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 Meet the Math Placement for MAT 1475
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	Updated by Henry Africk, Laura Ghezzi, Caner Koca and Lin Zhou, Spring 2021

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-Based Learning Outcomes and Alignment with General Education Goals

Upon satisfactory completion of this course, the student will be able to:

MAT 1475	NYCCT Gen Ed Common Core	CUNY Common Core
Draw graphs and set up tables from formulas and quantitative representations.	Think creatively, critically, analyze data, develop quantitative literacy.	Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.
Use algebraic, numerical and graphical methods to draw conclusions and solve mathematical problems.	Think creatively, critically, analyze data, develop quantitative writing skills,	Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.
Represent quantitative problems algebraically and numerically using suitable mathematical notation.	Think creatively, critically, analyze data, develop quantitative reading and writing skills.	Represent quantitative problems expressed in natural language in a suitable mathematical format.
Effectively communicate solutions to mathematical problems in written and oral form.	Think creatively, critically, analyze data, develop quantitative verbal and writing skills. Develop teamwork while sharing solutions with others.	Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.
Check solutions to mathematical problems using graphical and numerical methods, including informed estimation.	Think critically while analyzing solutions. Develop quantitative reading and writing skills.	Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.
Apply mathematical methods to problems in the physical, biological and social sciences,	Develop information skills, intercultural knowledge and competence, ethical reasoning, skills for lifelong learning and inquiry and analysis and quantitative writing and literacy.	Apply mathematical methods to problems in other fields of study.

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**	