NEW YORK CITY COLLEGE OF TECHNOLOGY
The City University of New York

DEPARTMENT:	Mathematics
COURSE:	MAT 1475
TITLE:	Calculus I
DESCRIPTION:	Topics include functions, limits, differentiation, and tangent lines, L'Hôpital's Rule, Fundamental Theorem of Calculus and Applications.
TEXT:	Calculus, Volume 1, openstax.org E. Herman and G. Strang
CREDITS:	4 (4 class hours)
PREREQUISITES:	MAT 1375 or qualifying score on the mathematics placement exam.
	Prepared by: Henry Africk and Satyanand Singh
	Fall, 2019

A. Testing Guidelines:

The following exams should be scheduled:

1. A one session exam at the end of the First Quarter.
2. A one session exam at the end of the Second Quarter.
3. A one session exam at the end of the Third Quarter.
4. A one session Final Examination.

B. A graphing calculator is required.

Course Intended Learning Outcomes/Assessment Methods

Learning Outcomes	Assessment Methods
1. Solve problems related to limits and continuity.	Classroom activities and discussion, homework, exams.
2. Find the derivative of functions using the definition, sum rule, product rule, quotient rule, and the chain rule.	Classroom activities and discussion, homework, exams.
3. • Use the derivative of a function to find an equation for the tangent line at a point. • Use L'Hôpital's Rule to evaluate limits. • Sketch the graph of functions. • Solve optimization problems. • Solve related rates problems.	Classroom activities and discussion, homework, exams.
4. Evaluate definite and indefinite integrals of polynomials, trigonometric and exponential functions.	Classroom activities and discussion, homework, exams.

General Education Learning Outcomes/Assessment Methods

Learning Outcomes	Assessment Methods
1. Understand and employ both quantitative and qualitative analysis to solve problems.	Classroom activities and discussion, homework, exams.
2. Employ scientific reasoning and logical thinking.	Classroom activities and discussion, homework, exams.
3. Communicate effectively using written and oral means.	Classroom activities and discussion, homework, exams.
4. Use creativity to solve problems.	Classroom activities and discussion, homework, exams.

New York City College of Technology Policy on Academic Integrity

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

MAT 1475 - Calculus I

Textbook: Calculus, Volume 1, by E. Herman and G. Strang, OpenStax
PDF available from: https://openstax.org/details/books/calculus-volume-1
WeBWorK: WeBWorK for MAT 1475 uses the OpenLab Q&A site: https://openlab.citytech.cuny.edu/ol-webwork/
Students will need an OpenLab account in order to post new questions.
Video Resources: All video resources listed below can be found at https://openlab.citytech.cuny.edu/groups-mat-1475-student-video-resources-/syllabus-with-links-to-videos/

Session	Topic	Homework	WeBWorK Set	Video Resource
1	2.2 The Limit of a Function (p.135-153)	p.154: 30-33 all, 35, 38, 42, 46-49 all	Limits - Introduction Limits - One-Sided Limits - Analytic Limits - Infinite	The limit of a function
2	2.3 The Limit Laws (p.160-174)	p.176: 83-105 odd	Limits - Limit Properties	The limit laws
3	2.4 Continuity (p.179-188)	p.191: 131-135 all, 137-147 odd	Limits - Continuity	Continuity
4	3.1 Defining the Derivative (p.213-227)	p.228: 1, 3, 11-17 odd, 21-25 odd	Derivatives - Limit Definition	Defining the derivative
5	3.2 The Derivative as a Function (p.232-242)	p.243: 54-58 all, 61, 62	Derivatives - Function	The derivative as a function
6	3.3 Differentiation Rules (p.247-260)	p.263: 106-113 all, 115-117 all	Derivatives - Power Rule Derivatives - Product Rule Derivatives - Quotient Rule	Differentiation rules
7	3.4 Derivatives as Rates of Change (p.266-270)	p.273: 153, 155, 156, 157	Derivatives - Rates of Change	Derivatives as rates of change
8	**First Examination**			
9	3.5 Derivatives of Trigonometric Functions (p.277-284)	p.285: 175-189 odd	Derivatives - Trigonometric	Derivatives of trigonometric functions
10	3.6 The Chain Rule (p.287-296)	p.297: 215-221 odd, 222, 229-237 odd	Derivatives - Chain Rule Derivatives - Mixed Rules	The chain rule
11	3.7 Derivatives of Inverse Functions (p.299-305)	p.306: 265, 267, 279, 280, 281, 283	Derivatives - Inverses	Derivatives of inverse functions
12	3.8 Implicit Differentiation (p.309-316)	p.317: 300-303 all, 309, 311, 315, 319	Derivatives - Implicit	Implicit differentiation
13	3.9 Derivatives of Exponential and Logarithmic Functions (p.319-330)	p.331: 331-333 all, 337, 340, 341, 346-348 all, 351	Derivatives - Exponential and Logarithmic	Derivatives of exponential and logarithmic functions
14	4.1 Related Rates (p.341-349)	p.350: 1-9 odd, 10, 17-21 all, 25, 29	Application - Related Rates	Related rates

Session	Topic	Homework	WeBWorK Set	Video Resource
15	**Midterm Examination**			
16	4.2 Linear Approximations and Differentials (p.354-363)	p.364: 62, 63, 65, 67, 68, 69, 70, 72, 73, 74, 78, 79, 80	Application - Linearization Application - Differentials	Linear approximations and differentials
17	4.3 Maxima and Minima (p.366-375)	p.376: 101, 103, 108-113 all, 118, 119, 122, 124, 129, 130	Application - Extrema	Maxima and minima
18	4.4 The Mean Value Theorem (p.379-387)	p.388: 153, 155, 157, 161, 164, 165, 168, 171, 174, 176, 179, 186, 187, 188	Application - Mean Value Theorem	The mean value theorem
19	4.5 Derivatives and the Shape of a Graph (p.390-402)	p.403: 201, 203, 207, 212, 213, 214, 223, 224, 225, 229	Application - Monotonicity Application - Shape of Polynomials	Derivatives and the shape of a graph
20	4.6 Limits at Infinity and Asymptotes (p.407-425)	p.436: 251, 253, 256, 257-273 odd, 274, 279, 281	Application - Asymptotes	Limits at infinity and asymptotes
21	4.6 (continued) Drawing the Graph of a Function (p.425-435)	p.436: 294, 295, 297, 298, 299, 301, 302	Application - Shape of Graphs	Drawing the graph of a function
22	4.7 Applied Optimization (p.439-450)	p.451: 315, 316, 318-322 all, 335, 336	Application - Optimization	Applied optimization
23	4.8 L'Hôpital's Rule (p.454-464)	p.470: 356, 359, 362-367, 373, 377, 380, 387, 393, 395	Application - LHopital	L'Hôpital's rule
24	**Third Examination**			
25	4.10 Antiderivatives (p.485-496)	p.497: 465, 470, 471, 476, 477, 481, 484, 490, 492, 493, 495, 496, 499-501 all	Application - Antiderivatives	Antiderivatives
26	5.1 Approximating Areas (p.507-522)	p.523: 2, 12, 14-19 all	Integration - Riemann Sums	Approximating areas
27	5.2 The Definite Integral (p.529-543)	p.545: 73, 75, 76, 77, 80, 88, 89, 90, 92	Integration - Definite	The definite integral
28	5.3 The Fundamental Theorem of Calculus (p.549-559)	p.562: 170-172 all, 177, 182-184 all, 187	Integration - Fundamental Theorem	The fundamental theorem of Calculus
29	**Review**	Final Exam Review Problems		Selected final exam review questions solved
30	**Final Exam**			