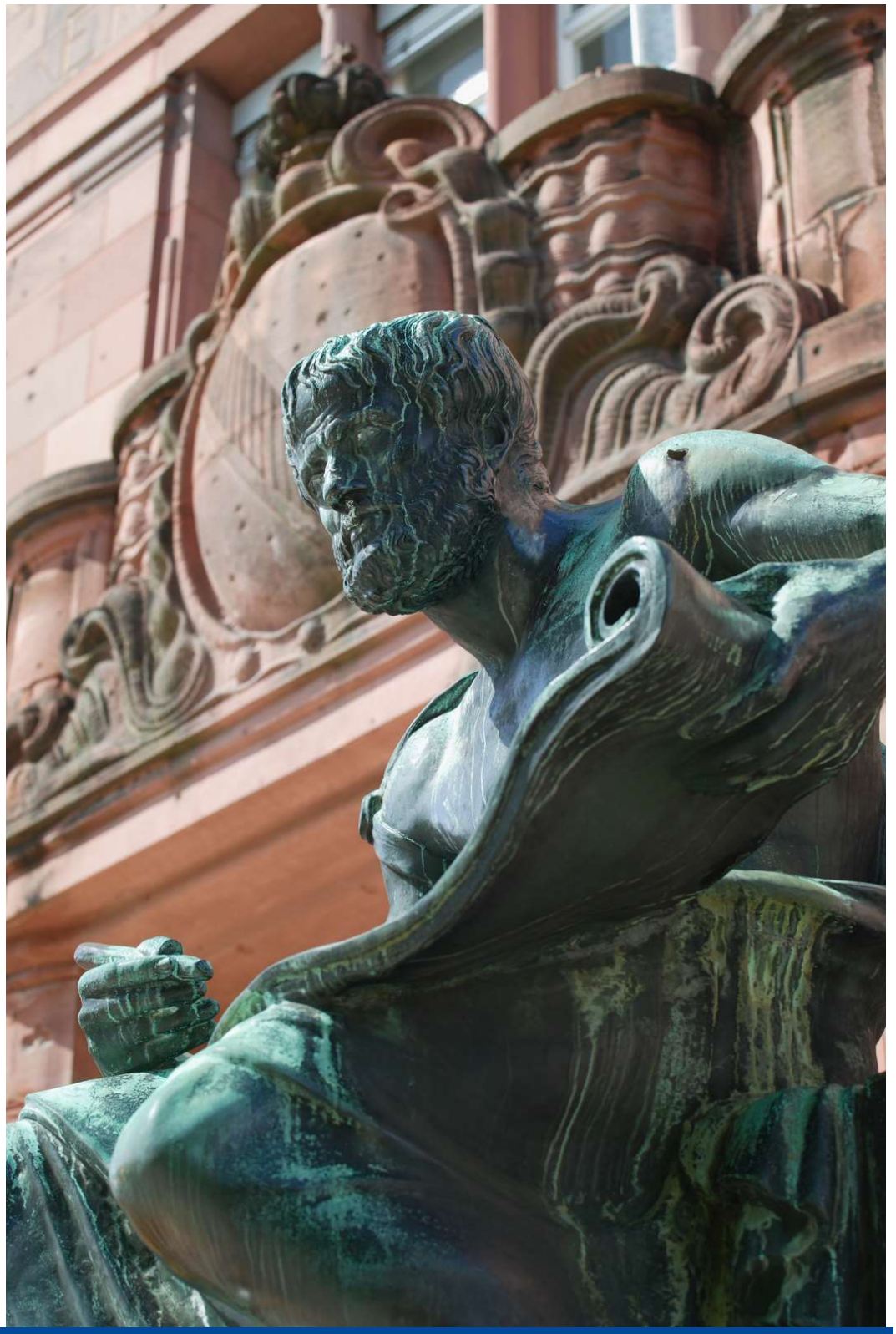

UNI FREIBURG

Handbook of Modules

Master of Science Economics

Edition: July 2019

Content

Disclaimer:

- The indications about the frequency in which the courses are taught are orientative. Changes and modifications are possible.
- This version of the Module Handbook has not been approved by any official organ of the Faculty. It is a preliminary version. Changes and modifications are possible.

1. The program of studies

The master's program in Economics offers a broad and consecutive degree at an advanced level with a focus on economic issues and methods. During the course of the program, students will develop distinct analytical skills as well as gain knowledge about current economic topics. They will be able to identify, structure and analyze problems from different economic, political and social fields, and find and present solutions to these problems. Students will gain professional skills and thus will be able to successfully work in the fields of business, finance, policy-making and economic research.

1.1. Outline

Degree:	**Master of Science**
Study form:	Consecutive study with a second occupational qualificatory final degree
Begin of studies:	Winter semester (1. term); Winter- and Summer semester (in terms)
Standard period of Study:	4 Semester
Degree requirements:	120 ECTS-Points
Specializations:	**Economics and Politics** **Finance** **Information Systems and Network Economics (Profile not available in 2019)**
Study Abroad:	Recommended in the third and/or fourth semester. Both the faculty and the university offer extensive exchange programs. Alternatively, studying abroad can also be organized by yourself. Advice regarding study aborad from the foreign office of economics can be found in Chapter 5.
Language:	▪ English

1.2. General program structure

The Master of Science in Economics is a 2-year-program with a total of 120 ECTS points. After a general introduction, the focus will be put on applied economics, which is also dealt within the field of basic research. The general structure of the Master of Science in Economics at the University of Freiburg is discussed below.

The degree program is divided into two areas: basic area (mandatory area) and a specialization area.

Basic Area. The basic area consists of **30 ECTS-Points** and it includes the block “Economic Theory and Policy” and the block “Quantitative Economics”.
Students must complete all the modules from the Quantitative Economics block:

- Computational Economics (6 ECTS)
- Intermediate Econometrics (10 ECTS)

Students must complete four of the five modules from the Economic Theory and Policy Block:

- Advanced Microeconomics I (6 ECTS)
- Advanced Microeconomics II (6 ECTS)
- Advanced Macroeconomics I (6 ECTS)
- Advanced Macroeconomics II (6 ECTS)
- Economic Policy and Public Choice (6 ECTS)

Specialization Area. A total of **6 ECTS credits** have to be acquired in the block “Specialization Courses”. The specialization module for each profile is:

- Economic & Politics: Constitutional Economics / Global Economic Governance (6 ECTS)
- Finance: Principles of Finance
- Information Systems and Network Economics (Profile not available in 2019)

Elective Area: A total of 44 ECTS must be completed with modules chosen by the student among the different courses offered by the Department of Economics. Most of elective modules provide 4 or 6 ECTS. The elective area comprehends two type of courses:
Internal Elective Courses: A minimum of 32 ECTS and a maximum of 44 ECTS must be acquired among internal elective courses. These modules are chosen by the student and are related to their field of specialization.
External Elective Courses: A maximum of 12 ECTS can be chosen among those modules that are considered internal elective of the other profiles.

The general structure of the Master of Science in Economics at the University of Freiburg is shown in the following figure.

1.3. Recommended Study Plan for Master of Science Economics (MEP)

Recommended plan of studies for the Master of Science in Economics

Sem.	Economic Theory and Policy (30 ECTS)	Quantitative Economics (16 ECTS)	Profile 1 Economics & Politics	Profile 2 Finance	Profile 3 ISNE	ECTS-Pkte.
1 (WS)	Advanced Microeconomics I *and* Advanced Macroeconomics I *and* Economic Policy and Public Choice 18 ECTS	Computational Economics 6 ECTS				24
2 (SS)	Advanced Microeconomics II *and* Advanced Macroeconomics II 12 ECTS	Intermediate Econometrics 10 ECTS	Constitutional Economics 6 ECTS	Principles of Finance 6 ECTS	Network Economics *and* Electronic Marktes 6 ECTS	ca. 32
3 (WS)			Elective courses Economics & Politics	Elective Courses Finance	Elective Courses Information Systems and Network Economics	ca. 32
4 (SS)			44 ECTS	44 ECTS	44 ECTS	ca. 32
	Master Thesis (24 ECTS, 20 Weeks)					
ECTS	30 ECTS	16 ECTS	74 ECTS	74 ECTS	74 ECTS	120

Explanation for the Study Plan:

Contact hours (SWS): *Semesterwochenstunden* (weekly hours per semester).
ECTS: Credit points according to the European Credit Transfer System
Mind: *Mindestens* (minimum requirement)
SS: Summer term (April 1 – September 30)
WS: Winter term (October 1 – March 31)

Please notice

The course schedule is a general recommendation for the organization of successful and continuous studies. Individual preferences and changes are possible. The study regulations are to be complied with. Additionally, the following points have to be considered:

a. Modules can be consecutive with regards to content, e.g. lectures are often succeeded by seminars in the next semester. Please compare with the individual module descriptions
b. After 2 semesters, at least 30 ECTS points have to be acquired in order to ensure a successful progress of the studies. If the student is not able to fulfill the requirements, he or she will lose the right to take the exams. This is not the case if the student is not responsible for exceeding the deadline.
c. Frequency of courses: Mandatory courses are offered regularly. Some elective courses are also offered regularly (every Winter Semester or every Summer Semester). Several elective courses are offered irregularly, although courses of similar content are offered regularly. Please check the section “Frequency taught” in each module description.

   The indications about the frequency in which the courses are taught are orientative. Changes and modifications are possible.

For this reason, a careful and individual schedule for your studies is highly recommended

1.4. Job perspectives

The aim of this program is to qualify students for positions in national and international organizations and institutes. The program is designed specifically to provide graduates with professional competence and knowledge of empiric methods.

The Economics & Politics profile with its emphasis on economic policy analytics and quantitative methods qualifies for employment at regulatory, or policy-making organizations, from governmental and international institutions such as Central Banks, ministries, the European Commision, or international development agencies, to economic policy consultancy at top consultancy firms or research institutes devoted to economy policy analysis.

The Finance profile with its strong focus on quantitative finance prepares students for careers in the financial sector, particularly in the areas of risk analysis, portfolio management and analysis, development of derivatives, futures and options.
The quantitative skills of the program allow our students to succeed in careers as data scientitsts, data analysts, data mining and business analitycs. In addition to that, the degree provides an entry for an academic career, doctoral studies and research institutes.

2. Organization of the studies

During the course of the program, students have to comply with various formalities regarding registration and proof of successful exam results. The examination office of the Faculty of Economy is responsible for the administration of these formalities.

2.1 Type of courses

There are three different types of courses. The most common type of courses are lectures. Lectures take place weekly and students can register for the examination during the examination period.
Seminars are restricted to small groups of students and usually require students to conduct research-related tasks such as reviewing the literature, conducting research projects, writing reseach papers and holding scientific presentations. Seminars do not require written examinations, but require the preparation of written assignments (seminar papers) and oral presentations. Topics courses provide students a very close approximation to research and are necessary for obtaining the master degree with honors.
Lectures usually have 4 ECTS. Sometimes lectures can be accompanied by tutorial, an additional weekly session in which the concepts of the lecture are elaborated in a more practical way, usually involving solving problem sets. Lectures accompanied by a tutorial usually provide 6 ECTS

2.2 Registration

Attending courses:

Attending lectures generally does not require previous registration. Lectures are open to all those who want to attend them.

Some lectures might restrict participation to smaller groups, such as block lectures or those requiring PC-Pool-tutorials. To take part in a course with limited spaces available, students have to register directly. Registration usually takes place before the beginning of the semester. Seminars and topic courses are restricted to small groups and usually require application before the beginning of the semester.

Registration for exams:

It is necessary to register via the online campus management system (HISinONE) for the examination of courses of the lecture type. You can find all necessary information regarding deadlines and procedures on the Economic Faculty examination office's homepage or at the website of the Master of Economics Program.

2.3 Performance records

You can only receive the ECTS points for a given module once you have successfully taken all the required course-related examinations or fulfilled all the required achievements of that course.

Program achievements:

Program achievements are individually written, oral or practical tasks that students fulfill during the semester in the connection with their courses. These tasks can be written assignments or journals. Students will be informed about the amount and type of program achievements at the beginning of each module. Program achievements are evaluated, but not graded. However, there are minimum requirements that have to be fulfilled. The evaluation of these achievements is usually not part of the final grade.

Course-related exams:

Module exams are usually course-related. Students will be informed about the amount and type of course-related exams in their module handbook and at the beginning of each module. Oral exams are usually seminar presentations. Typical written exams are tests, assignments or term papers.

