

Master of Science in **Statistics**

Joint Masters Program
in Berlin



Berlin University Alliance



The Berlin University Alliance

Joint Masters Program in Statistics

(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, ...
- ▶ 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 seven 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: 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) Recommendations:
 - ▶ At least one empirical study
 - ▶ Programming

Compulsory Modules (32 CP)

- (a) Stochastik I (Probability Theory at Math. Level!) (10 CP, HU)
- (b) Linear Regression Model and Related Topics (10 CP)
 - ▶ Econometric Methods (10 CP, HU) or
 - ▶ Methoden der Statistik (10 CP, HU)
- (c) Multivariate Statistics (6 SP)
 - ▶ Multivariate Statistical Analysis (6 SP, HU)
- (d) Advanced Statistics (6 SP)
 - ▶ Advanced Econometrics (6 SP, HU) or
 - ▶ Advanced Statistics¹ (6 SP, HU)

¹recognized as equivalent to Statistik für Fortgeschrittene (6 SP, FU). Course Equivalency Form on stat.de.

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: ≤ 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 (6 CP)
- ▶ Advanced Statistics (6 CP)
- ▶ 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)
- ▶ Multivariate Time Series 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

- ▶ 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

- ▶ Introduction to Survey Statistics (6 CP)
- ▶ New Statistical Methods (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 Statistics (6 CP)
- ▶ Module on Statistical Software (6 CP)
- ▶ Statistical Consultation (6 CP)
- ▶ Selected Topics in Survey Statistics (6 CP)

Joint program in "Teleteaching" format with Univ. Bamberg. Course list changing, in case of questions email Jan Marcus.

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)

- ▶ Statistics for Biosciences II (8 CP)
- ▶ Multivariate Methods in Psychology¹ (6 CP)
- ▶ Research Seminar in Psychology¹ (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)

¹Psychometrics may be offered irregularly at present due to vacancy of a professorship.

Specialization track VII: Data Science (1/2)

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 (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 (6 CP)
- ▶ Stochastics II (Stochastic Processes, 10 CP)
- ▶ All other modules from the specialization tracks I-VII
- ▶ All (master) modules of the School of Business and Economics at HU (including e.g. the module Statistical Seminars)
- ▶ Nutzung der Amtlichen Statistik in den Wirtschafts- und Sozialwissenschaften

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 grade.
- ▶ 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)
 - ▶ 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 written 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 st Semester (Winter Term)	- Econometric Methods or Statistical Methods (10 ECTS) - Multivariate Statistical Analysis (6 ECTS)	1 Modules (6 ECTS)	Measure Theory (6 ECTS)		28 ECTS
2 nd Semester (Summer Term)	- Stochastics I (10 ECTS) - Advanced Statistics or Advanced Econometrics (6 ECTS)	1 Module (6 ECTS) 1 Module (10 ECTS)			32 ECTS
3 rd Semester (Winter Term)		1 Module (10 ECTS)	1 Module (10 ECTS)	10 ECTS	30 ECTS
4 th Semester (Summer Term)	Master Thesis (30 ECTS)				30 ECTS
ECTS total	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.

Module Overview

SS 2016, 2

Master of Science in Statistics – Joint Masters Program in Berlin

This is a non-official visualization of the study regulations, specialization areas and modules for the Master of Science in Statistics (study and examination regulations 2016 including the first and second amendment 2023/2).
Legally binding are only the study and examination regulations published in the official journals of the Humboldt-Universität zu Berlin.

