Shanghai University of Finance & Economics

2019 Summer Program

MATH 111 Calculus 1

Course Outline

Term: June 3 – June 28, 2019

Class Hours: 10:00-11:50AM (Monday through Friday)

Course Code: MATH 111

Instructor: Anja Bankovic

Home Institution: Boston College

Office Hours: TBA and by appointment

Email: anja289@yahoo.com

Credit: 4

Class Hours: This course will have 52 class hours, including 32 lecture hours, professor 8 office hours, 8-hour TA discussion sessions, 4-hour review sessions.

Course Description:
This is the first course in calculus for engineers, physicists, computer scientists, and mathematicians. The goal is for students to build a solid understanding of fundamental concepts such as sequences,functions, limits, continuity, differentiability, and basics of integration.
Calculus studies the limiting behavior of functions. Functions themselves are among the most important discoveries in history, because they describe the dependence of objects and phenomena in nature. Most functions of interest exhibit a rather regular behavior which makes it possible to understand their infinitesimal properties. This enables us to describe the nature and predict its behavior. The proper understanding of calculus plays a crucial role in careers of mathematicians, physicists, economists, engineers, programmers, and in recent years biologists and other life scientists. This course will teach students how to think and to understand the reasons behind formulas. The calculus will give meaning to the future courses and life.

Required Textbooks:
Stewart: Calculus – Early Transcendentals

Grading & Evaluation:
Homework and quizzes: 30%
Midterm: 30%
Final: 40%

Course Schedule:
Week 1:

Session 1: Four Ways to Represent a Function; Mathematical Models

Sessions2: New Functions from Old Functions; Exponential Functions; Logarithmic functions

Session 3: Tangents and Velocity; The Limit of a Function; Using Limit Laws

Week 2:

Session 1: Continuity; Limits at Infinity: Horizontal Asymptotes; Derivatives and Rates of Change

Session 2: The Derivative as a Function; Derivatives of Polynomials and Exponential Functions; The Product and Quotient Rules;

Session 3: Derivatives of Trigonometric Functions; The Chain Rule; Implicit Differentiation

Week 3:

Session 1: Derivatives of Logarithmic functions; Rates of Change; Related Rates

Session 2: Linear Approximation and Differentials; Maximum and Minimum Values; How Derivatives Affect the Shape of a Graph

Session 3: Indeterminate Values and L'Hospital's Rule; Curve Sketching

Week 4:

Session 1: Optimization Problems; Newton's Method; Antiderivatives

Session 2: Areas and Distances; The Definite Integral

Session 3: The Fundamental Theorem of Calculus, Review for the Final