LAKES REGION COMMUNITY COLLEGE

379 Belmont Road
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COURSE OUTLINE/SYLLABUS SHEET

- **COURSE NO:**   MATH2700L

- **COURSE TITLE:**   Calculus I

- **CREDIT HOURS:**   4

- **SEMESTER:**   Spring 2021

- **INSTRUCTOR NAME:**   Katie Seigle

- **E-MAIL ADDRESS:**   kseigle@ccsnh.edu

- **OFFICE LOCATION:**   Turner 205

- **CONFERENCE HOURS:** Tuesday 6:00-7:00 via Zoom. Additional time available per student request. Link will be posted on Canvas course page.

- **PREREQUISITES:** LMAT2350 or Precalculus equivalent with a grade of C or better

- **COURSE DESCRIPTION:** This course is designed for the student who has a strong math background. Included is a brief review of topics from Precalculus. Calculus topics include functions, limits, continuity, slope/rate of change and the derivative, rules for and applications of the derivative, derivatives of exponential and logarithmic functions, exponential growth and decay, and an introduction to integrals. Applications are aimed at business and life sciences students.

TEXT/INSTRUCTIONAL MATERIALS AND EQUIPMENT NEEDED:
Text: *Contemporary Calculus* by Dale Hoffman at Bellevue College. Students are required to purchase an access code for Lumen Learning OHM online program for all homework and chapter tests. Access to the textbook is also available through this site. Students can purchase the code through the LRCC bookstore or directly through Lumen.
Weekly modules are set up in Canvas; students are expected to complete work as outlined in these modules and to read any notices posted.
Please note use of a scientific calculator (e.g. TI-84) is required in this course.

GRADING: The following criteria will determine your grade for the course:

Category	Percentage of Course Grade
Quizzes: (lowest dropped)	30%
Tests:	40%
Homework: (lowest dropped)	20%
Readings	10%

*If the final exam grade is higher than the cumulative test average, the final exam grade will be used for the test average.

The following grading scale will be used to assign your final grade:

A	93-100	B	83-86	C	73-76	D	63-66
A–	90-92	B–	80-82	C–	70-72	D–	60-62
B+	87-89	C+	77-79	D+	67-69	F	0-59

Quizzes: Quizzes will be given almost weekly. Two tries on each quiz is allowed. Quizzes will be done through Lumen OHM. The lowest quiz grade will be dropped from the overall average.

Tests: Tests will cover all material from the indicated chapters. All tests are cumulative and may contain material from previous tests. Tests will be done through Lumen OHM.

Homework: Weekly homework is assigned through Lumen OHM. Assignments are expected to be completed by Friday of each week. A 5% grade deduction will be given for late work.

Readings: Weekly readings are assigned through Lumen OHM. I highly recommend completing the readings before attempting the homework. Since this is an online course, this is the virtual "in-class" component. A 5% grade deduction will be given for late work.

CHEATING: If I find that you have cheated at any time, you will automatically receive a grade of "F" for this course.

- **NEED FOR ASSISTANCE:** Often additional assistance is needed in a math class. I am available during the office hours posted or you may make an appointment with me for other times that can be mutually agreed upon.

  For quick questions, email is the best method of communication. Lumen OHM provides students with the option to directly email the instructor with the specific problem. Students are encouraged to use this tool.

  Free peer tutoring is available through the learning lab. This is an excellent service that many students take advantage of regularly. It can often make the difference between success and failure. If you think you are going to have difficulty in this class, sign up immediately, since it can sometimes take a little time to connect you with a tutor.

- **ATTENDANCE POLICY:** Students are expected to complete work on time and maintain communication with the instructor when questions arise. This is an online course, but weekly check-ins will be beneficial (but are not required) for students. It is recommended that all students attend the first scheduled Zoom office hour for an overview of the course and to ensure everyone has proper access to online materials.

