NYU-Polytechnic School of Engineering

Department of Mathematics

Course Outline MA1024/MA1324 Calculus 1

Fall, 2014

Faculty

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Course Prerequisites

Placement Exam or MA914.

Course Description

This course covers the concepts of limits and differentiation with an emphasis on applications and modeling in science and engineering. A library of single variable functions is presented from a modeling approach. Limits and continuity of a function at a point and on an interval are presented. The concept of the derivative and its interpretations as an instantaneous rate of change is discussed. Derivatives of all the elementary functions presented in precalculus are introduced, as well as the rules for differentiating products, quotients, composite, inverse, and implicitly defined functions. Applications of the derivative to problems involving but not limited to rates and related rates, optimization, geometry, modeling, and indeterminate forms are covered.

Course Objectives

After completing this course the student will be able to:

- Understand the concept of limits; compute limits of functions from formulas, graphs, and tables.
- Understand the concept of continuity of a function at a point and on an interval.
- Differentiate elementary functions of a single variable.
- Apply knowledge of calculus to solve problems in, but not limited to, engineering and science.

Course Structure:
Each lesson is comprised of lectures as well as discussions regarding exercises and problems from the textbook and online homework. During the semester, there will be three midterm exams and one final exam.

The textbook for the course:
Essential Calculus, Early Transcendentals, by James Stewart, Published by Cengage Learning, ISBN 978-0-495-01428-7. You can buy a used book, loose-leaf version, or ebook if you wish. However, every student is required to use the WebAssign online homework system.

Course Information and Grading
Grades will be computed following the rules iterated below and provided at the course website:
(www.math.poly.edu/courses/ma1024/gradingpolicy.phtml).

Mandatory requirements: Attending all lectures, completing homework and demonstrating competency on the exams.

Homework: There will be weekly assignments administered through the online homework software WebAssign, which is a **required** course material.

Examinations: Three midterm exams and one **comprehensive final**.

Course Grade: Your letter grade will be based on the higher average computed according to the following two formulas.

Formula 1:
10% Homework and in class performance. Attendance to both lecture and recitation (in the case of MA1324) are mandatory.
25% Best mid-semester exam
25% Second best mid-semester exam
40% Comprehensive final exam

Formula 2:

10% Homework and in class performance. Attendance to both lecture and recitation (in the case of MA1324) are mandatory.
20% Mid-semester Exam 1
20% Mid-semester Exam 2
20% Mid-semester Exam 3
30% Comprehensive final exam

Fall 2014 Exam Dates:

Exam 1: September 30, 2014
Exam 2: October 28, 2014
Exam 3: November 25, 2014
Final Exam: TBA

In case you have missed an exam due to an illness, please see the "Student Development Office" to request a make-up exam. For all other reasons, please go to RH 303A Office of Freshman Mathematics.
There will be no make-up exams unless you have a documented reason and receive permission from the Office of Student Development.

Calculus Internet Resources:

Paul's Online Math Notes **(www.tutorial.math.lamar.edu/Classes/CalcI/CalcI.aspx)**
S.O.S. Mathematics **(www.sosmath.com/)**
Visual Calculus **(www.archives.math.utk.edu/visual.calculus/index.html)**

For Extra Help:

1. Contact Your Instructor.
2. The Resource Center: TBA
3. The General Math Workshop: TBA
4. NYU-Poly School of Engineering Academic support and services: http://engineering.nyu.edu/academics/support

If you are student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor.

Class Etiquette:
Please do not eat or drink, talk or text on your cell phone in class.

You may ONLY use a TI-30 calculator on Calculus 1 exams. This is UCSC rule for all first year courses!

Lecture Schedule MA1024/MA1324
Fall, 2014

Lecture 1
- 1.1: Functions and Their Representations

Lecture 2
- 1.2 A Catalog of Essential Functions

Lecture 3
- 1.3 The Limit of a Function

Lecture 4
- 1.4 Calculating Limits

Lecture 5
- 1.5 Continuity

Lecture 6
- 1.6 Limits Involving Infinity

Lectures 7 & 8
- 2.1 Derivatives and Rates of Change
- Catch up and review

September 30, Exam 1: Covers Sections 1.1 – 1.6

Lecture 9

- 2.2 The Derivative as a Function
- 2.3 Basic Differentiation Formulas

Lecture 10

- 2.4 The Product and Quotient Rules

Lecture 11

- 2.5 The Chain Rule

Lectures 12

- 2.6 Implicit Differentiation

Lectures 13 & 14

- 2.7 Related Rates
- Catch up and Review

October 28, Exam 2: Covers Sections 2.1 – 2.6

Lecture 15

- 2.8 Linear Approximation and Differentials

Lectures 16 & 17

- 3.1 Exponential Functions
- 3.2 Inverse Functions & Logarithms
- 3.3 Derivatives of Logarithmic and Exponential Functions

Lecture 18

- 3.4 Exponential Growth and Decay
- 3.5 Inverse Trig Functions

Lecture 19

- 3.7 Indeterminate Forms and L'Hôspital's Rule

Lectures 20

- 4.1 Maximum and Minimum Values
- 4.2 The Mean Value Theorem

Lectures 21 & 22

- 4.3 Derivatives and the Shapes of Curves
- Catch up and Review

November 25, Exam 3: Covers Sections 2.7 – 4.3 (Excluding Section 3.6)

Lecture 23

- 4.4 Curve Sketching

Lecture 24

- 4.5 Optimization Problems

Lecture 25

- 4.7 Antiderivatives

Lecture 26

- Catch up and Review

Final Exam Covers Sections 1.1-4.7 (Excluding Sections 3.6 & 4.6)