The duration of a written test is usually 15 minutes per ECTS point. The result is part of the final grade. The final grade is the average of ECTS points, consisting of module grades and master thesis.

Timely registration is necessary in order to take the exam. If students take a module of choice from a different faculty, these faculty's course-related exam regulations apply.

2.4. Preliminary Exam

The program's preliminary exam is passed when at least 30 ECTS points have been acquired after two semesters in order to ensure a successful progress of the studies. If the student is not able to fulfill the requirements, he or she will lose the right to take the exams. This is not the case if the student is not responsible for exceeding the deadline.

3. Overview of the modules

Tip:

With a click on the title of the module you will be linked to the detailed description of the module. From this page you will also return by clicking on the titel of the module.

1st year: Mandatory courses:

Economic Theory and Policy		
	ECTS	**Page**
4 out of 5 Modules (one can be replaced with an elective course)		
Advanced Macroeconomics I	6	16
Advanced Macroeconomics II	6	17
Advanced Microeconomics I	6	18
Advanced Microeconomics II	6	19
Economic Policy and Public Choice	6	20
Quantitative Economics		
Intermediate Econometrics	10	
Computational Economics	6	
Specialization mandatory course		
Constitutional Economics (for Economics & Politics specialization profile)	6	
Principles of Finance (for Finance specialization profile)	6	21

2nd year: Elective courses:

Internal electives		
	ECTS	**Page**
Internal elective modules: those elective modules of the own profile of specialization. A minimum of 32 ECTS and a maximum of 44 ECTS in internal elective modules must be attained.		

External electives		
	ECTS	**Page**
External elective modules: those elective modules of the other profiles of specialization A maximum of 12 ECTS in external elective modules can be attained.		

3.1. Profiles

All modules in each profile can be taken by students of all profiles, either as internal elective if the student belongs to that profile, or as external elective if the student is from another profile.

Profile 1: Economics and Politics		
	ECTS	**Page**
Mandatory Course:		
Constitutional Economics (EP)		
Elective Courses in free choice of 44 ECTS		
Advanced Mathematics for Economics and Finance		
Basic Income and Social Justice in the Social Contract Laboratory (SoCo Lab) (Seminar)		
Behavioral Economics		
Case Studies in Labor Economics		
Current Issues in Finance and Monetary Economics (Bundesbank-Seminar)		
Development Microeconometrics using STATA		
Dynamic Fiscal Policy		
Econometric Risk Management in Finance		
Economics of Social Justice		
Electronic Markets		
Empirical Research Seminar in Institutional Economics		
Global Economic Governance		
International Monetary Economics I		
International Monetary Economics II		
Introduction to Empirical Economics Using STATA		
Mathematical Methods for Economics and Finance		
Migration Economics		
Modern Econometrics Using R		
Research Colloquium on Migration Empirics (Seminar)		
Selected Topics in Insitutional Economics and International Economic Policy (Seminar)		
Selected Topics in International and Development Economics (Seminar)		
Statistical Learning		
The Economics of Terror		
The Long Term Determinants of Economic Development		
The Political Economics of Information and Media		
Time Series Analysis (discontinued until later date)		
Topics in Macroeconomics		

Profile 2: Finance		
	ECTS	**Page**
Mandatory Course:		
Principles of Finance (F)		
Elective Courses in free choice of 44 ECTS		
Advanced Mathematics for Economics and Finance		
Basic Income and Social Justice in the Social Contract Laboratory (SoCo Lab) (Seminar)		
Behavioral Economics		
Business Analytics		
Business Analytics (Seminar): Business Intelligence with R and Python		
Business Analytics (Seminar): Webscraper Development and Data Analysis using R and Python		
Computational Finance (discontinued until later date)		
Continuous Time Finance		
Credit Risk		
Current Issues in Finance and Monetary Economics (Bundesbank-Seminar)		
Dynamic Fiscal Policy		
Econometric Risk Management in Finance		
Electronic Markets		
Futures and Options		
Global Economic Governance		
Interest Rate Theory and Applications		
International Monetary Economics I		
International Monetary Economics II		
Introduction to Systematic Investment Strategies (Seminar)		
Mathematical Methods for Economics and Finance		
Modern Econometrics Using R		
Portfolio Management		
Statistical Learning		
Seminar in Quantitative Finance		
Seminar Series in Finance		
Time Series Analysis (discontinued until later date)		
Topics in Macroeconomics		

4. Module description

4.1. Block Economic Theory and Policy

Module	Advanced Macroeconomics I		
Area of Study	► Mandatory Economic Theory and Policy		
Recommended semester	1	Mandatory/elective	Mandatory
Module coordinator	Prof. Oliver Landmann	Work load	180 hours
ECTS (credit points)	6	Contact hours (SWS)	3 (L) 2 (T)
Course type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	Winter term		
Requirements	Firm Command of Intermediate Microeconomics and Macroeconomics. The following macro text is particularly suitable for preparation: Blanchard/Amighini/Giavazzi (2013): Macroeconomics – A European Perspective, 2nd ed.		
Learning/ qualification target	Introduction to advanced theories of economic growth and business cycles		
Content	▪ Introduction ▪ Economic Growth ▪ Growth and Inequality ▪ Review of Basic Short-Run Macro ▪ New Classical Revival ▪ Monetary Policy in a DSGE Model		
Examination type	2 hour written examination at the end of the semester		
Literature	▪ David Romer: Advanced Macroeconomics, 4th ed., McGraw-Hill, New York 2012 or 5th ed. 2018. ▪ Journal articles as indicated in lecture		
Additional information & links	For further information please see the chair home page: http://www.macro.uni-freiburg.de/news/home		

Module	Advanced Macroeconomics II		
Area of Study	► Mandatory Economic Theory and Policy		
Recommended semester	2	Mandatory/elective	Mandatory
Module coordinator	Prof. Günther Schulze	Work load	180 hours
ECTS (credit points)	6	Contact hours (SWS)	3h Lecture 1h Tutorial
Course type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	Summer term		
Requirements	Solid micro- and macroeconomics at Bachelor level		
Learning/ qualification target	Knowledge of concepts of the political economy of macroeconomics at an advanced level		
Content	Topics from the following list: ▪ Principle-agent problems in the political delegation ▪ Time-inconsistency problem ▪ Commitment vs. flexibility ▪ Central bank independence ▪ Credibility and reputation ▪ Mimicking and signaling ▪ Election ▪ Redistribution ▪ Rent-seeking ▪ Political business cycles and other topics (topics may vary)		
Examination type	Exam (90 min.)		
Literature	Drazen, A: Political Economy in Macroeconomics. Princeton: Princeton University Press (current edition) Addititonal journal articles		
Additional information & links	For further information please see the chair home page: http://www.vwl.uni-freiburg.de/iwipol/teaching.htm		

Module	Advanced Microeconomics I		
Area of Study	► Mandatory Economic Theory and Policy		
Recommended Semester	1	Mandatory/Elective	Mandatory
Module Coordinator	TBA	Work Load	180 hours
ECTS (Credit Points)	6	Contact Hours (SWS)	3 (L) 2 (T)
Course Type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	Every winter semester		
Requirements	Strong command of intermediate microeconomics. The following text is suitable for preparation: Varian: Intermediate Microeconomics: A Modern Approach, Norton, 5th ed. 1999.		
Learning/ Qualification Target	The basic aim of the course is to provide the students with a solid foundation in microeconomic theory using mathematical techniques. The course aims at providing a deeper knowledge within the neo-classical theory of consumers and firms. Demand and supply of goods and factors of production are derived. The course also aims at providing a deeper knowledge of issues related to general equilibrium, decision under uncertainty, learning and behavioral economics.		
Content	▪ Preferences, Utility, Choice ▪ Choices of a Consumer: Classical Demand Theory ▪ Choices of a Producer: Classical Supply Theory ▪ General Equilibrium ▪ Choice under Uncertainty ▪ Learning ▪ Topics in Behavioral Economics		
Examination Type	▪ Written examination at the end of the semester		
Literature	▪ Andreu Mas-Colell, Michael D. Whinston and Jerry R. Green ▪ Hal R. Varian, Microeconomic Analysis, Third Edition.		
Additional Information & Links			

Module	Advanced Microeconomics II		
Area of Study	► Mandatory Economic Theory and Policy		
Recommended Semester	2	Mandatory/Elective	Mandatory
Module Coordinator	TBA	Work Load	180 hours
ECTS (Credit Points)	6	Contact Hours (SWS)	3 (L) 2 (T)
Course Type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	Every summer semester		
Requirements	Knowledge of the course “Advanced Microeconomics I”- intermediate game theory		
Learning/ Qualification Target	Insights in advanced decision theory and advanced game theory.		
Content	In this course we discuss problems of decisions under uncertainty. We analyse various types of non cooperative games. We consider games with complete and incomplete information, games with finite and infinite horizon. We develop solution concepts in order to predict strategic decision making. Furthermore we will classify and evaluate our results.		
Examination Type	▪ Written examination at the end of the semester		
Literature	*Introductory textbooks:* ▪ Osborne, M. J.: An Introduction to Game Theory, Oxford University Press, 2009. ▪ Gibbons, R.: A Primer in Game Theory, Harvester Wheatsheaf, 1992. *Further Literature:* ▪ Mas-Collel, A., Whinston, M. D., Green, J.: Microeconomic Theory, Oxford University Press, 1995.		
Additional Information & Links			

Module	Economic Policy and Public Choice		
Area of Study	► Mandatory Economic Theory and Policy		
Recommended semester	1	Mandatory/elective	Mandatory
Module coordinator	Prof. Bernhard Neumärker	Work load	180 hours
ECTS (credit points)	6	Contact hours (SWS)	2 (L) 2 (T)
Course type	► Lecture ► Tutorial	Language	English
Frequency taught	Winter term		
Requirements	Basic knowledge of microeconomics is recommended		
Learning/ qualification target	▪ Identification of economic policy problems ▪ Appreciate the economic analysis of different systems and ▪ levels of collective choice ▪ Sophisticated understanding of economic policy formation ▪ Structuring economic policy norms		
Content	▪ Introduction ▪ Economic problems of economic policy 1. Economic man and collective action 2. Allocation and exchange 3. Distribution and conflict 4. Liberty and welfare 5. Implementation and reform 6. Stability and sustainability ▪ The public choice of economic policy 1. Rational and behavioral public choice 2. Positive and normative public choice ▪ Institutions and hierarchies of public choice 1. Authoritarian policy formation 2. Democratic organization and voting rules 3. Spatial hierarchy ▪ Liberal concepts of economic policy formation 1. Ordoliberal design 2. Liberal paternalism 3. Constitutional political economy ▪ Application to special policy issues 1. Redistribution in democracy 2. Organizing the just welfare state 3. Market regulation and privatization 4. Constitutional budget constraints and their effects on economic policy		
Examination type	Written exam (90 minutes)		
Literature	*Introductory textbooks:* ▪ Hillman, A.L.: Public Finance and Public Policy, 2nd Ed., Cambridge 2009. ▪ Mueller, D.C.: Public Choice III, Cambridge 2003. ▪ Additional readings are announced in class.		
Additional information & links	For further information please see the chair home page: http://www.wipo.uni-freiburg.de		

4.2. Block Quantitative Economics

Module	Computational Economics: Non-linear Optimization		
Area of Study	► Mandatory Quantitative Economics		
Recommended semester	1-2	Mandatory/elective	Mandatory
Recommended semester	1-4	Mandatory/elective	Elective
Module coordinator	Prof. Dirk Neumann	Work load	180 hours
ECTS (credit points)	6	Contact hours (SWS)	2 (L) 1 (E) 1 (T)
Course type	▪ Lecture ▪ Exercise ▪ Tutorial	Language	English
Frequency taught	Winter term		
Requirements	None, Computational Economics is designed as an introductory Master-level course		
Learning / qualification target	Students develop an understanding of economic models using standard software at a PC. They learn to formulate optimization problems, and the theory behind optimization techniques. Exercise sessions will provide a hands-on experience using the programming language R.		
Content	In Computational Economics well-known economic problems are revisited, formulated as mathematical problems, and implemented using software. The models encompass a wide range of issues from microeconomics and macroeconomics, business production planning, as well as complex models of economic growth. The lecture discusses theoretical basics and methods of model design, as well as algorithms to solve them. During hands-on exercise sessions and tutorials these skills are practiced using software.		
Examination type	Written Exam		
Literature	▪ K.L. Judd, 1998, *Numerical Methods in Economics*, MIT Press: Cambridge, MA. ▪ D.A. Kendrick, P.R. Mercado, & H.M. Amman, 2005, *Computational Economics*, Princeton University Press: Princeton, NJ.		
Additional information & links	For further information, please see the chair home page: http://www.is.uni-freiburg.de		

