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81, Oedae-ro, Mohyeon-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 17035, Korea

Hankuk University of Foreign Studies

2024 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

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

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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

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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 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 assimptotes.
	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
3		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
		4.2 The Mean Value Theorem 4.3 Derivatives and the shape of the graph 4.4 L'Hôpital's rule
4		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