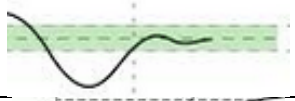
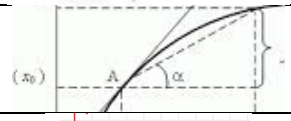
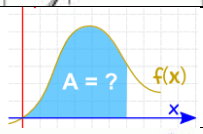
MAT 181 Calculus I ***Course Syllabus*** ***Siena Heights University Winter 2021***	
Instructor:	**Dr. Jeff Kallenbach**
Phone:	**264-7641**
Office:	**SC27A (Math Office) – Online for Now**
Hrs:	**M-F 10:00-11:00**
Course Meets:	**M-F 1:00-1:50 On line (MS Teams)**
Prerequisites:	**Successful completion of Pre-Calculus**
Text:	**OpenStax Calculus Volume 1. Gilbert Strand and Edwin Herman.** **©2016** XanEdu Publishing Inc. **Versions:** • **Free Online ebook (click here to load)** • **Hardbound: ISBN:**978-1938168024 • **Paperback: ISBN:**978-1506698069 • **Pdf: (click here)**
Homework App	**WebAssign for our text (required).** ISBN-13: 9781337777391
Handheld:	**A TI-NSpire CAS or TI CX CAS will be the handheld model of choice.**
Course Management:	**Canvas will be used for this course.**

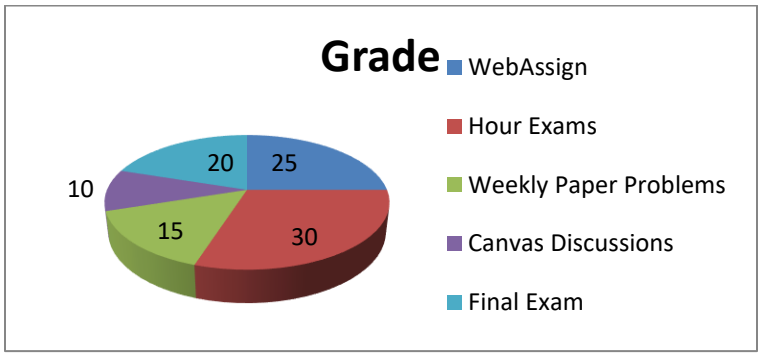
The instructor reserves the right to make changes to this syllabus without notice

Course Objectives:

This course will introduce you to the first part of the subject of calculus: the study of limits and derivatives, and their applications. We will cover most of chapters 2-5 of the text.

Topics Covered

Functions	
Limits	
Derivatives	
Integrals	
Applications	



Grading Scale(%)	
$[92, +\infty)$	**A**
[88,90)	**A-**
[86,88)	**B+**
[80,86)	**B**
[78,80)	**B-**
[76-78)	**C+**
[70,76)	**C**
[68-70)	**C-**
[60-68)	**D**
[0-60)	**E**

Course Description

Calculus I at SHU covers the material normally associated with a university-level Calc I course. As we proceed through the course, students will engage in Liberal Arts learning by becoming conversant with the ideas, contents, and methods of various disciplines for which the course material is applicable. As much as possible, we will begin each unit by setting up real world problems, then pursuing the mathematics needed to solve them. In this way we will connect our course to world at large, including matters of ethics in the pursuit and application of math and science. We begin with a brief review of functions that most students will have learned in their pre-calculus course, focusing on composition and trigonometric and exponential/logarithmic functions. We then discuss the concept of a limit of a function, both intuitive and formal epsilon-delta definitions, and develop the idea through our catalog of functions from the first unit. We then move to continuity with formal definitions and theorems. Next we cover derivatives of continuous functions, beginning with the definition in terms of limits, and follow with the rules, theorems, and shortcuts with all of our functions. Applications such as velocity/acceleration, exponential growth, and related rates are treated at the end of this unit. We wrap up Calc I with the development of the concept of area, the definition of anti-derivative, the Fundamental Theorem, the Mean Value Theorem, and integration by substitution.

Method of Evaluation

- **WebAssign Homework/Quizzes**

  Each unit (section of the text) will be accompanied by a brief assignment in WebAssign. These will generally be due twice/week, since we will usually cover two sections per week. These problem sets will be given credit, but are generally for practice, as you will have up to 3 attempts to get them correct. We will always have at least one class period between when the problems are assigned and when they are due, during which I will take questions on the set.

No late submissions will be accepted. To allow for the bad day/missed class, the lowest WebAssign score will be dropped.

All of the WebAssign sets together will make up 25% of your grade.

- **Weekly Paper Assignments**

  So that I can observe your work (intermediate steps) on the material, problem sets covering that material will be collected each Sunday evening using a Canvas pdf upload. I'll assign these problems in the middle of the week (as soon as I determine how far we will get that week). You should plan to work these on paper as you normally would, getting started when they are assigned and making notes of questions you might have so you can ask them in class. Instructions for uploading them will be found in Canvas.

  All of the paper assignments together will make up 15% of your grade.

