

The PhD in Quantitative Methods in Economics is designed to train highly qualified researchers, equipped to apply advanced scientific tools to the analysis and management of complex economic issues. The programme promotes rigorous methodological expertise, regarded as essential for addressing the challenges of contemporary economic research.

AIMS OF THE COURSE

The doctoral programme develops advanced training in quantitative analysis and promotes a culture of quantitative research within institutions. It covers economic analytical tools, both ex ante (calibrated forecasting models) and ex post (counterfactual analysis of observational data).

Mathematical and statistical methods, in deterministic and stochastic settings, are applied to economic growth, income distribution, monetary policy, international trade, environmental economics, social inclusion, business economics, and other applied areas. These topics are also explored using simulation models, including multisectoral frameworks (input-output, SAM-based and computable general equilibrium) and agent-based models.

Attention is given to emerging methods of online data collection, network analysis, and other advanced techniques, equipping candidates with tools at the frontier of quantitative research.

Quantitative Methods in Economics

SDA
scuola di dottorato

Using quantitative methodologies to analyse contemporary economic dynamics.

The PhD in Quantitative Methods in Economics aims to develop highly qualified researchers equipped to apply advanced scientific tools to the analysis and management of complex economic issues. The programme promotes rigorous methodological expertise, essential for addressing the challenges of contemporary economic research.

CAREER PROSPECTS AND PROFESSIONAL PATHWAYS

PhD candidates in QME will be qualified for professions requiring advanced skills in data analysis, construction and maintenance of quantitative research models, and policy evaluation, at both micro- and macroeconomic levels.

Specifically, the QME doctoral programme facilitates access to academic careers within national and international universities; research centres in economics at the national and international level; support for the design and implementation of economic policies across all levels of government; policy impact assessment roles, both ex ante and ex post, in research institutes, R&D divisions, public administrations, and private enterprises; and professions related to applied economics and statistics, as well as emerging roles such as data scientist, data analyst, or data journalist.

Particular emphasis is placed on training public officials in economic policy analysis, to enhance technical competence in public administration. Similarly, applying quantitative methods to business administrative data and fields such as business analytics provides professional opportunities in companies that prioritise data-driven strategic planning.



THE PHD PROGRAMME

The PhD programme is organised over three years as follows:

> FIRST YEAR

Svolgimento di attività didattiche, seminari ed esami comuni a tutti i curricula, finalizzati all'acquisizione di competenze avanzate nei metodi quantitativi.

> SECOND YEAR

Research and training period in an international context, to be undertaken at foreign institutions affiliated with the doctoral programme; a 50% increase in the scholarship amount is provided for this period.

> THIRD YEAR

Research activities aimed at the preparation, completion, and final defence and discussion of the doctoral thesis.



For further information, please contact the doctoral programme coordinator, Prof. Margherita Scoppola
qme@unimc.it

CURRICULUM

1. Computable General Equilibrium Models and Multisectoral Analysis (QME1)

The curriculum covers multisectoral analysis methodologies, the use of advanced national accounting tools such as the Social Accounting Matrix (SAM), and the application of computable general equilibrium (CGE) models for policy evaluation and structural analysis.

2. Mathematical, Statistical and Econometric methods (QME2)

The curriculum provides training in basic statistical analysis, in linear and nonlinear regression methods, and in the main techniques of more advanced empirical analysis, ranging from quantile regression to time-series analysis and panel-data methods; it also deepens the study of dynamical systems and structural equation modelling.

3. Advanced Data Analysis (QME3)

The curriculum examines analytical techniques for 'new data', including large-scale and firm-level datasets, web-scraping methods, textual analysis, relational data structures, machine learning approaches, network analysis, and predictive modelling.

