

University of Montana

## ScholarWorks at University of Montana

---

University of Montana Course Syllabi

Open Educational Resources (OER)

---

Fall 9-1-2018

### M 171.01: Calculus I

Karel M. Stroethoff

*University of Montana, Missoula*, [karel.stroethoff@umontana.edu](mailto:karel.stroethoff@umontana.edu)

Follow this and additional works at: <https://scholarworks.umt.edu/syllabi>

**Let us know how access to this document benefits you.**

---

#### Recommended Citation

Stroethoff, Karel M., "M 171.01: Calculus I" (2018). *University of Montana Course Syllabi*. 8239.  
<https://scholarworks.umt.edu/syllabi/8239>

This Syllabus is brought to you for free and open access by the Open Educational Resources (OER) at ScholarWorks at University of Montana. It has been accepted for inclusion in University of Montana Course Syllabi by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact [scholarworks@mso.umt.edu](mailto:scholarworks@mso.umt.edu).

This syllabus contains information about this class. Please read this carefully and keep it for future reference (in case you lose it, a copy of the syllabus will be posted on the class Moodle page). In case you have questions, please do not hesitate to ask me. A good time for questions is right after class or during office hours.

CRN: 70095

CLASS TIMES: MTWF 9:00 – 9:50 in Room 311 in the Mathematics Building

PROFESSOR: Karel Stroethoff (Office: Math 307, Phone: 243-4082)  
Email: [karel.stroethoff@umontana.edu](mailto:karel.stroethoff@umontana.edu)

OFFICE HOURS: Monday: 4:10 – 5:00, Tuesday: 1:00 – 1:50, Wednesday: 3:00 – 3:50, and Friday: 2:10 – 3:00.

PREREQUISITE: Precalculus (M 151) or College Trigonometry (M 122) or appropriate placement score (ALEKS placement  $\geq 5$  or M03-MapleSoft Calculus score  $\geq 15$ ).

MOODLE PAGE: <https://moodle.umt.edu/course/view.php?id=23726>

This site will contain all information on this sheet plus more. Homework assignments and other information pertinent to this course (such as office hours and tentative schedule) will be posted at this web site, which will be updated frequently, so you should visit it regularly.

TEXT: *Calculus: Single Variable*, 6<sup>th</sup> edition, by Deborah Hughes-Hallett et al, John Wiley & Sons, 2014 (ISBN 9781118972960).

DESCRIPTION: Differential calculus, including limits, continuous functions, Intermediate Value Theorem, tangents, linear approximation, inverse functions, implicit differentiation, extreme values and the Mean Value Theorem. Integral Calculus including antiderivatives, definite integrals, and the Fundamental Theorem of Calculus.

GRAPHING CALCULATOR: Recommended. You can use your favorite brand/model. In the classroom I may use a TI-84 or TI-86 or an online graphing calculator such as [desmos](https://www.desmos.com/). Please note that calculators or computers capable of symbolic algebraic computations are not allowed on exams.

LEARNING OUTCOMES: The learning goals for this course are:

- Understand the idea behind the definition of a limit. Use the rules associated to limits to determine the limits of transcendental, rational and piecewise defined functions.
- Understand the idea behind and the rules of infinite limits, limits at infinity, asymptotes, indeterminate forms and how to use L'Hopital's Rule.

- Explain the limit definition of continuity.
- Explain the limit definition of the derivative of a function, how it relates to the function itself, and how to use it to compute derivatives.
- Use derivatives to find tangent lines to curves and velocity for particle motion.
- Apply the power, sum, product, quotient and chain rules of differentiation.
- Use the derivatives of exponential, logarithmic, trigonometric and hyperbolic functions.
- Explain implicit and logarithmic differentiation.
- Apply the Intermediate and Mean Value Theorems.
- Graphically analyze functions including using continuity and differentiation to determine local and global extrema, concavity, and inflection points.
- Use the derivative to solve related rate and optimization word problems.
- Explain Newton's Method for estimating zeros of a functions.
- Explain the Riemann integral, areas under graphs, antiderivatives and the Fundamental Theorem of Calculus.

#### GRADING:

- **TESTS:** There will be Prerequisite Test given in class on September 7, and three Midterm Exams scheduled for the *evenings* (6:00 pm – 8:00 pm) of September 27, October 25, and November 15 (Thursdays).
- **FINAL EXAM:** There will be a common Final Exam on all material covered in the course. This exam is scheduled for Wednesday, December 12, 6:00 pm – 8:00 pm (note this is in the *evening*).
- **HOMEWORK:** There will be daily homework assignments and part of the assigned homework will have to be submitted online and part will be collected for grading the traditional way.
- **QUIZZES:** There will be regular quizzes based on assigned homework and examples worked in class. There will be no make-ups for missed quizzes. The lowest quiz score will be dropped. Quizzes will be announced at least two class periods prior to a scheduled quiz.
- **DIFFERENTIATION SKILLS TEST:** Each student must pass the Differentiation Skills Test (DST) in order to pass the course. A score of 80% is required to pass this test. This test will be given for the first time in class on Friday, November 2 (this in-class differentiation skills test will be counted as a quiz). The DST may be retaken outside of class and must be passed by December 7 in order to pass the course.

