Calculus I Course Outline
MAT 175 Section B402[13968], Fall 2012
Tuesdays and Thursdays 9:00AM - 10:40AM, Room: Gillet 305
CUNY Lehman College

Instructor: Byung Do Park
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Office Hours: By appointment
Course Syllabus: The departmental course syllabus and the course calendar is available at: http://lehman.edu/academics/mathematics-computer-science/calculus.php
Section webpage: Announcements, homework, exam schedules and other relevant information will be posted on the following webpage(Case Sensitive!):
http://wfs.gc.cuny.edu/bpark/www/teaching/F2012_MAT175.html
Textbook: R. Larson, R. Hostetler and B. Edwards, *Calculus: Early Transcendental Function*, 4th ed., Cengage Learning, 2007. Custom ISBN: 1424080738

There are a **prerequisite** and a **corequisite** to take this course. A grade of C or better in MAT 172 or placement by the department is required, and MAT 155 Calculus I Laboratory should be taken together with this course.

Motivation: In history of mathematics, there are a few landmarks each of which is totally distinguished from the rest in terms its role in a huge edifice, the modern mathematics. If the contribution of ancient Greeks, featured by Euclid's *Elements*, were taking the first place chronologically, this seventeenth-century mathematics, calculus, would be placed next, unanimously. The usefulness of calculus has been tremendous, and many important consequences in mathematics and sciences have been followed from ideas and techniques of it. In modern mathematics, it is not an exaggeration that calculus is deeply rooted in any branch of it. A very sophisticated use of calculus plays a key role in expanding human knowledge in research-level mathematics, or a theorem that requires a highly elaborated setup is often simplified into a well-known theorem in calculus.

Let us take an overview to feel where we are. Calculus is to understand the following **Stokes' formula** for $\mathbb{R}^n$:

$$\int_{\partial c} \omega = \int_c d\omega.$$

You will learn this formula in the following form in the course *Vector Calculus*:

$$\int_\Omega \nabla \times \overrightarrow{F} \cdot d\overrightarrow{\Omega} = \int_{\partial\Omega} \overrightarrow{F} \cdot d\overrightarrow{r},$$

and a simplified version of it for the case of a real-valued function on $\mathbb{R}$ is the following, which is called the **fundamental theorem of calculus**:

$$\int_a^b f(x)dx = F(b) - F(a).$$

You will exploit this theorem if you take MAT 176, *Calculus 2*. Now we multiply both sides by $1/(b-a)$ to get

$$\frac{1}{b-a}\int_a^b f(x)dx = \frac{F(b)-F(a)}{b-a}$$

Then a fact we shall study tells us that there exists some $\xi \in [a,b]$ such that

$$\frac{F(b)-F(a)}{b-a} = f(\xi).$$

This is called the **mean-value theorem** characterized by the method of *differential calculus*, which will be defined by using the concept of *limit*.

Course description: We shall study limit, continuity, differential calculus and applications of the differential calculus, in the case of one variable real-valued functions. As well as computational aspects, we shall carefully examine proof of propositions, and in particular, we shall put emphasis on speaking and writing seamlessly in mathematical standard.

Exams: There will be *two* midterm exams and a final exam. Location, date and time will be announced as soon as determined. An *optional* midterm exam will be given between the second midterm and the final. This exam will cover entire topics covered in two regular midterm exams. Students may take this optional exam if one wishes to increase score or needs to take a make-up exam. If you take three midterm exams, the smallest score will be dropped. Note that questions may be more challenging than other two regular midterms. Any one who wishes to take this optional exam should sign-up by email until November 14th, 2012, 11:59PM. Other than this, there will be no make-up exam for any reason.

Homework and quizzes: The homework and due dates will be posted on the section webpage. The departmental course calendar contains a list of problems, and some of these will be done in class. Quizzes will be given as an in-class exam style, which may be shorter in terms of number of problems or duration for it. There will be no make-up for quizzes. The **precalculus assessment quiz**, which will be given in the first session, will not be reflected to the total score.

Grading Policies: 2 Midterms 40%(20% each), Final 40%, Quizzes 15% and Homework 5%.

Academic Integrity: It is expected that you will complete all quizzes and exams without giving or receiving help from anyone. You may talk to other students about the homework but you must then complete the homework yourself. The minimum penalty for giving or receiving help on a quiz or an exam is a grade of 0 on that exam.

Instructor's policies: Cell phones are not allowed to use in class.