Master's Programs in Econometrics and Statistics

International track

2019 – 2020

Toulouse School of Economics offers a **two-year Master's program** that integrates different options in the first year that prepare to different specializations offered in the second year. Within the international track in econometrics and statistics, students can primarily choose to pursue in the Statistics and Econometrics international master or the Economic Theory and Econometrics Doctoral master, admission in the other specializations is possible by way of derogation. All courses are taught in English and students benefit from specific courses and services to help them learn, grow and build skills in a challenging international job market.

1st year: Master in Econometrics and Statistics

Objective

The key objective of this master program is to give students a broad and solid classical education in economics together with a very good level in applied mathematics. 100% of courses of this program are taught in English. The program is composed of two exclusive paths: the **"Applied Statistics and Econometrics" path**, and the **"Decision mathematics" path**.

Applied econometrics and Statistics path: students are prepared for executive-level jobs in the service sector (quantitative marketing, banking, industry, etc.). The combination of economics and mathematical engineering is what makes this track unique at TSE. The natural continuation is the master 2 "Statistics and Econometrics. Career options include data scientist, consultant in statistics or econometrics, statistical engineer.

Decision mathematics path: students acquire a good level in classical quantitative economics as well as the fields of applied mathematics related to economics (game theory, advanced analysis, optimization). After this first year, it is possible to continue for the second year at TSE within the International track master 2 in Statistics and Econometrics or within the Doctoral track Master 2 "Economic Theory and Econometrics", or outside TSE in a master 2 in applied mathematics. In this latter case, examples of trainings followed by former students include master 2 in Data Science at ENSAE, master 2 in applied mathematics at Paris-Dauphine, master 2 in Operational research at university Toulouse III, PhD student at Ecole Polytechnique, etc.

A. Applied Econometrics and Statistics path

Courses:

SEMESTRE 1	SEMESTRE 2
Compulsory courses: • Applied econometrics • Intermediate econometrics * • Statistical Softwares for data scientists (SAS, R, Python) • Mathematical Statistics 1 * • Game Theory * • Professional Development • FLE	Compulsory courses: • Program Evaluation* • Applied econometrics* • Mathematical Statistic 2* • FLE
2 electives from: • Environmental economics • Development economics • Markov chain and applications • Probability Modelling • Evolution of economic behaviour • Understanding real world Organizations • Project management • Optimization	4 electives from: • Industrial Organization** • Corporate finance** • North-South Economic Relations** • Environmental & Resource Economics** • Market finance** • Dynamic Optimization • Time series** • Introduction to big data ** (limited numbers of students) • Martingales theory and application*** • Data Bases ** • Optimization for big data** (limited numbers of students)
End of August refesher courses - Math Camp: • Algebra Refresher **** • Probability refresher **** • Static Optimization refresher ****	Internship or master thesis

** Core Courses*

*** Highly suggested by a M2 director :*

- 'Introduction to big data' or 'Optimization for big data' or 'data bases' or 'times series' : Master Statistics and Econometrics

- Industrial Organization : M2 EMO, Environmental & Resource Economics Relations: M2 ERNA, North-South economics relations: M2 PP&D, - Corporate finance and Market finance: M2 Finance, Time series : M2 EEE, Advanced Microeconomics and Advanced Macroeconomics: M2 ETE

**** Student must have followed the course "Markov chains"*

***** Math camp for M1 and M2 (End of August)*

B. Decision Mathematics path

Courses:

SEMESTRE 1	SEMESTRE 2
Compulsory courses: • Macroeconomics • Intermediate econometrics* • Mathematical Statistics 1 • Strategic Optimization* • Advanced Analysis* • FLE • Professional Development	Compulsory courses: • Program Evaluation* • Games and Equilibria* • Mathematical Statistics 2* • FLE
Optional: 1 among 2: • Markov Chains and applications • Optimization • 1 among 7: • Optimization • Markov Chains and applications • Probability Modelling • Environmental Economics • Development Economics • Evolution of economic behaviour • Project Management	Optional: 1 among 2: • Martingales theory and application • Optimization for big data 3 among 12: • Martingales theory and applications • Optimization for big data*** • Industrial Organization*** • Corporate finance • Market finance • Dynamic optimization • Introduction to big data*** • Advanced Macroeconomics*** • Advanced Microeconomics*** • Time series*** • Environmental & Resource Economics*** • North-South economic relations***
End of August refesher courses – Math Camp: • Algebra refresher ** • Probability refresher ** • Static Optimization refresher **	Internship or master thesis

