. in Quantitative Decision Making in Economics and Management

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participations**

**8.2. Coursework**
None.
**8.3. Module Exam**
Exam (120 min).

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Summer Semester.

**11. Module Representative and full-time Lecturers**

Jun.-Prof. Dr. Panagiotis Bouros.

| 12. | **Further Information** |
|---|---|
| | Language: Lecture: English. Tutorial: English or German. |

# Location Planning and Network Design

| Modul-Kennnummer (JOGU-StINe) | Arbeitsaufwand (workload) | Moduldauer (laut Studienverlaufsplan) | Regelsemester (laut Studienverlaufsplan) | Leistungspunkte (LP) |
|---|---|---|---|---|
| M.03.996.3140 | 180 h | 1 Semester | 3. Semester | 6 LP |

| | | | | |
|---|---|---|---|---|
| 1. | **Lehrveranstaltungen/Lehrformen** | **Kontaktzeit** | **Selbststudium** | **Leistungspunkte** |
| | Standortplanung und Netzwerk-Design (03.996.3140) | | | |
| | a) Vorlesung (Pfl) | 2 SWS/21 h | 69 h | 3 LP |
| | b) Übung (Pfl) | 2 SWS/21 h | 69 h | 3 LP |

2. **Gruppengrößen**

Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

3. **Qualifikationsziele/Lernergebnisse/Kompetenzen**

Standortentscheidungen sind strategische Entscheidungen und haben oft erheblichen Einfluss auf den Unternehmenserfolg. Die Studierenden sollen die in der Praxis auftretenden Standortprobleme klassifizieren und in Modellen abbilden können. Ziel ist es ferner, dass die Studierenden die relevanten Planungsmethoden erlernen, kritisch beurteilen und prototypisch z.B. mit Hilfe von Spreadsheet Software oder Modellierungssprachen anwenden können.

4. **Inhalte**

Die Wahl von Produktions- und Lagerstandorten ist für viele Unternehmen eine der wesentlichen strategischen Entscheidungen. Die Frage wo, wann, wie viel produziert oder gelagert wird, bestimmt Materialflüsse, Kosten, Lieferzeiten und Lieferzuverlässigkeit. Die Lehrveranstaltung gibt eine Einführung in die grundlegenden Begriffe, Modelle und Methoden zur Standortplanung und zum Design von logistischen Netzwerken. Im Einzelnen:

- Modelle in der Ebene, in Netzwerken und diskrete Modelle
- Problemstellungen: Mediane, Zentren, Überdeckungen (Coverings), Hub-Location
- Methoden: primär Heuristiken: Eröffnungs- und Verbesserungsverfahren

5. **Verwendbarkeit des Moduls**

Als Spezialisierungsmodul im M. Sc. in Management.
Als Wahlpflichtmodul im freien Teil des M. Sc. in Accounting and Finance.
Als Wahlpflichtmodul im freien Teil des M. Sc. in International Economics and Public Policy.
Als Wahlpflichtmodul im M. Sc. Wirtschaftspädagogik.
Als Wahlpflichtmodul im M. Sc. Wirtschaftswissenschaftliche Informatik.
Als Spezialisierungsmodul im M. Sc. in Quantitative Decision Making in Economics and Management.

6. **Empfohlene Voraussetzung(en) für die Teilnahme**

Vorkenntnisse aus der Veranstaltung Operations Research/Management Science.

7. **Zugangsvoraussetzung(en)**

Keine.

8. **Leistungsüberprüfungen**

**8.1. Aktive Teilnahme**

**8.2. Studienleistung(en)**
Keine.
**8.3. Modulprüfung**
Klausur (60 min).

9. **Stellenwert der Note in der Endnote**

6/120 Leistungspunkten.

10. **Häufigkeit des Angebots**

anually in the winter term

11. **Modulbeauftragte oder -beauftragter sowie hauptamtlich Lehrende**

Prof. Dr. Stefan Irnich.

| 12. | **Sonstige Informationen** |
|---|---|
| | Unterrichtssprache: Deutsch.<br>Empfohlene Literatur: (Auszüge werden in Moodle bereitgestellt)<br>- [Daskin 1995] Daskin, M.S.: Network and Discrete Location, Models, Algorithms, and Applications. New York : Wiley, 1995<br>- [Domschke und Drexl 1995] Domschke, W. ; Drexl, A.: Logistik: Standorte. 4. Auflage. Oldenbourg, 1995. – ISBN 978-3486235869<br>- [Love u. a. 1988] Love, R.F. ; Morris, James G. ; Wesolowsky, George O.: Publications in Operations Research Series. Bd. 7: Facilities Location: Models and Methods. New York, NY : Elsevier Science Publishing, 1988. – ISBN 978-0130500557 |

# Transportation I

| Modul-Kennnummer (JOGU-StINe) | Arbeitsaufwand (workload) | Moduldauer (laut Studienverlaufsplan) | Regelsemester (laut Studienverlaufsplan) | Leistungspunkte (LP) |
|---|---|---|---|---|
| M.03.996.3120 | 180 h | 1 Semester | 2. Semester | 6 LP |

| | Lehrveranstaltungen/Lehrformen | Kontaktzeit | Selbststudium | Leistungspunkte |
|---|---|---|---|---|
| 1. | Transportation I (03.996.3120) | | | |
| | a) Vorlesung (Pfl) | 2 SWS/21 h | 69 h | 3 LP |
| | b) Übung (Pfl) | 2 SWS/21 h | 69 h | 3 LP |

**2. Gruppengrößen**

Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualifikationsziele/Lernergebnisse/Kompetenzen**

Die Studierenden sollen lernen, was typische Planungsaufgaben der Transportlogistik sind. Sie sollen die in der Praxis anzutreffenden Problemstellungen klassifizieren und in Modelle einordnen können. Sie erhalten einen Überblick über die heutzutage anwendbaren Lösungsverfahren, wie sie in IT-Systemen zur Transportplanung und -disposition eingesetzt werden.

**4. Inhalte**

Behandelt werden Modelle und Verfahren für die Standardprobleme der taktischen und operativen Transportplanung wie Netzflussprobleme, Rundreiseprobleme, Briefträgerprobleme, Tourenplanungsprobleme. Im Einzelnen:

- Strategische, taktische und operative Planungsprobleme in der Transportlogistik, rollierende Planung;
- Wege, Minimal-spannende Bäume, Traveling Salesman Probleme und praxisrelevante Erweiterungen des TSP (insb. Zeitfenstern und Präzedenzen), Vehicle Routing Probleme, Briefträgerprobleme.

**5. Verwendbarkeit des Moduls**

Als Spezialisierungsmodul im M. Sc. in Management.
Als Wahlpflichtmodul im freien Teil des M. Sc. in Accounting and Finance.
Als Wahlpflichtmodul im freien Teil des M. Sc. in International Economics and Public Policy.
Als Wahlpflichtmodul im M. Sc. Wirtschaftspädagogik.
Als Wahlpflichtmodul im M. Sc. Wirtschaftswissenschaftliche Informatik.
Als Spezialisierungsmodul im M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Empfohlene Voraussetzung(en) für die Teilnahme**

Vorkenntnisse aus der Veranstaltung Operations Research/Management Science.

**7. Zugangsvoraussetzung(en)**

Keine.

**8. Leistungsüberprüfungen**

**8.1. Aktive Teilnahme**

**8.2. Studienleistung(en)**
Keine.
**8.3. Modulprüfung**
Klausur (60 min).

**9. Stellenwert der Note in der Endnote**

6/120 Leistungspunkten.

**10. Häufigkeit des Angebots**

Jährlich im Sommersemester.

**11. Modulbeauftragte oder -beauftragter sowie hauptamtlich Lehrende**

Prof. Dr. Stefan Irnich.

| 12. | **Sonstige Informationen** |
|---|---|
| | Unterrichtssprache: Deutsch.<br>Empfohlene Literatur: (Auszüge werden in Moodle bereitgestellt)<br>- [Domschke 2007] Domschke, W.: Logistik: Transport. 5. Auflage, München, Wien : Oldenbourg, 2007. – ISBN 978-3-486-58290-1<br>- [Domschke und Scholl 2010] Domschke, W. ; Scholl, A.: Logistik: Rundreisen und Touren. 5. Auflage. München, Wien : Oldenbourg, 2010. – ISBN 978-3-486-59093-7<br>- [Grünert und Irnich 2005] Grünert, T. ; Irnich, S.: Optimierung im Transport Band I: Grundlagen. Aachen : Shaker Verlag, 2005<br>- [Grünert und Irnich 2005] Grünert, T. ; Irnich, S.: Optimierung im Transport Band II: Wege und Touren. Aachen : Shaker Verlag, 2005<br>- [Toth and Vigo, 2014] Toth, P. and Vigo, D.: Vehicle Routing: Problems, Methods, and Applications. Philadelphia: SIAM, 2014. – ISBN 978-1-611973-58-7 |

# Transportation II

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.996.3122 | 180 h | 1 Semester | 3. Semester | 6 ECTS |

| | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| 1. | Transportation II (03.996.3122.) | | | |
| | a) Project/Project seminar (compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

Students will learn to classify and model problems encountered in practice in the area of vehicle routing. They will receive an overview of modern solution methods as they are used in IT systems for vehicle routing and scheduling. Exemplary algorithmic components are implemented on the PC (programming, extending and testing).

