



# ST. FRANCIS XAVIER UNIVERSITY

## ECONOMICS

### Econ 271

#### Quantitative Methods in Economics

**J. ROSBOROUGH**

**WINTER 2017**

**Office:** NH 507 Nicholson Tower

**Email:** jrosboro@stfx.ca

**Office Hours**

Mon 11:15am – 12:30pm

Wed 12:45pm – 2:00pm (or by appointment)

**Lectures:** NH 142

Mon 2:15pm – 3:30pm

Wed 2:15pm – 3:30pm

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### Description of the Course

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 include computing elasticities, microeconomic and macroeconomic equilibria, profit-maximization, constrained optimization, interest rates, present value and bond pricing. The objectives of the course are to learn basic mathematical tools; to demonstrate the applicability of these mathematical tools to problems that are commonly encountered in Economics and Finance; and to prepare students for upper-year Economics and Finance courses where these tools are commonly used.

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**REQUIRED TEXTBOOK:** *Essential Mathematics for Economics and Business*  
Teresa Bradley, 4<sup>th</sup> Ed., Wiley, 2013

### SUPPLEMENTARY BOOKS

*Mathematics for Economists*, Carl Simon & Lawrence Bloom, Norton (1994)

*Essential Mathematics for Economic Analysis*, Sydsaeter & Hammond, Pearson (2006)

## COURSE OUTLINE



### 1. Linear Functions; Elasticities & Equilibria

CHAPTERS 1 – 3: Review of basic linear functions; modelling of common economic concepts in mathematical form; solving systems of linear equations

### 2. Non-Linear Functions and Mathematical Finance

CHAPTERS 4 – 5: Introduction to common non-linear functions; revenue & cost functions; simple & compound interest; future & present value; Net present value & internal rate of return; annuities & debt repayments; interest rates & bond prices

### 3. Differential Calculus: Unconstrained & Constrained Optimization

CHAPTERS 6 – 7: First & higher order derivatives; applications to marginal analysis; maxima & minima; partial derivatives; constrained optimization & Lagrange multipliers; applications of constrained optimization

### 4. Integral Calculus & Applications

CHAPTER 8: Power rule for integration; area under curves; computing consumer and producer surplus; finding total cost from marginal cost

### 5. Linear Algebra & Applications

CHAPTER 9: Matrices and their operations; solving systems of equations; determinants & matrix inversions; Cramer's Rule; solving macroeconomic equilibria

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## Evaluation

Your grade for the course will be determined by the following weighting scheme:

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|---------------------|----------------------------|-----|
| • Problem Sets (4): | Throughout term            | 20% |
| • Midterm Exam (1): | Wed. March 1 <sup>st</sup> | 30% |
| • Final Exam (1):   | TBA by registrar           | 50% |

## Classes & Exams

You are expected to attend all lectures and the midterm will be scheduled during class time. The final exam for the course is cumulative and will cover material from the whole term.

## Problem Sets

You are free to work with other students on the problem sets, and submit your answers in groups of 1, 2 or 3. Problem sets must be submitted at the start of the lecture in which they are due. Late problem sets will not be accepted and will receive a mark of zero.

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