Course Descriptions None 2026-2027

Course Title	Time Series Analytics
Course Code	EBC4008
ECTS Credits	6,5
Assessment	Whole/Half Grades

Period

Period	Start	End	Mon	Tue	Wed	Thu	Fri
1	31-8-2026	16-10-2026		X	X		X

Level	Advanced
Coordinator	Ines Wilms For more information:i.wilms@maastrichtuniversity.nl
Language of instruction	English
Goals	The objectives of this course are: * provide students with an understanding/intuition of the concepts of modern time series methods that are used in econometrics * introduce students to fundamental methodological issues and theoretical concepts in dynamic econometric modeling (non-stationarity, nonstandard asymptotic theory) * equip students with the necessary tools such that students themselves can derive, by relying on provided building blocks, theoretical properties of time series processes that have not been studied explicitly in the course * gain experience in analyzing univariate and multivariate time series from economics or business. The preferred software tool for time series analyses is R * make judgments about the suitability of time series analyses performed on a variety of economic applications
Description	This course equips students with both theoretical and practical skills to model and analyze complex systems of time series, which consist of multiple dynamically interacting components that evolve over time. Time series oftentimes exhibit various complexities such as autocorrelation, seasonality, unit roots and trends, which requires a different treatment than for example cross-sectional data, and care when jointly modelling multiple time series to avoid pitfalls such as spurious correlation. The course starts by rigorously studying fundamental concepts that characterize behavior over time (such as stochastic processes, stationarity, dependence). Students will then be introduced to well-established univariate and multivariate modeling approaches for both stationary and non-stationary time series, including models for studying short-run and long-run dynamic relationships like cointegration analysis. The course covers asymptotic theory behind all these models to provide students with reliable estimation and inference techniques. Next to gaining a deep theoretical understanding on how to adequately model complex dynamic systems, emphasis will be placed on how to predict their future evolution (forecasting) and how to understand the dynamics and dependencies within times series data. Students will gain such practical experience through a series of empirical exercises and case studies, including applications like demand forecasting in operations research or causal analysis in macro-economics, using modern software languages for hands-on experience.
Literature	The main textbook used in this course will be: * Hamilton, J.D. (1994), Time Series Analysis, Princeton University Press, Princeton.
Prerequisites	ATTENTION: This course is an ADVANCED econometrics course, NOT an introductory one. Familiarity with the mathematical methods underlying econometric theory is therefore essential. In particular, students need to have solid background in probability theory, mathematical statistics, econometric methods, comparable to the knowledge obtained during the econometric courses of the bachelor program Econometrics and Operations Research. This includes: * THOROUGH knowledge of probability theory and statistical inference on the level of Chapters 1 through 11 of Casella and Berger (2002; Statistical Inference, 2nd edition), as covered in EBC1024 Probability Theory and EBC2107 Mathematical Statistics * THOROUGH knowledge of econometric analysis on the level of Greene (2012, Econometric Analysis), as covered in EBC2111 Econometric Methods I. It will be pretty much impossible to make up for a lack of this knowledge during the course. In addition, and introductory knowledge on time series econometrics is recommended, in particular on stationarity and ARIMA models as we will start the course by briefly REVISING these concepts. EXCHANGE STUDENTS: You are welcome to take the course but you should realize that your background may not be sufficient. If you studied a standard Bachelor economics or business program, and you do not fulfill the prerequisites stated above, it is NOT advised to take this course.
Transitional Regulations	<ul class="trcohorts"> - Master Business Research - No specialisation [2023-2024 and earlier] - Master Business Research - Operations Research [2023-2024 and earlier] - In 2024-2025 and 2025-2026 education and exam/resit opportunities are offered. - In 2026-2027 exam/resit opportunities are offered. - From 2027-2028 onwards, the course is cancelled. <table><col style="width: 200px;"><col style="width: 120px;"><col style="width: 120px;"><col><thead><tr><th>Academic Year</th><th>Education</th><th>Exam/Resit</th><th>Replacement(s)</th></tr></thead><tbody><tr><td>2024-2025 - 2025-2026</td><td>X</td><td>X</td><td> </td></tr><tr><td>2026-2027</td><td> </td><td>X</td><td> </td></tr><tr><td>2027-2028 onwards</td><td> </td><td> </td><td> </td></tr></tbody></table> <ul class="trcohorts"> - Master Econometrics and Operations Research [2025-2026 and earlier] - From 2026-2027 onwards, the course is still offered. <table><col style="width: 200px;"><col style="width: 120px;"><col style="width: 120px;"><col><thead><tr><th>Academic Year</th><th>Education</th><th>Exam/Resit</th><th>Replacement(s)</th></tr></thead><tbody><tr><td>2026-2027 onwards</td><td>X</td><td>X</td><td>Any other elective within the program</td></tr></tbody></table> <ul class="trcohorts"> - Master Financial Economics - Asset Pricing [2025-2026 and earlier] - Master Financial Economics - Banking [2025-2026 and earlier] - Master Financial Economics - Financial Analysis [2025-2026 and earlier] - Master Financial Economics - No specialisation [2025-2026 and earlier] - From 2026-2027 onwards, the course is still offered. <table><col style="width: 200px;"><col style="width: 120px;"><col style="width: 120px;"><col><thead><tr><th>Academic Year</th><th>Education</th><th>Exam/Resit</th><th>Replacement(s)</th></tr></thead><tbody><tr><td>2026-2027 onwards</td><td>X</td><td>X</td><td>Any other elective within the program</td></tr></tbody></table>
Teaching methods	PBL / Presentation / Lecture / Assignment / Papers / Groupwork
Assessment methods	Participation / Written Exam / Assignment / Presentation
Evaluation in previous academic year	For the complete evaluation of this course please click http://iwio-sbe.maastrichtuniversity.nl/rapporten.asp?referrer=codeUM

This course belongs to the following programme / specialisation

Master Business Research - No specialisation	In transition - Year 2 Free Electives
Master Business Research - Operations Research	In transition - Year 1+2 Elective Courses
Master Econometrics and Operations Research	Compulsory Courses
Master Econometrics and Operations Research	In transition - Elective Courses
Master Economic and Financial Research - Econometrics and Operations Research	Elective Courses
Master Economic and Financial Research - Econometrics and Operations Research	Year 1 Core Courses
Master Economic and Financial Research - No specialisation	Elective Courses
Master Financial Economics - Asset Pricing	In transition - Elective Courses
Master Financial Economics - Banking	In transition - Elective Courses
Master Financial Economics - Financial Analysis	In transition - Elective Courses
Master Financial Economics - No specialisation	In transition - Elective Courses
SBE Exchange Master	Master Exchange Courses
SBE Non Degree Courses	Master Courses