**ASSESSMENT:** 20% Homework  
10% Quizzes  
45% Prerequisite Test (6%) and three Midterm Exams (13% each)  
25% Comprehensive Final Exam

## GRADE SCALE:

$\geq 93\%$	90%	87%	83%	80%	75%	70%	65%	62%	58%	55%	$< 55\%$
A	A <sup>-</sup>	B <sup>+</sup>	B	B <sup>-</sup>	C <sup>+</sup>	C	C <sup>-</sup>	D <sup>+</sup>	D	D <sup>-</sup>	F

**MAKE-UPS:** Make-ups for tests will be given under special and extenuating circumstances such as a family emergency or illness, provided that documentation (from the Health Service or Doctor) is furnished by the student. It is your responsibility to notify me as soon as you know that you will miss any test and to make sure that a make-up is scheduled: if you are unable to contact me by phone, then please send an email so that it will be convenient to get back to you in order to schedule a make-up. Early final exams will *not* be given.

**HOMEWORK:** Working hard on the homework is how you will succeed in this course, so please take the homework seriously. It is okay to work together with classmates on homework assignments, but you must write up your own solutions in your own words. There will be two components to your homework:

1. Online homework given through WeBWorK. To access this homework, go to the webpage <https://lennes.math.umt.edu/webwork2/171-Calculus-I/> to bring up a login window. As username use your last name (lowercase); your initial password is the last 6 digits of your student ID (with no dashes). Please change your password after logging in the first time by clicking “Password/Email” from WeBWorK’s Main Menu.
2. Written homework will be collected regularly. With regard to the write-up of your written homework the following:
  - Problems should be clearly marked — for each problem include the section number! Please staple or paperclip your homework problems in correct order.
  - It should be legible. Be as concise as you possible can; however, do not be too concise! *Just answers do not suffice.* It is important you *show* your work and provide *explanations* for your answers.

*Late homework will not be accepted.* The two lowest homework scores will be dropped. A list of all assigned homework will be posted on the Moodle page for this class.

**HONESTY:** All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at <http://www.umt.edu/student-affairs/dean-of-students/default.php>.

**ACCOMMODATION:** The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors and Disability Services for Students (DSS). If you think that you may have a disability adversely affecting your academic performance, and you have not already registered with DSS, please contact DSS in Lom-massen 154. I will work with you and DSS to provide an appropriate accommodation.

## SOME IMPORTANT DATES:

Aug.	27 (Monday):	First day Fall Semester instruction
Sep.	3 (Monday):	Labor Day: No Class
Sep.	7 (Friday):	Prerequisite Test
Sep.	21 (Thursday):	Last day to drop or change grading option from letter grade to Credit/No Credit or vice versa via Cyberbear.
Sep.	27 (Thursday):	Midterm Exam 1
Oct.	25 (Thursday):	Midterm Exam 2
Oct.	29 (Monday):	Last day to drop or change grading option from letter grade to Credit/No Credit or vice versa using paper form. After this date a student is allowed to make these changes only by <b>petition</b> .
Nov.	2 (Friday):	Differentiation Skills Test
Nov.	6 (Tuesday):	Election Day: No Class
Nov.	12 (Monday):	Veteran's Day: No Class
Nov.	15 (Thursday):	Midterm Exam 3
Nov.	21–23 (Wed-Fri):	Thanksgiving Break
Dec.	7 (Friday):	Last day Fall Semester instruction
Dec.	7 (Friday):	Last day for petitions to drop or change the grading option.
Dec.	12 (Wednesday):	Final Exam, 6:00 pm – 8:00 pm.

STUDY ADVISE: (i) Read through the material to be covered in the lecture before coming to class. This will be very helpful for taking notes in class and you will get more out of the lecture. The course will move rapidly. Daily reading in the textbook *with paper and pencil in hand to verify the calculations* (math books are *not* read as novels!) and doing all assigned problems will go a long way towards success in this course. You should plan to spend 2 hours outside of class for each hour in class (and *more* if you have missed a class!).

(ii) Do *not* equate understanding what the instructor does in class with being able to work (or solve) a problem yourself. When a problem or concept is explained in class you may understand this, but that does *not* imply that you can do a similar problem. You must work out the homework problems from beginning to end (without any help, see (iii)). The best way to learn mathematics is to do, to ask, and to do again.

(iii) Before starting your homework go over the concepts and examples from class and from the textbook. Memorize the formulas, algorithms, definitions, notations, etc. Then work through a few problems which have answers in the back of the book. Do the rest of your homework without using the book or your class notes.