Module	Intermediate Econometrics		
Area of Study	Mandatory Quantitative Economics		
Recommended semester	2 (1st year)	Mandatory/elective	Mandatory
Module coordinator	Dr. Florian Neumeier	Work load	• Approx. 240 hours
ECTS (credit points)	• 10 ECTS (M.Sc. in Economics)	Contact hours (SWS)	• Lecture: 4 h • Exercise session / PC exercise session: 2 h
Course type	• Lecture • Exercise session / PC execise session	Language	English
Frequency taught	Every summer term		
Requirements	Knowledge of mathematics and statistics as taught in the first three semesters of the bachelor program in economics.		
Learning/qualification target	After completing this course, students should be able to carry out empirical research projects on their own. They should have profound knowledge of linear regression methods, including their strengths and limitations, and know how to translate economic theory into an empirical model. Students should also have basic command of econometric software and know how to apply econometric tools in practice. Finally, upon successful completion of this course, students should be familiar with the concept of causality and the conditions for the identification of causal effects.		
Content	The course provides an up-to-date introduction into econometrics at the level of Wooldridge's textbook on “Introductory Econometrics – A Modern Approach”. The course will give an introduction into regression analysis with cross-sectional data, time-series data, and panel data. In addition, the course will cover selected advanced econometric tools that are common in quasi-experimental designs.		
Target group	The course is a required 10 ECTS		
Examination type	100% final exam:120 minutes for 10 ECTS		
Literature	**Main References** • Wooldridge, J. M. (2015): *Introductory Econometrics – A Modern Approach*, 6th ed., South Western, Cengage Learning. Please note that the current EMEA adaptation of the book (Introductory Econometrics EMEA Edition 2013) and old book editions are acceptable as well. • Angrist, J.D., and J.-S. Pischke (2009): *Mostly Harmless Econometrics – An Empiricist's Companion*, Princeton University Press. • Further references will be given throughout the course.		
Additional information & links	The first part of the course involves a review of the methods taught in the statistics and econometrics courses in the Bachelor of Science in Economics, as well as some further content. In the second part, there will be further advanced topics only mandatory for students writing the exam for 10 ECTS points (Master in Economics). http://www.empiwifo.uni-freiburg.de.		

4.3. Specialization courses

Module	**Constitutional Economics**		
Area of Study i	► Specialization Economics and Politics		
Recommended semester	2	Mandatory/elective	Mandatory
Module coordinator		Work load	180 hours
ECTS (credit points)	6	Contact hours (SWS)	2 (L) 2 (T)
Course type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	Summer term		
Requirements	Under Review		
Learning/ qualification target	Under Review		
Content	Under Review		
Examination type	Written exam (90 minutes)		
Literature	Under Review		
Additional Links information & links			

Module	Principles of Finance		
Area of study	► Specialization Finance		
Recommended semester	1	Mandatory/elective	Elective
Module coordinator	Prof. Eva Lütkebohmert-Holtz	Work load	120 hours
ECTS (credit points)	6	Contact hours (SWS)	2 (L9 2 (T)
Course type	▪ Lecture ▪ Tutorial	Language	English
Rotation	Every summer semester		
Requirements	Advanced Microeconomics I		
Learning/ qualification target	Introduction to basic concepts of asset pricing and the valuation of contingent claims		
Content	This course introduces the basic concepts of asset pricing and the valuation of contingent claims. Asset pricing in complete markets generates strong results such as information efficiency and the concepts of a market portfolio and a market price of risk. Moreover, in dynamically complete markets simple arbitrage techniques allow to value derivatives such as options. Empirically, however, the predictions based on complete markets are often rejected. So-called anomalies suggest that many - if not most - real markets are incomplete. Therefore, the second part introduces elements of valuation in incomplete markets when the property of equilibrium prices to communicate private information is rather limited.		
Examination type	120 min written exam at the end of the semester		
Literature	▪ Bingham, Kiesel “Risk-Neutral Valuation: Pricing and Hedging of Financial Derivatives.” 2nd ed., Springer Finance, 2004. ▪ Cochrane “Asset Pricing.” Princeton University Press, 2005. ▪ Elton, Gruber, Brown, Goetzman “Modern Portfolio Theory and Investment Analysis”, 6th Edition, John Wiley & Sons, 2003. ▪ Gitman “Principles of Managerial Finance”, 11th Edition, Addi-son- ▪ Wesley, 2006. ▪ Hull “Options, Futures and Other Derivatives.” 7th ed., Prentice Hall, 2009. ▪ LeRoy, Werner “Principles of Financial Economics”, Cambridge University Press, 2001. ▪ Shreve “Stochastic Calculus for Finance I: The Binomial Asset Pricing Model.” Springer Finance, 2005.		
Additional information & links	https://www.finance.uni-freiburg.de/		

4.4. Elective Courses

Elective courses are open students from all profiles. In the profile is indicated as “Interal Are of Study”, the course will be considered “internal elective”. If the profile is not indicated, the course can be taken “as external elective”.

Module	Advanced Mathematics for Economics and Finance		
Area of study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended Semester	1. to 4. Semester	Mandatory/Elective	Elective
Module Coordinator	Anastasia Golubeva, M.Sc. Markus Epp, M.Sc.	Workload	180 hours
ECTS (credit points)	6 ECTS	Contact Hours (SWS)	2h Lecture 2h Tutorial
Course Type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	Winter term 2019/20		
Requirements	Good command of calculus and linear algebra at the undergraduate level		
Learning / Qualification Target	This lecture is aimed at students of the MSc VWL and MSc Economics (all profiles) who are at the beginning of their studies. Mathematical tools going beyond the undergraduate level are provided. The lecture will cover a range of relevant mathematical tools and techniques that are typically required for further studies in economics. At the end of the course students should be able to understand and apply these tools. The methods discussed in class help students to read current economic research papers and work with economic models. Thus, they might be able to fully concentrate on the economics in their economic courses. During the semester the students demonstrate and exercise the material with the help of problem sets which are discussed in class.		
Content	▪ Topics in Linear Algebra ▪ Multivariate Calculus ▪ Static Optimization ▪ Topics in Integration ▪ Differential Equations ▪ Probability Theory		
Examination Type	Written exam		
Literature	The lecture makes heavy use of the following book: Knut Sydsæter et. al., 2008, Further Mathematics for Economic Analysis, 2nd edition, Prentice Hall University Press		
Additional Information & Links	For further information please see the chair home page: http://www.macro.uni-freiburg.de/news/home		

Module	Algorithm Design and Software Engineering		
Internal Areas of Study	► Information System and Network Economics		
Recommended Semester	1-4	Mandatory / Elective	Elective
Module Coordinator	Prof. Dirk Neumann	Work load	Ca. 120 hours
ECTS (credit points)	4	SWS	1 (L) 1 (T)
Course type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	Irregular		
	This course covers the concepts of software engineering and algorithm design. Students will acquire basic knowledge on software engineering, software testing and IT management. This knowledge serve as a lever for creating new software applications or changing the functionality of existing ones. While the aforementioned concepts address the “big picture”, we also focus on the underlying programming. A short-introduction to control flows will enable students to design algorithms for various purposes. Here, we introduce the most relevant ones from the literature, e.g. for sorting, searching and graph operations. Basic knowledge of the statistical software “R” is necessary.		
Content	Software has become an integral part for every successful business. Software systems help to detect, solve and organize problems in a reliable and efficient manner. Common examples include systems for customer relationship management (CRM) or ticketing, which distribute tasks across stakeholders. Moreover, analyzing big data or even simple office programs are just a few examples for prevalent applications of software. Nowadays, tailored software exist for almost all common business sectors. Software engineering has thus evolved as the handcraft of the 21th century. At the heart of any software is the programmed code with its different algorithm. In that context, an algorithm is a clearly defined and logical step-by-step operation. It sets certain standards of quality; nevertheless, it is still flexible enough to solve a broad variety of problems in short time. Furthermore, it is easy to retrace the result of such a step-by-step operation. In our daily live algorithms are omnipresent, as they play important roles in search engines, stock trading, social networking etc. **Tentative Topics** ▪ Organization and Motivation ▪ Introduction to Logic ▪ Control Structures ▪ Recursion and Dynamic Programming (DP) ▪ Data Structures ▪ Trees ▪ Graphs ▪ Sorting and Searching ▪ Object Oriented Programming (OOP) ▪ Unified Modeling Language (UML) ▪ Software Testing ▪ IT Management		
Examination type	Written Exam		
Literature	▪ Wickham: *Advanced R* (CRC Press, 2014) ▪ Sedgewick: *Algorithms* (Addison-Wesley, 2011)		
Additional information& links	For further information, please see the chair home page: http://www.is.uni-freiburg.de		

Module	Behavioral Economics		
Internal Areas of Study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended Semester	3. semester	Mandatory/Elective	Elective
Module Coordinator	Prof. Lars Feld	Workload	120 hours
ECTS (credit points)	4 ECTS	Contact Hours (SWS)	2h Lecture
Course type	Lecture	Language	English
Frequency taught	Winter term		
Requirements	No special requirements		
Learning/ Qualification Target	Students shall become familiar with the basic insights of the subject, the cutting-edge empirical methods used in this realm and the latest research findings.		
Content	The area of “Behavioral Economics” studies the actual behavior of agents. It explicitly takes into account human emotions (e.g., perception of fairness, risk aversion) and attempt to model systematic deviations from standard economic theory with respect to human behavior. This lecture gives an introduction to “Behavioral Economics”, its main theories and implications. We will discuss models of human behavior and related studies that empirically test these theories in an empirical way (mainly using experiments).It is expected that all participants in the lecture participate actively by reading the relevant papers. In the first lecture we will assign 10 papers to students who will give a short presentation of a paper (motivation, research design, findings) of max. 15 minutes over the whole semester. All relevant materials will be uploaded on ILIAS in October.		
Examination Type	Written exam		
Literature	Cartwright, E. (2014). Behavioral Economics. Routledge.		
Additional Information & Links	For further information please see the chair home page – confirm which link is correct: www.eucken.de or http://www.ordo.uni-freiburg.de/		

Module	Basic Income and Social Justice in the Social Contract Laboratory [SoCoLab] (Seminar)		
Area of study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended Semester	1 to 4 semester	Mandatory/Elective	Elective
Module Coordinator	Prof. Bernhard Neumärker	Workload	120 hours
ECTS (credit points)	6 ECTS	Contact hours (SWS)	Blockcourse (further informations are available on the homepage)
Course Type	Blockcourse	Language	English
Rotation	Irregular		
Requirements	no special requirements		
Learning/ Qualification Target	▪ Familiarizing with experimental logic and design and its application to social contracting, collective action and economic policy. ▪ Designing, conducting and analyzing own experiments ▪ Experiencing experimental approaches, especially with respect to social contracting, basic income and income redistribution. ▪ Deepening on social contract and rules of redistribution. ▪ Enhancing analytical thinking and understanding of contract and social justice theories. ▪ Experiencing and analyzing (experimental) consequences of different degrees of inequality and social immobility for the choice of social justice principles, tax rules and redistributive economic policy		
Content	SoCoLab seminar, winner of a University teaching award 2012, deviates from a usual seminar setting. The students after reading the necessary papers and finish the required assignments will be welcomed during class to participate and discuss the elements of the theories and their ideas with Prof. Neumärker and his co-workers. The seminar consists of an introduction, 2 blocked meetings, a day of experiments with the participants, and a concluding session for the team experiments. In the first sessions (Part I), the theoretical foundations and political problems are laid, and after the introduction to experiment settings (Part II) follow the presentations and critical discussion on design and conduct of team experiments (Part III). The participation in all the classes is obligatory in order to achieve maximum participation and understanding of the subjects. After the classes and the experiments for seminar participants are over, teams are given a sufficient amount of time to develop an experiment on the topic. In the team experiments, the participants are expected to critically reflect on one of the issues tackled in the seminar. The experiment design formalities and more specific information on the content will be provided to all participants.		

