



## Hankuk University of Foreign Studies

### 2023 Summer Session

### MATH 111 Calculus 1

### Course Outline

**Course Code: MATH 111**

**Instructor: Professor Vadim Olshevsky**

**Home Institution: University of Connecticut**

**Office Hours: By Appointment**

**Email: [olshevsky@gmail.com](mailto:olshevsky@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 with WebAssign Access Code. Can be purchased directly at

<https://www.cengage.com/c/calculus-early-transcendentals-8e-stewart/9781337771498#compare-buying-options>



It is important that you purchase both the textbook and the WebAssign code, the latter is necessary for the homework assignments.

### Grading & Evaluation

Attendance and participation: 10%  
Homework: 30%  
Midterm: 30%  
Final: 30%

### Grading System (1 ~ 100)

The final score will be scaled and the scaled score will be used to assign a Course grade.

A+ : 96 - 100	A : 91 - 95
B+ : 86 - 90	B : 81 - 85
C+ : 76 - 80	C : 71 - 75
D+ : 66 - 70	D : 60 - 65
F : 0 - 59	
Pa : Pass	Fa : 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

**Week2** Derivatives: Differentiation rules: polynomial, trigonometric, inverse, logarithmic, exponential, implicit functions. The product, quotient, and chain rules.

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

**Week4** Applications of differentiation: Applied optimization problems Integrals (Anti-derivatives, approximating areas, the definite integral).

Integrals: The Fundamental Theorem of Calculus, substitution rule.

### Detailed Course Outline



Week	Chapter	Topic
1	1 Functions	1.0 Preview of Calculus
		1.1 Four ways to represent a function
		1.2 Mathematical models. A catalog of essential functions.
		1.3 New functions from old functions
		1.5 Exponential Functions
2	2 Limits and continuity	1.6 Inverse Functions and logarithms
	3 Derivatives	2.1 The tangent and velocity problems
		2.2. The limit of a function
		2.3 The limit laws.
		2.4 Precise definition of a limit
	2.5 Continuity	
3	3 Derivatives	2.6 Limits at infinity. Horizontal asymptotes.
		2.7. Derivatives and the rates of change.
		2.8 Derivatives as a function
		3.1 Derivatives of Polynomials and Exponentials.
		3.2 Product and quotient rules
		3.3 Derivatives of trigonometric functions
		3.4 The chain rule
	3.6 Derivatives of logarithms	
4		Exam 1
		3.7 Rates of change
		3.8 Exponential growth and decay
	4 Applications of derivatives	3.10 Linear Approximation and Differentials
		4.1 Maxima and minima
4		4.2 The Mean Value Theorem
		4.3 Derivatives and the shape of the graph
		4.4 L'Hôpital's rule
		4.5 Curve sketching
		4.9 Anti-derivatives
		5.1 Approximating areas
		5.2 The definite integral
	5.3 The Fundamental Theorem of Calculus	
	5.5 Substitution Rule	
	Exam 2	