- **COURSE OUTCOMES/COMPETENCIES:**

  Course competencies: At the conclusion of this course, the student will be able to:
  - Define the limit of a function
  - Evaluate limits, including one-sided limits
  - Identify limits that do not exist
  - Explain continuity
  - Find the slope of the tangent line to a graph
  - Interpret the slope of the tangent line
  - Find the limit of difference quotients
  - Relate the limit of difference quotients to slope
  - Define derivative in terms of slope
  - Find derivatives using the difference quotient
  - Relate differentiability and continuity
  - Apply the constant, power, sum and difference rules for differentiation
  - Solve problems involving instantaneous rate of change and velocity
  - Apply the product and quotient rules for differentiation
  - Use the chain rule
  - Find higher order derivatives
  - Use implicit differentiation
  - Solve related rate problems
  - Use the concepts of increasing/decreasing intervals, critical numbers, relative/absolute extrema, concavity, points of inflection, and horizontal/vertical asymptotes to graph functions
  - Solve optimization problems
  - Define e using limits
  - Differentiate exponential and logarithmic functions
  - Evaluate exponential growth and decay
  - Find limits involving trig functions
  - Differentiate trig functions
  - Use indefinite integral notation for antiderivatives
  - Use basic integration rules to find antiderivatives
  - Evaluate sums using summation notation
  - Approximate the area of a region using summation techniques
  - Evaluate definite integrals using limits and properties of definite integrals
  - Apply the fundamental Theorem of Calculus

- Evaluate indefinite integrals using pattern recognition, change of variables, and the General Power rule
- Use the Trapezoidal Rule

EXPECTATIONS: The following will be expected from all students:

- Behave in an ethical manner (all work is your own, use legitimate resources, do not abuse absences, etc.)
- Complete assignments in a timely manner. When deadlines are given, meet them; do not procrastinate.
- Conduct yourself appropriately for a college learning environment.
- Work effectively as a member of a group.
- Work independently when required.
- Use a variety of sources (text, teacher, videos, computer programs, alternate books, other students when appropriate, etc.) to achieve proficiency in the course competencies. Remember, it is your responsibility to learn the material.

It is my hope that this course meets your every expectation as a challenging, engaging, respectful learning experience. If you find this not to be the case, I would welcome the opportunity to address your concerns. This is not only a courtesy, it is a matter of process and procedure outlined in the LRCC Student Handbook. Should we fail to arrive at a mutually satisfactory understanding, you should refer the matter to my department chair, Prof. Stephen Freeborn, at sfreeborn@ccsnh.edu.

Course Schedule (Spring 2021)

Instructor may announce changes to this schedule in Canvas. Students are expected to stay informed of any changes.

	Class Topics	Assignments
Week 1 1/19	Review Topics – Functions, Operations on Functions, Exponents, Quadratics, Exponential Functions, Logarithms, Trig Functions and Identities	**Homework #1:** OHM Student Tutorial and Review Homework – 0.3, Review 2, 4, 5, 7, 8, 9, 10 **Due 1/22**
Week 2 1/25	Section 1.0 – Slopes and Velocities Section 1.1 – Limit of a Function Section 1.2 – Limit Properties	**Reading #1:** Sections 1.0 – 1.2 **Homework #2:** Sections 1.0 – 1.2 **Quiz #1** – Review, Slopes, Limits **Due 1/29**
Week 3 2/1	Section 1.3 – Continuous Functions Section 1.4 – Formal Definition of a Limit	**Reading #2:** Sections 1.3 – 1.4 **Homework #3:** Sections 1.3 – 1.4 **Quiz #2** – Continuity and Limits **Exam #1** – Review and Chapter 1 **Due 2/5**
Week 4 2/8	Section 2.0 – Slope of a Tangent Line Section 2.1 – Definition of a Derivative	**Reading #3:** Sections 2.0 – 2.1 **Homework #4:** Sections 2.0 – 2.1 **Quiz #3** – Tangent Lines and Derivatives **Due 2/12**
Week 5 2/15	Section 2.2 – Differentiation Formulas Section 2.3 – Differentiation Patterns	**Reading #4:** Sections 2.2 – 2.3 **Homework #5:** Sections 2.2 – 2.3 **Quiz #4** – Differentiation **Due 2/19**
Week 6 2/22	Section 2.4 – Chain Rule Section 2.5 – Using the Chain Rule	**Reading #5:** Sections 2.4 – 2.5 **Homework #6:** Sections 2.4 – 2.5 **Quiz #5** – Chain Rule **Due 2/26**
Week 7 3/1	Section 2.6 – Related Rates Section 2.9 – Implicit Differentiation	**Reading #6:** Sections 2.6, 2.9 **Homework #7:** Sections 2.6, 2.9 **Quiz #6** – Related Rates and Implicit Diff. **Exam #2** – Chapter 2 **Due 3/5**
Week 8 3/8	Section 3.1 – Intro to Max and Min Section 3.2 – Mean Value Theorem	**Reading #7:** Sections 3.1 – 3.2 **Homework #8:** Sections 3.1 – 3.2 **Quiz #7** – Max and Min, MVT **Due 3/12**
3/15	Spring Break – no class.	No new assignments.
Week 9 3/22	Section 3.3 – F' and the Shape of F Section 3.4 – F' and the Shape of F	**Reading #8:** Sections 3.3 – 3.4 **Homework #9:** Sections 3.3 – 3.4 **Quiz #8** – F' and the Shape of F **Due 3/26**
Week 10 3/29	Section 3.5 – Applied Max and Min Section 3.6 – Asymptotes Section 3.7 – L'Hopital's Rule	**Reading #9:** Sections 3.5 – 3.7 **Homework #10:** Sections 3.5 – 3.7 **Quiz #9** – Asymptotes, Max and Min **Exam #3** – Chapter 3 **Due 4/2**
Week 11 4/5	Section 4.0 – Intro to Integrals Section 4.1 – Sigma Notation and Reimann Sums	**Reading #10:** Sections 4.0 – 4.1 **Homework #11:** Sections 4.0 – 4.1 **Quiz #10** – Integrals and Sums **Due 4/9**
Week 12 4/12	Section 4.2 – Definite Integral Section 4.3 – Properties of the Definite Integral	**Reading #11:** Sections 4.2 – 4.3 **Homework #12:** Sections 4.2 – 4.3 **Quiz #11** – Definite Integrals and Properties **Due 4/16**
Week 13 4/19	Section 4.4 – Areas, Integrals, and Antiderivatives Section 4.5 – Fundamental Theorem of Calculus Section 4.6 – Finding Antiderivatives	**Reading #12:** Sections 4.4 – 4.6 **Homework #13:** Sections 4.4 – 4.6 **Quiz #12** – Area, Antiderivatives, FTC **Due 4/23**
Week 14 4/26	Section 4.7 – First Applications of Definite Integrals Section 4.8 – Using Tables to Find Antiderivatives	**Reading #13:** Sections 4.7 – 4.9 **Homework #14:** Sections 4.7 – 4.9 **Quiz #13** – Applications, Tables, and Approximations **Exam #4** – Chapter 4 **Due 4/30**