	Content: ▪ Introductory Session ▪ Learning sessions: - 3x2 Hour Sessions on Social Contract, Basic Income Theories and Economic Problems of Inequality and Social Immobility - 3x2 Hour Sessions on Experimental Logic and Design and its Applicationto Social Contracting on Basic Income and Public Inequality Regulation - 2x3 Hour Experimental Sessions - 2x2 Hour Feedback Sessions on Critical Discussion of the Theoretical Underpinnings and Experimental Outcomes
Examination Type	The overall grade is the weighted as a sum of all three elements of the seminar with the following weights: ▪ Team Experiment and Paper/Report on a Experiment: 60%, ▪ Assignments: 20%, ▪ Class Participation: 20%. The teams will be built, at the latest, after the “Experimental Sessions for Participants”.
Literature	Are provided in the Introductory session
Additional Information &Links	For further information please see the chair home page http://www.wipo.uni-freiburg.de/Lehre

Module	Business Analytics		
Internal Areas of Study	► Finance ► Information System and Network Economics		
Recommended semester	2-4	Mandatory/Elective	Elective
Module cordinator	Prof. Dirk Neumann	Workload	Ca. 120 hours
ECTS (credit points)	4	SWS	2
Course type	Lecture	Language	English
Frequency taught	Summer Semester		
Requirements	The module builds upon the lecture “Business Intelligence” from the Bachelor program, but sets a different focus. Hence, having attended the Bachelor lecture is not a prerequisite, but an affinity for working with and analyzing data is recommended.		
Learning/ qualification target	The lecture aims at training students in the following methodologies: ▪ Clustering – the automated separation of large data sets into meaningful clusters ▪ Associations – pattern recognition based on the relationships between observations in the data set ▪ Prediction – using relationships between observations to predict future developments - Decision Trees - Support Vector Machines - Kernels - (Logistic) - Regression - Linear Discriminant Analysis - Bootstrapping		
Content	Data mining is becoming increasingly important to interpret the vast amounts of data that are accumulated today. In this lecture students are introduced to several techniques that allow them to extract previously unknown information from these enormous data sets. The gained insights can subsequently be used to support decision making in business or public administration.		
Examination type	Written Exam (60 min)		
Literature	▪ C.M. Bishop, *Pattern Recognition and Machine Learning*, Springer, New York, 2006. ▪ G. James, D. Witten, T. Hastie, R. Tibshirani, *An Introduction to Statistical Learning,* 4th edition, Springer, New York, NY, 2013. ▪ F. Provost, *Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking,* O’Reilly Media, 2013. ▪ J. Friedman, T.Hastie, R. Tibshirani, *The elements of statistical learning*, Springer, Berlin: Springer series in statistics, 2001.		
Additional information& links	For further information, please see the chair home page: http://www.is.uni-freiburg.de		

Module	**Business Analytics (Seminar): Business Intelligence with R and Python**		
Internal Areas of Study	► Finance ► Information System and Network Economics		
Recommended Semester	2. to 4. semester	Mandatory/Elective	Elective
Module Coordinator	Prof. Dirk Neumann	Workload	Ca. 180 hours
ECTS (credit points)	6 ECTS	Contact Hours (SWS)	
Course Type	Seminar	Language	English
Rotation	See additional information		
Requirements	No special requirements. However, basic programming experience is recommended.		
Learning/ Qualification Target	Work on an individual scientific topic. Acquire programming & data mining skills.		
Content	Prior to the start of the Information Age in the late 20th century, companies were forced to collect data from non-automated sources manually. Companies back then lacked the computing capabilities necessary for data to be analyzed, and as a result, decisions primarily originated not from knowledge but from intuition. With the emergence of ubiquitous computing technology, company decisions nowadays rely strongly on computer-aided **"Data Mining"**. **Business Intelligence** refers to technologies that target how business information (or sometimes information in general) is collected, analyzed and presented. Combining these features results in software called Business Intelligence systems. These systems serve the purpose of providing better decision support. In this seminar, we will focus on what distinguishes the varying capabilities across Data Mining – namely the underlying methods. We will review different strategies for data collection, data analysis, and data visualization. Sample approaches include dimension reduction of big data, data visualization, model selection, clustering and forecasting. In particular, the seminar will answer the following questions: • **Forecasting:** Based on historical values, how can businesses predict future developments ahead of time? Given the current stock market prices, can we predict tomorrow's values? • **Data analysis:** How does weather impact electricity prices? Which parameters of second-hand cars correlate with their value? • **Clustering:** How can businesses group consumers into distinct categories according to their purchase behavior? Can businesses group job applicants into groups of similar characteristics? • **Dimension reduction:** How can businesses simplify a large amount of indicators into a smaller subset with similar significance? Can the huge set of features characterizing supermarkets (e.g. gas station, discounts, service) be combined into groups?		

	Individual assignments will consist of a specific problem from Data Mining. Each participant will be provided with a dataset to which a certain method should be applied to using the programming languages Python or R.
Examination Type	Usually a presentation and a written paper
Literature	Among others, we will cover material from the following books: - Wickham, Hadley, and Garrett Grolemund. R for data science: import, tidy, transform, visualize, and model data. O'Reilly Media, Inc., 2016. - Friedman, Jerome, Trevor Hastie, and Robert Tibshirani. The elements of statistical learning. Vol. 1. New York: Springer series in statistics, 2001.
Additional Information & Links	For further information, please see the chair home page: http://www.is.uni-freiburg.de

Module	Business Analytics (Seminar): Webscraper Development and Data Analysis using R and Python		
Internal Areas of Study	► Finance ► Information System and Network Economics		
Recommended Semester	2 - 4		
Module Coordinator	Prof. Dirk Neumann	Mandatory/Elective	
ECTS-Points	6	Workload	Ca. 120 - 180 Stunden
Course Type	Seminar	SWS	
Rotation	See information	Language	Deutsch / Englisch
Requirements	There are no formal requirements. However, basic programming skills are recommended (preferably, you will work in R and/or Python). For students who are less familiar to programming, it is also possible to work with a precollected dataset and focus on the data mining part. Please indicate in your application if you would prefer this setup. Please also indicate your level of programming expertise.		
Learning and Qualification Target	In this seminar, students will acquire two kinds of skills. First, students will learn to build a webscraper to collect their own dataset from the web. Second, students will review different strategies for data analysis, and data visualization.		
Content	Prior to the start of the Information Age in the late 20th century, companies were forced to collect data from non-automated sources manually. Companies back then lacked the computing capabilities necessary for data to be analyzed, and as a result, decisions primarily originated not from knowledge but from intuition. With the emergence of ubiquitous computing technology, company decisions nowadays rely strongly on computer-aided “Data Mining”. In this seminar, students will acquire two kinds of skills. First, students will learn to build a webscraper to collect their own dataset from the web. Second, students will review different strategies for data analysis, and data visualization. Students are asked to describe and visualize the content of their dataset. Optionally, committed students can pick a statistical method / data mining algorithm of their choice and perform a descriptive or predictive data mining task on their dataset.		
Examination Type	Usually a presentation and a written paper		
Literature	Among others, we will cover material from the following books: - Wickham, Hadley, and Garrett Grolemund. R for data science: import, tidy, transform, visualize, and model data. O'Reilly Media, Inc., 2016. - Friedman, Jerome, Trevor Hastie, and Robert Tibshirani. The elements of statistical learning. Vol. 1. New York: Springer series in statistics, 2001.		
Additional Information & Links	Every semester there is at least one Seminar on Business Analytics covering one specific topic. More information at the website of the Chair (http://www.is.uni-freiburg.de/).		

Module	Case Studies in Labor Economics		
Area of study	► Economics & Politics		
Recommended Semester	3rd - 4th semester	Mandatory/Elective	Elective
Module Coordinator	▪ Dr. Alexander Spermann ▪ Prof. Günther Schulze	Workload	120 hours
ECTS (credit points)	4 ECTS	Contact Hours (SWS)	2 hours
Course Type	Block course (lecture style, case studies and complementary learning videos)	Language	English
Rotation	Irregular		
Requirements	No special requirements		
Learning/ Qualification Target	tba		
Content	The course focuses on current issues in labor economics with a special focus on the use of modern econometrics to solve the fundamental evaluation problem. It will combine lecture style and case studies on various labor economics topics. The lectures will deliver input for the case studies to allow for a more qualified discussion in small and large groups. Topics will cover the issues of leading labor economics textbooks.		
Examination Type	Exam		
Literature	Selected papers. Topics change each semester, a literature list will be available at the beginning of the seminar on the homepage of Prof. Schulze's chair.		
Additional Information & Links	The course is held by Dr. Alexander Spermann. For further information please check the homepage of Prof. Schulze's chair at http://www.vwl.uni-freiburg.de/iwipol/teaching.htm		

Module	Computational Finance		
Internal Areas of Study	► Finance ► Information Systems and Network Economics		
Recommended semester	2nd	Mandatory/elective	Elective
Instructor	Dr. Ernst August v. Hammerstein	Work load	120 hours
ECTS (credit points)	6	Contact hours (SWS)	2 L 1 T
Course type	▪ Lecture ▪ Computer Course	Language	English
Frequency taught	Discontinued*		
Requirements	▪ Principles of Finance ▪ Futures and Options. Programming knowledge in other languages/software packages is *not* required resp. expected, but may be helpful of course.		
Learning/ qualification target	Introduction to the R programming environment and its application to calculate and visualize interest rates, option prices, loss distributions, and risk measures.		
Content	In this course, we first give a concise introduction to the R programing environment. With help of the provided tools, we then develop some programs for bootstrapping zero rates, pricing vanilla options in binomial trees and exotic options in time-continuous models via Monte Carlo methods. We also regard some aspects of hedging and convergence in this context. Further we discuss the implementation of risk measures, the sampling of loss distributions in elementary credit risk models. Depending on the time left, we may additionally discuss the simulation of (approximate) solutions to stochastic differential equations.		
Examination type	90 min. computer-based exam (some small programming exercises) at the end of the semester.		
Literature	▪ Hull, J.C.: *Options, Futures, and other Derivatives*, 7th ed., Prentice Hall, 2009 ▪ Lai, T.L., Xing, H.: *Statistical Models and Methods for Financial Markets*, Springer, 2008 ▪ Seydel, R.U.: *Tools for computational finance*, 4th ed., Springer, 2009 ▪ Any introductory book to the R programming environment, e.g. ▪ Braun, J., Murdoch, D.J.: *A first course in statistical programming with R*, Cambridge University Press, 2007 See also the documentation on the official R homepage		
Additional information & links	*The course is currently discontinued, but might be offered at a later date.		

Module	Credit Risk		
Internal Areas of Study	► Finance		
Recommended semester	2	Mandatory/elective	Elective
Module coordinator	Prof. Eva Lütkebohmert-Holtz	Work load	120 hours
ECTS (credit points)	6	Contact hours (SWS)	2 (L) 2 (T)
Course type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	irregular		
Requirements	▪ Principles of Finance ▪ Futures and Options		
Learning/ qualification target	Introduction to single name and portfolio credit risk models and pricing of credit derivatives		
Content	Credit risk represents by far the biggest risk in the activities of a traditional bank. In particular, during recession periods financial institutions lose enormous amounts of money as a consequence of bad loans and default events. In the last two decades, a multitude of credit-linked derivatives has been developed to manage and transfer credit risks in an efficient and standardized way. These allow banks to shape their risk profile according to regulatory standards. In this lecture, we introduce some of the most popular single name- and portfolio credit models and show how these are used to quantify credit risk and to price credit derivatives like credit default swaps (CDS), basket default swaps and collateralized debt obligations (CDO).		
Examination type	120 min. written examination at the end of the semester		
Literature	▪ Bielecki, T.R., Rutkowski, M.: Credit Risk: Modeling, Valuation, and Hedging. Springer, 2002 ▪ Bluhm, C., Overbeck, L.: Structured credit portfolio analysis, baskets & CDOs. Chapman & Hall/CRC Press, 2006 ▪ Duffie, D., Singleton, K.F.: Credit Risk: Pricing, Measurement, and Management. Princeton University Press, 2003 ▪ Lando, D.: Credit Risk Modeling: Theory and Applications. Princeton University Press, 2004 ▪ Lütkebohmert, E.: Concentration Risk in Credit Portfolios. Springer, 2009 ▪ Schönbucher, P.J.: Credit Derivatives Pricing Models. Wiley, 2003		
Additional information & links	For further information please see the chair home page: https://www.finance.uni-freiburg.de/		

