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in Statistics**  
*Joint Masters Program in Berlin*  
[www.stat.de](http://www.stat.de)

Freie Universität



Berlin

  
 CHARITÉ  
 UNIVERSITÄTSMEDIZIN BERLIN



# The Joint Master Program in Statistics of the Berlin Universities (HU, FU, TU) in cooperation with the Charité

## Participating Institutions:

- ▶ Wirtschaftswissenschaftliche Fakultät, Humboldt-Universität zu Berlin
- ▶ Mathematisch-Naturwissenschaftliche Fakultät (Institut für Mathematik), Humboldt-Universität zu Berlin
- ▶ Fachbereich Wirtschaftswissenschaft, Freie Universität Berlin
- ▶ Fakultät Wirtschaft & Management, Technische Universität Berlin
- ▶ Charité – Universitätsmedizin Berlin



# Why a Master in Statistics?

- ▶ Quantitative methods become more and more important. The importance of data is on the rise.
- ▶ Growing need for well trained statisticians in economics, finance, insurance, biology, medicine, psychology, engineering, ...
  - ▶ Also visible in the Covid-19 pandemic, with Statistics needed to nowcast infections, forecast intensive care unit needs, estimate underreporting of cases, analyse virus loads in children compared to adults, . . . , while accounting for uncertainty.
- ▶ Demand for training in statistical methods based on sound mathematical foundations, coupled with competencies in statistical applications and data analysis.
- ▶ Need for a self-contained degree in statistics.

# Fundamental Principle of the Master Program

- ▶ Pooling of resources, competence and excellence in mathematics, statistics, econometrics and biometrics in Berlin.
- ▶ Providing students much flexibility and a variety of alternative courses.
- ▶ Strong research orientation.
- ▶ Comprehensive background in mathematics.
  
- ▶ Modular system.
- ▶ Compulsory area ("Pflichtbereich").
- ▶ Disciplinary compulsory elective area ("Fachlicher Wahlpflichtbereich").
- ▶ Interdisciplinary compulsory elective area ("Überfachlicher Wahlpflichtbereich").

# General Structure: 120 ECTS credit points (CP) (1/2)

- (i) Compulsory courses in Methodological Foundations, Probability Theory, and Advanced Statistical Methods: 32 CP
- (ii) Two out of six fields of disciplinary compulsory electives (specialization tracks, each at least 15 CP)
  - ▶ I: Statistical Inference
  - ▶ II: Econometrics
  - ▶ III: Quantitative Methods of Financial Markets
  - ▶ IV: Survey Statistics
  - ▶ V: Applied Microeconometrics and Quantitative Economics
  - ▶ VI: Statistics in the Life Sciences
  - ▶ VII (in planning): Data Science

# General Structure: 120 ECTS credit points (SP) (2/2)

- (iii) Disciplinary compulsory elective modules (including (ii)):  
48 CP (18 CP ungraded)
- (iv) Interdisciplinary compulsory elective modules (10 CP):  
ungraded
- (v) Master Thesis (30 CP): To be presented in a seminar!
- (vi) Recommendation: At least one empirical study

# Compulsory Modules (32 CP)

- (a) Stochastics I (Probability Theory at Math. Level!) (10 CP)
- (b) Linear Regression Model and Related Topics (10 CP)
  - ▶ Econometric Methods (10 CP) or
  - ▶ Statistical Methods (10 CP)
- (c) Multivariate Statistics (6 SP)
  - ▶ Multivariate Statistical Analysis (6 SP) or
  - ▶ Multivariate Procedures (6 SP)
- (d) Advanced Statistics (6 SP)
  - ▶ Advanced Statistics (6 SP) or
  - ▶ Advanced Econometrics (6 SP)

# Disciplinary Compulsory Elective Area

## Specialization track I: Statistical Inference (1/2)

- ▶ Multivariate Statistics and Non- and Semiparametric Modelling (6 CP)
- ▶ Statistical Software and Data Analysis: two out of 5 modules (R, SAS, Statistical Programming Languages, Data Analysis I+II) with 6 CP each
- ▶ New Statistical Methods (6 CP)
- ▶ Current Research Topics in Statistics (Seminar) (6 CP)
- ▶ Mathematical Statistics (10 CP)
- ▶ Nonparametric Statistics (10 CP)
- ▶ Statistics of Stochastic Processes (5 CP)
- ▶ Statistical Consultation (6 CP)



# Specialization track I: Statistical Inference (2/2)

Additionally with the new study regulations:

- ▶ Statistical Inference I + II (6 CP each)
- ▶ Generalized Regression (6 CP)
- ▶ Advanced Regression Modelling (6 CP)
- ▶ Selected Topics in Statistics (6 CP)
- ▶ Research Seminar in Statistics (6 CP)
- ▶ Projektpraktikum II (Stochastik) (5 CP)

