



Mathematics 403

Topics in Mathematics for Economics

(see Course Descriptions for the applicable academic year:

<http://www.ucalgary.ca/pubs/calendar/>)

Syllabus

<u>Topics</u>	<u>Number of Hours</u>
Structure of Euclidean spaces	3
Topology of Euclidean spaces	4
Completeness and Sequences	3
Continuity	5
Convex sets and polytopes	5
Separating hyperplanes and supporting hyperplanes	3
Brouwer's Fixed Point Theorem	3
Correspondences, upper and lower hemicontinuity	3
Kakutani's fixed point theorem	2
Review of integration of functions of a single variable	2
Double and triple integrals	3
TOTAL:	36

Course Outcomes

Mathematical maturity outcomes. After successfully completing this course, students should be able to:

1. critically evaluate the meaning of a mathematical definition, and to construct illustrative examples and non-examples.
2. critically evaluate the meaning of a mathematical theorem, to construct illustrative examples and to assess the potential necessity of its assumptions.
3. critically evaluate the meaning of a mathematical assertion and to devise steps to test its truth or falsehood, proving proofs or counter-examples as appropriate.

Subject specific knowledge. After successfully completing this course, students should be able to:

4. state the definitions, and provide illustrative examples of all the essential analytical and topological terms covered in the course commonly used in the mathematical literature related to theoretical Economics, including limits, continuity, upper and lower hemicontinuity, compactness, and convexity.
5. state all the theorems discussed in the course and provide illustrative examples, including Bolzano Weierstrass Theorem, Caratheodory's Theorem, Brouwer's Fixed Point Theorem and Kakutani's Fixed Point Theorem.
6. use all definitions and theorems discussed in this course correctly and appropriately in proofs and expository communications.
7. explain the significance of Kakutani's Fixed Point Theorem in the proof of the existence of Nash equilibrium.

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Fall 2003

Calendar Prerequisite Change 2005/06; 2009:07:01.