College of the Environment,
Forestry, and Natural Sciences
Department of Mathematics and Statistics

MAT 136 (Calculus I) Syllabus, Fall 2022
Section 003, Class 3478, MWThF 10:20-11:10 in AMB 164
Section 005, Class 3481, MWThF 12:40-1:30 in AMB 163

Instructor: Jim.Swift@NAU.edu www.nau.edu/Jim.Swift AMB 110 523-6878

Office Hours: MWTh: 11:30-12:30, M: 3:00-3:50, F: 1:50-2:50. If these times are inconvenient, you can make an appointment, or drop by my office any time. E-mail is always a good way to contact me. I will check my e-mail after 9:00pm on nights before a WeBWorK assignment is due, and reply that night.

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 Description and Objectives: MAT 136 is a four credit hour course that meets 200 minutes each week. The course initiates the study of calculus with emphasis on limits, differentiation, the beginnings of integration and the applications of the ideas to geometry and the natural sciences. This courses addresses the essential skills of critical thinking, quantitative analysis, and the use of technology.

Student Learning Outcomes: Upon completion of the course, students should be able to calculate limits by a variety of methods, apply these methods to the calculation of derivatives from the definition of derivative, be able to take derivatives of the basic algebraic and transcendental functions and to use the chain rule to take derivatives of more complex functions. They will be able to correctly interpret the meaning of the derivative in terms of rates and tangent lines and do numerical approximations. They will be able to apply their knowledge of the derivatives of functions to find tangent lines and rates of change in a variety of circumstances and to find maximums and minimums of functions and be able to use this knowledge to analyze graphs. They will be able to find higher derivatives and use them to investigate concavity and the application of concavity to maximum and minimum problems and to acceleration. They will be able to take derivatives in complicated situations by use of logarithmic differentiation and implicit differentiation. In addition, they will be able to find easy antiderivatives and apply this knowledge to the calculation of areas using the fundamental theorem of Calculus and to do some more complex integrals by the use of tables and substitution.

Text: *Whitman Calculus, early transcendentals* by David Guichard and friends. A cheap paperback version is available at lulu.com/spotlight/whitmancalculus, and the online version is free at https://naumathstat.github.io/calculus/.

Dates of Midterm Exams:

Exam 1 will be on Review and Limits. (Sept. 23)

Exam 2 will be on Differentiation. (October 14)

Exam 3 will be on Applications of the Derivative (November 4)

Exam 4 will be on the Integral (December 2)

These dates are subject to change.

Prerequisite: MAT 125 with a grade of C or better, or Math Placement Test Results (MTHPLACE 65+; ALEKS 65+; PLACE 70+) or International Exchange Student Group

Course Structure The class will mostly use lecture-discussion format. There will be several in-class group work projects. Students will apply what they have learned to solve homework problems. Problems will come mostly from WeB-WorK.

Assessment of Student Learning Outcomes

Points: There are approximately 810 class points possible, plus extra credit. Class points can always be converted to letter grades with the scale A (90%), B (80%), C (70%), and D (60%).

The timeline for assessment is simple; whenever class points are assigned, they are fully "curved" and will not change further. So at any point students can calculate the fraction of the assigned class points to determine their current grade.

Midterm Exams: $\approx 50\%$ of grade ($4 \times 100 = 400$ class points) All the NAU Calc 1 courses use the same rules: No formula sheets or calculators are allowed on the exams. The lowest exam is not dropped.

Final Exam: $\approx 25\%$ of grade (200 class points) The comprehensive Final Exam is on Monday, December 12, in our usual classroom.
10:00 to 12:00 for the 10:20 class
12:30 to 2:30 for the 12:40 class
I reserve the right to raise your course grade from the 90/80/70 curve, based on an exceptional final exam.

WeBWorK: $\approx 19\%$ of grade ($26 \times 6 = 156$ class points). Regular homework assignments will be given in WeBWorK, a web-based homework system. Each assignment is worth 6 class points. For most problems you have unlimited attempts to get the correct answer.

Group Work and Quizzes: $\approx 6\%$ of grade ($10 \times 5 = 50$ class points for the quizzes, and possibly other assignments) Almost every day we will have a worksheet posted on the web site. Usually you will do this on your own paper, we will go over the solutions in class, and it will not be graded. On Fridays (or the last class day of the week) that are not exam days, the worksheet will be a 5 point quiz that I will hand out on a half sheet of paper. You will turn the quiz

in for grading. There might be other assignments that do not fit the catagories listed.

Attendance: (8 extra credit class points for perfect attendance, down to 40 points deducted for never showing up) Attendance is mandatory, and will be recorded for every class period. At each of the 4 tests midterms, the students will receive an attendance score equal to 2 minus the number of unexcused absences since the previous exam. That is, you get 2 class points of extra credit at each exam, but you loose one point for every class you miss.

Extra credit: There will be occasional extra credit opportunities. For example, extra credit may be given for the departmental "Problem of the Week."

Course Policies

Calculators: No calculators are allowed at the exams. You may bring a calculator to class on non-exam days.

Phones/Tablets/Laptops: On non-exam days, it is suggested that you bring a mobile device for the group work, to take notes, do WeBWorK problems, photograph the white board, or check wikipedia pages that are relevant to the class. No social media during class, please.

Excused Absences: If you have an institutional excuse, you will not lose the attendance extra credit. If you feel you deserve an excused absence for some other reason contact me by e-mail, phone, or in person. Do so before the absence, if possible. Makeup exams will be given in extenuating circumstances. Contact me *before* an exam if you must miss it.

Late Homework: I can delay your individual due date for WeBWorK assignments. I will handle requests on a case-by-case basis, but you must send an email request to me by 9:00 pm on the night the assignment is due.

Help: If you need help the first person to contact is me. I am your personal tutor at no charge. I encourage you to come to my office hours or contact me via e-mail. There is a button in WeBWorK for sending me e-mail. The Math Achievement Program (MAP) in AMB 137, with a supportive environment for help with this class. The Academic Success Center (ASC) has one-to-one tutoring available by appointment.

Academic Honesty: Do not look at other people's exams during tests. You may not use cell phones or other electronic communication devices during the exams (see next item). You are allowed and encouraged to work together on homework (WeBWorK and textbook problem sets). However, you are expected to complete your own work. Copying, plagiarism, or cheating of any kind will be considered Academic Dishonesty and will be dealt with very harshly.

Department of Mathematics & Statistics Portable electronic device policy Cell phones, mp3 players and portable electronic communication devices, including but not limited to smart phones, cameras and recording devices, must be turned off and inaccessible during in-class tests. Any violation of this policy will be treated as academic dishonesty.

Department and University Policies: Our class web site has links to the Departmental and University Policies at
`www.nau.edu/Jim.Swift/classes/DepartmentPolicies.pdf` and
`https://nau.edu/wp-content/uploads/sites/26/Syllabus-Policy-Statements-Final-Aug-`
`pdf`.

Amendments: Any changes to this syllabus will be announced in class, and an updated version will be posted on my website. This wersion: September 2, 2022