St. Francis Xavier University

Department of Economics

ECON 271: Quantitative Methods in Economics

Instructor: Zeynep Ozkok   Winter 2024

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Classes: Tuesday 6:30 – 7:45 pm and Thursday 6:30 – 7:45 pm
Office Hours: Wednesday 12 pm – 1 pm and Thursday 4 pm – 5 pm

Description

This course introduces students to quantitative and mathematical tools commonly used in the study of economics and finance. Topics include functions of one or more variables, financial mathematics, differential calculus, and linear algebra. Applications consist of microeconomic and macroeconomic equilibria, cost minimization and profit-maximization, constrained optimization, interest rates, present value and bond pricing.

Objectives and Learning Outcomes

The course has three main objectives:

(1) To introduce students to basic mathematical tools.
(2) To demonstrate the applicability of these mathematical tools to problems commonly encountered in economics and finance.
(3) To prepare students for upper-year economics and finance courses where these tools are frequently used.

Prerequisites

ECON 101

Textbook

Bradley, T. (2013) *Essential Mathematics for Economics and Business*, Fourth Edition. Wiley.

Evaluation

The course grade will be determined by the following weighting scheme:

- Midterm exam: 30%
- Assignments (4): 20%
- Final exam: 50%

Please note that this in-person course will switch to online delivery if circumstances related to Covid-19 require it in the Winter term.

Students are expected to attend all lectures. The midterm exam is scheduled for **February 13** during class time. Should a student miss a midterm for a medical reason, they should contact the professor immediately.

Students may drop a course, online in Banner, on or before the relevant deadline. The drop date is **March 8, 2024** for second term, three-credit courses. Note that the permission to drop or change a course after the course drop deadline can only be granted by the Dean's office.

The final exam, to be scheduled by the examinations office in April 2024, will be cumulative.

Four assignments will be given throughout the term. Students are free to work with other students on these problem sets and submit their work in groups of 1, 2 or 3. Assignments should be handed in during the start of the lecture in which they are due. Late assignments will not be accepted and will receive a mark of zero. The solutions for the assignments will be posted on Moodle.

Office hours

The office hours for this term will be conducted online on Blackboard Collaborate. The link for the virtual office hours is posted on Moodle. Please allow for 5 to 10 minutes for everyone to get on Blackboard Collaborate. Aside from the online office hours, you can also send me questions via email and you can request an in-person meeting.

Artificial Intelligence Aids

This course does NOT permit any artificial intelligence aids. It is important that students do not use AI aids in completion of the assignments. The midterm and the final exam will not permit the use of any aids.

Copyright policies

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COURSE OUTLINE

Part I: Linear Functions

CHAPTERS 1 – 3: *Review of basic linear functions; Modelling of common economic concepts in mathematical form; Solving systems of linear equations; Applications of simultaneous equations in economics*

Part II: Matrix Algebra & Applications

CHAPTER 9: *Matrices and their operations; Solving systems of equations; Determinants & Matrix inversions; Cramer's Rule; Solving macroeconomic equilibria*

Part III: Non-Linear Functions and Mathematical Finance

CHAPTER 4 – 5: *Introduction to common non-linear functions; Revenue & Cost functions; Applications of non-linear functions; Financial mathematics; Simple & Compound interest; Annual percentage rate & Net present value; Annuities & Debt repayments; Interest rates & Bond prices*

Part IV: Differential Calculus: Unconstrained & Constrained Optimization

CHAPTERS 6 – 7: *First & higher order derivatives; Applications to marginal analysis; Maxima & minima; Partial derivatives; Applications of partial differentiation; Unconstrained optimization; Constrained optimization & Lagrange multipliers; Applications of constrained optimization*

Part V: Integral Calculus & Applications (If time permits)

CHAPTER 8: *Power rule for integration; Area under curves; Computing consumer and producer surplus*

Important Dates

> **January 8:** Second term classes begin
> **January 31:** April exam schedule is available online
> **February 19 - 25:** Winter Study Break
> **February 26:** Classes resume after the study break
> **March 1:** Winter term midterm grades available on Banner
> **March 8:** Last day to drop second term three-credit courses
> **April 4:** Last day of OUR class for the second term