# Specialization track II: Econometrics

- ▶ Microeconometrics (6 CP): 3 alternative courses
- ▶ Time Series Analysis (6 CP): 3 alternative courses
- ▶ Multivariate Time Series Analysis (6 CP)
- ▶ Econometric Analysis of Panel Data (6 CP): 2 alternative courses
- ▶ Econometric Analysis (6 CP)
- ▶ Analysis of Treatment Effects (6 CP): 2 alternative courses
- ▶ Introduction to Financial Econometrics (6 CP)
- ▶ Econometric Projects (6 CP)
- ▶ Selected Topics in Econometrics (6 CP)
- ▶ Current Research Topics in Econometrics (Seminar) (6 CP)

# Specialization track III: Quantitative Methods of Financial Markets

- ▶ Statistics of Financial Markets (6 CP)
- ▶ Advanced Methods in Quantitative Finance (6 CP)
- ▶ Selected Topics in Finance, Insurance and Mathematical Statistics (6 CP)
- ▶ Stochastic Financial Mathematics I (10 CP)
- ▶ Selected Topics of Financial and Actuarial Mathematics (5 CP)
- ▶ Introduction to Financial Econometrics (6 CP)

# Specialization track IV: Survey Statistics (1/2)

- ▶ Introduction to Survey Statistics (6 CP)
- ▶ Calibration and Weighting (6 CP)
- ▶ Variance Estimation (6 CP)
- ▶ Panel Surveys (6 CP)
- ▶ Small Area Estimation (6 CP)
- ▶ Introduction to Bayes Statistics (6 CP)
- ▶ Introduction to Multiple Imputation (6 CP)
- ▶ Simulation and Survey Sampling (6 CP)
- ▶ Seminar on Survey Sampling (6 CP)
- ▶ One (out of Two) Module on Statistical Software (6 CP)
- ▶ Statistical Consultation (6 CP)

Joint program in "Teleteaching" format with Univ. Bamberg and Trier.

# Specialization track IV: Survey Statistics (2/2)

## The Extra-certificate: European Master in Official Statistics (EMOS)

- ▶ Extra certificate granted by Eurostat (Statistical Agency of European Union)
- ▶ Master thesis + internship at Official Statistical Agency (Amt für Statistik Berlin-Brandenburg) (40 CP)
- ▶ Course on issues of Official Statistics (6 CP): This term!
- ▶ Courses related to EMOS learning outcomes (50 CP)

# Specialization track V: Applied Microeconometrics and Quantitative Economics

- ▶ Empirical Labor Economics (6 CP)
- ▶ Applied Predictive Analytics (6 CP)
- ▶ Business Analytics & Data Science (6 CP)
- ▶ Advanced Marketing Modelling (6 CP)
- ▶ Microeconometrics or Applied Microeconometrics (6 CP): 3 alternative courses
- ▶ Analysis of panel data (6 CP): 2 alternative courses
- ▶ Analysis of treatment effects (6 CP): 2 alternative courses
- ▶ Panel Surveys (6 CP)
- ▶ Econometric Projects (6 CP)
- ▶ Selected Topics in Econometrics (6 CP)

# Specialization track VI: Statistics in the Life Sciences (Biometrics + Psychometrics)

With the new study regulations:

- ▶ Statistics for Biosciences I (6 CP)
- ▶ Statistics for Biosciences II (8 CP)
- ▶ Multivariate Methods in Psychology (6 CP)
- ▶ Research Seminar in Psychology (6 CP)
- ▶ Statistical Consultation (6 CP)
- ▶ Methods of Clinical Trials (5 CP)
- ▶ Advanced Biometric Methods (5 CP)
- ▶ Statistical Methods for Small Sample Sizes (5 CP)
- ▶ Selected Topics in Statistics in the Life Sciences (6 CP)

# Specialization track VII: Data Science (in planning)

- ▶ In cooperation with TU Informatics:
  - ▶ Machine Learning 1+2 (9 CP each)
  - ▶ Artificial Intelligence: Foundations and applications (6 CP)
  - ▶ AI: Foundations, applications and seminar (9 CP)
  - ▶ Monte Carlo Methods in Artificial Intelligence and Machine Learning (6 CP)
  - ▶ Probabilistic and Bayesian Modelling in Machine Learning and Artificial Intelligence (6 CP)
  - ▶ Projects in Machine Learning and Artificial Intelligence (6 CP)
- ▶ TU Economics: Regression-based statistical learning with R (6)
- ▶ HU School of Business and Economics:
  - ▶ Statistical Learning and Machine Learning (6 CP)
  - ▶ Theory and Practice of Machine Learning (6 CP)
  - ▶ Advanced Data Analytics for Management Support (6 CP)
  - ▶ Seminar Information Systems (6 CP)
  - ▶ Selected Topics in Data Science (6 CP)

List preliminary!



