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Spring 2-1-2019

## M 171.02: Calculus I

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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: 30297

CLASS TIMES: MTWF 10:00–10:50 in Room 305 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: 11:00–11:50, Wednesday: 4:00–4:50, and Friday: 11:00–11:50.

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=25975>

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:

- **ALGEBRAIC SKILLS TEST:** There will be an Algebraic Skills Test (AST) given in class on January 18. This test is given to motivate you to brush up on the prerequisite material you will need to be successful in this class. A score of 80% is required to pass this test and there will be no partial credit given. The AST may be retaken outside of class once a week until February 7. If you do not pass the AST by February 7, you will be required to take the calculus coreq class (more information below).
- **MIDTERMS:** There are three Midterm Exams scheduled for the *evenings* (6:00 pm – 7:30 pm) of February 7, March 7, and April 4 (Thursdays).
- **FINAL EXAM:** There will be a common Final Exam on all material covered in the course. This exam is scheduled for Wednesday, May 1, 6:00 pm – 8:00 pm (note this is in the *evening*).
- **HOMEWORK:** There will be frequent homework assignments with a mix of online and written assignments. More information is below.
- **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, March 15 (this in-class DST will be counted as a quiz). The DST may be retaken outside of class and must be passed by April 26 (the last day of regular classes) 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 web-page <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:
  - *Answers alone do not suffice.* It is important you *show* your work and provide *explanations* for your answers.
  - It should be legible. Please write clearly. If I cannot read it, you will not get credit for it.

*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.

COREQUISITE CLASS: A calculus corequisite class will be offered this semester. This is a one-credit class called M 191-04 (CRN: 35672). It is scheduled for Thursdays from 4:00 – 4:50 in room MATH 211. This coreq will be a workshop-style class designed to give extra practice for topics covered in class. Anyone is welcome to register and you may attend even if you do not official register for it. If you do not pass the AST before the first Midterm on February 7, you will be required to take the coreq to stay in the course. If you are unable to attend the coreq due to scheduling conflicts, the problems will be assigned to you as extra homework.

SOME IMPORTANT DATES: (See [here](#) for more.)

Jan	10 (Thursday):	First day Spring Semester instruction
Jan	18 (Friday):	Algebraic Skills Test (in class)
Jan	21 (Monday):	Martin Luther King, Jr. Day: No Class
Feb	7 (Thursday):	Midterm Exam 1
Feb	18 (Monday):	Presidents' Day: No Class
Mar	7 (Thursday):	Midterm Exam 2
Mar	15 (Friday):	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> .
Mar	25–29 (Mon-Fri):	Spring Break
Apr	4 (Thursday):	Midterm Exam 3
Apr	26 (Friday):	Last day Fall Semester instruction
Apr	26 (Friday):	Last day for petitions to drop or change the grading option.
May	1 (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.

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.