Module	**Current Issues in Finance and Monetary Economics (Bundesbank-Seminar)**		
Internal Areas of Study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended Semester	2-4 semester	Mandatory/elective	Elective
Module Coordinator	Prof. Günter Beck (Visiting Professor)	Work load	120 h
ECTS (credit points)	4 ECTS	Contact hours (SWS)	2 SWS
Course Type	Seminar	Language	English
Frequancy	One-time event		
Prerequisites	Successful completion of „Advanced Macro 1“ and/or „Principles of Finance“ strongly recommended		
Learning/ qualification target	Introduction to Current Issues in Finance and Monetary Economics		
Content	1. Frictionless investment model, Tobin’s q, the Modigliani-Miller theorem 2. Microfoundations of frictions in credit markets 3. Macroeconomic implications of frictions in credit markets 4. Endogenous leverage and leverage cycles 5. Financial intermediation, liquidity provision and bank runs 6. The term structure of interest rates		
Type of examination	Term paper and classroom presentation		
Literature	▪ Brunnermeier, Markus K, Thomas M Eisenbach, and Yuliy Sannikov (2012). Macroeconomics with financial frictions: A survey. Tech. rep. National Bureau of Economic Research. ▪ Freixas, Xavier and Jean-Charles Rochet (2008). Microeconomics of Banking, Second Edition. Cambridge [Mass]: The MIT Press. ▪ Romer, David (2011). Advanced macroeconomics, 4th edition. McGraw-Hill Education. ▪ Walsh, Carl E (2010). Monetary Theory and Policy, Third Edition. The MIT Press.		
Additional information & links	For further information please see the chair home page: http://www.macro.uni-freiburg.de/news/home		

Module	Development Microeconometrics Using STATA		
Internal Areas of Study	► Economics & Politics		
Recommended semester	1-4	Mandatory/elective	Elective
Module coordinator	Prof. Günther Schulze	Work load	120 hours
ECTS (credit points)	6	Contact hours (SWS)	2 (S)eminar 2 (T)
Course type	Seminar	Language	English
Rotation	irregular		
Requirements	Required: Intermediate Microeconometrics or intermediate knowledge of econometrics demonstrated through the completion of comparable courses. Parallel enrollment in Microeconometrics is strongly recommended.		
Learning/ qualification target	The primary goal of the course is to broaden students' skills of working with the statistical program STATA and to enable them to conduct own empirical analyses for their thesis. The course targets advanced master students with a good basic knowledge of econometrics. By replicating and discussing published empirical studies, students are trained in critical thinking about the design and identification of micro-empirical studies.		
Content	In the course, students will replicate selected empirical papers within the field of Development Economics. It will include sessions on finding and managing micro-data, linear regression models, instrumental variable approaches, nonlinear regression models and empirical analyses based on panel data.		
Examination type	Weekly homeworks, two take-home exams.		
Literature	Selected papers, literature list will be available at the beginning of the seminar.		
Additional information & links	For further information please see the chair home page: http://www.vwl.uni-freiburg.de/iwipol/teaching.htm		

Modul	Dynamic Fiscal Policy		
Area of study	► Economics & Politics ► Finance		
Recommended Semester	1. to 4. semester	Mandatory/Elective	Elective
Module Coordinator	Prof. Bernd Raffelhüschen	Workload	180 Hours
ECTS (credit points)	6 ECTS	Contact Hours (SWS)	2h Workshop
Course Type	Workshop (Lecture plus computer sessions)	Language	English
Rotation	Every summerterm		
Requirements	Students should have passed lectures “Öffentliche Ausgaben” and “Öffentliche Einnahmen” or introductory public economic courses at their home universities. In addition, students should have some basic knowledge of Mircosoft Excel or any other spread-sheet software.		
Learning/ Qualification Target	The course is designed to provide students with an in-depth under-standing of the dynamic macroeconomic effects of fiscal policy, general equilibrium theory, neoclassical growth theory and the model of overlapping generations.		
Content	The course is structured in four case studies, including the introduc-tion of a pay-as-you-go social security scheme, a deficit-financed tax cut, the incidence of capital income taxation and generational accounting in general equilibrium. Each case study consists of two parts. A lecture providing students with the theoretical background of the case study at hand and an accompanying computer session devoted to the analysis of the dynamic macroeconomic effects by means of a numerical simulation.		
Module Courses	Lecture and computer sessions (compulsory attendance)		
Examination Type	▪ four graded worksheets ▪ participation during the computer sessions ▪ oral exam		
Literature	▪ Auerbach, A. J. und L. J. Kotlikoff (1987), Dynamic Fiscal Pol-icy, Cambridge: Cambridge University Press. ▪ Raffelhüschen, B. (1989), Alterssicherung und Staatsverschul-dung, Finanzarchiv, 47, 60-76. ▪ Raffelhüschen, B. (1993), Funding Social Security Through Pareto-optimal Conversion policies, Journal of Economics, 7, 105-131. ▪ Raffelhüschen, B. und A. E. Risa (1997), Generational Ac-counting and Intergenerational Welfare, Public Choice, 93: 149–163.		
Additional Information & Links	Further information about the application process is available on the homepage of the department: http://www.fiwi1.uni-freiburg.de/lehre/veranstaltungen.html		

Module	Econometric Risk Management in Finance		
Internal Areas of Study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended semester	3–4	Mandatory/elective	Elective
Module coordinator	Prof. Sevtap Kestel	Work load	Approx. 120 hours
ECTS (credit points)	4	Contact hours (SWS)	2 (L) + PC tutorial
Course type	Block course	Language	English
Frequency taught	Irregular		
Requirements	Knowledge in Principles of Finance, Econometrics will be an advantage to follow the theoretical part of the course. The quantitative part of the lecture requires background in Econometrics.		
Learning/ qualification target	This course provides an overview on the risk management techniques, especially, on finance by using econometric and statistical techniques. The main parts of the course are quantitative analysis and the components of risks related to financial markets. The quantitative part contains characterizing random variables, linear transformation of random variables and their distributions, simulation technique, simulation of Markov processes and yields, VaR methods, linear models, time variation at risk, GARCH, EWMA, Risk adjusted performance measures, risk and risk aversion with utility functions and expected values, stress testing and back testing. Risk management practices introduce the analyses of market, credit, operational and investment risk in general. Case studies discussing current examples of the lack of proper risk management in world-wide known companies in last decade constitute the application part of the lecture which will be covered during the lectures and tutorials. The targets proposed will be achieved through the interactive classwork and assignments given through the semester. A term project may be given to enable students to practice the topics covered.		
Content	Highly changing demand and supply structure in the market, increasing effect of globalization, economic fluctuations, environmental disasters are just some of the challenges that economies have to consider. For these reasons Risk Management became one of the vital steps to be taken as an important part of the economic policy. ▪ Introduction Risk management definition, steps and major techniques; risk aversion, utility and expectation, Jensen's inequality, Example: Determination of optimal insurance premium by utility theory ▪ Quantitative Analysis: Random variable, linear transformation of random variables, sum and portfolios of random variables and their distributions, Simulation techniques ▪ Risk Management practices: Market risk management, credit risk management, operational risk management, investment risk management, Basel II. ▪ VaR, Simulating VaR, Markov process, yields, Risk adjusted performance measures, The mean-variance criterion, stress testing, back testing ▪ Linear models, time variation at risk, GARCH, EWMA ▪ Case studies		

Examination type	Assignments and Final Exam
Literature	▪ Financial Risk Manager Handbook by Philippe Jorion, 6th Ed., John Wiley and Sons, 2009. ▪ Risk Management by Michel Crouhy, Dan Galai, Robert Mark, McGraw Hill, 2000. ▪ Investment Risk Management by Yen Yee Chong, John Wiley, 2004.
Additional information & links	For further information please see the chair home page: http://www.macro.uni-freiburg.de/news/home

Module	Economics of Social Justice		
Internal Areas of Study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended semester	1-4	Mandatory/elective	Elective
Module coordinator	Prof. Bernhard Neumärker	Work load	120 - 180 hours
ECTS (credit points)	4 or 6	Contact hours (SWS)	2 (L) 2 (T)
Course type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	Winter term		
Requirements	Lectures in “Advanced Microeconomics” and “Economic Policy and Public Choice“ are recommended		
Learning/ qualification target	▪ understanding the role of justice and fairness in economics analysis and collective decision-making ▪ learning how to apply theories and norms of justice to specific problems of economic policy ▪ assessing social justice as a part of positive economic analysis ▪ assessing social justice as a part of normative economic analysis ▪ approaching the development and determination of just constitutional rules for a society		
Content	Practical policy choices involve sacrificing the well-being and the means of some for the benefits of others, as compared with alternatives that could have been chosen. Even if it is not the only thing that matters, the problem of distributive justice is essential, omnipresent and inevitable. Economists not only have failed to answer the questions of the just distribution, but have tried harder to avoid the problem than to solve it. They have a great deal to say about efficiency and potential compensation, but they are nearly silent concerning meaningful principles of justice and their effects on economic policy. One has to integrate the following normative and positive aspects of justice into the analysis of economic policy: Is social justice equality? Why (or why not)? Among whom? Is equality to each according to her abilities, her work or her consumption? Or else is it equality of opportunities, liberties, powers and/or rights? Do we need a just process or a just outcome of policy making? What are the most important elements of a just constitution? How is the reason of just rules applied to daily economic policy?		
Examination type	▪ 4 ECTS: Written exam (60 min) ▪ 6 ECTS: Written exam (90 min)		
Literature	▪ Kolm, S.-C.: Modern theories of justice, Cambridge et al. 1996. ▪ Konov, J.: Which is the fairest one of all? A positive analysis of justice theories, in: Journal of economic literature 41 (2003),1188-1239. ▪ Moulin, H.J.: Cooperative microeconomics, Princeton 1995. ▪ Mueller, D.C.: Public choice III, Cambridge 2003. ▪ Roemer, J.E.: Theories of distributive justice, Cambridge et al. 1996. ▪ Schotter, A.: Free Market Economics, 2nd Ed., Oxford et al. 1990. ▪ Silver, M.: Foundations of Economic Justice, Oxford et al. 1989. ▪ Zajac, E.E.: Political economy of fairness, Cambridge/MA 1995.		
Additional information & links	For further information please see the chair home page: http://www.wipo.uni-freiburg.de		

Module	Electronic Markets		
Internal Areas of Study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended Semester	1-4	Mandatory / Elective	Elective
Module coordinator	Prof. Dirk Neumann	Work load	180 hours
ECTS (credit points)	6	SWS	2 (L) 1 (E)
Course type	▪ Lecture ▪ Exercise	Language	English
Frequency taught	Summer term		
Requirements	No special requirements		
Learning/ qualification target	Electronic markets are an essential building block of today's networked service economy. We face them in automated stock exchanges, auctions at ebay and Google, as well as in industrial contracting. By enabling the trade and allocation of frequencies for wireless communication (UMTS, LTE) and emission certificates, electronic markets shape the future of our planet, our economies, and our societies. However, the design and implementation of market mechanisms is highly complex. Markets need to be protected from cheating by individual agents or full-blown market failures. The lecture "Electronic Markets" seeks to provide students with an understanding of how electronic market platforms are analyzed, designed, and introduced.		
Content	The topics covered in the lecture can be divided into three broad areas: ▪ *The microstructure*. This area includes rules that define how markets operate and covers, for instance, a recap of game theory and auction rules for single-unit and combinatorial auctions. This is the main focus of the lecture. ▪ *The IS infrastructure*. This area contains issues concerning the implementation of electronic markets, such as computational complexity. ▪ *The business structure*. This area outlines how the electronic market is offered to its customers and covers issues such as enforcement, trust, and monitoring. Students learn to comprehend, to enhance, and to evaluate the design potentials of electronic market platforms. The participation in the exercise sessions is highly recommended. During the exercise sessions, students will get hands-on experiences with game-theoretical experiments and different auctions formats.		
Examination type	Written Examination		
Literature	▪ Roth, A. The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools for Design Economics. Econometrica 70(4): 1341-1378, 2002. ▪ Weinhardt, C. ,Holtmann, C., Neumann, D. Market Engineering. Wirtschaftsinformatik 45(6): 635-640, 2003. ▪ Wolfstetter, E. Topics in Microeconomics - Industrial Organization, Auctions, and Incentives. Cambridge: Cambridge University Press, 1999.		

