Course Details

Course Name	Calculus I
Course CRN and Term	21212 – Fall, 2021
GT Pathways Category	GT-MA1
Credits and Delivery Method	5 Credits. Remote delivery.
Time Expectation	12 hours per week.
Location	ZOOM Link: https://us02web.zoom.us/meeting/register/tZIpduuhpj4sGtPn1Q3zvPkGuGzqh7vaYNlL ZOOM Passcode: **316639**
Meeting Dates and Time	MWF, 2:45 – 4:10 p.m.
Instructor	Harry S. Mills
Instructor E-mail	hmills1@online.aims.edu
Instructor Office Location Instructor Phone Number	EDBH 134K 970-290-0550
Office Hours	9:45 – 11:00 MW, and by appointment.
Drop/Add Information	Last Day to Add is August 27th, 2021 Last Day to Drop is September 3rd, 2021
The course withdrawal date for this course is	November 3rd, 2021 Remember, withdrawal does not come with any reductions or refunds in tuition. A withdrawal will also place a "W" grade on your transcript. Please contact your advisor to see if a withdrawal is appropriate given your specific situation.
Other Important Dates	https://www.aims.edu/student/schedule/calendars/
Student Services	https://www.aims.edu/student/services.php

Course Requirements

Prerequisite(s)	MAT 121 and MAT 122, with grade of C or better, or assessment. Five credits.
Co-requisite(s)	None
Standards of Behavior & Policies – These statements apply to every course at Aims Community College and are hereby incorporated into this document.	Closely review these policies at: https://www.aims.edu/policies/standard-syllabus/
	WebAssign is Required

Materials	Register on https://www.webassign.net/ with Class Key **aims 2357 1979** Registration comes with eBook, based on Stewart's Calculus, 9th Edition, but any edition will do. I suggest eBay.
Other Materials	Scientific Calculator required. Graphing calculator can be helpful for homework, but may not be used on Exams. Computer Algebra System is optional. I use Maple. They can get you into a student version for around $30.

Course Information

Course Description:

The following boilerplate makes education people happy, but isn't much help to the student while taking the course. It'll be handy if you want some other institution to accept your Aims credit, because we cover what it says we do.

But for *your* purposes, I'd say go to the table of contents in Stewart's Calculus or see the eBook on WebAssign, and see what the table of contents says for Chapters 1-4 and Sections 5.1, 5.2 and 6.1 – 6.4. That's all you need to know.

BEGIN BOILERPLATE. BOILERPLATE ENDS AROUND THE MIDDLE OF PAGE 4. YOU DON'T NEED ANY OF IT.

Course Learning Outcomes – According to the Colorado Community College Common Course Database, upon completion of this course, the student/learner should be able to:

1. Evaluate limits using appropriate analytical, numerical or graphical techniques.
2. Analyze the continuity of functions.
3. Apply the definition and techniques of differentiation to find derivatives, including derivatives of transcendental functions.
4. Analyze functions represented by an equation or a graph using derivatives and limits.
5. Create graphs of functions using properties of derivatives and limits.
6. Apply techniques of integration to find the antiderivative of a function.
7. Evaluate definite integrals using Riemann Sums and the Fundamental Theorem of Calculus.
8. Utilize Calculus techniques to solve application problems.

Topical Outline – These topics will be covered in class, but not necessarily in this order:

I. Limits using appropriate analytical, numerical or graphical techniques
 a. Limits computation
 b. Properties of limits
 c. Limits at infinity
 d. Infinite limits
II. Continuity of functions
 a. Definition of continuity
 b. Discontinuities with respect to type (removable or non-removable)
 c. Intermediate Value Theorem
III. Definition of derivative and techniques of differentiation
 a. The limit definition of a derivative
 b. Basic rules of derivatives
 c. Product Rule
 d. Quotient Rule