**4. Content**

Central aspects of vehicle routing and scheduling are covered: classical variants of the vehicle routing problem, components of modern exact solution methods, shortest path problems with resource constraints, components of modern heuristic solution methods and current trends in transport logistics (e.g. ridesharing, electric vehicles, sustainability aspects, ...). In the exercise, new components of solution methods are developed by the students according to the principle of "learning by doing" (case studies), implemented on the PC and analyzed (PC Pool).

**5. Applicability of the Module**

As a specialization module in M. Sc. in Accounting and Finance.
As a specialization module in M. Sc. in Management.
As a specialization module in M. Sc. in Quantitative Decision Making in Economics and Management.
As an elective module in M. Sc. in International Economics and Public Policy.
As an elective module in M.Sc. Business Education.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

Operations Research/Management Science, Transportlogistik I (Transportation I)

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

None.

**8.3. Modul Exam**

Exam (60 min, 50 percent weight) and presentation (in small groups, 50 percent weight).

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Winter Semester.

**11. Module Representative and full-time Lecturers**

Prof. Dr. Stefan Irnich

| 12. | **Further Information** |
|---|---|
| | Language: English.<br>Literature:<br>- Costa, L., Contardo, C., and Desaulniers, G. (2019). Exact branch-price-and-cut algorithms for vehicle routing. Transportation Science, 53(4), 946–985.<br>- Desaulniers, G., Desrosiers, J., Ioachim, I., M. Solomon, M., Soumis, F., and Villeneuve, D. (1998). A unified framework for deterministic time constrained vehicle routing and crew scheduling problems. In T. G. Crainic and G. Laporte, editors, Fleet Management and Logistics, pages 57–93. Springer.<br>- Irnich, S. and Desaulniers, G. (2005). Shortest path problems with resource constraints. In G. Desaulniers, J. Desrosiers, and M. Solomon, editors, Column Generation, chapter 2, pages 33–65. Springer.<br>- Pisinger, D. and Ropke, S. (2010). Large neighborhood search. In M. Gendreau and J.-Y. Potvin, editors, Handbook of Metaheuristics, volume 146 of International Series in Operations Research & Management Science, pages 399–419. Springer.<br>- Toth, P. and Vigo, D. (2014). Vehicle Routing: Problems, Methods, and Applications. Society for Industrial and Applied Mathematics, Philadelphia, PA. |

# Programming Operations Research Models and Methods

| Modul-Kennnummer (JOGU-StINe) | Arbeitsaufwand (workload) | Moduldauer (laut Studienverlaufsplan) | Regelsemester (laut Studienverlaufsplan) | Leistungspunkte (LP) |
|---|---|---|---|---|
| M.03.996.3130 | 180 h | 1 Semester | 2. Semester | 6 LP |

| | Lehrveranstaltungen/Lehrformen | Kontaktzeit | Selbststudium | Leistungspunkte |
|---|---|---|---|---|
| 1. | Programming Operations Research Models and Methods (03.996.3130) | | | |
| | a) Vorlesung (Pfl) | 2 SWS/21 h | 69 h | 3 LP |
| | b) Übung (Pfl) | 2 SWS/21 h | 69 h | 3 LP |

2. **Gruppengrößen**

Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

3. **Qualifikationsziele/Lernergebnisse/Kompetenzen**

Die Studierenden sollen lernen, unter welchen Voraussetzungen Revenue Management (RM) Methoden eingesetzt werden können und welches Potential diese bieten. Sie sollen die RM Instrumente verstehen, um über deren Einsatz zu entscheiden, Ergebnisse kritisch zu beurteilen und Instrumente im konkreten Anwendungskontext weiter zu entwickeln bzw. bei der Entwicklung zu helfen.

4. **Inhalte**

Behandelt werden ausgewählte Modelle und Methoden der Preisdifferenzierung, Kapazitätssteuerung und Überbuchungssteuerung, dargestellt an typischen Beispielen aus Anwendungsbereichen Personenluftverkehr, Autovermietungen, Hotellerie, Gütertransport, Einzelhandel u.a.

5. **Verwendbarkeit des Moduls**

Als Spezialisierungsmodul im M. Sc. in Management.
Als Wahlpflichtmodul im freien Teil des M. Sc. in Accounting and Finance.
Als Wahlpflichtmodul im freien Teil des M. Sc. in International Economics and Public Policy.
Als Wahlpflichtmodul im M. Sc. Wirtschaftspädagogik.
Als Wahlpflichtmodul im M. Sc. Wirtschaftswissenschaftliche Informatik.
Als Spezialisierungsmodul im M. Sc. in Quantitative Decision Making in Economics and Management.

6. **Empfohlene Voraussetzung(en) für die Teilnahme**

Vorkenntnisse aus der Veranstaltung Operations Research/Management Science.

7. **Zugangsvoraussetzung(en)**

Keine.

8. **Leistungsüberprüfungen**

**8.1. Aktive Teilnahme**

**8.2. Studienleistung(en)**
Keine.
**8.3. Modulprüfung**
Referat.

9. **Stellenwert der Note in der Endnote**

6/120 Leistungspunkten.

10. **Häufigkeit des Angebots**

jährlich im Sommersemester

11. **Modulbeauftragte oder -beauftragter sowie hauptamtlich Lehrende**

Prof. Dr. Stefan Irnich.

12. **Sonstige Informationen**

Unterrichtssprache: Deutsch.
Empfohlene Literatur: Auszüge werden in Moodle bereitgestellt

# Process Mining

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.B98.6310 | 180 h | 1 Semester | 2. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Process Mining | | | |
| | a) Lecture (compulsory, 03.B98.6310) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Seminar (compulsory, 03.B98.6315) | 2 SWS/21 h | 69 h | 3 ECTS |

ⓘ To successfully participate students need to register for both course components (lecture + seminar).

2. **Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

3. **Qualification Goals/Learning Outcomes/Competencies**

Teaching the fundamentals of process mining. In addition to the theory of the three basic components of process mining (1) process discovery, (2) conformance check, (3) enhancement, the course's particular focus is on the application of process mining in the areas of business administration and empirical educational and social research. In this context, methodological competencies for the use of data processing tools etc. such as R, Python, SQL as well as agile working in the sense of Scrum are taught. The focus is on getting to know the typical data structure of process mining, the event log, such as for example eye-tracking data and how to handle and analyse it. The goal is not only to become familiar with the data structure itself, but also to understand the steps from data preparation and process visualization to analysis and interpretation. The course consists of a theoretical-conceptual input in the form of a lecture (1 SWS) and practical exercises in the form of a seminar (3SWS), with the goal of applying the theoretical content learned in the lecture in the seminar accompanied by the lecturers independently in a self-organized data project.

4. **Content**

- Fundamentals of process mining
- Process Discovery (Processing data to create process models)
- Conformance Checking (Comparing target process and actual process)
- Enhancement (Applying data to process models)
- Data Mining vs. Process Mining (Process KPIs)
- Working with event log data from different domains, including eye-tracking data from educational research or data from business practice, for example from purchase or similar processes in an independent project

5. **Applicability of the Module**

As an elective module in the specialization area in M. Sc. in Quantitative Decision Making in Economics and Management.

6. **Recommended Participation Requirements**

None.

7. **Prerequisites**

None.

8. **Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

None.

**8.3. Module exam**

Presentation and term paper or exam (60 min).

9. **Value in the Final Score**

6/120 Credit Points.

10. **Periodicity**

Every Summer Semester.

11. **Module Representative and full-time Lecturers**

Prof. Dr. Olga Zlatkin-Troitschanskaia, Dr. Susanne Schmidt

| 12. | **Further Information** |
|---|---|
| | Language: English<br>Literature:<br>• Kerzner, H. (2018). Agile and Scrum. In H. Kerzner (Ed.), Project management best practices: Achieving global excellence. John Wiley & Sons.<br>• Schmidt S, Zlatkin-Troitschanskaia O, Roeper J, Klose V, Weber M, Bültmann A-K and Brückner S (2020). Undergraduate Students' Critical Online Reasoning—Process Mining Analysis. Front. Psychol. 11:576273. doi: 10.3389/fpsyg.2020.576273<br>• Van der Aalst, W.M.P. (2011). Process Mining: Discovery, Conformance and Enhancement of Business Processes. Springer, Berlin |

# 2.3. Economic Behavior and Strategy

## Advanced Digital Economics

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.897.2310 | 180 h | 1 Semester | 2. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Advanced Digital Economics | | | |
| | a) Lecture (03.897.2310, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.897.2315, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

After the course, students should:
- have an overview over fundamental economic implications of digitization
- have knowledge of some key microeconomic models required to understand these implications
- be able to apply these models to concrete scenarios and cases

**4. Content**

The course will analyze the economic implications of digitization from a microeconomic perspective using insights from industrial organization, information economics, behavioral economics, and data science.

**5. Applicability of the Module**

As elective module in M. Sc. in International Economics and Public Policy.
As an elective module in M. Sc. in Management.
As an elective module in M. Sc. in Accounting and Finance.
As an elective module in the specialization area in M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**
None.
**8.3. Module exam**
Exam (60 min).

