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 high school mathematics GPA of at least 94 and a successful completion of a high school math course beyond Algebra 2 OR NYS Regents Trigonometry score of at least 85 (or equivalent on Common Core Algebra 2)
	Prepared by: Henry Africk and Satyanand Singh
	Updated by Henry Africk, Laura Ghezzi, Caner Koca and Lin Zhou, Fall 2020

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 **Text**: E. Herman, G. Strang, Calculus, Volume 1, openstax.org

Session	Topic	Homework (WW = WeBWorK)
1	2.2 The Limit of a Function pp. 135-153	p. 154 # 30-33 all,35,38,42 WW Limits-Introduction: 5-8 all
2	2.3 The Limit Laws pp. 160-174	p. 176 # 83-101 odd WW Limits-Analytic: 1,3 WW Limits-One Sided: 1,2,3,4 WW Limits-Limit Properties: 1,2
3	2.4 Continuity pp. 179-188	p. 191 # 131,133,139,143,145,147 WW Limits-Continuity: 1,2,3
4	3.1 Defining the Derivative pp. 213-227	p. 228 # 1,3,11-17 odd, 21-25 odd WW Derivatives-Limit Definition: 1,2,4,5,6
5	3.2 The Derivative as a Function pp. 232-242	p. 243 # 54,55,57,58,59,61,62 WW Derivatives-Functions 1-6 all
6	3.3 Differentiation Rules pp. 247-260	p. 263 # 107,110,112,115,116,117 WW Derivatives-Power Rule 1-9 all,11-14 all,16-18, 21 WW Derivatives-Product Rule 1,2,3,4,6,7,8,9 WW Derivatives-Quotient Rule 1-7 all,9,12,13
7	3.4 Derivatives as Rates of Change pp. 266-270	p. 273 # 153,155,156,157 WW Derivatives-Rates of Change: 7,8,9
8	**First Examination**	
9	3.5 Derivatives of Trigonometric Functions pp. 277-284	p. 285 # 177,179,185,187,191,193,195 WW Derivatives-Trigonometric: 1-9 all
10	3.6 The Chain Rule pp. 287-296	p. 297 # 215,221,222,229-237odd WW Derivatives-Chain Rule: 1-8 all, 10-14 all, 18-20 all
11	3.7 Derivatives of Inverse Functions pp. 299-305	p. 306 # 265,267,279-283 all,287 WW Derivatives-Inverses: 1-8 all, 10
12	3.8 Implicit Differentiation pp. 309-316	p. 317 # 300-303 all, 309,311,315,319 WW Derivatives-Implicit: 1-3 all, 6-9 all
13	3.9 Derivatives of Exponential and Logarithmic Functions pp. 319-330	p. 331 # 331,334,337,340,341,346,347,351 WW Derivatives-Exponential: 1,2,3,4,7,13 WW Derivatives-Logarithms: 1-5 all,8 WW Derivatives-Logarithmic: 1,2,3
14	Review	
15	**Midterm Examination**	
16	4.1 Related Rates pp. 341-349	p. 350 # 1,5,10,17,20,25,29 WW Application-Related Rates: 4,6,7,11,12,13,14,16,17,18

17	4.2 Linear Approximations and Differentials pp. 354-363	p. 364 # 62,63,67,68,69,70,72,73,74 WW Application-Linearization: 3,4,5,6,8,9,10,12 WW Application-Differentials: 3,4,5,6
18	4.3 Maxima and Minima pp. 366-375	p. 376 # 108,110,113,119,122,124 WW Application-Extrema: 1,4,5,6
19	4.4 The Mean Value Theorem pp. 379-387	p. 388 # 161,164,168,171,174,186,188 WW Application-Mean Value Theorem: 4,5,6,7,11
20	4.5 Derivatives and the Shape of a Graph pp. 390-402	p. 405 # 223,224,225,226,229 WW Monotonicity: 1-6 all,8 WW Application-Shape of Polynomials: 4-7 all
21	4.6 Limits at Infinity and Asymptotes pp. 407-435	p. 436 # 271,273,274,279,281,298 WW Shape of Graphs: 1-7 all WW Limits-Infinite: 1-5 all
22	4.7 Applied Optimization pp. 439-450	p. 451 # 315,316,318-321 all, 335,336 WW Application-Optimization: 1,2,3,5-11 all
23	**Third Examination**	
24	4.8 L'Hopital's Rule pp. 454-464	p. 470 # 356,362,370,371,367,377,387, (393,395 Optional) WW Application-LHopitalsRule: 2,3,4,6,7,8,10
25	4.10 Antiderivatives pp. 485-496	p. 497 # 465,468,469,470,471,473,476,477, 481,482,490,491,492,493,499,500,502 WW Application-Antiderivatives: 2-12 all
26	5.1 Approximating Areas pp. 507-522	p. 523 # 2,12,14-17 all WW Integration-Riemann Sums: 2,3,4,7
27	5.2 The Definite Integral pp. 529-543	p. 545 # 72,73,76,77,80,81,88,89,91,93 WW Integration-Definite: 1-8 all,11
28	5.3 The Fundamental Theorem of Calculus pp. 549-559	p. 562 # 170,171, 177,182,183 WW Integration-Fundamental Theorem: 1-9 all
29	Review	
30	**Final Examination**	