Guangdong University of Finance

2019 Summer Program

MATH 111 Calculus 1

Course Syllabus

Term: June 3 – July 5, 2019

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

Course Code: MATH 111

Instructor: Sema Salur

Home Institution: University of Rochester

Office Hours: TBA

Email: semasalur@gmail.com

Credit: 4

Class hours: This course will have 72 class hours, including 40 lecture hours, professor 10 office hours, 10-hour TA discussion sessions, 2-hour review sessions, 10-hour extra classes.

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, 8th Edition.

Grading & Evaluation:

Homework and quizzes: 25%
Midterms: 45%
Final: 30%

Course Schedule:
Week1:
- Functions (definitions and representations, mathematical models, elementary functions, composition of functions)
- Limits of functions (definition, asymptotes, rules for calculating the limits); Limits of functions (precise definition, continuity, rates of change)
- Derivatives (derivative as a limit: precise definition and properties)

Week2:
- Derivatives (examples)
- Differentiation Formulas, Derivatives of polynomials and trigonometric functions.
- The Chain Rule, Implicit Differentiation, Derivatives of logarithmic and exponential functions.

Week3:
- Higher Derivatives, Linear Approximation and Differentials
- Applications of Differentiation: Maximum and minimum values
- Mean Value Theorem, L'Hopital's Theorem, Curve Sketching

Week4:
- Optimization Problems. Taylor and MacLaurin formulas.
- Integrals: Anti-derivatives
- Areas and definite integrals

Week5:
- The Fundamental Theorem of Calculus
- Substitution Rule
- Applications (Areas between curves, volumes)