ECON0010: MATHEMATICS FOR ECONOMICS

Course Outline, 2020-2021 (Term 2)

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Class Teachers See Moodle page

Aims
To consolidate the mathematics background needed for the rest of the degree programme at a level appropriate for economics specialists.

Objectives
At the end of the course, students should:
(i) understand constrained optimisation including interpretation of Lagrange multipliers, envelope theorems and inequality constraints and be able to apply their knowledge to economic models;
(ii) understand harder first-order and linear second-order differential and difference equations and be able to apply their knowledge to economic models;
(iii) understand linear and non-linear systems of differential and difference equations and be able to apply their knowledge to economic models.

Outline Syllabus
Constrained optimisation: meaning of Lagrange multipliers, envelope theorems, inequality constraints and the Kuhn-Tucker theorem.
Mean value theorem, l'Hôpital's rule, Taylor's theorem. The circular functions. Complex numbers.
Harder first-order differential equations: solution by integrating factor, Bernoulli's equation. Linear second-order differential and difference equations.
Eigenvalues and eigenvectors. Linear systems of difference and differential equations, stability of stationary solutions. Nonlinear systems of differential equations: linearisation, stability of stationary solutions.

Required coursework
Two assignments to be submitted for marking.

Assessment
50% one hour online remote examination in summer
25% one hour multiple choice examination in January
25% one hour multiple choice examination in April

Recommended reading
Malcolm Pemberton and Nicholas Rau, **Mathematics for Economists: An introductory textbook, Fourth Edition**, Manchester University Press, 2015

Arrangements for synchronous and asynchronous sessions
The lectures will be given live each week and there will also be weekly demonstrations. The demonstrations will consist largely of going through exercises from Pemberton and Rau.

Assignments to be given in

1. To be given in on Friday 12 February 2021

2019 examination, questions 5,6,12

2. To be given in on Friday 19 March 2021

2019 examination, questions 7,8,13,14