



上海财经大学

Shanghai University of Finance & Economics

中国上海市国定路777号 邮编200433 777 Guoding Road, Shanghai, 200433, China

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## Shanghai University of Finance & Economics

### 2019 Summer Program

### MATH 300 Multivariable Calculus

### Course Outline

**Term: June 3 – June 28, 2019**

**Class Hours: 18:00-19:50PM (Monday through Friday)**

**Course Code: MATH 300**

**Instructor: Anja Bankovic**

**Home Institution: Boston College**

**Office Hours: TBA and by appointment**

**Email: [anja289@yahoo.com](mailto: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 a lower division course in multivariable calculus with elements of analytic geometry. The course covers differential and integral calculus of functions of several variables. It provides a solid background for students who wish to continue their studies in natural sciences such as mathematics, physics, engineering, finance, economics, and computer science.

The course will start with the study of analytic geometry of vectors, lines, planes, curves, and surfaces.

The next major topic is differential calculus and optimization problems, and the final topic includes multiple integrals and surface integrals.

#### **Required Textbooks:**

*Stewart: Calculus – Early Transcendentals*

#### **Grading & Evaluation:**

Homework and quizzes: 30%; Midterm: 30%; Final: 40%



## **Course Schedule:**

### **Week 1:**

Session 1: Three-Dimensional Coordinate Systems; Vectors; The Dot Product; The Cross Product;

Session 2: Equations of Lines and Planes; Cylinders and Quadric Surfaces; Vector Functions and Space Curves

Session 3: Derivatives and Integrals of Vector Functions; Arc Length and Curvature; Motion in Space: Velocity and Acceleration

### **Week 2:**

Session 1: Functions of Several Variables; Limits and Continuity; Partial Derivatives

Session 2: Tangent Planes and Linear Approximations; The Chain Rule; Directional Derivatives and the Gradient Vector

Session 3: Maximum and Minimum Values; Lagrange Multipliers

### **Week 3:**

Session 1: Double Integrals over Rectangles; Double Integrals over General Regions; Double Integrals in Polar Coordinates; Applications of Double Integrals

Session 2: Surface Area; Triple Integrals; Triple Integrals in Cylindrical Coordinates

Session 3: Triple Integrals in Spherical Coordinates; Change of Variables in Multiple Integrals;  
Vector Fields

### **Week 4:**

Session 1: Line Integrals; The Fundamental Theorem for Line Integrals' Green's Theorem

Session 2: Curl and Divergence; Parametric Surfaces and Their Areas; Surface Integrals

Session 3: Stokes' Theorem; The Divergence Theorem