



Department of Mathematics & Statistics College of Environment, Forestry & Natural Sciences

MAT 136H Fall 2019

Calculus I

Instructor: Nándor Sieben

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<http://jan.ucc.nau.edu/ns46/136/136.html>

Office: AMB 123, Please check the course web page for office hours

**Prerequisites:** (MAT 125 with a grade of C or better) or Math Placement Test Results (MTH-PLACE 65+; ALEKS 65+; PLACE 70+) or International Exchange Student Group

**Description:** Calculus I (4). Calculus of one variable; basic concepts, interpretations, techniques, and applications of differentiation and integration.

**Information:** This course fulfills a requirement in the Science/Applied Science distribution block in the University Liberal Studies program. It is a Certified First Year Learning Initiative course.

**Course web page:** <http://jan.ucc.nau.edu/ns46/136/136.html>

**Textbook:** The main source of information should be your own handwritten notes from class. We are going to use: *Calculus I Lecture Notes (2nd edition)*. It is available for purchase (below \$20) at the bookstore. Online resources are available at the course web page. Any standard printed calculus book you already own can be beneficial as well.

### Learning outcomes:

Demonstrate an understanding of the concepts of limit, derivative and integral in writing, and graphically. Calculate, or approximate as appropriate, the limit of a function using appropriate techniques including l'Hospital's rule. Find the derivative of elementary polynomial, exponential, logarithmic and trigonometric functions. Use rules of differentiation including the power rule, product rule, quotient rule, chain rule, and implicit differentiation to compute the derivative of a function. Obtain expressions for higher order derivatives of a function. Interpret the derivative as the instantaneous rate of change and as the slope of the tangent line. Apply the derivative to find the line tangent to a function at a point and the linearization of a function at a point. Apply the derivative to analyze graphical behavior of a function, motion problems, other rate problems, and optimization problems. Construct a definite integral as the limit of a Riemann sum and use the sum to approximate a definite integral. Find the anti-derivative of elementary polynomial, exponential, logarithmic and trigonometric functions. Use substitution to find the anti-derivative of a composite function. Evaluate a definite integral and interpret an indefinite integral as a definite integral with variable limit(s) in order to evaluate it. Apply the definite integral to analyze the area under a curve and motion problems. Apply the Fundamental Theorem of Calculus. Apply differentiation and integration in setting up and critically evaluating hypotheses in the fields of science, engineering and technology.

**Attendance:** Class attendance is mandatory. You are responsible for material covered in class whether or not it is in the text book. It is important to take notes, and review them after class.

**Grading:** A : 90.00%, B : 80.00%, C : 70.00%, D : 60.00%

Check the accuracy of your scores regularly on the grade sheet posted on the web. Grades are not negotiable based on personal reasons like scholarships, graduation time, job offers etc. Cutoff levels are firm.

- Weights: 20% homework, quizzes, attendance; 60% tests; 20% final
- Tests: There will be 4 in-class tests. The exact dates will be announced at least a week before the tests in class and on the course web page. Use of electronic devices (advanced calculators, ipods,

cell phones, watches, etc.) and cheat sheets are not allowed on the tests. Simple calculators only capable of the 4 basic operations are allowed (but not required) on tests and quizzes. Borrowing calculators from other students on tests is forbidden. Coming to class in not sufficient preparation for taking the tests. The problems on the tests are not always routine calculations. You need to have a deep understanding of the material. You need to spend a considerable amount of time preparing for the tests. Review your notes, make sure you understand the theory and examples we do in class. Review the handouts, test each other with questions.

- Comprehensive final exam: A final exam is scheduled on finals week. Exact dates and times are available on the NAU academic calendar on the NAU web site.
- Quiz: A quiz may be given at any time without announcement. There may be group and individual quizzes.
- Homework: Homework will be assigned regularly on WeBWorK or on paper. Try to log in to WeBWorK as soon as possible to make sure you have an account. Let me know immediately if you experience difficulties logging in. Check WeBWorK regularly for new assignments. Make sure your email address on WeBWorK is current. I am going to send out announcements to this email address. I recommend that you collect your solutions to the WeBWorK problems in a notebook. Check the course web page regularly for announcements. Homework is the foundation of your learning. You cannot expect to solve the assigned problems easily. Some problems require a great deal of effort and time. Even if you are unable to solve a problem, the time spent on trying is not wasted. The only way to build mathematical skills is to think about problems. The more you think the more you know. Do not spend your time on memorization. Try to understand everything as deeply as possible. The emphasis in this class, like in any mathematics class, is on understanding. Your questions are always appreciated. No late homework is accepted. It is recommended to create study groups and discuss the assigned problems but you need to solve your homework sets on your own. The discussion forum is a convenient way to communicate with other students in the class. I encourage you to discuss the homework problems on the discussion forum.

**Resources:** Free tutoring is available in AMB 137 through the Math Achievement Program. Computers are available in AMB 137 and in AMB 222.

**Portfolio:** Please collect and save all handouts and graded material in a portfolio.

**Activities:** You can earn extra credit by submitting solutions to the problem of the week.

**Make up** tests will be given only in case of verified medical or other emergency which must be documented. You must make a reasonable effort to notify me as soon as you can. Let me know before a missed test is given if possible. The best way to contact me is by email. Tell me your name and class time if you send me an email.

**Classroom Etiquette:** Laptop and cell phone use (including texting) during classes is inappropriate.

**Other policies:** Please read the **Department Policies** and **Academic integrity policy** documents on the course web site.

All the information on this syllabus are subject to change and any class announcements regarding the syllabus are considered official amendments to it.