Additional information & links	For further information, please see the chair home page: http://www.is.uni-freiburg.de

Module	Empirical Research Seminar in Institutional Economics		
Internal Areas of Study	► Economics & Politics		
Recommended semester	1-4	Mandatory/elective	Elective
Module coordinator	Prof. Tim Krieger	Work load	180
ECTS (credit points)	6	Contact hours (SWS)	2h Seminar, 2h Tutorial
Course type	Seminar	Language	English
Frequency taught	Every second semester (winter term)		
Requirements	Statistics and econometrics		
Learning/ qualification target	The aim of the seminar is twofold: A specific topic will be covered in depth so that students gain a thorough understanding of this topic. At the same time, students will be trained in applying empirical methods using the statistical program Stata in the tutorial. Students will learn how to critically discuss, replicate and extend empirical scientific studies and apply this in their seminar paper and presentation.		
Content	Seminar topics change every semester. The Stata tutorial will include sessions on managing data, linear regression models and further techniques related to the respective topic.		
Examination type	▪ Seminar paper ▪ Presentation ▪ Participation in the discussion ▪ Stata Do- and log-files		
Literature	Changes every semester		
Additional information & links	For further information, please see the chair home page: http://www.wguth.uni-freiburg.de/aktuelles		

Module	Futures and Options		
Internal Areas of Study	► Finance		
Recommended semester	Second semester	Mandatory/elective	Elective
Module coordinator	Prof. Eva Lütkebohmert-Holtz	Work load	120 hours
ECTS (credit points)	6	Contact hours (SWS)	2 (L) 2 (T)
Course type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	Every winter semester		
Requirements	Principles of Finance (should be taken in parallel)		
Learning/ qualification target	Introduction to basic principles of risk-neutral valuation of futures, standard and exotic options as well as interest rate derivatives.		
Content	This course covers an introduction to financial markets and products. Besides futures and standard put and call options of European and American type we also discuss interest-rate sensitive instruments such as swaps. For the valuation of financial derivatives we first introduce financial models in discrete time as the Cox-Ross-Rubinstein model and explain basic principles of risk-neutral valuation. Finally, we will discuss the famous Black-Scholes model which represents a continuous time model for option pricing.		
Examination type	120 min. written examination at the end of the term		
Literature	▪ Chance, D.M., Brooks, R.: *An Introduction to Derivatives and Risk Management*, 8. ed., South-Western, 2009. ▪ Hull, J.C.: *Options, Futures, and other Derivatives*, 7. ed., Prentice Hall, 2009. ▪ Shreve, S.E.: *Stochastic Calculus for Finance I: The Binomial Asset Pricing Model*, Springer Finance, 2005. ▪ Strong, R.A.: *Derivatives. An Introduction*, 2. ed., South-Western, 2004.		
Additional information & links	For further information please see the Chair's home page: http://www.finance.uni-freiburg.de/aktuelles		

Module	Global Economic Governance		
Internal Areas of Study	► Economics and Politics ► Finance		
Recommended semester	1-4	Mandatory/elective	Elective
Module coordinator	Prof. Tim Krieger	Work load	180 hours
ECTS (credit points)	4 or 6	Contact hours (SWS)	2 (L) 2 (T)
Course type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	Every winter term		
Requirements	Recommended: good working knowledge of microeconomics and trade theory		
Learning/ qualification target	In this lecture, students acquire a solid knowledge of the institutions of global economic governance. Furthermore, they will learn in a systematic manner how the international economic order evolves in an environment without supranational government, i.e., how mechanisms and processes of self-enforcement shape the international order.		
Content	Closed economies can be governed within the national institutional framework. This is no longer the case in a globalized world with strong transnational linkages, e.g., through trade or factor mobility. Under these circumstances, there is a need to establish international rules that guarantee smooth operation of the global economy. Since there is no global government, issues such as the enforcement of property rights in the international arena, the provision of global public goods or the internalization of cross-border externalities are difficult to resolve. Setting up a global economic order is therefore a major challenge because it requires not only the coordination of several independent actors (i.e., countries), but the establishment of a coordination mechanism as a first step. Hence, in the course self-enforcing mechanisms and institutions of global governance will be discussed and formal economic analysis is applied to the genesis and functioning of the most important institution of global economic governance, the World Trade Organization (WTO/GATT).		
Examination type	Written Exam: ▪ 4 ECTS: To earn 4 ECTS a 60 minutes exam based on the lecture material has to be passed. ▪ 6 ECTS: Written exam (90 minutes)		
Literature	▪ Bagwell, K.; Staiger, R.W. (2002): The Economics of the World Trading System. MIT Press: Cambridge/MA and London. ▪ Hoekman, B.M.; Kostecki, M.M. (2008): The Political Economy of the World Trading System, Oxford University Press, Oxford. Further readings will be provided before and during the class		
Additional information & links	For further information, please see the chair home page: http://www.wguth.uni-freiburg.de/aktuelles		

Module	Interest Rate Theory and Applications		
Area of study	► Finance		
Recommended semester	First year of the master program	Mandatory/elective	Elective
Module coordinator	Dr. Christoph Gerhart	Work load	120 hours
ECTS (credit points)	6 ETCS	Contact hours (SWS)	2h Lecture 2h Tutorial
Course type	▪ Lecture ▪ Tutorial	Language	English
Rotation	irregular		
Requirements	R Preparation Course		
Learning/ qualification target	Introduction to fixed income markets		
Content	This course provides an introduction to fixed income markets. We focus on bootstrapping of yield curves and the pricing of interest-rate sensitive instruments. For this purpose, we will meet the most widely used model approaches such as a short-rate, HJM and market models. The financial crisis causes many changes in the valuation of interest-rate products. For this reason, we address the multiple-curve approach that deals with this new market situation. In addition to the lecture there will be general tutorial where the theoretical methods taught in the lecture will be deepened by exercises as well as practically implemented (mostly in the programming language R) and applied to real data problems.		
Examination type	120min written exam at the end of the semester		
Literature	Hull, J.C.: Options, Futures, and other Derivatives, 7th ed., Prentice Hall, 2009 Shreve, S.E.: Stochastic Calculus for Finance I: The Binomial Asset Pricing Model, Springer Finance, 2005 Filipovic, D.: Term-Structure Models, Springer Finance, 2009		
Additional information & links	For further information see http://www.finance.uni-freiburg.de/studium-und-lehre		

Module	International Monetary Economics I		
Internal Areas of Study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended semester	2-4	Mandatory/elective	Elective
Module coordinator	Prof. Oliver Landmann	Work load	120 hours
ECTS (credit points)	4	Contact hours (SWS)	2 (lecture + tutorial)
Course type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	Irregular		
Requirements	Firm Command of Intermediate Microeconomics and Macroeconomics. The following macro text is particularly suitable for preparation: Blanchard/Amighini/Giavazzi (2013): Macroeconomics – A European Perspective, 2nd ed.		
Learning/ qualification target	Introduction to basic theories of open economy macroeconomics and international monetary systems		
Content	▪ The Basics: the Balance of Payments and the Foreign Exchange Market ▪ Some History ▪ Basic Long-Run relations in the Open Economy ▪ The Open Economy in the Short Run ▪ International Interdependence and Policy Coordination ▪ Optimum Currency Area Theory and the Euro		
Examination type	2 hour written examination at the end of the semester		
Literature	mostly journal articles as provided during the lecture		
Additional information & links	For further information please see the chair home page: http://www.macro.uni-freiburg.de/news/home		

Module	International Monetary Economics II		
Internal Areas of Study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended semester	2-4	Mandatory/elective	Elective
Module coordinator	Prof. Oliver Landmann	Work load	180 hours
ECTS (credit points)	6	Contact hours (SWS)	3 (L) 1 (T)
Course type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	irregular		
Requirements	Firm Command of Intermediate Microeconomics and Macroeconomics. International Monetary Economics I is advisable, but not required		
Learning/ qualification target	Familiarization with advanced topics and current issues of open economy macroeconomics and the international monetary system		
Content	▪ The Intertemporal Approach to the Current Account and Capital Flows ▪ Exchange Rates in the Long Run ▪ Exchange Rates in the Short Run ▪ Currency Crises		
Examination type	2 hour written examination at the end of the semester		
Literature	mostly journal articles as provided during the lecture		
Additional information & links	For further information please see the chair home page: http://www.macro.uni-freiburg.de/news/home		

Module	Introduction to Empirical Economics Using STATA		
Area of study	► Economics & Politics		
Recommended semester	4	Mandatory/elective	Elective
Module coordinator	Prof. Dr. Günther Schulze	Work load	Approx. 120 hrs
ECTS (credit points)	4	Contact hours (SWS)	2
Course type	Lecture / tutorial	Language	English
Frequency taught	Irregular		
Requirements	The successful completion of Intermediate Econometrics or an equivalent course is required (basic statistics is not enough).		
Learning/ qualification target	The course introduces to econometrics using the software Stata. Participants will learn to assemble a dataset, write execution code and output the results. Every session will include an exercise part for practicing new material on actual problem sets. The main goal is to provide students with basic knowledge and familiarity with statistical software, which is essential for performing an own empirical analysis (e.g. a master thesis).		
Content			
Module title	Introduction to Empirical Economics using STATA		
Examination type	Exam		
Literature	Selected papers, literature list will be available at the beginning of the course.		
Additional information & links	For further information please see the chair home page: http://www.vwl.uni-freiburg.de/iwipol/teaching.htm		

Module	Introduction to Systematic Investment Strategies (Seminar)		
Internal Areas of Study	► Finance		
Recommended semester	Third Semester	Mandatory/elective	Elective
Module coordinator	Prof. Sergey Perminov Konstantin Andreyev	Work load	120 hours
ECTS (credit points)	4 or 6 ECTS	Contact hours (SWS)	2h Seminar
Course type	Seminar	Language	English
Frequency taught	irregular		
Requirements	▪ Futures and Options (advantageous)		
Learning/ qualification target	Designing and implementing systematic investment strategies.		
Content	This course is teaching students design and implement systematic investment strategies, which were long restricted to hedge funds and investment banks: ▪ learn, design and program a modern systematic investment algorithms to capture market's inefficiencies, ▪ use the secret weapon used by Wall Street to incorporate volumes of data, test strategies, conquer emotional biases, and beat the market, ▪ learn to utilize Quantopian platform which provides end-to-end support for algorithmic investing, including algorithm writing, backtesting with a database of 12 years of historical & fundamental data, forward testing with live data, paper trading, ▪ Learn to evaluate, optimize and pick the best algorithms, based on various backtest characteristics.		
Examination type	Presentation and seminar paper, 60 min. written examination The course can be taken as a standalone seminar (4 ECTS) or as a topics course (6 ECTS). The participants will move step by step and every week will be given a small task to complete. At each meeting, randomly selected students will present their work. Students are encouraged to ask questions and discuss relevant points and challenges they are facing in order to improve mutual learning. Students will communicate online and offline with the project supervisors (Beneficious Investment Management) and other students on project-related issues. Students wishing to earn extra credits, can take the course in the form of a topics course. This will require the same steps as the seminar as well as completion of an individual research based on learned techniques in the seminar and passing a 60min written examination. Individual research will be about exploring the real world phenomena, creating bespoke investment strategy, backtest and optimizing it.		
Literature	tba		

Additional information & links	For further information please see the chair home page: http://www.finance.uni-freiburg.de/aktuelles

Module	Mathematical Methods for Economics and Finance		
Area of study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended Semester	1. to 4. Semester	Recommended Semester	1. to 4. Semester
Module Coordinator	Anastasia Golubeva, M.Sc. Markus Epp, M.Sc.	Module Coordinator	Anastasia Golubeva, M.Sc. Markus Epp, M.Sc.
ECTS (credit points)	6 ECTS	ECTS (credit points)	6 ECTS
Course Type	▪ Lecture ▪ Tutorial	Course Type	▪ Lecture ▪ Tutorial
Rotation	Winter term 2019/20		
Requirements	Good command of calculus and linear algebra at the undergraduate level		
Learning / Qualification Target	This lecture is aimed at students of the MSc VWL and MSc Economics (all profiles) who are at the beginning of their studies. Mathematical tools going beyond the undergraduate level are provided. The lecture will cover a range of relevant mathematical tools and techniques that are typically required for further studies in economics. At the end of the course students should be able to understand and apply these tools. The methods discussed in class help students to read current economic research papers and work with economic models. Thus, they might be able to fully concentrate on the economics in their economic courses. During the semester the students demonstrate and exercise the material with the help of problem sets which are discussed in class.		
Content	▪ Linear Algebra ▪ Multivariate Calculus ▪ Dynamic Systems ▪ Analytical and Numerical Optimization		
Examination Type	Written exam		
Literature	The lecture makes heavy use of the following book: Knut Sydsæter et. al., 2008, Further Mathematics for Economic Analysis, 2nd edition, Prentice Hall University Press		
Additional Information & Links	For further information, please see the chair home page: http://www.macro.uni-freiburg.de/news/home		