	Section 4.9 – Approximating Definite Integrals **Calc 2?		
Week 15 5/3	No new material. Finish any outstanding assignments.	**Final Exam**	**Due 5/7**

Weekly Schedule MATH2700L Calculus I

Week	Description	Assignment/Assessment
August 28-Sept 1, 2017 Begin Unit 1 Limits & Continuity	**Graphing Calculator Operations; Introduction to limits graphically and analytically; Evaluating limits using properties and direct substitution**	
	Trigonometric Review; Algebraic strategies for evaluating limits; Limits that Fail to Exist; One-sided and Infinite limits/ Vertical asymptotes	**Quiz 1.2 Understanding and Evaluating Limits**
September 5-8, 2017	**LABOR DAY ON LINE Continuity; Determining continuity at a point;**	
	Removable/non-Removable discontinuities; Properties of continuity & the Intermediate Value Theorem END UNIT 1	**Quiz 1.3 Evaluating Limits Algebraically; One Sided limits**
September 11–15, 2017 Begin Unit 2 Understanding the Derivative	**The definition of the derivative; Understanding the tangent line to the curve and Local Linearity**	**Quiz 1.4 Continuity**
	Differentiability; Basic differentiation rule for constants, powers, multiples, and sum/differences; Exam Preparation	
September 18–22, 2017	**ON LINE Understanding the derivative as a rate of change; Higher order derivatives including motion problems**	**Unit 1 Exam: Limits and Continuity**
	Product and Quotient rules for Differentiation	**Quiz 2.1-2.2 Definition of the derivative; Basic differentiability rules**
September 25–29, 2017	**The chain rule for algebraic functions including trig**	
	Operations involving Logs and (e) Review; Derivatives of	**Quiz 2.3 Quiz Rate of Change; Product & Quotient Rules**

