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



# 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 (new): 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:  $\leq 2$  out of 4 modules (Computer-assisted Statistics, 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)

- ▶ 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 III: Quantitative Methods of Financial Markets

With the new study regulations:

- ▶ Time Series Analysis (6 CP): 3 alternative courses
- ▶ Multivariate Time Series Analysis (6 CP)
- ▶ Introduction to Financial Econometrics (6 CP)
- ▶ Stochastic Financial Mathematics I+II (10 CP each)
- ▶ Selected Topics of Financial and Actuarial Mathematics (5 CP)
- ▶ Stochastics II (10 CP)
- ▶ Selected Topics in Quantitative Finance (6 CP)
- ▶ Statistics of Stochastic Processes (5 CP)
- ▶ Selected Topics in Stochastics (5 CP)



# 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 (Applied) Econometrics (6 CP each)

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

With the new study regulations:

- ▶ 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)
- ▶ Resampling Techniques and their Applications (5 CP)
- ▶ Selected Topics in Statistics in the Life Sciences (6 CP)

# Specialization track VII: Data Science (new) (1/2)

With the new study regulations (partly 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)
- ▶ Regression-based statistical learning with R (6)
- ▶ Statistical and Machine Learning (6 CP)



## Specialization track VII: Data Science (new) (1/2)

- ▶ Advanced Data Analytics for Management Support (6 CP)
- ▶ Seminar Information Systems (6 CP)
- ▶ Selected Topics in Data Science (6 CP)
- ▶ Research Seminar in Data Science (6 CP)
- ▶ Introduction to Natural Language Processing (6 CP)
- ▶ Applied Predictive Analytics (6 CP)
- ▶ Business Analytics & Data Science (6 CP)
- ▶ Machine Intelligence I+II (6 CP each)

# 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
- ▶ Nutzung der Amtlichen Statistik in den Wirtschafts- und Sozialwissenschaften



# 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!

# Plagiarism and Scientific Misconduct

- ▶ Plagiarism or scientific misconduct can be a problem if **sources are not properly referenced**.
- ▶ Typically in seminar papers, assignments or Master theses.
- ▶ Usually leads at least to a failing grade.

Resources for learning about scientific writing and proper citations:

- ▶ Students' Guide How to Write a Scientific Work (<https://www.wiwi.hu-berlin.de/de/studium/sb/leitfaden.pdf>)
- ▶ Courses on Scientific Writing and English for Scientific Writing (credits can be used in the ÜWP, the Interdisciplinary compulsory elective area!)

We highly recommend familiarizing yourself with the topic!

Freie Universität



Berlin

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# Information Platforms and Networking

Homepage: [www.stat.de](http://www.stat.de). In addition to information, documents and news, it includes links to the following:

- ▶ an FAQ with answers to many frequently asked questions.
- ▶ Moodle webpage. Please sign in to get important updates!
- ▶ a student facebook group.
- ▶ an Alumni network.
- ▶ Contact information for the student members in the Joint Commission:  
Ben Thies and Lukas Pin (Deputy: Marco Simnacher)
  - ▶ Are you interested in becoming a member of the commission?