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Summer Semester.

**11. Module Representative and full-time Lecturers**

Prof. Dr. Florian Hett

**12. Further Information**

Language: English.
Literature: Information will be made available in JOGU-StINe before the beginning of the course.

# Behavioral and Experimental Economics

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.897.2140 | 180 h | 1 Semester | 2. Semester | 6 ECTS |

| | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| 1. | Behavioral and Experimental Economics | | | |
| | a) Lecture (03.897.2140, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.897.2145, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

After the course, students should be able to understand and independently analyze modern topics in behavioral economics. They should understand the relevance of the behavioral sciences for economic/public policy and economic decision-making in particular, and for evidence based policy advice in general. Furthermore, they should be able to apply these insights to current debates in behavioral economics and economic policy.

**4. Content**

The module covers central methods and concepts of behavioral economics at an advanced level. The course starts by providing an introduction to theoretical and empirical research in behavioral and experimental economic research. Various models of economic decision behavior will be discussed. Then, the course presents evidence from laboratory and field experiments in economics and psychology which has led to alternative descriptive models of behavior. In this context, it will also be discussed how the modern empirical toolbox of behavioral economists can be used to obtain causal evidence on the determinants and motives underlying human behavior as well as on the effect of policy interventions. Finally, the course also briefly discusses recent advances in behavioral economics, such as Neuro- and Genoeconomics.

**5. Applicability of the Module**

As elective module in the specialization part (Public Policy) and in the free part of the M. Sc. in International Economics and Public Policy.
As an elective module in M. Sc. in Management.
As an elective module in M. Sc. in Accounting and Finance.
As an elective module in the specialization area in M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**
None.
**8.3. Module exam**
Exam (60 min).

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Summer Semester.

**11. Module Representative and full-time Lecturers**

Prof. Dr. Daniel Schunk.

**12. Further Information**

Language: English.
Literature: References will be provided via JOGU-StINe.

# Behavioral Measurement

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.B98.6410 | 180 h | 1 Semester | 3. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Behavioral Measurement | | | |
| | a) Lecture (03.B98.6410, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.B98.6415, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

Students shall
- become acquainted with using experimental approaches as measurement tools,
- get exposed to the broad variety of existing tools,
- study applications using these tools to provide new perspectives on economic problems,
- think themselves about new measures and/or new applications.

The course is particularly suited for students with an interest in behavioral economics and empirical methods with a focus on experiments.

**4. Content**

This seminar deals with empirical methods measuring individual economic characteristics, preferences, and beliefs, thereby making them subject to an explicit empirical analysis.

**5. Applicability of the Module**

As an elective module in the specialization area in M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

Presenting and summarizing a research paper (pass / no pass).

**8.3. Module exam**

Term paper.

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Winter Semester.

**11. Module Representative and full-time Lecturers**

Prof. Dr. Florian Hett.

**12. Further Information**

Language: English.
Literature: Recent research papers.

# Behavioral Finance

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.C52.2410 | 180 h | 1 Semester | 2. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Behavioral Finance (03.C52.2410) | | | |
| | a) Lecture (compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (elective) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

The students
- learn to solve concrete problems in the field of Behavioral Finance with scientific work,
- learn additional statistical and experimental methods, which are essential for the understanding of empirical literature,
- learn to apply and test theories from previous courses and new theories by means of scientific papers, which are mainly empirical in nature,
- will understand and be able to apply advanced methods and concepts of behavioral economics specifically in the field of finance,
- begin to develop their own ideas for a potential master's thesis by working on scientific studies in detail.

**4. Content**

Advanced theories from the field of behavioral finance are developed together. These theories will be reviewed on the basis of current empirical literature in the course of the lecture. In the following, students present selected research papers in small groups, which are subsequently discussed in more depth in the tutorial.

**5. Applicability of the Module**

As a specialization module in M. Sc. in Accounting and Finance
As an elective module in M. Sc. in Management.
As an elective module in M. Sc. in International Economics and Public Policy.
As an specialization module in M. Sc. in Quantitative Decision Making in Economics and Management
As an elective module in M. Sc. and M.Ed. in Business Education.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**

None.

**8.3. Modul Exam**

Exam (60 min; 60%) and in-class presentation (40%).

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Summer Semester.

**11. Module Representative and full-time Lecturers**

Prof. Dr. Andrej Gill

**12. Further Information**

Language: English.

# Advanced Corporate Finance

| Modul-Kennnummer (JOGU-StINe) | Arbeitsaufwand (workload) | Moduldauer (laut Studienverlaufsplan) | Regelsemester (laut Studienverlaufsplan) | Leistungspunkte (LP) |
|---|---|---|---|---|
| M.03.C52.2401 | 180 h | 1 Semester | 3. Semester | 6 LP |

| 12. | Lehrveranstaltungen/Lehrformen | Kontaktzeit | Selbststudium | Leistungspunkte |
|---|---|---|---|---|
| | Advanced Corporate Finance (03.C52.2401) | | | |
| | a) Vorlesung (Pfl) | 2 SWS/21 h | 69 h | 3 LP |
| | b) Übung (Pfl) | 2 SWS/21 h | 69 h | 3 LP |

**13. Gruppengrößen**

Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**14. Qualifikationsziele/Lernergebnisse/Kompetenzen**

Die Studierenden
- vertiefen die finanzwirtschaftlichen Kenntnisse aus dem Bachelor-Studium und erlernen mit wissenschaftlichen Arbeiten konkrete Fragestellungen aus dem Bereich der Corporate Finance zu lösen,
- sollen hierbei besonders an komplexe Zusammenhänge auf Finanzmärkten herangeführt werden und auch weitere statistische Methoden erlernen, welche zwingend zum Verständnis empirischer Literatur beitragen,
- erlernen fortgeschrittene Theorien anhand von Modellen und wissenschaftlicher Arbeiten, welche hauptsächlich empirischer Natur sind, anzuwenden und zu überprüfen,
- sollen fortgeschrittene Methoden und Konzepte der Unternehmensfinanzierungstheorie verstehen und anwenden können.

**15. Inhalte**

Behandelt werden auf fortgeschrittenem Niveau Fragen der optimalen Investitionsentscheidung sowie Finanzierungsentscheidung auf Märkten mit asymmetrischer Informationsverteilung. Diese Theorien werden anhand aktueller empirischer Literatur im Rahmen der Vorlesung überprüft.

**16. Verwendbarkeit des Moduls**

Als Kernmodul im M. Sc. in Accounting and Finance.
Als Wahlpflichtmodul im freien Teil des M. Sc. in Management.
Als Wahlpflichtmodul im freien Teil des M. Sc. in International Economics and Public Policy.
Als Spezialisierungsmodul des M. Sc. In Quantitative Decision Making in Economics and Management
Als Wahlpflichtmodul im M. Sc. und M. Ed. Wirtschaftspädagogik.

**17. Empfohlene Voraussetzung(en) für die Teilnahme**

Keine.

**18. Zugangsvoraussetzung(en)**

Keine.

**19. Leistungsüberprüfungen**

**8.1. Aktive Teilnahme**

**8.2. Studienleistung(en)**

Keine.

**8.3. Modulprüfung**

Schriftliche Prüfung im Rahmen einer Klausur (60 min).

**20. Stellenwert der Note in der Endnote**

6 von 120 Leistungspunkten.

**21. Häufigkeit des Angebots**

Jährlich im Wintersemester.

**22. Modulbeauftragte oder -beauftragter sowie hauptamtlich Lehrende**

Prof. Dr. Andrej Gill

**23. Sonstige Informationen**

Unterrichtssprache: Deutsch.

# Economics of Education

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.897.2170 | 180 h | 1 Semester | 2. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Economics of Education | | | |
| | a) Lecture (03.897.2170, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (03.897.2175, compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

After the course, students should be able to understand and independently analyze modern topics in the field of "Economics of Education". They should understand the role of human capital for economic prosperity and for economic/public policy. They should be able to understand and communicate the economic and social trade-offs involved in different educational policies, and they should know how current data can be used to inform economic and educational policy.

**4. Content**

The course deals with current research in the area "Economics of Education" at an advanced level and with a focus on empirical research in economics of education. We discuss topics such as the role of human capital as a determinant of individual labor market success, the role of education for individual and societal economic prosperity and the efficiency and equity of various different educational policies.

**5. Applicability of the Module**

As elective module in the specialization part (Public Policy) and in the free part of the M. Sc. in International Economics and Public Policy.
As an elective module in the specialization area in M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**
None.
**8.3. Module exam**
Exam (60 min) or term paper (60 %) with presentation (40 %).

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Summer Semester.

**11. Module Representative and full-time Lecturers**

Prof. Dr. Daniel Schunk

**12. Further Information**

Language: English.
Literature: will be provided in JOGU-StINe.

# 3. FREE PART (MAXIMUM OF 12 ECTS)

A maximum of 2 modules with a total of 12 credit points may be completed.

## 3.1. Management

### Cross Channel Management

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.996.4320 | 180 h | 1 Semester | 3. Semester | 6 ECTS |

| | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| 1. | Cross Channel Management (03.996.4320) | | | |
| | a) Lecture (compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

Students
-learn to know managerial concepts of cross-channel management
-understand consumer behavior in the interaction between physical and digital environments
-apply experimental methods for field experiments in companies
-discuss developments in technologies and artificial intelligence

**4. Content**

The coordination of different communication and distribution channels has become one of the most important challenges in management. Companies increasingly invest into building up new departments that interlink interdisciplinary managerial functions such as marketing, sales, strategy, and information technologies. The change process in companies is known as "multi-channel", "cross-channel", or "omni-channel" management and denotes a) the optimization of the overall channel performance by accounting for potential channel conflicts, b) the seamless channel coordination of retail mix instruments for customer acquisition, retention, and development, and c) the strategic and operational integration of marketing-, sales-, service-, and logistic activities in the physical and digital retail environment. The course will prepare students for managerial positions in this growing field.
The course covers cross-channel management topics such as strategy & positioning, segmentation & targeting, experience management, retail mix integration, personalization, behavioral mechanisms, social response, smart applications, and connectivity. The first part of the course takes the managerial perspective on measuring and managing customer equity as the central driver for performance optimization and disentangles potential conflicts in steering customers across channels successfully. Students will learn how to manage relationships with customers by 1) understanding and designing customer journey experiences, 2) integrating and analyzing data from various channel sources, and 3) personalizing digital environments according to individual customer attributes. In the evolving new data-rich retail environment, managers are increasingly challenged to use empirical insights which requires high methodological competences. In this course, students will learn to know and apply experimental research methods to conduct field experiments in companies. The second part of the course will investigate how consumers perceive the use of different channels and how their behavior is influenced by incentives, appeals, and subtle cues. As consumers increasingly spend their time online, their interaction with the digital environment is designed to include a social response – a human touch that makes consumers build up relationships with the company, even if the interaction is only digital. The course outlines future developments in smart applications, artificial intelligence and their implications for retailing. Finally, the course integrates concepts to use social networks in which consumers increasingly gain influence through social media.

**5. Applicability of the Module**

As an elective module in M. Sc. in Accounting and Finance.
As an elective module in M. Sc. in Management.
As an elective module in M. Sc. in International Economics and Public Policy.
As an elective module in M. Sc. in M.Sc. in Wirtschaftspädagogik.
As an elective module in M.Sc. in Psychologie.
As an elective module in the free part in M. Sc. in Quantitative Decision Making in Economics and Management.

| | |
|---|---|
| 6. | **Recommended Participation Requirements** |
| | None. |
| 7. | **Prerequisites** |
| | None. |
| 8. | **Forms of Examinations** |
| | **8.1. Active Participation**<br><br>**8.2. Coursework**<br>None.<br>**8.3. Module exam**<br>Exam (60 min; 70 %) and term paper (in the form of an experimental design; 30 %). |
| 9. | **Value in the Final Score** |
| | 6/120 Credit Points. |
| 10. | **Periodicity** |
| | Every Winter Semester. |
| 11. | **Module Representative and full-time Lecturers** |
| | Prof. Dr. Oliver Emrich. |
| 12. | **Further Information** |
| | Language: English.<br>Literature: Excerpts from books and scientific articles which will be announced for each chapter of the lecture. |

# Crafting Management Research

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.996.4440 | 180 h | 1 Semester | 3. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Crafting Management Research (03.996.4440) | | | |
| | Proseminar (compulsory) | 4 SWS/42 h | 138 h | 6 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

Students build on their knowledge from the bachelor's program on how to conduct scientific research and deepen it based on current issues in management research with a thematic focus on digital transformation and digital technologies. Students develop a deep understanding of the research process and theory building, and learn different methods of conducting management research. The course enables the students to analyze and understand scientific articles and to develop their own research ideas in the field of management.

**4. Content**

In-depth study of the scientific research process and profound engagement with current management research by reading scientific articles. Analysis and evaluation of scientific articles and detailed examination of their main components (introduction, theory development, methods, results and discussion).

**5. Applicability of the Module**

As an elective module in M. Sc. in Management.
As an elective module in M. Sc. in Accounting and Finance.
As an elective module in the free part in M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

**8.2. Coursework**
None.
**8.3. Module exam**
Term paper.

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Winter Semester.

**11. Module Representative and full-time Lecturers**

Prof. Dr. Andranik Tumasjan

**12. Further Information**

Language: English.
Literature: References will be provided via JOGU-StINe.

# 3.2. Accounting and Finance

## Corporate Risk Management

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.C52.1330 | 180 h | 1 Semester | 2. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Corporate Risk Management (03.C52.1330) | | | |
| | a) Lecture (compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

- Knowledge, understanding and application of concepts from risk management.
- Economic analysis of the impact and significance of risk management.

**4. Content**

Internal control system
- Risk Management
- Internal audit

**5. Applicability of the Module**

As an elective module in M. Sc. in Accounting and Finance.
As an elective module in M. Sc. in Management.
As an elective module in M. Sc. in International Economics and Public Policy.
As an elective module in M. Sc. in M.Sc. in Wirtschaftspädagogik.
As an elective module in the free part in M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**
Written submission of case study processing; case study presentation.
**8.2. Coursework**
None.
**8.3. Module exam**
Exam (60 min).

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Summer Semester.

**11. Module Representative and full-time Lecturers**

Prof. Dr. Christopher Koch.

**12. Further Information**

Language: English.
Literature: References will be provided via JOGU-StINe.

# Empirical Corporate Governance

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.C52.1320 | 180 h | 1 Semester | 3. Semester | 6 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Empirical Corporate Governance (03.C52.1320) | | | |
| | a) Lecture (compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |
| | b) Tutorial (compulsory) | 2 SWS/21 h | 69 h | 3 ECTS |

**2. Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualification Goals/Learning Outcomes/Competencies**

- Students have knowledge of important research questions in the field of corporate governance.
- Students are able to analyze the basic problem of corporate governance from an economic point of view.
- Students know and understand econometric methods for identifying causal effects.
- Students can evaluate current research contributions in the field of corporate governance.

**4. Content**

- Fundamentals of Corporate Governance
- Empirical methods in corporate governance research
- Assessment of research contributions in empirical corporate governance research

**5. Applicability of the Module**

As an elective module in M. Sc. in Accounting and Finance.
As an elective module in M. Sc. in Management.
As an elective module in M. Sc. in International Economics and Public Policy.
As an elective module in M. Sc. in M.Sc. in Wirtschaftspädagogik.
As an elective module in the free part in M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Recommended Participation Requirements**

None.

**7. Prerequisites**

None.

**8. Forms of Examinations**

**8.1. Active Participation**

Written submission of assessment of empirical research contributions in the field of corporate governance;
Discussion of a research contribution in the form of a presentation.

**8.2. Coursework**

None.

**8.3. Module exam**

Exam (60 min).

**9. Value in the Final Score**

6/120 Credit Points.

**10. Periodicity**

Every Winter Semester.

**11. Module Representative and full-time Lecturers**

Prof. Dr. Christopher Koch.

**12. Further Information**

Language: English.
Literature: References will be provided via JOGU-StINe.

# 3.3. Non-Economics/Management

## Quantitative Methods of Epidemiology A

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.XXX.XXX | 180 | 1 or 2 Semester | 2./3. Semester | 6 LP |

| 1. | Courses | Contact Time | Self-Study | Credit Points |
|---|---|---|---|---|
| | a) Lecture: Epidemiology of Infectious Diseases | 1 SWS/10,5 h | 58,5 | 1 |
| | b) Small group: Epidemiology of Infectious Diseases | 2 SWS/21 h | | 2 |
| | c) Lecture: Prevention and Health Promotion | 1 SWS/10,5 h | 58,5 | 1 |
| | d) Small group: Prevention and Health Promotion | 2 SWS/21 h | | 2 |
| | e) Lecture: Genetic Epidemiology | 1 SWS/10,5 h | 58,5 | 1 |
| | f) Small group: Genetic Epidemiology | 2 SWS/21 h | | 2 |
| | g) Lecture: Advanced Methods in Clinical Research and Epidemiology | 1 SWS/10,5 h | 58,5 | 1 |
| | h) Small group: Advanced Methods in Clinical Research and Epidemiology | 2 SWS/21 h | | 2 |
| | i) Lecture: Social Epidemiology | 1 SWS/10,5 h | 58,5 | 1 |
| | j) Small group: Social Epidemiology | 2 SWS/21 h | | 2 |
| | k) Lecture: Pharmacoepidemiology and Secondary Data | 1 SWS/10,5 h | 58,5 | 1 |
| | l) Small group: Pharmacoepidemiology and Secondary Data | 2 SWS/21 h | | 2 |

| 2. | Group Size |
|---|---|
| | Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf). |

| 3. | **Qualification Goals/Learning Outcomes/Competencies** |
|---|---|

**Epidemiology of Infectious Diseases:**
After completion of the module students should know/be able to:
- understand epidemiological terminologies of infectious diseases
- name, understand and apply concepts for causes, disease emergence, and epidemiology of infectious diseases (bacterial, viral and parasitic)
- explain and apply the 'host-parasite-environment'
- name and understand models for disease outbreaks
- calculate transmission probabilities
- analyze data sets for transmission routes and spread of diseases

**Prevention and Health Promotion:**
After completion of the module students should know/be able to:
- risk factors for specific diseases
- different prevention strategies
- development of preventive interventions
- evaluation of the efficiency of prevention concepts
- age-specific prevention approaches for infants and children, adolescents, adults and elderly persons.

**Genetic Epidemiology:**
After completion of the module students should know/be able to:
- principles of modern molecular and genetic technologies
- application of these technologies to measure risk categories, effects
- susceptibility and biomarkers
- specific methodological topics in the use of biomarkers in epidemiology (selection of biomarkers, biological sample collection, processing and storage, study design)
- understand Mendelian inheritance theory
- principles of quantitative genetics
- apply statistical analysis methods for genetic studies of families and genome studies

**Advanced Methods in Clinical Research and Epidemiology:**
After completion of the module students should know/be able to:
- practical application of selected methods to analyze missing data
- identify special research problems, research focus and methodological challenges
- methodological difficulties in studies of the epidemiology of chronic diseases
- different levels of analysis
- DAGs

**Social Epidemiology:**
After completion of the module students should know/be able to:
- define goals of social epidemiological research
- overview of the historical development of social epidemiology in the international perspective
- understand basic sociological concepts of social inequality
- overview of the sociological discussion about approaches to the structure of social inequality
- describe theoretical and methodological aspects of important current studies in social epidemiology
- overview of data sources, research institutes and scientific journals involved in social epidemiological research
- explanatory approaches to health inequalities
- concepts of prevention and health promotion
- evaluation of projects that aim to reduce health inequalities
- critical reading of scientific publications that concern themselves with social epidemiological research results

**Pharmacoepidemiology and Secondary Data:**
After completion of the module students should know/be able to:
- development of drugs, phase 1-4 studies, ‚safety' studies
- problems in observational studies of drug safety, ‚confounding by indication'
- meaning, methods and analyses in pharmacoepidemiology
- principles of signal generation for the detection of side effects
- types and use of secondary data in pharmacoepidemiology
- concrete examples of pharmacoepidemiological work

| | |
|---|---|
| 4. | **Content** |
| | **Epidemiology of Infectious Diseases:**<br>The students will learn about relationships in infectious epidemiology (cross-sectional studies, cohort studies, case-control studies). Research questions in infectious epidemiology (strengths, weaknesses, methodological constraints, practical issues) will be identified and analyzed. In addition, students will obtain insight into the mathematical models for epidemiologists and learn about disease outbreak patterns.<br>**Prevention and Health Promotion:**<br>The students will develop an understanding of the concepts and foundations in prevention. They will get insights into the application of the learned concepts. This course is an introduction into recent prevention research. The contents can be divided into the following units:<br>- Age-specific preventive interventions<br>- Assessment and evaluation of risk factors<br>- Skills to apply prevention methods with practical examples<br>**Genetic Epidemiology:**<br>The students will develop an understanding of the principles and foundation of genetic and molecular epidemiology and statistical analysis. They will get to know the current laboratory methods in the field of genetic epidemiology and their use for the measurement of biomarkers.<br>The contents can be divided into the following units:<br>- molecular epidemiology of study designs<br>- research with biomarkers<br>- linkage, association and genotypic analysis<br>- modern molecular and genetic laboratory procedures Advanced Methods in Clinical Research and Epidemiology<br>**Advanced Methods in Clinical Research and Epidemiology:**<br>Students will deepen their understanding of the foundations of data analysis and learn complex study designs and DAGs.<br>The contents can be divided into the following units:<br>- Advanced study designs in clinical and population studies<br>- DAGs<br>**Social Epidemiology:**<br>The students will be given an introduction to the central research questions of social epidemiology as well as the most important historical and current studies in social epidemiology. They will learn sociological and psychological concepts of social inequality and social stratification to apply to research questions about health inequalities. Methodological and theoretical aspects of more recent international social epidemiological studies will be discussed as well as current research gaps. Furthermore, concepts of prevention and health promotion will be presented, and projects that aim to reduce health inequalities will be discussed.<br>The contents can be divided in the following units:<br>- concepts and terminology in social epidemiology and the sociology of social inequality and social stratification<br>- historical and state of current social epidemiological research<br>- explanatory approaches (e.g., material, cultural-behavioral, psychosocial, social selection, life course approach)<br>- strategies to reduce health inequalities with an international perspective<br>**Pharmacoepidemiology and Secondary Data:**<br>This module introduces students to the principles of the development of drugs, studies of drug safety as well as the application and suitability of epidemiological study design in pharmacoepidemiology. They will learn about risk models, propensity scores and drug monitoring from a scientific, industrial and regulatory perspective. |
| 5. | **Applicability oft he Module** |
| | As an elective module in the free part in M. Sc. in Quantitative Decision Making in Economics and Management. |
| 6. | **Recommended Participation Requirements** |
| | None. |
| 7. | **Prerequisites** |
| | None. |
| 8. | **Forms of Examinations** |
| | **8.1. Active Participation**<br><br>**8.2. Coursework)**<br>None.<br>**8.3. Module Exam**<br>Term paper or exam. |
| 9. | **Value in the Final Score** |
| | 6/120 Credit Points. |

| | |
|---|---|
| 10. | **Periodicity** |
| | Winter Semester: c) and d).<br>Summer Semester: a), b), e), f), g), h), i), j), k), l ). |
| 11. | **Module Representative and full-time Lecturers** |
| | Prof. Dr. Singer. |
| 12. | **Further Informationen** |
| | Language: English.<br>Two lectures and the corresponding small group need to be chosen. |

Courses that have already been chosen in Module B may not be chosen again.

## Quantitative Methods of Epidemiology B

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.XXX.XXX | 180 | 1 or 2 Semester | 2./3. Semester | 6 LP |

| 1. | Courses | Contact Time | Self-Study | Credit Points |
|---|---|---|---|---|
| | a) Lecture: Epidemiology of Infectious Diseases | 1 SWS/10,5 h | 58,5 | 1 |
| | b) Small group: Epidemiology of Infectious Diseases | 2 SWS/21 h | | 2 |
| | c) Lecture: Prevention and Health Promotion | 1 SWS/10,5 h | 58,5 | 1 |
| | d) Small group: Prevention and Health Promotion | 2 SWS/21 h | | 2 |
| | e) Lecture: Genetic Epidemiology | 1 SWS/10,5 h | 58,5 | 1 |
| | f) Small group: Genetic Epidemiology | 2 SWS/21 h | | 2 |
| | g) Lecture: Advanced Methods in Clinical Research and Epidemiology | 1 SWS/10,5 h | 58,5 | 1 |
| | h) Small group: Advanced Methods in Clinical Research and Epidemiology | 2 SWS/21 h | | 2 |
| | i) Lecture: Social Epidemiology | 1 SWS/10,5 h | 58,5 | 1 |
| | j) Small group: Social Epidemiology | 2 SWS/21 h | | 2 |
| | k) Lecture: Pharmacoepidemiology and Secondary Data | 1 SWS/10,5 h | 58,5 | 1 |
| | l) Small group: Pharmacoepidemiology and Secondary Data | 2 SWS/21 h | | 2 |

| 2. | Group Size |
|---|---|
| | Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf). |

| 3. | **Qualification Goals/Learning Outcomes/Competencies** |
|---|---|

**Epidemiology of Infectious Diseases:**
After completion of the module students should know/be able to:
- understand epidemiological terminologies of infectious diseases
- name, understand and apply concepts for causes, disease emergence, and epidemiology of infectious diseases (bacterial, viral and parasitic)
- explain and apply the 'host-parasite-environment'
- name and understand models for disease outbreaks
- calculate transmission probabilities
- analyze data sets for transmission routes and spread of diseases

**Prevention and Health Promotion:**
After completion of the module students should know/be able to:
- risk factors for specific diseases
- different prevention strategies
- development of preventive interventions
- evaluation of the efficiency of prevention concepts
- age-specific prevention approaches for infants and children, adolescents, adults and elderly persons.

**Genetic Epidemiology:**
After completion of the module students should know/be able to:
- principles of modern molecular and genetic technologies
- application of these technologies to measure risk categories, effects
- susceptibility and biomarkers
- specific methodological topics in the use of biomarkers in epidemiology (selection of biomarkers, biological sample collection, processing and storage, study design)
- understand Mendelian inheritance theory
- principles of quantitative genetics
- apply statistical analysis methods for genetic studies of families and genome studies

**Advanced Methods in Clinical Research and Epidemiology:**
After completion of the module students should know/be able to:
- practical application of selected methods to analyze missing data
- identify special research problems, research focus and methodological challenges
- methodological difficulties in studies of the epidemiology of chronic diseases
- different levels of analysis
- DAGs

**Social Epidemiology:**
After completion of the module students should know/be able to:
- define goals of social epidemiological research
- overview of the historical development of social epidemiology in the international perspective
- understand basic sociological concepts of social inequality
- overview of the sociological discussion about approaches to the structure of social inequality
- describe theoretical and methodological aspects of important current studies in social epidemiology
- overview of data sources, research institutes and scientific journals involved in social epidemiological research
- explanatory approaches to health inequalities
- concepts of prevention and health promotion
- evaluation of projects that aim to reduce health inequalities
- critical reading of scientific publications that concern themselves with social epidemiological research results

**Pharmacoepidemiology and Secondary Data:**
After completion of the module students should know/be able to:
- development of drugs, phase 1-4 studies, ‚safety' studies
- problems in observational studies of drug safety, ‚confounding by indication'
- meaning, methods and analyses in pharmacoepidemiology
- principles of signal generation for the detection of side effects
- types and use of secondary data in pharmacoepidemiology
- concrete examples of pharmacoepidemiological work

| | |
|---|---|
| 4. | **Content** |
| | **Epidemiology of Infectious Diseases:**<br>The students will learn about relationships in infectious epidemiology (cross-sectional studies, cohort studies, case-control studies). Research questions in infectious epidemiology (strengths, weaknesses, methodological constraints, practical issues) will be identified and analyzed. In addition, students will obtain insight into the mathematical models for epidemiologists and learn about disease outbreak patterns.<br>**Prevention and Health Promotion:**<br>The students will develop an understanding of the concepts and foundations in prevention. They will get insights into the application of the learned concepts. This course is an introduction into recent prevention research. The contents can be divided into the following units:<br>- Age-specific preventive interventions<br>- Assessment and evaluation of risk factors<br>- Skills to apply prevention methods with practical examples<br>**Genetic Epidemiology:**<br>The students will develop an understanding of the principles and foundation of genetic and molecular epidemiology and statistical analysis. They will get to know the current laboratory methods in the field of genetic epidemiology and their use for the measurement of biomarkers.<br>The contents can be divided into the following units:<br>- molecular epidemiology of study designs<br>- research with biomarkers<br>- linkage, association and genotypic analysis<br>- modern molecular and genetic laboratory procedures Advanced Methods in Clinical Research and Epidemiology<br>**Advanced Methods in Clinical Research and Epidemiology:**<br>Students will deepen their understanding of the foundations of data analysis and learn complex study designs and DAGs.<br>The contents can be divided into the following units:<br>- Advanced study designs in clinical and population studies<br>- DAGs<br>**Social Epidemiology:**<br>The students will be given an introduction to the central research questions of social epidemiology as well as the most important historical and current studies in social epidemiology. They will learn sociological and psychological concepts of social inequality and social stratification to apply to research questions about health inequalities. Methodological and theoretical aspects of more recent international social epidemiological studies will be discussed as well as current research gaps. Furthermore, concepts of prevention and health promotion will be presented, and projects that aim to reduce health inequalities will be discussed.<br>The contents can be divided in the following units:<br>- concepts and terminology in social epidemiology and the sociology of social inequality and social stratification<br>- historical and state of current social epidemiological research<br>- explanatory approaches (e.g., material, cultural-behavioral, psychosocial, social selection, life course approach)<br>- strategies to reduce health inequalities with an international perspective<br>**Pharmacoepidemiology and Secondary Data:**<br>This module introduces students to the principles of the development of drugs, studies of drug safety as well as the application and suitability of epidemiological study design in pharmacoepidemiology. They will learn about risk models, propensity scores and drug monitoring from a scientific, industrial and regulatory perspective. |
| 5. | **Applicability oft he Module** |
| | As an elective module in the free part in M. Sc. in Quantitative Decision Making in Economics and Management. |
| 6. | **Recommended Participation Requirements** |
| | None. |
| 7. | **Prerequisites** |
| | None. |
| 8. | **Forms of Examinations** |
| | **8.1. Active Participation**<br><br>**8.2. Coursework)**<br>None.<br>**8.3. Module Exam**<br>Term paper or exam. |
| 9. | **Value in the Final Score** |
| | 6/120 Credit Points. |

| | |
|---|---|
| 10. | **Periodicity** |
| | Winter Semester: c) and d).<br>Summer Semester: a), b), e), f), g), h), i), j), k), l ). |
| 11. | **Module Representative and full-time Lecturers** |
| | Prof. Dr. Singer. |
| 12. | **Further Informationen** |
| | Language: English.<br>Two lectures and the corresponding small group are to be chosen. |

Courses that have already been chosen in Module A may not be chosen again.

# Quantitative Methoden der empirischen Sozialforschung für Fortgeschrittene

| Modul-Kennnummer (JOGU-StINe) | Arbeitsaufwand (workload) | Moduldauer (laut Studienverlaufsplan) | Regelsemester (laut Studienverlaufsplan) | Leistungspunkte (LP) |
|---|---|---|---|---|
| M.03.XXX | 180 h | 1 Semester | 2./3. Semester | 6 LP |

| 1. | Lehrveranstaltungen/Lehrformen | Kontaktzeit | Selbststudium | Leistungspunkte |
|---|---|---|---|---|
| | Quantitative Methoden der empirischen Sozialforschung für Fortgeschrittene (02.149.XXX) | | | |
| | Seminar (Pfl) | 2 SWS/21 h | 159 h | 6 LP |
| | Wechselndes Angebot von Seminaren aus dem Bereich der quantitativen Methoden der empirischen Sozialforschung. Lehrimport aus dem FB02. | | | |

**2. Gruppengrößen**

Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualifikationsziele/Lernergebnisse/Kompetenzen**

In den Seminaren erfolgt eine Einübung und kritische Auseinandersetzung mit fortgeschrittenen Methoden der quantitativen Sozialforschung hinsichtlich ihrer Eignung und Leistungsfähigkeit für empirische Fragestellungen. An konkreten Beispielen werden Verfahren der empirischen Sozialforschung erlernt, diskutiert und erprobt. Durch die erfolgreiche Beendigung dieses Moduls sind die Studierenden in der Lage, empirische Studien eigenständig durchzuführen. Das Modul dient der Vermittlung vertiefter sozialwissenschaftlicher Methodenkompetenz.

**4. Inhalte**

Das Modul vermittelt ein solides anwendungsorientiertes Wissensfundament hinsichtlich fortgeschrittener Methoden und Techniken der quantitativen empirischen Sozialforschung. Die Studierenden sollen mit den wissenschaftstheoretischen Grundlagen sowie den konkreten Vorgehensweisen unterschiedlicher Verfahren vertraut gemacht werden und anhand von Praxisbeispielen deren Leistungsfähigkeit beurteilen.

**5. Verwendbarkeit des Moduls**

Als Wahlpflichtmodul im freien Teil im M. Sc. in Quantitative Decision Making in Economics and Management.

**6. Empfohlene Voraussetzung(en) für die Teilnahme**

Keine.

**7. Zugangsvoraussetzung(en)**

Keine.

**8. Leistungsüberprüfungen**

**8.1. Aktive Teilnahme**

**8.2. Studienleistung(en)**

Keine.

**8.3. Modulprüfung**

Hausarbeit oder Klausur (90 Minuten) oder mündliche Prüfung (30 Minuten).

**9. Stellenwert der Note in der Endnote**

6/120 Leistungspunkten.

**10. Häufigkeit des Angebots**

Jedes Semester.

**11. Modulbeauftragte oder -beauftragter sowie hauptamtlich Lehrende**

Geschäftsführende Leitung /Alle Lehrenden des Instituts

**12. Sonstige Informationen**

Unterrichtssprache: Deutsch.
Literatur: Literaturhinweise können dem kommentierten Vorlesungsverzeichnis in JOGU-StINe entnommen werden.

# Training emotionaler und sozialer Kompetenzen I – TESK I

| Modul-Kennnummer (JOGU-StINe) | Arbeitsaufwand (workload) | Moduldauer (laut Studienverlaufsplan) | Regelsemester (laut Studienverlaufsplan) | Leistungspunkte (LP) |
|---|---|---|---|---|
| M.03.184.5011 | 180 h | 1 Semester | frei | 6 LP |

| 1. | Lehrveranstaltungen/Lehrformen | Kontaktzeit | Selbststudium | Leistungspunkte |
|---|---|---|---|---|
| | 03.185.5011 | | | |
| | Kleingruppe (Pfl) | 4 SWS/42 h | 138 h | 6 LP |

**2. Gruppengrößen**

15
Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualifikationsziele/Lernergebnisse/Kompetenzen**

Vermittlung von theoretischem und praktischem Wissen in Bezug auf emotionale Kompetenz. Ziele sind eine angemessene, adaptive Emotionswahrnehmung, -regulation und -nutzung, die Stärkung des Selbstwertes und des Selbstvertrauens, die Erarbeitung von Zielvorstellungen für die eigene berufliche und private Zukunft sowie eine reflektierte Selbstwahrnehmung.

**4. Inhalte**

Der Kurs fokussiert die eigene Selbstwahrnehmung und die Wahrnehmung der eigenen Gefühle sowie einen konstruktiven und adaptiven Umgang mit diesen. In dieser selbsterfahrungsorientierten Veranstaltung kommen unterschiedliche Übungen zum Einsatz, begleitet von einem engen Austausch in der Gruppe. Darüber hinaus werden visualisierende, kreative Techniken eingesetzt, die ein hohes Maß an Reflexionsbereitschaft und Offenheit erfordern. Zudem werden die Studierenden in unterschiedliche Entspannungs- und Achtsamkeitstechniken eingeführt.

**Überblick der Themen und Inhalte:**

*Selbstwert und Selbstkonzept*

- Ressourcenfokussierte und selbstwertstärkende Übungen
- Arbeit mit inneren Anteilen
- Arbeit mit Selbst- und Fremdwahrnehmung

*Emotionale Kompetenz*

- Psychoedukation zu Emotionsentstehung
- Akzeptanz, Toleranz und zielgerichtete Modifikation von Emotionen
- Konstruktiver Umgang mit negativen Emotionen

*Kennenlernen von verschiedenen Achtsamkeits- und Entspannungstechniken*

- Atemmeditation
- Body Scan
- Progressive Muskelrelaxation (PMR)

*Fokus auf Werte und Ziele*

- Kennenlernen eigener Stärken und Kompetenzen
- Reflexion von Vergangenheit und Gegenwart mit Blick auf die Zukunft
- Entwicklung von kurz- und mittelfristigen Zielen und Schritten der Zielerreichung

| | |
|---|---|
| 5. | **Verwendbarkeit des Moduls** |
| | Als Wahlpflichtmodul im freien Bereich des B.Sc. Wirtschaftswissenschaften.<br>Als Wahlpflichtmodul im freien Teil des M.Sc. Accounting and Finance.<br>Als Wahlpflichtmodul im freien Teil des M.Sc. Management.<br>Als Wahlpflichtmodul im freien Teil des M.Sc. International Economics and Public Policy.<br>Als Wahlpflichtmodul im freien Teil des M.Sc. Quantitative Decison Making in Economics and Management.<br><br>Als Veranstaltung im Studienprogramm Q+. |
| 6. | **Empfohlene Voraussetzung(en) für die Teilnahme** |
| | Keine |
| 7. | **Zugangsvoraussetzung(en)** |
| | Ausfüllen des Fragebogens auf<br>https://www.macro.economics.uni-mainz.de/studienmodul-emotionale-und-soziale-kompetenz2022-23/ |
| 8. | **Leistungsüberprüfungen** |
| | **8.1. Aktive Teilnahme**<br>Die Veranstaltung ist durch ein Viertel Wissensvermittlung (Psychoedukation) und durch drei Viertel aktive Teilnahme, Übungen und Austausch im Plenum und in Kleingruppen gekennzeichnet. Für das Modul besteht eine Anwesenheitspflicht, die unter Punkt 12 weiter erläutert wird.<br>**8.2. Studienleistung(en)**<br>Keine.<br>**8.3. Modulprüfung**<br>Seminararbeit: TeilnehmerInnen schreiben 8 bis 10 Seiten über ein vorher ausgegebenes Thema: Zunächst soll das Thema aus einer theoretischen Perspektive inklusive kritischer Diskussion beleuchtet werden, anschließend soll es in Anwendung auf sich selbst und die eigenen Erfahrungen und inneren Entwicklungen ausgearbeitet werden. |
| 9. | **Stellenwert der Note in der Endnote** |
| | 6 Leistungspunkte. (6 von 180 in Bachelorstudiengängen, 6 von 120 in Masterstudiengängen) |
| 10. | **Häufigkeit des Angebots** |
| | Jährlich im Wintersemester. |
| 11. | **Modulbeauftragte oder -beauftragter sowie hauptamtlich Lehrende** |
| | Prof. Dr. Klaus Wälde, Dr. Sarah Tran-Huu |
| 12. | **Sonstige Informationen** |
| | Unterrichtssprache: Deutsch<br>Bitte die Informationen zum Anmeldeverfahren auf der Homepage des Lehrstuhls für Makroökonomie beachten:<br>https://www.macro.economics.uni-mainz.de/studienmodul-emotionale-und-soziale-kompetenz2022-23/<br><br>Max. 6 LP können im Bereich der TESK-Module erreicht werden. Wenn bereits TESK II (M.03.184.5012) belegt wurde, können für TESK I keine Leistungspunkte erworben werden.<br><br>Da die Anwesenheit in der Lehrveranstaltung erforderlich ist, um das Lernziel zu erreichen, besteht eine Anwesenheitspflicht. Die Anwesenheit an der Lehrveranstaltung ist noch zu bestätigen, wenn die oder der Studierende bis zu drei Einzelveranstaltungen, höchstens jedoch bis zu 20 % der Veranstaltungszeit versäumt hat. Bei Überschreitung der zulässigen Fehlzeit aus Gründen, die die oder der Studierende nicht zu vertreten hat, entscheidet die Veranstaltungsleitung auf formlosen Antrag der oder des Studierenden und unter Berücksichtigung der Umstände des Einzelfalls, ob eine Kompensation der Fehlzeit möglich ist, um dennoch das Lernziel zu erreichen. |

# Training emotionaler und sozialer Kompetenzen II – TESK II

| Modul-Kennnummer (JOGU-StINe) | Arbeitsaufwand (workload) | Moduldauer (laut Studienverlaufsplan) | Regelsemester (laut Studienverlaufsplan) | Leistungspunkte (LP) |
|---|---|---|---|---|
| M.03.184.5012 | 180 h | 1 Semester | frei | 6 LP |

| 1. | Lehrveranstaltungen/Lehrformen | Kontaktzeit | Selbststudium | Leistungspunkte |
|---|---|---|---|---|
| | (03.184.5012) | | | |
| | Kleingruppe (Pfl) | 4 SWS/42 h | 138 h | 6 LP |

**2. Gruppengrößen**

15
Gemäß aktueller Satzung über die Betreuungsrelationen von Lehrveranstaltungen in Bachelor- und Masterstudiengängen und zur Festsetzung der Normwerte für den Ausbildungsaufwand (Curricularnormwerte) der Johannes Gutenberg-Universität Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

**3. Qualifikationsziele/Lernergebnisse/Kompetenzen**

Vermittlung von theoretischem und praktischen Wissen im Bezug auf soziale Kompetenz, Kommunikation, Konfliktentstehung und -bewältigung sowie Stressmanagement.

**4. Inhalte**

TESK II fokussiert die soziale Kompetenz und den Umgang mit Anderen (als Fortsetzung von TESK I). In dieser selbsterfahrungsorientierten Veranstaltung werden in unterschiedlichen Übungen, im Gruppenaustausch und in der Selbstreflexion Themen wie Kommunikation und Konfliktmanagement erarbeitet. Voraussetzung sind Offenheit und die Bereitschaft zur aktiven Teilnahme sowie zum Einbringen persönlicher Themen.

**Überblick der Themen und Inhalte:**

*Soziales Handeln und Kommunikation*

- Kennenlernen unterschiedlicher Modelle und Theorien systemisch-humanistischer Ausrichtung
- Praktisches Erlernen und Einüben von Kommunikationsstrategien (bspw. gewaltfreie Kommunikation nach Marshall Rosenberg, aktives Zuhören nach Carl Rogers)
- Reflexion des eigenen Handelns und Erlebens in Gruppen und sozialen Situationen

*Konstruktiver Umgang mit Konflikten*

- Theorien und Modelle zu Konfliktentstehung sowie Strategien der Konfliktlösung
- Inter- und intrapersonale Konfliktbearbeitung
- Reflexion des eigenen Konfliktverhaltens und Erfahrungen mit Konflikten in unterschiedlichen Settings und Rollen

*Umgang mit Stress*

- Stresstheorien und Modelle
- Instrumentelles, mentales und regeneratives Stressmanagement
- Erarbeitung von konstruktiven Bewältigungsstrategien

**5. Verwendbarkeit des Moduls**

Als Wahlpflichtmodul im freien Bereich des B.Sc. Wirtschaftswissenschaften.
Als Wahlpflichtmodul im freien Teil des M.Sc. Accounting and Finance.
Als Wahlpflichtmodul im freien Teil des M.Sc. Management.
Als Wahlpflichtmodul im freien Teil des M.Sc. International Economics and Public Policy.
Als Wahlpflichtmodul im freien Teil des M.Sc. Quantitative Decison Making in Economics and Management.

Als Veranstaltung im Studienprogramm Q+.

**6. Empfohlene Voraussetzung(en) für die Teilnahme**

Wünschenswert ist die Teilnahme an TESK I, jedoch nicht verpflichtend.

| | |
|---|---|
| 7. | **Zugangsvoraussetzung(en)** |
| | Ausfüllen des Fragebogens auf https://www.macro.economics.uni-mainz.de/studienmodul-emotionale-und-soziale-kompetenz2022-23/. |
| 8. | **Leistungsüberprüfungen** |
| | **8.1. Aktive Teilnahme**<br>Die Veranstaltung ist durch ein Viertel Wissensvermittlung (Psychoedukation) und durch drei Viertel aktive Teilnahme, Übungen und Austausch im Plenum und in Kleingruppen gekennzeichnet. Für das Modul besteht eine Anwesenheitspflicht, die unter Punkt 12 weiter erläutert wird.<br>**8.2. Studienleistung(en)**<br>Keine.<br>**8.3. Modulprüfung**<br>Seminararbeit: TeilnehmerInnen schreiben 8 bis 10 Seiten über ein vorher ausgegebenes Thema: Zunächst soll das Thema aus einer theoretischen Perspektive inklusive kritischer Diskussion beleuchtet werden, anschließend soll es in Anwendung auf sich selbst und die eigenen Erfahrungen und inneren Entwicklungen ausgearbeitet werden. |
| 9. | **Stellenwert der Note in der Endnote** |
| | 6 Leistungspunkte. (typ. 6 von 180 in Bachelorstudiengängen, 6 von 120 in Masterstudiengängen) |
| 10. | **Häufigkeit des Angebots** |
| | Jährlich im Sommersemester. |
| 11. | **Modulbeauftragte oder -beauftragter sowie hauptamtlich Lehrende** |
| | Prof. Dr. Klaus Wälde, Dr. Sarah Tran-Huu |
| 12. | **Sonstige Informationen** |
| | Unterrichtssprache: Deutsch<br>Bitte die Informationen zum Anmeldeverfahren auf der Homepage des Lehrstuhls für Makroökonomie beachten:<br>https://www.macro.economics.uni-mainz.de/studienmodul-emotionale-und-soziale-kompetenz2022-23/<br><br>Max. 6 LP können im Bereich der TESK-Module erreicht werden. Wenn bereits TESK I (M.03.184.5011) belegt wurde, können für TESK II keine Leistungspunkte erworben werden.<br><br>Da die Anwesenheit in der Lehrveranstaltung erforderlich ist, um das Lernziel zu erreichen, besteht eine Anwesenheitspflicht. Die Anwesenheit an der Lehrveranstaltung ist noch zu bestätigen, wenn die oder der Studierende bis zu drei Einzelveranstaltungen, höchstens jedoch bis zu 20 % der Veranstaltungszeit versäumt hat. Bei Überschreitung der zulässigen Fehlzeit aus Gründen, die die oder der Studierende nicht zu vertreten hat, entscheidet die Veranstaltungsleitung auf formlosen Antrag der oder des Studierenden und unter Berücksichtigung der Umstände des Einzelfalls, ob eine Kompensation der Fehlzeit möglich ist, um dennoch das Lernziel zu erreichen. |

# 3.4. Tutorial Module

| Tutorial Module | | | | | |
|---|---|---|---|---|---|
| **Module Identification Number (JOGU-StINe)** | | **Workload** | **Duration** | **Study Semester** | **Credit Points (ECTS)** |
| M.03.996.0015 | | 180 h | 1 Semester | 2./3. Semester | 6 ECTS |
| 1. | **Courses** | | **Contact Time** | **Self-study** | **Credit Points** |
| | Teaching one of the following tutorials (03.) | | | | |
| | a) EDV | | 4 SWS/42 h | 138 h | 6 ECTS |
| | b) Operations Management | | 4 SWS/42 h | 138 h | 6 ECTS |
| | c) Mikroökonomie I | | 4 SWS/42 h | 138 h | 6 ECTS |
| | d) Makroökonomie I | | 4 SWS/42 h | 138 h | 6 ECTS |
| | e) Mathematik | | 4 SWS/42 h | 138 h | 6 ECTS |
| | f) Statistik I | | 4 SWS/42 h | 138 h | 6 ECTS |
| | g) Statistik II | | 4 SWS/42 h | 138 h | 6 ECTS |
| | h) Empirische Wirtschaftsforschung | | 4 SWS/42 h | 138 h | 6 ECTS |
| 2. | **Group Size** | | | | |
| | The number of available places varies each semester. Usually, 3 to 12 places per subject. | | | | |
| 3. | **Qualification Goals/Learning Outcomes/Competencies** | | | | |
| | The students<br>- are able to lead a weekly exercise group on basic topics of economics with the help of solution sheets.<br>- can answer typical questions on the exercises independently.<br>- Are able to answer further questions from students after consulting with their supervisor.<br>- Present themselves confidently in front of a group. | | | | |
| 4. | **Content** | | | | |
| | The student independently either conducts two weekly tutorials totalling 4 semester hours or leads a tutorial (2 semester hours) and assists in correcting exams. The students receive the exercise sheets and the corresponding solutions from the respective chair.<br>The group size is approximately 5 to 60 students. | | | | |
| 5. | **Applicability of the Module** | | | | |
| | As an elective module in the free part in M. Sc. in Quantitative Decision Making in Economics and Management. | | | | |
| 6. | **Recommended Participation Requirements** | | | | |
| | Attendance at tutor training. | | | | |
| 7. | **Prerequisites** | | | | |
| | Good knowledge in the respective subject area. Application and selection take place at the respective chair. | | | | |
| 8. | **Forms of Examinations** | | | | |
| | **8.1. Active Participation**<br><br>**8.2. Coursework**<br>None.<br>**8.3. Module exam**<br>Demonstration of a lesson held by the student. | | | | |
| 9. | **Value in the Final Score** | | | | |
| | 6/120 Credit Points. | | | | |
| 10. | **Periodicity** | | | | |
| | Every Winter and Summer Semester (s. point 1). | | | | |
| 11. | **Module Representative and full-time Lecturers** | | | | |
| | Prof. Dr. Thorsten Schank | | | | |

| 12. | **Further Information** |
|---|---|
| | Language: German or English.<br>Literature: depends on the tutorial taught. |

# 4. RESEARCH MODULE (12 ECTS)

## Research Module: Applied Project Seminar

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.B98.690 | 180 h | 1 Semester | 2./3. Semester | 12 ECTS |

| 1. | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Project Seminar in Econometrics (03.B98.6911) | 2 SWS/21 h | 159 h | 6 ECTS |
| | Project Seminar in Management Science and Business Intelligence (03.996.3199 und 03.996.3299) | 2 SWS/21 h | 159 h | 6 ECTS |
| | Project Seminar in Economic Behavior and Strategy (03.B98.6932) | 2 SWS/21 h | 159 h | 6 ECTS |

| | |
|---|---|
| 2. | **Group Size** |
| | In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf). |
| 3. | **Qualification Goals/Learning Outcomes/Competencies** |
| | In the context of the three domains, students learn to apply quantitative methods themselves and to carry out their own empirical analysis or to identify, analyze and discuss current scientific literature on a specified research topic. Students deepen their presentation skills and learn to defend their findings in front of a medium-sized audience. By writing the seminar paper, they learn to formulate arguments and to structure and write a term paper that complies with academic standards. |
| 4. | **Content** |
| | Current applied research questions in economics and management. Depending on the domain, these could be examined via empirical analysis or a critical review of the literature. |
| 5. | **Applicability of the Module** |
| | As an elective module in M. Sc. in Quantitative Decision Making in Economics and Management |
| 6. | **Recommended Participation Requirements** |
| | None. |
| 7. | **Prerequisites** |
| | None. |
| 8. | **Forms of Examinations** |
| | **8.1. Active Participation**<br>-<br>**8.2. Coursework**<br>-None<br>**8.3. Module exam**<br>Consists of two partial module examinations: in two project seminars, a term paper and a presentation must be completed in each case. |
| 9. | **Value in the Final Score** |
| | 12/120 Credit Points. |
| 10. | **Periodicity** |
| | Each semester. |
| 11. | **Module Representative and full-time Lecturers** |
| | Prof. Dr. Florian Hett, Prof. Dr. Stefan Irnich., Prof. Dr. Thorsten Schank, Prof. Dr. Andranik Tumasjan, Prof. Dr. Reyn van Ewijk, Constantin Weiser. |
| 12. | **Further Information** |
| | Language: English.<br><br>Two project seminars must be chosen. 12 ECTS are required to complete the module.<br><br>Each semester, at least one seminar will be offered within each of three domains.<br>Further information on the seminar offer will be available on JOGU-StINe for the respective semester. |

# 5. RESEARCH COLLOQUIUM (5 ECTS)

## Research Colloquium

| Module Identification Number (JOGU-StINe) | Workload | Duration | Study Semester | Credit Points (ECTS) |
|---|---|---|---|---|
| M.03.XXX | 150 h | 1-3 Semesters | 2.-4. Semester | 5 ECTS |

| | Courses | Contact Time | Self-study | Credit Points |
|---|---|---|---|---|
| | Research Colloquium (03.) | 2 SWS/21 h | 129 h | 5 ECTS |

2. **Group Size**

In accordance with the current statutes on supervision ratios of courses in bachelor's and master's degree programs and on setting the standard values for the training effort (curricular standard values) of the Johannes Gutenberg University Mainz (http://www.uni-mainz.de/studlehr/ordnungen/CNW_Satzung_aktuell.pdf).

3. **Qualification Goals/Learning Outcomes/Competencies**

Students get to know current research applications of quantitative methods; students learn how to critically assess presentations of other researchers and to actively take part in an academic discussion; students learn how to present and to defend their own research in front of an academic audience.

4. **Content**

Presentations of academic papers on quantitative research in the fields of (a) econometrics (b) management science and business intelligence or (c) economic behavior and strategy.

5. **Applicability of the Module**

As a compulsory module in M. Sc. in Quantitative Decision Making in Economics and Management.

6. **Recommended Participation Requirements**

None.

7. **Prerequisites**

None.

8. **Forms of Examinations**

**8.1. Active Participation**
Participation in faculty seminars, brown bag seminars, research workshops.
**8.2. Coursework**
Term paper.
**8.3. Module exam**
Presentation of master thesis.

9. **Value in the Final Score**

5/120 Credit Points.

10. **Periodicity**

Every summer and winter term.

11. **Module Representative and full-time Lecturers**

Prof. Dr. Florian Hett, Prof. Dr. Stefan Irnich, Prof. Dr. Thorsten Schank.

12. **Further Information**

Language: English.
Participation (and written summary) from second semester onwards possible.