	Logarithmic Functions and Exponential Functions (e)	
October 2–6, 2017	**Implicit derivatives; Higher order implicit differentiation; Applications (1)**	**Quiz 2.4 Chain Rule and Motion Problems**
	Associated higher order derivative problems; Associated applications (Related Rates-1)	
October 9–13, 2017 Begin Unit 3 Derivative and Curve Sketching	**Related Rates (2) END UNIT 2**	**Quiz 2.5: Implicit Differentiation**
	Understanding Extrema; Exam Preparation	
October 16–20, 2017	**ON LINE First Derivative Test for Relative Extrema**	**Unit 2 Exam: Differentiation**
	Concavity and inflection; Apply Second Derivative Test for Relative Extrema	**Quiz 3.1-3.3 Extrema and MVT**
October 23–27, 2017	**Limits as X approaches infinity; Horizontal asymptotes; Curve Sketching**	
	Linear Approximation using the Tangent line; Differentials	**Quiz 3.4 Concavity, Inflection, 2nd Derivative Test; Curve Sketching**
October 30-Nov. 3, 2017	**Optimization(1)**	**Quiz 3.5 Linear Approximation & Differentials**
	Optimization (2); Exam Prep END UNIT 3	
November 6-10 , 2017	**ON LINE Definition of the AntiDerivative; Indefinite Integration; Basic Integration**	**Unit 3 Exam Applications of the Derivative**
	Basic Trig Integration; General and Particular solutions	
November 13–17 , 2017 Begin Unit 4 Integration	**Integration Review; Motion and its relationship to integration; Intro Area Under the Curve**	**Quiz 4.1 Anti-Differentiation**
	Left hand, Right Hand, and Midpoint Reimann Sums; The definite integral as an area under the curve	
November 20–24 , 2017 Thanksgiving Break	**Properties of definite integrals; The Fundamental Theorem of Calculus**	**Quiz 4.2 General/Particular Solutions to Differential Equations**
	Thanksgiving	
November 27– Dec 1, 2017	**Review Integration; Integration by Substitution**	**Quiz 4.3 Definite Integral/Fundamental Theorem of Calculus**
	Calculator Operations; Average Value of a Function; Applications of Integration	
December 4–8, 2017	**Area using Trapezoids**	**Quiz 4.4 Integration by Substitution**

	ON LINE **Prepare for Final Exam**	**Unit 4 Exam Integration and Applications**
December 11–15, 2017 **Final Exam Week**	**Prepare for Final Exam**	
		Final Exam

http://college.cengage.com/mathematics/blackboard/content/larson/calc8e/calc8e_solution_main.html?CH=00 &

Week	Description	Assignment/Assessment
August 28-Sept 1, 2017 **Begin Unit 1** **Limits & Continuity**	**Graphing Calculator Operations; Introduction to limits graphically and analytically; Evaluating limits using properties and direct substitution**	**1.2:** #1,3,7 (use the table feature of graphing calculator); 11,12, 19, 21, 23 **1.3:** 1, 7, 11, 15, 17, 23, 37,
	Trigonometric Review; Algebraic strategies for evaluating limits; Limits that Fail to Exist; One-sided and Infinite limits/ Vertical asymptotes	**Quiz 1.2-1.3 Understanding and Evaluating Limits** **1.3:** 27, 29, 33, 35, 41, 45, 51, 53, 57, 59, 67, 69, 73, 75 **1.4:** 7-10; 15,17 **1.5:** Worksheet Infinite Limits & Asymptotes
September 5-8, 2017	**LABOR DAY** **ON LINE** **Continuity; Determining continuity at a point;**	**1.4:** 1-6; 25-32
	Removable/non-Removable discontinuities; Properties of continuity & the Intermediate Value Theorem **END UNIT 1**	**Quiz 1.3-1.5 Evaluating Limits Algebraically; One Sided limits** **1.4:** 33, 34,37,38,41, 42, 45, 51, 57, 69-72
September 11–15, 2017 **Begin Unit 2** **Understanding the Derivative**	**The definition of the derivative; Understanding the tangent line to the curve**	**2.1:** 13, 14, 17, 18, (backtrack to) 5, 7, (then) 25, 27, 57
	Differentiability; Basic differentiation rule for constants, powers, multiples, and sum/differences; Exam Preparation	**Quiz 1.4 Continuity** **2.1:**81, 83, 85, 86 **2.2:** 5,7,9,13, 41,43,45,47, (backtrack) 32, 34, (then) 53, 56, 57, 60
September 18–22, 2017	**ON LINE** **Understanding the derivative as a rate of change; Higher order derivatives including motion problems**	**Unit 1 Exam: Limits and Continuity** **2.2:** Rate of Change/Higher Order/MotionWorksheet
	Product and Quotient rules for Differentiation	**Quiz 2.1-2.2 Definition of the derivative; Basic differentiability rules** **2.3:** 1,2,3,7,8,9,14,15,19,21,23,63, 65, 73
September 25–29, 2017	**The chain rule for algebraic functions including trig**	**2.4:** 7,9,14,18, 24, 41-44, 47,49,52, 56, 59, 61, 69, 71, 83
	Operations involving Logs and (e) Review; Derivatives of Logarithmic Functions and Exponential Functions (e)	**Quiz 2.3 Quiz Rate of Change; Product & Quotient Rules** **5.1:** 45, 46,48,50,51,53,59,95 **5.4:** 35-40, 42, 44
October 2–6, 2017	**Implicit derivatives; Higher order implicit diff; Applications (1)**	**2.5:**1, 2, 5, 7, 11, 26, 45, 46, 53 (tanline only), 58 Applications (1) Worksheet
	(Related Rates-1)	**2.6:** Related Rates(1) Worksheet
October 9–13, 2017 **Begin Unit 3**	**Related Rates (2)** **Exam Prep** **END UNIT 2**	**Quiz 2.2/2.4/5.1/5.4 Chain Rule and Motion Problems** **2.6:** Related Rates (2) Worksheet

