

Advanced Quantitative Economics

1. MODULE SUMMARY

Aims and Summary

The aim of this course is to make students familiar with notions of differential equation, difference equations and systems of simultaneous differential/difference equations and their applications to economic and econometrics.

Module Size and credits

ECTS points	10
Total student study hours	250
Number of weeks	12
School responsible	Lazarski University, Faculty of Economics, and Management
Academic Year	2022/2023

Entry Requirements (pre-requisites and co-requisites)

Mathematics, Introduction to Economic Analysis, Dynamic Economic Analysis, Intermediate Microeconomics, Intermediate Macroeconomics

Excluded Combinations

None

Composition of module mark (including weighting of components)

Final exam, 50%

Coursework, 50%, composed of one project

Pass requirements

To pass the course a student must score at least 40% of the overall weighted average and not less than 35% for each assessment component (i.e. coursework and final exam). Reassessment: coursework component and/or examination as appropriate.

Special Features

None

Course stages for which this module is an elective

BA in Business Economics, Year 2

Course stages for which this module is a core option

None

2. TEACHING, LEARNING AND ASSESSMENT

Intended Module Learning Outcomes

By the end of the course, students should be able to:

1. Solve a range of differential equations in relation to Quantitative Economics
2. Use phase diagram for one and two variables
3. Apply notions of differential equations (systems) to economic problems
4. Apply notions of difference equations (systems) to economic and econometric problems

Indicative Content

6. First order differential equations
 - a. Linear differential equations
 - b. Stability of market equilibrium
 - c. Non-linear differential equations
 - d. Phase diagram
 - e. Solow' Growth Model
7. Second and higher order differential equations
 - a. Linear second order differential equations
 - b. Market model with price expectations
 - c. Phillips curve with expectations
 - d. Nonlinear differential equations and differential equations of higher orders
8. First order difference equation
 - a. Methods of solving
 - b. Cobweb model
 - c. Market model with inventory

- d. Nonlinear difference equations – phase diagram
 - e. Random Walks and Deterministic trends in macroeconomic time series
9. Second and higher order difference equations
- a. Methods of solving
 - b. Multiplier-acceleration interaction model
 - c. Phillips curve in discrete time
 - d. Nonlinear and higher order difference equations
10. Simultaneous differential and difference equation
- a. Methods of solving
 - b. Phillips Curve revisited
 - c. Two-variable phase diagrams
 - d. Inflation and monetary rule a la Obst
 - e. Mankiw-Romer-Weil model
 - f. Linearization of a nonlinear differential equation system

Teaching and Learning

This module will be taught by means of lecture, seminars and self-directed study. Formative Assessment: Comments will be given on assessments, and tutorial guidance will be provided for coursework and exam. Student activity and time spent on each activity comprises:

Guided	0 hours	(0%)
Lecture	30 hours	(12%)
Self-guided	205 hours	(82%)
Seminar	15 hours	(6%)
Workshop	0 hours	(0%)
Total	250 hours	

Method of Assessment (normally assessed as follows)

The intended learning outcomes will be assessed as follows:

Final exam, 50%, will assess learning outcomes 1-4

Coursework, 50%, will assess learning outcomes 1-3

Re-sit

Students failing any component of assessment, at the first attempt, is entitled to one re-sit attempt. This will be by new examination and/or new coursework scheduled for the next assessment opportunity. For coursework, if more than one element existed in the first attempt, this may be combined into one assessment for re-sit.

Date of last amendment

30.01.2017

3. MODULE RESOURCES

Essential Reading

A. Chiang, K. Wainwright, 2005, Fundamental Methods of Mathematical Economics, 4th edition, McGraw-Hill Education

Required Equipment

None

4. MODULE ORGANISATION

Module leader

Name Dr. Krzysztof Beck

E-mail beckkrzysztof@gmail.com

Length and month of examination

120 minutes in June

Expected teaching timetable slots

No timetable information available

Subject Quality and Approval information

Board of Study Faculty Collaborative Provision Committee

Subject Assessment Board Faculty Council, Faculty of Economics and Management
Shortened title

Date of approval by FCPC Revised version 09.07.2015