**Core courses*
*** Math camp for M1 and M2 (End of August)*
****Highly recommended by Master 2 Directors:*
- 'Introduction to big data' or 'Optimization for Big data' or 'data bases' or 'Times series': M2 Statistics & ecometrics
- Industrial Organization: M2 EMO
- Environmental & Resource Economics: M2 ERNA
- North-South Economics Relations : M2 PP&D
- 'Corporate Finance' and 'Market Finance': M2 in Finance
- Time Series: M2 EEE
- 'Advanced Microeconomics' or 'Advanced Macroeconomics' : M2 ETE

2nd year: Master in Econometrics and Statistics

1. Master in Statistics and Econometrics (2019-2020 academic year curriculum)

SEMESTRE 1	SEMESTRE 2
• Data Mining • Survey sampling • Time series • Statistical Consulting** • Statistical Software : SAS, R, Python and Excel* • FLE (only for foreign students) • English (only for French speaking students) • Professional development	• Statistical Consulting • Big Data • Scoring • English (only for French speaking students)
Optional 2 among 4: <u>Option 1:</u> • Lifetime data analysis • Panel data analysis <u>Option 2:</u> • Econometrics of qualitative variables • Econometrics of Marketing <u>Option 3:</u> • Non-parametric models • Outlier detection and extreme value theory <u>Option 4:</u> • Mathematics of deep learning algorithms part 1 • Mathematics of deep learning algorithms part 2	Optional 2 among 3: <u>Option 1:</u> • Graph theory • Graph analytics <u>Option 2:</u> • Spatial econometrics • Geomarketing <u>Option 3:</u> • Data bases • Web Mining
Non-Mandatory: • Professional Development*** • Algebra Refresher**** • Probability Refresher**** • Dynamic Refresher**** • Datanomics : regulation of data spreading and data protection	Internship or master thesis

** Common course with the 1st year master in Econometrics and Statistics*
*** Groups of 4 students*
****Students who have already attended these courses in 2018-2019 are exempted*
***** Maths refresher courses*

2. Master in Economic Theory and Econometrics (Doctoral path) (2019-2020 academic year curriculum)

SEMESTRE 1	SEMESTRE 2
Compulsory: • Microeconomics 1 • Macroeconomics 1 • Econometrics 1	Compulsory: • Microeconomics 2 • Macroeconomics 2 • Econometrics 2
Choose 1 elective: • Optimization • Game Theory	2 among 12 : • Asset pricing and financial market • Corporate finance and financial intermediation • Public economics of the environment • Development microeconomics • Public economics • Economic theory • Stochastic optimal control in economics • Topics in econometrics and empirical economics • Industrial Organization • Quantitative techniques in economics • Advanced Behavioral and Experimental Economics
	Master thesis

Acceptance criteria and enrollment

- Students with an undergraduate degree who majored in Economics or Economics and Mathematics at the Toulouse School of Economics TSE , and able to justify a good English level (TOEFL, IELTS or Cambridge English Advanced Certificate C1 level required) are eligible to enroll in the M1 Econometrics and Statistics program international track (entirely taught in English)

- Or by application review:
  - ➢ Students with an undergraduate degree in an economic or mathematics field;
  - ➢ French or foreign students with a degree and credits considered equivalent, and able to justify a good English (TOEFL, IELTS or Cambridge English Advanced Certificate C1 level required) and Mathematics Level (GRE required for foreign students).

Application Process

Applications are considered in November for Eiffel scholarships applicants, in January for other foreign degree holders and in May for French degree holders : www.tse-fr.eu/admissions

Information

- **Administration:**
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- **Programs:**
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