Compulsory area (42 LP)	One course must be selected from each module										Please note that all modules with a German title will be taught in German, all modules with an English title in English.			
	Module 1		Module 2		Module 3		Module 4		Module 5					
	Stochastik I HU-Berlin	10	Economic Methods HU-Berlin Methoden der Statistik HU-Mann	12	Multivariate Statistical Analysis HU-Berlin Multivariate Verfahren FU	12	Advanced Economics HU-Berlin Statistik für Fortgeschrittene FU	12	Abstractmathematik (Master Thesis) HU-Berlin	12				
Elective subject area (48 LP)	At least two areas of specialization with at least 16 LP each must be selected													
	Statistical Inference		Economics		Quantitative Methods of Financial Markets		Survey Statistics		Applied Microeconomics and Quantitative Economic Research		Statistics in Life Sciences		Data Science	
	Multivariate Statistics and Non-Parametric Modeling HU-Berlin	10	Microeconomics HU-Berlin	12	Time Series Analysis HU-Berlin	12	Störgründungsverfahren FU	12	Empirical Labor Economics HU-Berlin	12	Statistik für Biowissenschaften I FU	12	Machine Learning 1 TU	12
	Statistical Programming Languages HU-Berlin	10	Microeconomics TU	12	Time Series Analysis FU	12	Neuere statistische Methoden FU	12	Applied Predictive Analytics HU-Berlin	12	Statistik für Biowissenschaften II FU	12	Machine Learning 2 TU	12
	Datenanalyse I HU-Berlin	10	Applied Microeconomics FU	12	Univariate Zeitreihenanalyse FU	12	Varianzschätzmethoden FU	12	Business Analytics & Data Science HU-Berlin	12	Multivariate Verfahren in der Psychologie HU-Potsdam	12	Künstliche Intelligenz: Grundlagen und Anwendungen TU	12
	Datenanalyse II HU-Berlin	10	Time Series Analysis FU	12	Multivariate Zeitreihenanalyse FU	12	Panel Surveys FU	12	Advanced Marketing Modeling HU-Berlin	12	Traktat in der psychologischen Methodik HU-Potsdam	12	Künstliche Intelligenz: Grundlagen, Anwendungen und Seminar TU	12
	Computergestützte Statistik FU	10	Time Series Analysis TU	12	Introduction to Financial Econometrics TU	12	Small Area Statistics/Verfahren FU	12	Microeconomics HU-Berlin	12	Statistische Beratung FU	12	Machine Learning and Artificial Intelligence TU	12
	Neuere statistische Methoden FU	10	Univariate Zeitreihenanalyse FU	12	Stochastische Finanzmarktmodelle I HU-Berlin	12	Einführung in die Bayes-Statistik FU	12	Applied Microeconomics TU	12	Advanced Biometric Methods FU	12	Probabilistic and Bayesian Modeling in Machine Learning and AI TU	12
	Aktuelle Forschungslagen der Statistik FU	10	Analysis of Panel Data FU	12	Stochastische Finanzmarktmodelle II HU-Berlin	12	Einführung in die Multiple Imputation FU	12	Analysis of Panel Data FU	12	Statistical Methods for Small Sample Sizes FU	12	Projects in Machine Learning and Artificial Intelligence TU	12
	Mathematische Statistik HU-Berlin	10	Econometric Analysis of Longitudinal and Panel Data TU	12	Ausgewählte Themen der Finanz- und Versicherungsmathematik HU-Berlin	12	Simulation und Störgründungsverfahren FU	12	Economic Analysis of Longitudinal and Panel Data FU	12	Selected Topics in Statistics in the Life Sciences FU	12	Statistical Learning and Machine Learning TU	12
	Nonparametrische Statistik HU-Berlin	10	Ökonometrische Analyse FU	12	Selected Topics in Quantitative Finance HU-Berlin	12	Seminar zur Survey Statistik FU	12	Estimation of Treatment Effects HU-Berlin	12	Resampling Techniques and Their Applications FU	12	Advanced Data Analytics for Management Support FU	12
	Statistik ökonomischer Prozesse HU-Berlin	10	Multivariate Zeitreihenanalyse FU	12	Stochastik II HU-Berlin	12	Computergestützte Statistik FU	12	Treatment Effects Analysis FU	12		12	Seminar Information Systems HU	12
	Statistische Beratung FU	10	Estimation of Treatment Effects FU	12	Statistik ökonomischer Prozesse HU-Berlin	12	Statistische Beratung FU	12	Economics Projects HU-Berlin	12		12	Selected Topics in Data Science HU	12
	Statistical Inference I HU-Berlin	10	Treatment Effects Analysis TU	12	Ausgewählte Themen der Statistik HU-Berlin	12	Selected Topics in Survey Statistics FU	12	Selected Topics in Economics HU-Berlin	12		12	Research Seminar in Data Science HU	12
	Statistical Inference II HU-Berlin	10	Economic Projects HU-Berlin	12					Panel Surveys FU	12		12	Introduction to Natural Language Processing HU	12
	Generalized Regression HU-Berlin	10	Selected Topics in Economics HU-Berlin	12					Selected Topics in Applied Economics FU	12		12	Applied Predictive Analytics HU	12
	Advanced Regression Modeling HU-Berlin	10	Introduction to Financial Econometrics TU	12						12		12	Business Analytics & Data Science HU	12
	Selected Topics in Statistics HU-Berlin	10	Aktuelle Forschungslagen der Ökonometrie FU	12								12	Machine Intelligence I TU	12
	Research Seminar in Statistics HU-Berlin	10		12								12	Machine Intelligence II TU	12
	Praxispraktikum II (Stochastik) HU-Berlin	10		12								12		12
	The remaining LP can be chosen from all modules of the specialization areas and the following modules:													
	Mathematik HU-Berlin													
	Stochastik II HU-Berlin													
	Nutzung der Analytischen Stat. in den Wirtschaftswissenschaften HU-Berlin													
Further Modules from Master VWL HU-Berlin														
Interdisciplinary Compulsory Elective Courses (16 LP): Modules from the module catalog of other subjects intended for this purpose or central institutions of the universities participating in the program, for example														
Interdisciplinary elective courses from other subjects of HU	Subject-specific and interdisciplinary courses from other universities	Subject-specific and interdisciplinary courses from universities abroad	HU Career Center courses	Language courses (note that special regulations for language courses exist)	Six-week internship, full-time or part-time, with a certificate (a certificate is not required as a mandatory internship)									