CORE COURSES

ADVANCED MICRO
ADVANCED MACRO
ECONOMIC GROWTH
THEORY OF ECONOMIC POLICY
INDUSTRIAL ORGANIZATION
INTERNATIONAL TRADE
LINEAR AND NON LINEAR REGRESSION
INTRODUCTION TO TIME SERIES
PANEL DATA
MATHEMATICAL and COMPUTATIONAL METHODS

DISCIPLINARY CORE COURSES

QME1

MULTISECTORAL SAM BASED MODEL
FOUNDATIONS of SAM
FOUNDATIONS of CGE SAM BASED MODEL
FOUNDATION of I-O and LINKAGES ANALYSIS
MACGEM-IT model and NRR EVALUATION

QME2

STATISTICAL LEARNING and MULTIVARIATE DATA
ANALYSIS WITH R SESSION (anche per QME3)
STATISTICAL METHODS for DISTRIBUTIONAL
ANALSIS
POLICY EVALUATION METHODS

QME3

TEXT MINING
INTRODUCTION to APPLIED SOCIAL NETWORK
ANALYSIS
MACHINE LEARNING

PILLS E SEMINARS

META ANALYSIS
GRAVITY MODELS
ECONOMIC GROWTH (PARTE DUE)
AGENT-BASED ECONOMIC MODELLING
INTRODUCTION TO R
INTRODUCTION TO PYTHON FOR DATA ANALYSIS
INTRODUCTION TO STATA
INTRODCUTION TO MATHLAB
MEASURING EFFICIENCY VIA STOCHASTIC DEA
MODELS AND APPLICATIONS TO FINANCIAL
INTERMEDIARIES
ISSUES IN MONETARY POLICIES AND MONETARY
CIRCUITS
INTRODUCTION TO STRUCTURAL EQUATION
MODELS (SEM)

DEVELOPMENT OF SOFTWARE COMPETENCIES

R, Stata, Python, Matlab and GAMS

ADMISSION TO THE PHD PROGRAMME

For the academic year 2025/2026, the XLII cycle (2026/2029) is activated, which provides for:

- 4 positions with University scholarship, one of which is preferentially reserved for candidates holding an entry qualification obtained abroad;
- 1 position without scholarship.

The application must be submitted exclusively online through the PICA – CINECA platform, attaching an identity document, the required qualifications, and a research proposal consistent with the themes of one of the curricula of the PhD programme, together with proof of payment of the application fee.



[Call for Applications for Admission to the PhD Programme 42nd Cycle \(A.Y 2026/2029\).](#)

THE SELECTION PROCESS

Graduates holding a Master's degree, a single-cycle Master's degree, a pre-reform degree, or a second-level AFAM qualification, as well as candidates with an equivalent foreign degree, may apply for admission to the selection process. Participation is also permitted on a provisional basis for those who will obtain the degree by the enrolment deadline, thus offering the opportunity to apply even to candidates who are completing their academic programme.

Admission takes place through a structured and transparent selection process that values both the quality of the educational background and the research potential of the candidates. The procedure includes a preliminary assessment, up to a maximum of 30 points, based on the consistency of the curriculum with the programme, the quality and originality of the proposed project, and the suitability of the scientific profile. Once this phase is passed, with a minimum score of 21 points, candidates are admitted to the interview, which further explores preparation, research aptitude, previous experience, and language skills. The selection is considered successful with an overall score equal to or above 70/100.

The research proposal to be submitted at the application stage represents a distinctive element of the selection process. It must be written in no more than 13,000 characters including spaces and developed in coherence with one of the programme's thematic areas and with the chosen curriculum. The committee evaluates its quality, originality, and consistency with the scientific fields of the PhD. Although central to the assessment, the proposal does not bind the development of the research during the three-year programme: the final topic will in fact be assigned by the Academic Board after enrolment, allowing optimal alignment with the programme's research lines.

The scholarship, amounting to €16,243.00 per year, provides concrete support for doctoral candidates and may be increased by 50% for research periods abroad, thus fostering the international dimension of the training programme. All doctoral candidates are also guaranteed an annual budget equal to 10% of the scholarship amount, intended to finance research activities, participation in conferences, data acquisition, and other initiatives useful for the development of their scientific work.