Module	Migration Economics		
Area of study	► Economics & Politics		
Recommended Semester	2nd to 4th semester	Mandatory/Elective	Elective
Module Coordinator	Prof. Tim Krieger	Workload	120 hours
ECTS (credit points)	4 ECTS	Contact Hours (SWS)	2h Lecture
Course Type	▪ Lecture	Language	English
Rotation	Every summer term		
Requirements	Intermediate Econometrics, solid knowledge of micro- and macroeconomics		
Learning/ Qualification Target	This lecture gives an introduction to the economics of migration. By the end of the course, students will be able to employ theoretical concepts and empirical methods to discuss a broad array of topics related to migration, such as why people leave, how migration affects destination countries, and how integration works. They will be able to evaluate critically the main arguments regarding consequences and causes of migration from an economic perspective.		
Content	Migration has become an increasingly important topic in the international political arena. Globalization processes make workers and students more mobile, while at the same time domestic and international conflicts as well as humanitarian and environmental catastrophes cause flows of refugees and asylum seekers. We will apply theoretical reasoning to current questions concerning the consequences and causes of migration. Among the questions covered are: Why is it useful to study migration? Why do people migrate? Who migrates? How do migrants do? How does the second generation of migrants perform economically? What are the effects of immigration on the destination country? Participation in the seminar “Research Colloquium on Migration Empirics” is recommended but not mandatory. In the seminar, recent empirical publications in the field of migration economics will be evaluated critically focussing on empirical methods.		
Examination Type	Written exam		
Literature	▪ Borjas, G. J. 2014. Immigration Economics. Harvard University Press. ▪ Bodvarsson, Ö. B. and H. Van den Berg. 2013. The Economics of Immigration: Theory and Policy. 2nd edition. Springer Further readings will be provided before and during class.		
Additional Information & Links	The course will be given by Dr. Renner.		

Module	Modern Econometrics using R		
Internal Areas of Study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended semester	3rd & 4th semester	Mandatory/elective	Elective
Module coordinator	Prof. Dr. Alexander Spermann	Work load	120 hrs
ECTS (credit points)	4	Contact hours (SWS)	2
Course type	Block course (lecture style, case studies and complementary learning videos)	Language	English
Frequency taught	Irregular		
Requirements	Students should install RStudio before the first session.		
Learning/ qualification target	The course offers a survey of modern econometrics, which is primarily designed to solve the fundamental evaluation problem. It will combine lecture style and practical exercises using R in class.		
Content	- Modern approach to Econometrics - Fundamental evaluation problem - Potential outcome approach - Methods: OLS, IV, Matching, RCT, BAE, DiD, RDD - Labor Market and Education		
Module title	Modern Econometrics using R		
Examination type	Exam		
Literature	Angrist, J.D., & Pischke, J. (2015): Mastering 'Metrics, The Path from Cause to Effect, Princeton University Press. + Selected papers		
Additional information & links	For further information please see the chair home page: http://www.vwl.uni-freiburg.de/iwipol/teaching.htm		

Module	Portfolio Management		
Internal Areas of Study	► Finance		
Recommended Semester	2. semester	Mandatory/Elective	Elective
Module Coordinator	Dr. Christoph Gerhart	Workload	120 hours
ECTS (credit points)	6 ECTS	Contact Hours (SWS)	2h Lecture 2h Tutorial
Course Type	▪ Lecture ▪ Tutorial	Language	English
Frequency taught	Every summer semester		
Requirements	Principles of Finance (can be taken in parallel), R course (recommendation)		
Learning/ Qualification Target	Introduction to security and portfolio analysis, the problem of optimal allocation of assets into a portfolio, as well as the evaluation of investments.		
Content	▪ Topics which will be discussed in the lecture include: ▪ classical mean-variance portfolio theory (risk and return, efficient frontier) ▪ determination of equilibrium security returns and prices (CAPM, arbitrage pricing models, empirical tests) ▪ analysis and valuation of securities (such as stocks, bonds, options, etc.) ▪ evaluation of portfolio performance (performance measurement, diversification, active portfolio management)		
Examination Type	120 min. written examination at the end of the term		
Literature	▪ Elton E., Gruber M., Brown S., Goetzmann W.: *Modern Portfolio Theory and Investment Analysis*, 9. ed., Wiley ▪ Chance, D.M., Brooks, R.: *An Introduction to Derivatives and Risk Management*, 8. ed., South-Western, 2009. ▪ Hull, J.C.: *Options, Futures, and other Derivatives*, 7. ed., Prentice Hall, 2009. ▪ Bodie, Z., Kane, A., Marcus, A.J. (2011): *Investments and Portfolio Management*. 9. ed., McGraw-Hill		
Additional Information & Links	For further information please see the chair home page: http://www.finance.uni-freiburg.de/aktuelles		

Module	Research Colloquium on Migration Empirics (Seminar)		
Area of study	► Economics & Politics		
Recommended Semester	2nd to 4th semester	Mandatory/Elective	Elective
Module Coordinator	Prof. Tim Krieger	Workload	120 hours
ECTS (credit points)	4 ECTS	Contact Hours (SWS)	2h seminar
Course type	Seminar	Language	English
Rotation	Every summer term.		
Requirements	Intermediate Econometrics, solid knowledge of micro- and macroeconomics; participation in the lecture “Economics of Migration” is mandatory		
Learning/ Qualification Target	By the end of the course, students will be familiar with empirical concepts and methods in the area of economics of migration, with a special focus on the identification of causal effects. Students will develop the ability to read and understand the content of scientific empirical papers and write (short) critical academic essays.		
Content	Migration has become an increasingly important topic in the international political arena. Globalization processes make workers and students more mobile, while at the same time domestic and international conflicts as well as humanitarian and environmental catastrophes cause flows of refugees and asylum seekers. This seminar is conducted as a colloquium that relies on active participation and preparation. In the discussion, we will focus on critically assessing empirical methods and assumptions as well as implications. In every class, we will discuss one or two articles that will be announced the week before. Preparing the required readings carefully and participating actively in the discussion in each class is mandatory. The lecture (Migration Economics) complements the seminar as it focuses on underlying theoretical concepts.		
Examination Type	▪ Seminar paper ▪ Presentation in class ▪ Participation in class		
Literature	▪ Borjas, G. J. 2014. Immigration Economics. Harvard University Press. ▪ Bodvarsson, Ö. B. and H. Van den Berg. 2013. The Economics of Immigration: Theory and Policy. 2nd edition. Springer The mandatory readings for every week will be announced in Ilias.		
Additional Information & Links	The course will be given by Dr. Renner.		

Module	Selected Topics in Institutional Economics and International Economic Policy (Seminar)		
Area of study	► Economics & Politics		
Recommended Semester	1. to 4. semester	Mandatory/Elective	Elective
Module Coordinator	Prof. Tim Krieger	Workload	180 hours
ECTS (credit points)	6 ECTS	Contact Hours (SWS)	2h seminar
Course Type	Seminar	Language	English
Rotation	Every semester		
Requirements	Very good working knowledge of theoretical and empirical economics		
Learning/ Qualification Target	During the seminar a specific topic in institutional economics and/ or international economic policy will be covered in depth, so students gain a thorough understanding of this topic. At the same time they learn how to approach a specialized field of study and how to write and present a seminar paper. These skills are particularly helpful for eventually writing the Master's thesis.		
Content	Seminar topics change every semester.		
Examination Type	▪ Seminar paper ▪ Presentation ▪ Participation in the general discussion.		
Literature	Selected readings which change every semester.		
Additional Information & Links	Seminar topics change every semester. There may be other lecturers in addition to or instead of Prof. Krieger. Further information (including each semester's seminar topic) can be found on the homepage of Prof. Krieger's chair: http://www.wguth.uni-freiburg.de/lehre-abschlussarbeiten		

Module	Selected Topics in International and Development Economics (Seminar)		
Internal Areas of Study	► Economics & Politics		
Recommended semester	3rd - 4th semester	Mandatory/elective	Elective
Module coordinator	Prof. Günther Schulze	Work load	180h
ECTS (credit points)	4 or 6 ECTS	Contact hours (SWS)	2h seminar
Course type	Seminar	Language	English
Frequency taught	Irregular		
Requirements	good command of intermediate econometrics		
Learning/ qualification target	The seminars cover changing topics in the field of international and development economics in depth. Students are introduced to the relevant literature and learn to understand how economic theory and econometric methods can be applied to the context of the respective seminar		
Content	Changing topics, e.g. political economy, corruption…		
Examination type	▪ Seminar paper ▪ Presentation ▪ Participation in the general discussion. ▪ For 6 ECTS: discussion of the presentation held by another student		
Literature	Selected papers, literature list will be available at a first meeting.		
Additional information & links	For further information please see the chair home page: http://www.vwl.uni-freiburg.de/iwipol/teaching.htm		

Module	The Economics of Terror		
Internal Areas of Study	► Economics & Politics		
Recommended semester	3-4	Mandatory/elective	Elective
Module coordinator	Prof. Schulze	Work load	180 h
ECTS (credit points)	4 or 6	Contact hours (SWS)	2 h Reading course 2 h Tutorial
Course type	Reading Course & tutorial	Language	English
Rotation	irregular		
Requirements	Intermediate Econometrics, solid knowledge of micro- and macroeconomics		
Learning/ qualification target	Students should familiarize themselves with the economic approach to analyzing terrorism. They should be able to understand, evaluate and critically analyze research articles on the economics of terror and understand the methodological concepts used.		
Content	1. Overview 2. Causes of terror, such as poverty, political regime, religious composition 3. Consequences of terror (economic, political, macro, sector and micro) 4. Counterterrorism policies 5. Conclusion		
Examination type	Exam		
Literature	Selected papers, literature list will be available at the beginning of the course		
Additional information & links	For further information please see the chair home page: http://www.vwl.uni-freiburg.de/iwipol/teaching.htm		

Module	The Long Term Determinants of Economic Development		
Internal Areas of Study	► Economics & Politics		
Recommended semester	3-4	Mandatory/elective	Elective
Module coordinator	Prof. Günther Schulze	Work load	120 (180) hours
ECTS (credit points)	4 or 6	Contact hours (SWS)	2h Reading Couse 2h Tutorial
Course type	▪ Reading Course ▪ Tutorial	Language	English
Rotation	Irregular		
Requirements	Good command of econometrics		
Learning/ qualification target	The reading course enables students to understand the fundamental causes of economic growth and the debate about it, to analyze the methodological challenges in addressing the arguably most fundamental question in economics – what fundamentally causes economies to develop and why are some countries falling behind? And to understand the empirical approaches that have been taken.		
Content	Why is North America wealthier than South America? Why is Africa the poorest continent in the world? Why is Northern Europe more prosperous than Southern and Eastern Europe? Is it because of culture? Is it religion? Geography? Is it that some countries have better institutions than others? And if yes, why do not all countries have good institutions? This reading course reviews the empirical evidence on the debate about the long term determinants of economic development. Examples of the hypotheses reviewed are historical changes of institutions, colonialism, slavery, religion, culture, geography, ethnic diversity, artificial borders, or the resource curse.		
Examination type	Exam		
Literature	Selected papers, literature list will be available at the beginning of the seminar		
Additional information & links	For further information please see the chair home page: http://www.vwl.uni-freiburg.de/iwipol/teaching.htm		