Seite 1

Updates

- ▶ Master in Statistics now accredited (since 1.10.24) by the Stiftung Akkreditierungsrat.
- ▶ Master in Statistics now named a Berlin University Alliance Master's programme (09/25).
- ▶ Updates to the study and examination regulations planned for 2027.

Approvals of External Course Achievements

- ▶ Compulsory courses already taken in other programs can be approved
- ▶ Generally no credit points for courses required for a previous degree. Credit points have to be earned by courses on top of these.
- ▶ E.g. Stochastik 1 already taken:
 - ▶ Already used for a Bachelor's in Mathematics → need not take again, but another class agreed on, e.g. Stochastik 2.
 - ▶ Not yet used → can be approved as equivalent by the examination board.
- ▶ Official applications on course/credit approvals to examination board (Prüfungsausschuss)
 - ▶ Application forms are available on our website www.stat.de

Admission and Registration

- ▶ In addition to enrolment at your assigned university (HU, FU, TU) each student must be enrolled at HU and now also at all other universities.
 - ▶ No additional fees involved!
 - ▶ The examination administration is at HU
 - ▶ This will also give access to local computing accounts, the local learning management system (e.g. Moodle, Blackboard), etc.
- ▶ Please register in the [HU Moodle System](#) (link on www.stat.de)
 - ▶ for quick information and material!

Study and Examination Regulations

- ▶ Official documents: see website www.stat.de for links to
 - ▶ study and exam regulations
 - ▶ complete list of modules
 - ▶ module descriptions
 - ▶ list of modules for current/upcoming semester
- ▶ 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!

AI usage

Please familiarize yourself with the rules for AI usage - what is allowed, what isn't, AI disclosure statements - for any given course.

AI usage in written exams is never allowed!

Study Guidance & Contact

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

Information Platforms and Networking

Homepage: www.stat.de. In addition to information, documents, news and job postings, it includes links to the following:

- ▶ an FAQ with answers to many frequently asked questions.
- ▶ Master Statistics Moodle course. **Please sign up** to get important updates!
- ▶ a student facebook group and WhatsApp group.
- ▶ Contact information for the student members in the Joint Commission: Jan Fuhlrott and Eric Decker
Deputy: Lucas Henze
 - ▶ Are you interested in becoming a member of the commission?