



Hankuk University of Foreign Studies

2024 Winter 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

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)

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
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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 1.6 Inverse Functions and logarithms
	2 Limits and continuity	2.1 The tangent and velocity problems 2.2. The limit of a function
	3 Derivatives	2.3 The limit laws. 2.4 Precise definition of a limit
2		2.5 Continuity 2.6 Limits at infinity. Horizontal asymptotes.
	3 Derivatives	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
		Exam 1
3		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
		4.2 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
4		5.1 Approximating areas 5.2 The definite integral
		5.3 The Fundamental Theorem of Calculus 5.5 Substitution Rule
		Exam 2