Derivative and Curve Sketching	**Understanding Extrema; Increasing and Decreasing Intervals**	**Quiz 2.5: Implicit Differentiation with Related Rates** **3.1:** 13, 15, 19, 22, 24, 28, 33, 39, 42 **3.3:** 3, 6, 7, 11, 12, 13, 15
October 16–20, 2017	**ON LINE** **First Derivative Test for Relative Extrema**	**Unit 2 Exam: Differentiation** **3.3:** 17-23, 35, 37, 39, 42
	Concavity and inflection; Apply Second Derivative Test for Relative Extrema	**3.4:** 11-13, 26, 31,32, 36, 39
October 23–27, 2017	**Limits as X approaches infinity; Horizontal asymptotes; Curve Sketching**	**Quiz 3.1-3.3 Extrema and 1st Derivative Test** **3.5:** 17, 21-28 **3.6**: 7, 8
	Linear Approximation using the Tangent line; Differentials	**Quiz 3.4 Concavity, Inflection, 2nd Derivative Test; Curve Sketching** **3.9:** Tangent Line Approximation & Differentials Worksheet
October 30-Nov. 3, 2017	**Optimization(1)**	**Quiz 3.5 Linear Approximation & Differentials** **3.7:** Optimization (1) Worksheet
	Optimization (2); Exam Prep END UNIT 3	**3.7:** Optimization (2) Worksheet
November 6-10 , 2017 **Begin Unit 4** **Integration**	**ON LINE** **Definition of the AntiDerivative; Indefinite Integration; Basic Integration**	**Unit 3 Exam Applications of the Derivative** **4.1:** 15-29 ODD; 30-34 ALL
	Basic Trig Integration; General and Particular solutions	**4.1:** 35-41 odd; 55, 57, 59, 60
November 13–17 , 2017	**Integration Review; Motion and its relationship to integration; Particular Solutions and Applications; Intro Area Under the Curve**	**Quiz 4.1 Anti-Differentiation** **4.:** Applications of Particular Solutions & Motion as Defined by Integration Worksheet
	Left hand, Right Hand, and Midpoint Reimann Sums; The definite integral as an area under the curve	**4.3:** Area Under the Curve/Reimann Sums and the Definite Integral Worksheet
November 20–24 , 2017 **Thanksgiving Break**	**Properties of definite integrals; The Fundamental Theorem of Calculus**	**Quiz 4.2 General/Particular Solutions to Differential Equations** **4.3:** 41, 43 **4.4:** 5, 6, 8, 9, 10, 11, 13, 15, 21, 39, 41
	Thanksgiving	
November 27– Dec 1, 2017	**Review Integration; Integration by Substitution including Trig, LN, and (e)**	**Quiz 4.3-4.4 Definite Integral/Fundamental Theorem of Calculus** **4.5:** 7 – 23 ODD; 37, 43-46 ; 48, 49, 51, 83 **5.2:** 1, 3, 5, 6, 7, 8 **5.4:** 85-89 ALL , 91
November 27– Dec 1, 2017 (Continued)	**Calculator Operations; Average Value of a Function; Applications of Integration**	**4.4:** Average Value of a Function & Integration Applications Worksheet
December 4–8, 2017	**Area using Trapezoids**	**Quiz 4.4 Integration by Substitution** **4.6:** Trapezoid Integration Worksheet

	ON LINE **Prepare for Final Exam**	**Unit 4 Exam Integration and Applications**
December 11–15, 2017 **Final Exam Week**	**Prepare for Final Exam**	
		Final Exam