Shanghai University of Finance & Economics

2021 Summer Program

MATH 111 Calculus 1

Course Outline

Term: June 14 – July 09, 2021

Class Hours: 12:00-13:50 (Monday through Friday)

Course Code: MATH111

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: 40%
Total: 100%

Grading System (1 ~ 100)

A : 94 - 100   A- : 90 – 93

B : 83 - 89   B- : 80 – 82

C : 73 - 79   C- : 70 – 72

D : 63 - 69   D- : 60 – 62

F : Fail

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

Week	Chapter	Topic
	1 Functions	1.1 Definition and representation of functions 1.2 Types of functions 1.3 Operations on functions (Composition, inverse) 1.4 Mathematical models
1	**2 Limits and continuity**	2.1 The limit of a function 2.2 The limit laws 2.3 Continuity 2.4 Precise definition of a limit
	3 Derivatives	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
2	**3 Derivatives**	3.5 Derivatives of trigonometric functions 3.6 Derivatives of inverse functions
		3.7 Implicit differentiation 3.8 Derivatives of exponential and logarithmic functions
		3.9 Higher derivatives
		Exam 1
3	**4 Applications of derivatives**	4.1 Linear Approximation and Differentials 4.2 Maxima and minima 4.3 The Mean Value Theorem
		4.4 L'Hôpital's rule 4.5 Limits at infinity and asymptotes

		4.6 Curve sketching 4.7 Applied Optimization problems
		Exam 2
		5.1 Anti-derivatives 5.2 Approximating areas 5.3 The definite integral
4	**5 Integrals**	5.3 The definite integral 5.4 The Fundamental Theorem of Calculus 5.5 Substitution Rule
		Final Exam
		Discussion of final exam

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 must be responsible and show respect towards fellow students. Late-coming to class or early departure from class meetings will not be allowed.

Examinations: There will be two exams plus one cumulative final exam. Each exam will consist of a multiple choice and a problem (free-response) section. The free-response problem section will contain problems to solve and definitions, brief explanations of concepts, and simple proofs.

Quizzes: Quizzes will be administered periodically throughout course period. Quizzes are meant to test the understanding of covered topics, and to give a benchmark prior to the exams.

Homework: The purpose of homework is to develop more skills in the material covered. It will be the student's responsibility to solve the assigned homework problems in a timely manner. Students who intend to do well in the course are advised to solve the homework problems. Students should feel free to approach the instructor with difficulties from homework problems. Problems in which students encounter difficulties may also be discussed in class.