# Other (Disciplinary) Compulsory Elective Modules

- ▶ Measure Theory (5 CP)
- ▶ Stochastics II (Stochastic Processes, 10 CP)
- ▶ All other modules from the specialization tracks I-VI
- ▶ All (master) modules of the School of Business and Economics at HU

# Interdisciplinary Compulsory Elective Area (ÜWP, 10 CP)

- ▶ This area is ungraded. If grades are obtained, they are not taken into account in the calculation of the overall score.
- ▶ The following are eligible for this area:
  - ▶ Generic electives (ÜWP) modules of other faculties of the HU
  - ▶ Interdisciplinary and professional courses from other universities (e.g. FU, TU) not listed in our study regulations
  - ▶ Interdisciplinary and professional courses from abroad
  - ▶ Language courses of the language centre (except language courses in the respective mother tongue or official language of the home country as well as German courses for foreigners and English courses below the level B2 GER)
  - ▶ Courses of the Career Centre (but no “elementary” statistics...)
  - ▶ Internship (10 CP): 6 weeks full-time or 12 weeks half-time during the Master’s; reference issued by company; report issued by student; seminar presentation

# Example of a Study Plan

Semester	Compulsory Modules	Disciplinary Compulsory Elective Modules		Interdisciplinary Compulsory Elective Modules	Credit Points
		Specialization	Others		
1 <sup>st</sup> Semester (Winter Term)	<ul style="list-style-type: none"> <li>Econometric Methods or Statistical Methods (10 ECTS)</li> <li>Multivariate Statistical Analysis (6 ECTS)</li> </ul>	2 Modules (each 6 ECTS)			28 ECTS
2 <sup>nd</sup> Semester (Summer Term)	<ul style="list-style-type: none"> <li>Stochastics I (10 ECTS)</li> <li>Advanced Statistics or Advanced Econometrics (6 ECTS)</li> </ul>	1 Module (6 ECTS) 1 Module (5 ECTS)	Measure Theory (5 ECTS)		32 ECTS
3 <sup>rd</sup> Semester (Winter Term)		1 Modules (10 ECTS)	1 Module (10 ECTS)	10 ECTS	30 ECTS
4 <sup>th</sup> Semester (Summer Term)	Master Thesis (30 ECTS)				30 ECTS
<b>ECTS total</b>	62 ECTS	48 ECTS		10 ECTS	120 ECTS

**Note:** The final grade is based on the compulsory modules (62 ECTS) and the best 30 ECTS of disciplinary compulsory elective modules.

# Approvals of External Course Achievements

- ▶ Generally approval of compulsory courses already taken in other programs
- ▶ Generally no credit points for courses required for a previous degree
- ▶ Credit points have to be earned by courses on top of those already completed
- ▶ Official applications on course/credit approvals to examination board (Prüfungsausschuss)
  - ▶ Application forms are available on our website [www.stat.de](http://www.stat.de)

# Admission and Registration

- ▶ In addition to the admission at the individual universities (HU, FU, TU) each student must be enrolled at HU.
  - ▶ The examination administration is at HU!
- ▶ Please register in the [HU Moodle System](#) (link on [www.stat.de](http://www.stat.de)).
  - ▶ For quick information!
- ▶ You will need “local” enrollment number (at TU and/or FU) to get access to local computing accounts, the local learning management system (for example Blackboard at FU), etc.
  - ▶ No additional fees involved!

# Study and Examination Regulations

- ▶ Official documents: see website [www.stat.de](http://www.stat.de) for a link
  - ▶ complete list of modules
  - ▶ module descriptions
- ▶ For any exam (including registration process), the rules of the university/faculty which offers the course apply!

# Study Guidance & Contact

- ▶ Student consultancy according to individual background
- ▶ Head of Joint Commission: Prof. Sonja Greven, HU
- ▶ Head of Examination Board: Prof. Timo Schmid, FU
- ▶ Representatives of different institutions and fields:
  - ▶ Prof. Sonja Greven, HU, Statistics & Econometrics
  - ▶ Prof. Timo Schmid, FU, Statistics & Econometrics
  - ▶ Prof. Markus Reiss, HU, Mathematics
  - ▶ Prof. Geraldine Rauch, Charité, Biometry
  - ▶ Prof. Axel Werwatz, TU, Statistics & Econometrics
- ▶ General Consultancy: Dr. Sigbert Klinke, HU
- ▶ Joint commission: see <https://www.stat.de/contact/>

# Information Platforms and Networking

- ▶ Homepage: [www.stat.de](http://www.stat.de). Includes links to the following:
- ▶ Moodle webpage. Please sign in!
- ▶ There exists a student facebook group.
- ▶ Alumni network.
- ▶ Student members in the Joint Commission: Ben Thies and Julian Schneider (Deputy: Manuel Pfeuffer)
  - ▶ Are you interested in becoming a member of the commission?