e. Chain Rule
f. Higher order derivatives
g. Implicit differentiation
h. Introduction of differentials
i. Derivatives of trigonometric functions
j. Derivatives of inverse trigonometric functions
k. Derivatives of exponential and logarithmic functions
IV. Functions represented by an equation or a graph using derivatives and limits
a. Critical values
b. Absolute extrema on an interval
c. Increasing and decreasing intervals
d. First and Second Derivative Tests for relative extrema
e. Inflection points
f. Intervals of concavity
g. Graphical connection between f and f'
h. Asymptotic behavior with limits
V. Graphs of functions using properties of derivatives and limits
a. Graphing techniques without technology
b. Graphing techniques with appropriate technology
VI. Techniques of integration to find the antiderivative of a function
a. Indefinite integrals
b. Integration by substitution
c. Integration of trigonometric functions
d. Integration involving inverse trigonometric functions
e. Integration involving exponential and logarithmic functions
VII. Definite integrals using Riemann Sums and the Fundamental Theorem of Calculus.
a. Riemann's Sums
b. Definite integrals
c. Fundamental Theorem of Calculus
d. Integration techniques with appropriate technology
VIII. Calculus techniques to solve application problems
a. Mean Value Theorem
b. Equations of tangent lines
c. Related rates
d. Rates of change
e. Optimization
f. Net signed area
g. Area between two curves

State General Education and Common Learning Outcomes: (for GT Pathways Courses)

Competency: Quantitative Literacy:
Students should be able to:
  1. **Interpret Information**
     a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
  2. **Represent Information**

     a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).

3. **Perform Calculations**
   a. Solve problems or equations at the appropriate course level.
   b. Use appropriate mathematical notation.
   c. Solve a variety of different problem types that involve a multi-step solution and address the validity of the results.

4. **Apply and Analyze Information**
   a. Make use of graphical objects (such as graphs of equations in two or three variables, histograms, scatterplots of bivariate data, geometrical figures, etc.) to supplement a solution to a typical problem at the appropriate level.
   b. Formulate, organize, and articulate solutions to theoretical and application problems at the appropriate course level.
   c. Make judgments based on mathematical analysis appropriate to the course level.

5. **Communicate Using Mathematical Forms**
   a. Express mathematical analysis symbolically, graphically, and in written language that clarifies/justifies/summarizes reasoning (may also include oral communication).

Aims Common Learning Outcomes – These outcomes define the expectations of an Aims Community College education and provide the benchmarks against which the college holds itself accountable. Find the outcomes at

https://www.aims.edu/prospective/common-learning-outcomes.php

END BOILERPLATE

Code of Conduct

In an effort to keep our college community safe, students are expected to comply with health guidelines as directed by the College, public health officials, and/or ordinance of a municipality, county, Governor of the State of Colorado or any Executive Order of the President of the United States. A complete copy of the Student Code of Conduct can be found at www.aims.edu/student/conduct.

Face Coverings

To help mitigate the transmission of COVID-19, it is required that all students wear masks or other face coverings in classrooms, laboratories and other similar spaces where in-person instruction occurs. The masks/face coverings must cover both nose and mouth, be worn for the duration of class, inside all college buildings, and outside whenever you are or are likely to come within 6 feet of another person. Students who do not comply with face covering and social distancing expectations will be asked to leave class and referred to the Dean of Students. We are a community of care and together we will work to ensure we can all engage in learning in the safest way possible.

Reuse of Instructional Materials

Reuse or distribution of instructional materials (i.e. PowerPoints, videos, class recordings, assessments, etc) or student created content (i.e. online discussion posts, presentations, etc) without approval is prohibited.

- **Attendance** – I will take roll the first week or two. After that, your homework progress is your primary attendance measure.

- **Communication and Feedback**
  Good thing about feedback: It's instant.
  Bad thing about feedback: It's online.
  This course, being designated "remote," will administer all homework and tests online, through WebAssign.

  Use hmills1@online.aims.edu to contact me by e-mail. This may also be accomplished by clicking on "E-Mail" in the Course Shell and clicking on "Mills, Steve" in the listing.

  Call or text me at 970-290-0550 if you have something urgent, or wish for a 1-on-1.

  As I have posted videos and notes on virtually all of the homework, I may not be giving a full-blown formal lecture on any given day. I will come ready to give a speech, although I'm generally skeptical of teacher speeches after decades of delivering them.

  I'd be pleased if "lecture" turned into a long question-and-answer session. As long as the questions are current, I don't mind at all if I just end up helping you with homework or other questions.

- **Grading**
  Tests: 40%
  Homework: 30%
  Writing Projects: 20%
  Attendance: 10%*

  *Attendance at the live lecture will only count if it can make a difference. If I see you're on the cusp of 2 different letter grades, I'll drill deeper into your actual attendance, a permanent and perfect record of which is maintained automatically by the ZOOM program documentation accompanying the recordings.

Grading Scale
90% - 100%   A   (Superior and excellent)
80% - 89%   B   (Above average)
70% - 79%   C   (Average)
60% - 69%   D   (Below average level of achievement)
Below 60%   F   (Not acceptable)
Links: