LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

Module Handbook

Master of Science program: "Quantitative Economics" (M.Sc.)

(120 ECTS credits, 4 semesters)

Based on the Examination and Programme Rules and Regulations issued on Sept. 29th, 2017

88/177/---/M0/H/2017

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Contents

Abbreviations and Annotations

CP	Credit Points, ECTS-Punkte
ECTS	European Credit Transfer and Accumulation System
h	hours
SoSe	summer semester
SWS	contact hours
WiSe	winter semester
WP	compulsory elective course
P	mandatory course

1. The ECTS credits assigned in the module handbook are designated as follows: Credit Points not listed in parentheses are awarded when the pertinent examination of the module or module parts have/has been completed successfully. Credit Points in parentheses are listed for calculatory purposes only.

2. The semester for taking a module can either be binding or may be considered as a recommendation, depending on the applicable data in annex 2 of the Examination and Programme Rules and Regulations. In this module catalogue, the options are indicated as "scheduled semester" and "recommended semester".

3. Please note: The module handbook is merely intended to serve as an orientation whereas the provisions of the applicable version of the Examination and Programme Rules and Regulations (in German only) of your Programme are legally binding. See: www.lmu.de/studienangebot and select your program.

4. The detailed contents of each module component and the suggested literature may change often. Therefore, these will be provided by each individual instructor at the beginning of the relevant semester in the form of a „course syllabus", either in print or online.

5. The module handbook lists all the allowed examination modalities for each module. If more than one type of examination is allowed, the specific type chosen each year for amodule or module component will be provided at the beginning of the relevant semester by the instructors, as stated in the Examination and Programme Rules and Regulations.

6. Unless otherwise indicated in writing by the instructor of the course or by the supervisor of the project, students are expected to pay for their own travel expenses and bring their own personal equipment, if the course / research project requires that field work be carried out.

Module: P 1 Microeconomics Consumer and Decision Theory

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self study hours	ECTS
Lecture	P 1.1 Microeconomics - Consumer and Decision Theory	WiSe	30 h (2 SWS)	60 h	(3)
Tutorial	P 1.2 Microeconomics - Consumer and Decision Theory	WiSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 4 contact hours per week. Including time for self-study and field time, 180 hours have to be invested in total.

Module Type	Mandatory module with mandatory courses
Usability of the module in other Programmes	none
Elective guidelines	none
Entry requirements	none
Semester	Recommended semester: 1
Duration	The completion of the module takes 1 semester.
Content	Microeconomics (and most of modern macroeconomics) tries to explain economic phenomena as the outcome of individual decisions. The starting point of the analysis is always individual behavior. The theory of individual decision making is of crucial importance for all subfields of economics. The module will cover the following topics: 1. Preference and Choice 2. Consumer Choice 3. Classical Demand Theory 4. Welfare Economics and Aggregate Demand 5. Production Theory 6. Decisions under Uncertainty 7. Risk Attitude 8. Problems of EUT and Prospect Theory 9. Partial Equilibrium 10. General Equilibrium and its Welfare Properties 11. General Equilibrium under Uncertainty
Learning outcomes	At the end of this course, you will have a good knowledge of the most important foundational concepts of microeconomic theory, and you will be able to use the mathematical formalism to analyze microeconomic issues.

Type of examination	Written exam
Type of assessment	The successful completion of the module will be graded.
Requirements for ECTS credits accrual	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Module coordinator	F. Englmaier / K. Schmidt
Language(s)	English
Additional information	Literature: • MWG (1995), Part 1 and 4 • Kreps (1990), Chapters 1-2

Module: P 2 Macroeconomics Growth Theory

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self study hours	ECTS
Lecture	P 2.1 Macroeconomics - Growth Theory	WiSe	30 h (2 SWS)	60 h	(3)
Tutorial	P 2.2 Macroeconomics - Growth Theory	WiSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 4 contact hours per week. Including time for self-study and field time, 180 hours have to be invested in total.

Module type	Mandatory module with mandatory courses.
Usability of the module in other Programmes	none
Elective guidelines	none
Entry requirements	none
Semester	Recommended semester: 1
Duration	The completion of the module takes 1 semester.
Content	This course covers dynamic optimization methods in discrete time. To illustrate these concepts, various applications in consumption and growth are presented and studied.
Learning outcomes	Students who have successfully completed this course have acquired the knowledge of the mathematical concepts related to dynamic programming (sequence problem, transversality condition, Bellman equation, contraction mapping, principle of optimality), the basic numerical tools required to implement these concepts and the classic work-horse models used in modern macroeconomic research. The class of models include: the Solow model, the neoclassical growth model and overlapping-generations models.
Type of examination	Written exam
Type of assessment	The successful completion of the module will be graded.
Requirements for ECTS credits accrual	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential

	elective compulsory module parts) has/have been completed successfully.
Module coordinator	U. Sunde / N.N.
Language(s)	English
Additional Information	Literature: Acemoglu, D. (2008). Introduction to Modern Economic Growth. Princeton University Press. Ljungqvist, L. – Sargent, T. J. (2004). Recursive Macroeconomic Theory. MIT Press. Lucas, R. E. – Stokey, N. L. (1989). Recursive Methods in Economic Dynamics. Harvard University Press.

Module: P 3 Mathematics for Economists

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self study hours	ECTS
Lecture	P 3.1 Mathematics for Economists	WiSe	30 h (2 SWS)	60 h	(3)
Tutorial	P 3.2 Mathematics for Economists	WiSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 4 contact hours per week. Including time for self-study and field time, 180 hours have to be invested in total.

Module type	Mandatory module with mandatory courses.
Usability of the module in other Programmes	Master of Science in Economics
Elective guidelines	none
Entry requirements	none
Semester	Recommended semester: 1
Duration	The completion of the module takes 1 semester.
Content	The module presents the mathematical methods underlying economic theories and applications. The aim is to provide students with the mathematical background for their subsequent study of economics. It comprises a lecture and an accompanying problem solving class (i.e. the tutorial): 1 Methods of Proof 2. Matrix Algebra (Basics) 3. Sets and Mappings 4. Functions 5. Optimization 6 Differential Equations (Basics) 7. Probability Theory (Basics) 8. Integration 9. Basic Concepts in Game Theory
Learning outcomes	Students will acquire the mathematical methods which are necessary for the continuation of their studies and will be able to apply them independently.
Type of examination	Written exam
Type of assessment	The successful completion of the module will be graded.

Requirements for ECTS credits accrual	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Module coordinator	F. Englmaier / K. Schmidt
Language(s)	Englisch
Additional information	Literature: Most of the core material is covered in the math appendix of the excellent Jehle/Reny book, but any good math for econ book is equally advisable. • M. Hoy, J. Livernois, C.J. McKenna, R. Rees, and T. Stengos. Mathematics for Economics. MIT Press. 2nd edition (2001) • G. Jehle and P.J. Reny. Advanced Microeconomic Theory. Prentice Hall. 3rd edition (2011) • C.P. Simon and L.E. Blume. Mathematics for Economists. W. W. Norton & Company (1994) • K. Wainwright and A. Chiang. Fundamental Methods of Mathematical Economics. McGraw-Hill/Irwin. 4th edition (2004)

Module: P 4 Econometrics Regression Analysis

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self study hours	ECTS
Lecture	P 4.1 Econometrics - Regression Analysis	WiSe	30 h (2 SWS)	60 h	(3)
Tutorial	P 4.2 Econometrics - Regression Analysis	WiSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 4 contact hours per week. Including time for self-study and field time, 180 hours have to be invested in total.

Module type	Mandatory module with mandatory courses.
Usability of the module in other Programmes	none
Elective guidelines	none
Entry requirements	none
Semester	Recommended semester: 1
Duration	The completion of the module takes 1 semester.
Content	**Topics I:** • Causality / Identification • Statistical properties of estimators **Topics II:** • The linear model and OLS estimation **Topics III:** • Instrumental variables • Linear models for panel data • Treatment effects
Learning outcomes	The module introduces students to modern micro-econometrics. Students develop a formal and intuitive understanding of standard econometric methods and key concepts: identifcation, ordinary least squares (OLS), instrumental variables, panel data, treatment effects. The module enables students to apply and implement estimators using Stata. Students also learn to critically evaluate real-world empirical studies.
Type of examination	Written exam
Type of assessment	The successful completion of the module will be graded.

Requirements for ECTS credits accrual	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Module coordinator	D. Cantoni / J. Winter
Language(s)	English
Additional information	Literature: **Primary textbook**: Jeffrey M. Wooldridge, Econometric Analysis of Cross Section and Panel Data, 2nd Edition, MIT Press, 2010. **Supplementary textbooks**: • Colin Cameron and Pravin K. Trivedi, Microeconometrics, Cambridge University Press, 2005. • Joshua D. Angrist and Joern-Ste_en Pischke, Mostly Harmless Econometrics, Princeton University Press, 2009. **For more intuitive reading**: Jeffrey M. Wooldridge, Introductory Econometrics: A modern Approach, 5th Edition, South-Western Cengage Learning, 2013

Module: P 5 Econometrics Advanced Methods

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self study hours	ECTS
Lecture	P 5.1 Econometrics - Advanced Methods	WiSe	30 h (2 SWS)	60 h	(3)
Tutorial	P 5.2 Econometrics - Advanced Methods	WiSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 4 contact hours per week. Including time for self-study and field time, 180 hours have to be invested in total.

Module type	Mandatory module with mandatory courses.
Usability of the module in other Programmes	none
Elective guidelines	none
Entry requirements	none
Semester	Recommended semester: 1
Duration	The completion of the module takes 1 semester.
Content	The module covers the following topics: • Large Sample Asymptotics • Maximum Likelihood • GMM and (advanced) Instrumental Variable methods • (Advanced) methods for panel data • Simulation-based estimation • Non-/ Semi-parametric estimation • Introduction to machine learning (if time allows)
Learning outcomes	The goal of the course is to develop a detailed understanding of the advanced econometrics methods and provide students with the necessary theoretical background for further courses in econometrics. The lecture includes a discussion of the main estimation approaches, instrumental variables, generalized method of moments, maximum likelihood approaches as well as non-parametric methods. The tutorials consist of theoretical exercises, empirical applications in Stata.
Type of examination	Written exam
Type of assessment	The successful completion of the module will be graded.
Requirements for ECTS credits	ECTS credits will be granted when the module examination (or

accrual	the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully
Module coordinator	D. Cantoni / J. Winter
Language(s)	Englisch
Additional information	Literature: • Cameron A.C. and P.K Trivedi (2005) Microeconometrics: Methods and Applications, Cambridge University Press. [CT (2005)] • Wooldridge, J.M. (2010), Econometric analysis of cross section and panel data, 2nd ed., Cambridge, Mass: MIT Press [W (2010)] But also: • Bruce Hansen (2016). Econometrics, Chapter 5. A textbook draft available online at www.ssc.wisc.edu/~bhansen/econometrics/Econometrics.pdf • Casella G. and Berger R. L. (2002) Statistical Inference, Duxbury Advanced Series

Module: P 6 Microeconomics Game Theory and Information Economics

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self study hours	ECTS
Lecture	P 6.1 Microeconomics - Game Theory and Information Economics	SoSe	30 h (2 SWS)	60 h	(3)
Tutorial	P 6.2 Microeconomics - Game Theory and Information Economics	SoSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 4 contact hours per week. Including time for self-study and field time, 180 hours have to be invested in total.

Module type	Mandatory module with mandatory courses.
Usability of the module in other Programmes	none
Elective guidelines	none
Entry requirements	none
Semester	Recommended semester: 2
Duration	The completion of the module takes 1 semester.
Content	1. Rerun: Static Games of Complete Information 2. Static Games of Incomplete Information 3. Dynamic Games of Complete Information 4. Bargaining Games 5. Repeated games 6. Dynamic Games of Incomplete Information 7. Information Economics (Adverse Selection, Screening, Signaling, Moral Hazard)
Learning outcomes	Students will acquire the skills that are necessary to understand strategic interactions in economics (e.g., in markets).
Type of examination	Written exam
Type of assessment	The successful completion of the module will be graded.
Requirements for ECTS credits accrual	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed

	successfully.
Module coordinator	F. Englmaier / K. Schmidt
Language(s)	English
Additional information	Lecture Slides will be provided and weekly exercises need to be solved. There is no mandatory textbook, but there are suggested textbooks: • Gibbons, Robert, Game Theory for Applied Economists , New York: Harvester, 1992 • Tadelis, Steven, Game Theory, Princeton University Press, 2013 • Mas-Colell, A., Whinston, M., and J. Green, Microeconomic Theory, Oxford: Oxford University Press, 1995 • Osborne, Martin J. and Ariel Rubinstein, A Course in Game Theory, Cambridge: MIT Press, 1994 • Fudenberg, Drew and Jean Tirole, Game Theory, Cambridge: MIT Press, 1991 • Osborne, Martin J., An Introduction to Game Theory, Oxford: Oxford University Press, 2009

Module: P 7 Macroeconomics Business Cycles and Policy

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self study hours	ECTS
Lecture	P 7.1 Macroeconomics - Business Cycles and Policy	SoSe	30 h (2 SWS)	60 h	(3)
Tutorial	P 7.2 Macroeconomics - Business Cycles and Policy	SoSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 4 contact hours per week. Including time for self-study and field time, 180 hours have to be invested in total.

Module type	Mandatory module with mandatory courses.
Usability of the module in other Programmes	none
Elective guidelines	none
Entry requirements	none
Semester	Recommended semester: 2
Duration	The completion of the module takes 1 semester.
Content	This course covers dynamic optimization methods in discrete time. To illustrate these concepts, various applications in labor search, optimal taxation and real business cycles are presented and studied.
Learning outcomes	Students who have successfully completed this course have acquired the knowledge of • the mathematical concepts related to dynamic programming (sequence problem, transversality condition, Bellman equation, contraction mapping, principle of optimality), • the basic numerical tools required to implement these concepts and • the classic work-horse models used in modern macroeconomic research. The class of models include: the real business cycle model, and partial and general equilibrium search and matching models.
Type of examination	Written exam
Type of assessment	The successful completion of the module will be graded.
Requirements for ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective

accrual	compulsory module parts) has/have been completed successfully.
Module coordinator	U. Sunde / N.N.
Language(s)	English
Additional information	Literature: • Acemoglu, D. (2008). Introduction to Modern Economic Growth. Princeton University Press. • Ljungqvist, L. – Sargent, T. J. (2004). Recursive Macroeconomic Theory. MIT Press. • Lucas, R. E. – Stokey, N. L. (1989). Recursive Methods in Economic Dynamics. Harvard University Press.

Module: P 8 Soft Skills

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self study hours	ECTS
Seminar	P 8.1 Academic Writing	SoSe	30 h (2 SWS)	60 h	(3)
Seminar	P 8.2 Presentation Skills	WiSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 4 contact hours per week. Including time for self-study and field time, 180 hours have to be invested in total.

Module type	Mandatory module with mandatory courses.
Usability of the module in other Programmes	none
Elective guidelines	none
Entry requirements	none
Semester	Recommended semester: 2
Duration	The completion of the module takes 1 semester.
Content	The module consists of 2 workshops: "Presentation Techniques" and "Academic Writing". <u>Content Presentation Techniques:</u> • Structuring talks to be audience-friendly • Expressions for introducing, summarizing and making transitions • Building rapport with the audience • Emphasizing key messages • Using your voice: intonation, pace, pausing • Body language and eye contact • Effective style and format for visuals • Dealing with difficult questions <u>Content Academic Writing:</u> • Managing the writing process professionally • Understanding the drafting and revision processes • Finding a focus by identifying an appropriate research question • Creating precise, accurate, and correct sentences • Understanding structural and language norms for English research papers • Giving and receiving feedback on texts • Examining structural relationships within and between sections of a paper • Examining participants' texts with regard to structure and

	language, using a variety of feedback strategies • Recognizing stylistically adequate and inadequate language
Learning outcomes	Presenation Techniques: Students will learn to think more about their audience when creating research talks. Their talks will be developed to make them more interesting, clear and concise so that their audience can better understand the content and key messages. They will also learn about typical differences between German and international English presentation style. Academic Writing: Students will be introduced to a variety of strategies that will provide assistance to draft texts more efficiently, to pinpoint their strengths and weaknesses, and to revise them effectively.
Type of examination	Written assignment and presentation
Type of assessment	The module is not graded. (Certificate of attendance)
Requirements for ECTS credits accrual	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Module coordinator	M. Breu
Language(s)	English
Additional information	Presentation Techniques: The training is interactive with skills being practised through a range of short activities, building up to the longer research talk. Participants need to prepare a short talk on their research topic. Individual Videofeedback is given. Academic Writing: Because the workshop uses material from students, there is a call for papers two weeks prior to the workshop. Guidelines and a deadline will be provided.

Module: WP 1 Advanced Topics in Microeconomics

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (compulsory elective)	Rotation	Contact hours	Self study hours	ECTS
Lecture	WP 1.1 Advanced Topics in Microeconomics	WiSe and SoSe	30 h (2 SWS)	60 h	(3)
Tutorial	WP 1.2 Advanced Topics in Microeconomics	WiSe and SoSe	30 h (2 SWS)	60 h	(3)
Seminar	WP 1.3 Advanced Topics in Microeconomics (Reading Course)	WiSe and SoSe	30 h (2 SWS)	150 h	(6)
Lecture	WP 1.4 Research in Microeconomics	WiSe and SoSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 15 ECTS credits have to be acquired. Class attendance averages about 8 contact hours per week. Including time for self-study and field time, 450 hours have to be invested in total.

Module type	Compulsory elective module with compulsory elective courses.
Usability of the module in other Programmes	none
Elective guidelines	The module can be chosen by adhering to the following guidelines: Students have to choose two compulsory elective courses out of WP1 – WP4. In the 2nd and 3rd semester each, one compulsory elective course has to be taken.
Entry requirements	none
Semester	Recommended semester: 2
Duration	The completion of the module takes 1 semester.
Content	The module covers modern microeconomic models with a focus on consumer choice, game theory, principal agent theory and problems of adverse selection.
Learning outcomes	The students learn theoretical and empirical methods to test microeconomic theories and analyze real world mechanisms and institutions. Students are able to understand and work with important concepts in micoreconomics: incentives, mechanisms, auctions, innovation and strategic interaction.

Type of examination	Oral examination
Type of assessment	The successful completion of the module will be graded.
Requirements for ECTS credits accrual	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Module coordinator	Dekan (Uwe Sunde)
Language(s)	English
Additional information	

Module: WP 2 Advanced Topics in Macroeconomics

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (compulsory elective)	Rotation	Contact hours	Self study hours	ECTS
Lecture	WP 2.1 Advanced Topics in Macroeconomics	WiSe and SoSe	30 h (2 SWS)	60 h	(3)
Tutorial	WP 2.2 Advanced Topics in Macroeconomics	WiSe and SoSe	30 h (2 SWS)	60 h	(3)
Seminar	WP 2.3 Advanced Topics in Macroeconomics (Reading Course)	WiSe and SoSe	30 h (2 SWS)	150 h	(6)
Lecture	WP 2.4 Research in Macroeconomics	WiSe and SoSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 15 ECTS credits have to be acquired. Class attendance averages about 8 contact hours per week. Including time for self-study and field time, 450 hours have to be invested in total.

Module type	Compulsory elective module with compulsory elective courses.
Usability of the module in other Programmes	none
Elective guidelines	The module can be chosen by adhering to the following guidelines: Students have to choose two compulsory elective courses out of WP1 – WP4. In the 2nd and 3rd semester each, one compulsory elective course has to be taken.
Entry requirements	none
Semester	Recommended semester: 2
Duration	The completion of the module takes 1 semester.
Content	The module covers modern, dynamic models in macroeconomics with a focus on economic growth, business cycles, as well as monetary theory.
Learning outcomes	The students learn advanced theoretical and empirical methods in order to be able to understand as well as test state of the art macroeconomic theories. Students are able to understand and work with the variables in macroeconomics: production, employment, unemployment, inflation and interest.

Type of examination	Oral examination
Type of assessment	The successful completion of the module will be graded.
Requirements for ECTS credits accrual	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Module coordinator	Dekan (Uwe Sunde)
Language(s)	English
Additional information	

Module: P 9 Research Project

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self study hours	ECTS
Colloquium	P 9.1 Research Project	WiSe and SoSe	30 h (2 SWS)	150 h	(6)
Practical course	P 9.2 Research Project	WiSe and SoSe	60 h (4 SWS)	120 h	(6)

For successful completion of the module, 12 ECTS credits have to be acquired. Class attendance averages about 6 contact hours per week. Including time for self-study and field time, 360 hours have to be invested in total.

Module type	Mandatory module with mandatory courses.
Usability of the module in other Programmes	none
Elective guidelines	none
Entry requirements	none
Semester	Recommended Semester: 3
Duration	The completion of the module takes 1 semester.
Content	The students have to conduct their own research project by formulating a research question and working on this question. Their project has to contribute to current research within their field of interest.
Learning outcomes	The students learn to formulate a research question, to plan a research project and work as a researcher. Through cooperation with their supervisor they learn how to structurally answer research questions and how to deal with obstacles within the process. They are required to guarantee reproducibility through adhering to open science standards. The communication of their results in form of a presentation and a working paper is also an essential part of the research project. Therefore, the students have to acquire necessary soft skills (e.g. project management) as well as necessary skills with statistical and mathematical software.
Type of examination	Presentation

Type of assessment	The module is not graded. Certificate of attendance.
Requirements for ECTS credits accrual	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Module coordinator	Dekan (Uwe Sunde)
Language(s)	English
Additional information	

Module: WP 3 Advanced Topics in Econometrics

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (compulsory elective)	Rotation	Contact hours	Self study hours	ECTS
Lecture	WP 3.1 Advanced Topics in Econometrics	WiSe and SoSe	30 h (2 SWS)	60 h	(3)
Tutorial	WP 3.2 Advanced Topics in Econometrics	WiSe and SoSe	30 h (2 SWS)	60 h	(3)
Seminar	WP 3.3 Advanced Topics in Econometrics (Reading Course)	WiSe and SoSe	30 h (2 SWS)	150 h	(6)
Lecture	WP 3.4 Research in Econometrics	WiSe and SoSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 15 ECTS credits have to be acquired. Class attendance averages about 8 contact hours per week. Including time for self-study and field time, 450 hours have to be invested in total.

Module type	Compulsory elective module with compulsory elective courses.
Usability of the module in other Programmes	none
Elective guidelines	The module can be chosen by adhering to the following guidelines: Students have to choose two compulsory elective courses out of WP1 – WP4. In the 2nd and 3rd semester each, one compulsory elective course has to be taken.
Entry requirements	none
Semester	Recommended semester: 3
Duration	The completion of the module takes 1 semester.
Content	The module deepens the students' understanding of the methods used in contemporary empirical research. The module focuses on the identification and estimation of causal relationships; the evaluation and simulation of policy interventions; and the analysis of experimental, survey, administrative and naturally occurring ("big") data. Both theory and practice are covered. Applications cover a wide range of current research questions in economics.
Learning outcomes	Students learn to apply state-of-the-art methods in micro-econometrics to realistic research questions. They understand the theoretical foundations of contemporary estimation

	methods, in particular the underlying identification and statistical assumptions. They appreciate both the potential and the limitations of these methods in realistic research settings. They learn to conduct all steps of an empirical research project: formulation of research hypotheses grounded in economic theory; choice of appropriate methods and data; programming and estimation of econometric models; and interpretation and communication of results.
Type of examination	Oral examination
Type of assessment	The successful completion of the module will be graded.
Requirements for ECTS credits accrual	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Module coordinator	Dekan (Uwe Sunde)
Language(s)	English
Additional information	

Module: WP 4 Advanced Topics in Public Economics

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (compulsory elective)	Rotation	Contact hours	Self study hours	ECTS
Lecture	WP 4.1 Advanced Topics in Public Economics	WiSe and SoSe	30 h (2 SWS)	60 h	(3)
Tutorial	WP 4.2 Advanced Topics in Public Economics	WiSe and SoSe	30 h (2 SWS)	60 h	(3)
Seminar	WP 4.3 Advanced Topics in Public Economics (Reading Course)	WiSe and SoSe	30 h (2 SWS)	150 h	(6)
Lecture	WP 4.4 Research in Public Economics	WiSe and SoSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 15 ECTS credits have to be acquired. Class attendance averages about 8 contact hours per week. Including time for self-study and field time, 450 hours have to be invested in total.

Module type	Compulsory elective module with compulsory elective courses.
Usability of the module in other Programmes	none
Elective guidelines	The module can be chosen by adhering to the following guidelines: Students have to choose two compulsory elective courses out of WP1 – WP4. In the 2nd and 3rd semester each, one compulsory elective course has to be taken.
Entry requirements	none
Semester	Recommended semester: 3
Duration	The completion of the module takes 1 semester.
Content	The module deepens the understanding of public sector economics. Advanced theoretical and empirical methods for the economic analysis of taxation and social insurance, public expenditure and governmental behavior (Political Economy) are introduced.
Learning outcomes	Students are enabled to analyze the fundamental goals of efficiency and distributive justice arising in modern welfare states. This is done by using state-of-the-art theoretical and empirical methods. They understand different policy options for integrated open economies.

Type of examination	Oral examination
Type of assessment	The successful completion of the module will be graded.
Requirements for ECTS credits accrual	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Module coordinator	Dekan (Uwe Sunde)
Language(s)	English
Additional information	

Module: P 10 Final Module

Programme	Master of Science in Quantitative Economics (M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self study hours	ECTS
Master Thesis	P 10.1	WiSe and SoSe	---	900 h	(30)

For successful completion of the module, 30 ECTS credits have to be acquired. Class attendance averages about 0 contact hours per week. Including time for self-study and field time, 900 hours have to be invested in total.

Module type	Mandatory module
Usability of the module in other Programmes	none
Elective guidelines	none
Entry requirements	none
Semester	Recommended semester: 4
Duration	The completion of the module takes 1 semester.
Content	In this module, the master's thesis demonstrates the ability to do independent scientific work.
Learning outcomes	Through intensive study of a subject in the Master's thesis as well as the independent application of scientific methods in the subject, students learn to relate and combine the contents of the modules completed during their studies.
Type of examination	Master thesis
Type of assessment	The successful completion of the module will be graded.
Requirements for ECTS credits accrual	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Module coordinator	Dekan (Uwe Sunde)
Language(s)	English
Additional information	