MATH 104 Course Outline
Differential Calculus with Applications to Commerce and Social Sciences
2017W Term 1

MATH 104 is a course in differential calculus, with applications and examples drawn primarily from business and economics. These courses are equivalent in technical content to MATH 100/180/102/184 and serve as a pre-requisite for any of MATH 101/103/105.

The text book for MATH 104 is *Differential Calculus Notes*, by Joel Feldman and Andrew Rechnitzer. This is an open-source textbook available for free under a Creative Commons Attribution – Non-commercial License. You can download the text from the link on the main course page and take it to a print shop for printing if you wish a hardcopy.

Please note that "Week" below typically means 3 lecture hours, but this will vary.

There are two midterms scheduled in the term. These will be held during regular class time. The midterms are set by the MATH 104 teaching team to minimize variation in basic content and difficulty between sections.

This course is heavily coordinated, but individual instructors will have their own style. Be assured that the content taught will be the same across all sections in spite of this, and that all sections will be prepared for the common final exam.

Week 0 Introduction: Review of Exponentials, Logarithms, and Inverse Functions. Chapter 0 and pp. 141 to 143 and Appendix A. (Note: students review most material on their own. Lectures will not cover all of it.)

Week 1 A standard business problem from managerial economics. (Notes). An Introduction to Limits. Chapter 1.1 to 1.5.

Week 2 Continuous Functions. Chapter 1.6. The Derivative. Chapter 2.1 to 2.3.

Week 3 Rules of Differentiation I. Chapter 2.4, 2.6. Exponential Functions. Chapter 2.7.

Week 4 Rules of Differentiation II. Trigonometric Functions. Chapter 2.8. The Chain Rule. Chapter 2.9.

Mid-term I. (Wednesday, October 4th or Thursday, October 5th)

Week 5 The Natural Logarithm. Implicit Differentiation. Chapter 2.10 and 2.11. Note: Thanksgiving Day is Monday, October 11th.

Week 6 Applications: Elasticity of Demand (Notes to be posted online). Exponential Growth and Compound Interest. Chapter 3.3.

Week 7 Mean Value Theorem Chapter 2.13. Related Rates. Chapter 3.2. Optimisation I: Maxima and Minima. Chapter 3.5.

Week 8 Optimisation Problems . Chapter 3.5.

Week 9 Graphing functions. Chapter 3.6.

Mid-term II. (Wednesday, November 8th or Thursday, November 9th)

Week 10 Graphing Functions. Chapter 3.6. Note: Monday, November 13 is a holiday in lieu of November 11th.

Week 11 Approximating Functions with polynomials I. Chapter 3.4.

Week 12 Approximating Functions with Polynomials II. Chapter 3.4. Inverse Trigonometric Functions. Chapter 2.12