Module	The Political Economics of Information and Media		
Internal Areas of Study	► Economics & Politics		
Recommended semester	3rd & 4th semester	Mandatory/elective	Elective
Module coordinator	Prof. Schulze	Work load	180 hours
ECTS (credit points)	4 or 6 ECTS	Contact hours (SWS)	2h Reading Course 2h Tutorial
Course type	▪ Reading Course ▪ Tutorial	Language	English
Frequency taught	Irregular		
Requirements	Intermediate Econometrics, solid knowledge of micro- and macroeconomics		
Learning/ qualification target	Students learn about the role of information and the media for the behavior of individuals in the marketplace, in the polity, and in bureaucratic hierarchies. They are familiarized with the empirical approaches that analyze the relationship between the individual behavior and media presence or the availability of information.		
Content	• media and voting behavior • media and resignation probabilities • media and corruption • information and social attitudes • violence against journalists and the media and other topics		
Module title	The Political Economics of Information and Media		
Examination type	Exam 4 ECTS – 90 minutes 6 ECTS – 120 minutes		
Literature	Selected papers, literature list will be available at the beginning of the course		
Additional information & links	For further information please see the chair home page: http://www.vwl.uni-freiburg.de/iwipol/teaching.htm		

Module	Time Series Analysis		
Internal Areas of Study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended semester	Master	Mandatory/elective	elective
		Work load	approx. 180 hours
ECTS (credit points)	6	Contact hours (SWS)	2 (L) 2 (T)
Course type	▪ Lecture ▪ Tutorials ▪ PC Lab Sessions	Language	English
Frequency taught	Discontinued, might be offered at a later date.		
Requirements	Statistics, Econometrics		
Learning /qualification target	The objective of the course is to provide students to learn time series modelling in theory and practice.		
Learning / qualification target	The course will start with reviewing the fundamental concepts in regression analysis. The course will also cover further topics such as stationary and non-stationary time-series models, models with trends, multi equation time-series models (VAR models), cointegration and (vector) error correction models, Granger causality, the application of time-series methods to panel data etc. Students will learn to implement the estimation methods using the econometric package Gretl. Other packages (such as Stata or EViews) may also be used.		
Examination type	Final Exam		
Literature	▪ Kirchgässner, G., Wolters, J., Introduction to Modern Time Series Analysis, Springer ▪ Enders, W., Applied Econometric Time Series, 2nd ed., Wiley ▪ Shumway, R.H., Stoffer D.S., Time Series Analysis and its Applications, 2nd ed., Springer		
Additional information & links			

Module	Topics in Macroeconomics		
Internal Areas of Study	► Economics and Politics ► Finance ► Information Systems and Network Economics		
Recommended Semester	2-4	Mandatory/Elective	Elective
Module Coordinator	▪ Prof. Oliver Landmann ▪ Markus Epp MSc	Workload	120 hours
ECTS (credit points)	6	Contact Hours (SWS)	2
Course Type	▪ Topics Course ▪ Seminar	Language	English
Rotation	Irregular		
Requirements	Advanced Macroeconomics I or Advanced Mathematics		
Learning/Qualification Target	Familiarization with Advanced Topics in Macroeconomics		
Content	Current Issues in Macroeconomics		
Examination Type	Presentation plus assignments		
Literature	Research papers (tba)		
Additional Information & Links	For further information please see the chair home page: http://www.macro.uni-freiburg.de/news/home		

Module	Seminar in Quantitative Finance		
Area of study/Profile	► Finance		
Recommended semester	Second year of the master program	Mandatory/elective	Elective
Module coordinator	Prof. Eva Lütkebohmert-Holtz	Work load	120 hours
ECTS (credit points)	6 ECTS	Contact hours (SWS)	2
Course type	Seminar	Language	English
Rotation	Every winter term		
Requirements	Principles of Finance, Futures and Options (can be taken in parallel)		
Learning/ qualification target	Seminars on different topics in quantitative finance will be offered every winter term. Topics may include but are not limited to the following fields: - Portfolio management - Derivative pricing - Advanced financial modelling - Credit and liquidity risk - Risk management Participants are expected to be familiar with basic principles of risk-neutral valuation in discrete time as well as with some standard financial derivatives (e.g. through successful participation in the courses Principles of Finance and Futures and Options). Moreover, some knowledge in probability theory is required		
Examination type	Oral presentation and seminar paper		
Literature	Will be announced on the department´s website		
Additional information & links	https://www.finance.uni-freiburg.de/		

Module	Seminar Series in Finance (Seminar)		
Area of study/Profile	► Finance		
Recommended semester	Current master, diploma and PhD students of the Department of Quantitative Finance	Mandatory/elective	Elective
Module coordinator	Prof. Eva Lütkebohmert-Holtz	Work load	
ECTS (credit points)	No ECTS	Contact hours (SWS)	
Course type	Seminar	Language	English
Rotation	Every semester		
Learning/ qualification target	Presentation and discussion of own research work		
Content	The seminar is intended for current master, diploma and PhD students of the Department of Quantitative Finance. Students have the possibility to present their research work and to discuss potential problems with the other members of the department. Presentations are based on individual invitation only. With a participation in this seminar you cannot earn ECTS. Should you be interested in holding a presentation or joining the audience, please register at the secretariat of the department.		
Literature	Will be discussed individually		
Additional information & links	https://www.finance.uni-freiburg.de/		

Module	Statistical Learning		
Area of study	► Business Analytics ► Empirical Economics		
Recommended Semester	3rd semester	Mandatory/Elective	Elective
Module Coordinator		Workload	180 h
ECTS (credit points)	6 ECTS	Contact Hours (SWS)	3 SWS lecture 1 SWS exercise
Course Type	▪ Lecture ▪ Exercise session	Language	English
Rotation	Discontinued, might be offered again.		
Requirements	Intermediate Econometrics		
Learning/ Qualification Target	Learn set of tools for modeling complex datasets; goal is mainly prediction of quantitative or qualitative outcomes.		
Content	1. Introduction 2. Statistical Learning 3. Linear Regression 4. Classification 5. Resampling Methods 6. Linear Model Selection and Regularization 7. Tree-Based Methods 8. Support Vector Machines 9. Unsupervised Learning Notes: The exercise session will contain both theoretical exercises as well as applied exercises, which involve analyzing datasets using the statistical software R. Knowledge of the statistical software R is an advantage, but is not required.		
Examination Type	Final Exam (90 min.)		
Literature	This course is based on the textbook “An Introduction to Statistical Learning with Applications in R” (2013, corrected printing 2017) by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani; Springer.		
Additional Information & Links	This textbook is freely available: http://www-bcf.usc.edu/~gareth/ISL/ISLR%20Seventh%20Printing.pdf		

5. Exchange and Studying Abroad

Study abroad is a great opportunity for enrichment and personal development. Studing abroad is becoming more and more important for opportunities on the job market. The international exchange programs offered by the faculty and the University of Freiburg offer many opportunities to spend part of your studies in Europe or other areas in the world.

The recommended period for a semester abroad or year depends on the individual study situation. Typically, study abroad takes place in the third semester of the course studies. The preparation and planning period is about 10-12 months (gathering information, planning, making decisions, adhering to application deadlines, etc.).

With the Foreign Office of the Department of Economics, the faculty has an advisor and coordination office for study abroad. With over 30 partners in Europe, the US and Brazil, there is a wide range of exchanges available to students. The International Office is the primary contact for all questions and inquiries. The International Office also has communication and contracts with partner universities worldwide. Further information about exchange programs, current information, events, contact details, are available at http://portal.uni-freiburg.de/vwl-international.

For more information: https://portal.uni-freiburg.de/vwl-international

EUCOR exchange program:

Additionally, all students of the Master of Economics Program can enjoy of the EUCOR program, by which they can take any course at the Universities of three different countries:

- Germany Karlsruher Institut für Technologie (KIT),
- Switzerland: Universität Basel,
- France: Université de Haute-Alsace, Université de Strasbourg

For more information about the EUCOR program: http://www.studium.uni-freiburg.de/en/counseling/exchange-programs-and-studying-abroad/eucor?set_language=en

Partner Universities and exchange places

Country	University	Places	M.Sc.
Belgium	Universität Gent	8 x 10 Months	**X**
Brazil	University of Sao Paulo	3 x 6 Months	**X**
Bulgaria	University of Economics Varna	3 x 6 Months	**X**
Finnland	Hanken School of Economics (1 Platz am Campus Helsinki, 1 Platz am Campus Vasa)	2 x 6 Months	**X**
France	Université Jean Moulin (Lyon III)	2 x 10 Months	**X**
	Institut Catholique de Paris	2 x 10 Months	**X**
	Université des Antilles et de la Guyane	2 x 5 Months	**X**
	Université Pierre Mendès (Grenoble II)	2 x 10 Months	**X**
Greece	Ioannina University	2 x 10 Months	**X**
Italy	Universita degli Studi di Bologna	4 x 10 Months	**X**
	Università degli Studi di Roma	2 x 10 Months	**X**
	Università di Siena	2 x 6 Months	**X**
	Università degli Studi di Torino	2 x 5 Months	**X**
	Universita Cattolica del Sacro Cuore (Mailand)	2 x 10 Months	**X**
Norway	UMB Ås	2 x 10 Months	**X**
Poland	Szkola Glowna Handlowa, Warschau	2 x 10 Months	**X**
Portugal	Universidade de Lisboa	3 x 6 Months	**X**
Romania	Universitatea Iasi	2 x 5 Months	**X**
Sweden	Göteborgs Universitet	1 x 5 Months	**X**
	Karlstads Universitet	2 x 5 Months	**X**
	Lunds Universitet	1 x 5 Months	**X**
Switzerland	Université de Genève	2 x 9 Months	**X**
	Università della Svizzera Italiana, Lugano	2 x 5 Months	**X**
Turkey	Middle East Technical University Ankara	3 x 5 Months	**X**
	Piri Reis University Istanbul	2 x 6 Months	**X**
Hungary	Andrássy Universität Budapest	2 x 10 Months	**X**
	Westungarische Universität Sopron	2 x 5 Months	**X**

6. Master Thesis

The Master Thesis is written at the end of the Masters Degree. The Thesis is a written assignment with 35 pages and 24 ECTS points and will at least take 20 weeks. The Master thesis can be started, when 80 ECTS points are reached.

7. Advisory Services

For further information regarding the M.Sc. Economics Program you can visit our faculty homepage, or you can send us an email.

MEP Coordination Office:

- **http://master.econ.uni-freiburg.de/**
- Questions about the application process: mep.admission@vwl.uni-freiburg.de
- Questions about the rules and procedures of the program: mep.admin@vwl.uni-freiburg.de
- General counseling and advice about the pogram: : mep @vwl.uni-freiburg.de

Actual Information of the Department of Economics:
https://portal.uni-freiburg.de/vwl/aktuell/nachrichten

Chairs and Institutes:
https://portal.uni-freiburg.de/vwl/institute

Examination Office:
http://portal.uni-freiburg.de/pa-vwl/willkommen-bei-der-geschaeftsstelle-fuer-wirtschaftswissenschaftliche-pruefungsausschuesse?set_language=en

International Exchange programs of the Department of Economics:

- https://portal.uni-freiburg.de/vwl-international
- Announcement of current exchange places of the Department
- Support of incoming students in the Department of Economics

8. Further Information

International Programs Office:

- International Office of the University: http://www.international.uni-freiburg.de/en?set_language=en
    - Counseling for studies abroad.
    - EUCOR program: http://www.studium.uni-freiburg.de/en/counseling/exchange-programs-and-studying-abroad/eucor?set_language=en

Student Service Center - International Admissions and Services

- https://www.studium.uni-freiburg.de/en/application/international-student-admissions
- Admission and registration of international students
- Advice on opportunities for studying and requisites at the University of Freiburg
- Questions about the equivalence of studies from Universities in other countries
- Legal advice for foreigners.

Student Service Centrer –

https://www.studium.uni-freiburg.de/en/student-services

- Registration Office
- Matriculation (enrollment)
- Leave Of Absence
- Changing Fields/Courses of Study
- Exmatriculation
- Maternity Protection for Pregnant and Nursing Students
- Study Fees
- UniCard
- Offers for Beginning Students
- Certificates of Enrollment
- Dates, Deadlines & Events
- Campus Management
- Student health

Student Service Center - Career Services

- **https://www.studium.uni-freiburg.de/en/counseling**
- Advice about internships in Germany and abroad
- Check of application materials
- Career advice for students

- EURES: Advice about career entry in countries of the EU
- Scholarship advice

SWFr: Studierendenwerk Freiburg

- https://www.swfr.de/en/
- New in Freiburg
- Housing
- Jobs
- Food and drinks
- International Club for students
- Child care
- Psychotherapy services for services
- Legal advice
- Social advice
- Students with Handicap

See also: https://portal.uni-freiburg.de/vwl/studium/beratung

http://www.studium.uni-freiburg.de/service_und_beratungsstellen