



# 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

## Shanghai University of Finance & Economics

### 2021 Summer Program

### MATH 111 Calculus 1

### Course Outline

**Term: July 12 – August 6, 2021**

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

**Course Code: MATH 111**

**Instructor: Dr. Calistus Ngonghala**

**Home Institution: University of Florida, USA**

**Office Hours: TBA and by appointment**

**Email: calistusnn@gmail.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:** Calculus 1 is the first of a sequence of three courses in calculus covering basic calculus. Topics to be covered include a review of functions, limits, differentiation, applications of the derivative, and introduction of integration.

**Course Objectives:** The objective of the course is to build an understanding of the basic principles and applications of differential and integral calculus through lectures, homework, discussion, quizzes, and exams.

**Required Textbooks:** Calculus: Early Transcendentals, 8th edition, by James Stewart or the free online textbook available at <http://bit.ly/2uEmmKF>

#### Grading & Evaluation:

Attendance and participation:	10%
Homework and quizzes:	20%
Midterm:	30%
Final:	<u>40%</u>
Total:	100%

#### Grade Range

A	90-100
B	80-89
C	70-79
D	60-69
F	0-59

#### Course Schedule

**Week1** Functions: definition, representation, types, operations, mathematical models. Limits and continuity: limit of a function, the limit law, continuity, definition of a limit. Derivatives: Definition, rates of change. The product and quotient rules.



**Week2** Derivatives: Differentiation rules: Trigonometric, inverse, logarithmic, exponential, implicit functions, and chain rules, higher derivatives.

**Week3** Applications of differentiation: Linear approximation and differentials, minima and maxima, the Mean Value Theorem, L'Hôpital's rule, limits at infinity and asymptotes, curve sketching, applied optimization problems.

**Week4** Integrals: Anti-derivatives, approximating areas, the definite integral, the Fundamental Theorem of Calculus, substitution rule.

### Detailed Course Outline:

The course outline is tentative and I will modify accordingly depending on the pace of the class.

Week	Date	Chapter	Topic
		<b>1 Functions</b>	1.1 Definition and representation of functions 1.2 Types of functions
			1.3 Operations on functions (Composition, inverse) 1.4 Mathematical models
<b>1</b>		<b>2 Limits and continuity</b>	2.1 The limit of a function 2.2 The limit laws 2.3 Continuity
		<b>3 Derivatives</b>	2.4 Precise definition of a limit 3.1 Definition of a derivative 3.2 Derivatives as rates of change
			3.3 Differentiation rules (constants and polynomials) 3.4 The chain, product, and quotient rules
			3.5 Derivatives of trigonometric functions 3.6 Derivatives of inverse functions
<b>2</b>		<b>3 Derivatives</b>	3.7 Implicit differentiation 3.8 Derivatives of exponential and logarithmic functions 3.9 Higher derivatives
			4.1 Linear Approximation and Differentials Exam 1
<b>3</b>			4.2 Maxima and minima 4.3 The Mean Value Theorem 4.4 L'Hôpital's rule
		<b>4 Applications of derivatives</b>	4.5 Limits at infinity and asymptotes 4.6 Curve sketching
			4.6 Curve sketching 4.7 Applied Optimization problems
<b>4</b>		<b>5 Integrals</b>	5.1 Anti-derivatives 5.2 Approximating areas 5.3 The definite integral 5.5 Substitution Rule
			Final Exam
			Discussion of Final Exam



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## **Student responsibilities/expectations:**

The main course material will be presented through lectures. A discussion session, to be held every Friday will offer an opportunity for students to discuss course material and assigned problems with a teaching assistant (TA). Students are advised to keep pace with the course material as it is being presented. Consequently, students should endeavor to attend all class meetings and discussion sessions, be early for class, and spend sufficient time working on assigned homework problems. If for any reason a student misses a class, he/she should endeavor to obtain the notes and learn the missed material before the next class meeting. Students should not hesitate to ask questions or seek additional assistance to ensure that they are staying on pace with the class. Students will be expected to come to class prepared and ready to participate actively. Please, turn off your cell phones and put aside any unrelated material before class begins. Students should exhibit a sense of responsibility and respect towards fellow students. Late-coming to class or early departure from class meetings will not be allowed.

## **Examinations:**

There will be one midterm exam plus one cumulative final exam. The exams will contain problems to solve and definitions, brief explanations of concepts, and simple proofs.