COURSE DATA

DATA SUBJECT

Code: 44943
Name: Quantitave Methods
Cycle: Master's Degree
ECTS Credits: 5
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
2242 - Master's Degree in Economics	Facultat d'Economia	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2242 - Master's Degree in Economics	Instrumental matter	COMPULSORY

COORDINATION

ROCHINA BARRACHINA MARIA ENGRACIA

SERRANO DOMINGO GUADALUPE

SUMMARY

This course gives an introduction to the quantitative methods required to study Economics at the masters level.

The course begins by covering unconstrained and constrained optimisation methods, with several examples from different fields of economics. The course then progresses to covering matrix algebra, which is an important tool that is frequently used in both theoretical economics and econometrics. The final topic is mathematical methods of economic dynamics, which are required to analyse the behaviour of economic agents over time.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

None. There are no prerequisites for students admitted to the Master.

COMPETENCES / LEARNING OUTCOMES

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Acquire linguistic and technological skills: ability to use English in the scientific field of economics and to use ICT in the field of economic study and research.

Communicate orally and in writing using an inclusive and egalitarian language.

Gain the capacities of abstraction and logical reasoning that are essential for the creation of economic models: ability to express oneself using formal, graphic and symbolic languages, to apply analytical and mathematical methods to economics, and to relate and manipulate concepts according to a purpose.

Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.

Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.

Students should demonstrate self-directed learning skills for continued academic growth.

Students should possess and understand foundational knowledge that enables original thinking and research in the field.

DESCRIPTION OF CONTENTS

1. Topic 1. Optimisation

Unconstrained optimization
Constrained optimization with equality and inequality constraints

2. Topic 2. Matrix algebra

Matrix operations
Determinants and inverse matrices
Eigenvalues and eigenvectors

3. Topic 3. Analysis of dynamic economic behaviour

Dynamic optimization in discrete and continuous time

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	40,00
Classroom practices	10,00
Total hours	**50,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	75,00
Preparation of lessons	0,00
Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	**75,00**

TEACHING METHODOLOGY

The classes will consist of lectures covering the theoretical material, with frequent use of examples that illustrate the application of the methods to economic phenomena. There will also be several practical sessions with a focus on solving exercises related to the theoretical material. When relevant the practical sessions will involve the use of appropriate software packages.

EVALUATION

The evaluation in the module will consist of an assignment which will be distributed during the delivery of the course (50% of the mark) and a final exam at the end of the course (50% of the mark)

REFERENCES

- Alpha C. Chiang (2000): Elements of Dynamic Optimization. Waveland Press. - Akira Takayama (1994): Analytical methods in Economics. Harvester, Hertfordshire. - Gerhard Sorger (2015): Dynamic economic analysis: deterministic models in a discrete time. Cambridge University

Press. - Nancy L. Stokey, Robert E. B. Lucas, Edward C. Prescott (1989): Recursive Methods in Economic Dynamics. Harvard University Press. - Rangarajan K. Sundaram (1996): A first course in optimization theory. New York University.

- Knut Sydsæter, Peter Hammond, Arne Strøm, Andrés Carvajal (2021): Essential Mathematics for Economic Analysis. Pearson. - Alpha C. Chiang (1984): Fundamental methods of mathematical economics. McGraw-Hill.