- **Canvas Discussions**

  For each of our weekly paper assignments we will have Canvas discussions to which you will be uploading your solutions with explanations, maybe even videos. 10 % of your grade.

- **Hour Exams**

  We will have 4 or 5 hour exams during the semester, evenly spaced. 50 minutes in length. Hour exams together will count for 30% of your grade. As of the writing of this syllabus, format of these is flexible – some will probably be in WebAssign, others on paper uploaded. Details to follow.

- **Final Exam – Comprehensive,** 20% of your grade – Date, time, and format TBD

Learning Outcomes (Math Department)

The **Mathematics Department** has identified the following five learning outcomes to be achieved by majors and minors in its program.

1. Students will read and understand mathematics, differentiating between correct and incorrect mathematical reasoning. (Reading, listening, following my discussions).
2. Students will effectively communicate mathematics to others, both in writing and speaking. (Presentations and written work)
3. Students will demonstrate abilities to work independently and in-groups to develop mathematical models using appropriate technologies.
4. Students will demonstrate mastery of the content of the course. (Quizzes and exams)

Learning Outcomes (MAT181)

1. Understand the concept and formal definition of the limit of a function
2. Calculate limits by substitution and by eliminating zero denominators
3. Calculate limits at infinity of rational functions
4. Calculate limits in indeterminate forms by a repeated use of l'Hopital's rule
5. Know derivatives of power, trigonometric, exponential, hyperbolic, logarithmic and inverse trigonometric functions
6. Know the basic rules of differentiation and use them to find derivatives of products and quotients
7. Know the chain rule and use it to find derivatives of composite functions
8. Use derivatives to find intervals on which the given function is increasing or decreasing
9. Find maxima and minima, critical points and inflection points of functions and to determine the concavity of curves
10. Use Calculus to ketch graphs of rational functions including finding asymptotes
11. Find tangents and normals to graphs of functions given in explicit and implicit forms
12. Understand the concept of indefinite integral as anti-derivative
13. Know standard indefinite integrals and basic rules of indefinite integration

Unit learning outcomes will be presented at the begin of each unit

Practice Problems:

Practice problems will be assigned for each section that we cover. They will be listed on the Canvas page for that date. In general these problems will NOT be collected, but will be covered on the homework and will also be the basis for our discussion sections. In other words, when I assign practice problems, I will begin our next meeting by asking if you need help with any of those. BEWARE: if you ask about a problem I will probably ask you to show the class how far you got. If you didn't actually try the problem ahead of time, I will probably tell you to try it again before I help.

Late Work:

No late assignments will be accepted.

Course Methods:

- The focus of this class is on learning through daily activities. In this pursuit, we'll use technology: calculators (e.g., TI-NSpire) to enhance your understanding of the concepts being developed. **We will review and discuss daily assignments** to provide instant and interactive feedback on your learning. Students should keep a notebook of worked examples and written homework assignments. Students are expected to be active participants in class discussions. *Successful completion of this course requires a substantial amount of out of class study* **(Up to 2 hours outside of class for every hour in class)**. Students are encouraged to form study groups and visit the Math Lab (Science 26). **Homework is assigned for every section, and you should plan to complete it once that section is covered in class unless otherwise stated**. **We will be discussing the assignment at the beginning of the next class, before proceeding to the next topic**. Mainly odd-numbered problems will be assigned, so you will be able to check the book to see if you've gotten to the correct answer.

On Getting Through the Course

- Attend class prepared: review notes, read book, do problems.
- You should not miss class if at all possible. However, if you do, a pdf of the notes for the class will usually be posted in Canvas. Be sure to make use of those postings when needed.

- **USE YOUR GRAPHING CALCULATOR** whenever possible (even if not assigned). Graphs & Numerical tables provide concrete visual representations of important concepts, patterns & abstract relationships. Technology gives you the freedom to explore realistic problems & examples, and to spend your time learning concepts, w/o getting bogged down by difficult and/or tedious hand calculations.
- **Ask** questions **DURING** class: if you're confused, seek clarification. One of the things I get paid for is answering your questions. If you don't understand something, it's likely someone else in the class will benefit from the question and answer.
- **Answer** questions **DURING** class. Lead group discussions and help others: tell us what you've learned and let us learn from you.
- Study in groups as **SOON** after class as possible: help -- but don't copy from each other …we call that plagiarism and the results of that are undesirable.

Academic Honesty:

The search for truth and dissemination of knowledge are the central mission of a university. Siena Heights University pursues this mission in an environment guided by our Roman Catholic tradition and our Dominican heritage. Integrity and honesty are therefore expected of all members of the University community, including students, faculty, administration, and staff. Actions such as cheating, plagiarism, collusion, fabrication, forgery, falsification, destruction, multiple submission, solicitation, and misrepresentation, are violations of these expectations and constitute unacceptable behavior in the University community. The penalties for such actions range from verbal warning all the way to expulsion from the University.

Students are responsible for their own work and accomplishments. Your actual written work submitted should be your own. The first occurrence of cheating on any assignment will result in a grade of zero on that assignment. The second time the same student is observed cheating will result in that student being given an E for the course. All cases of academic dishonesty will be documented and reported to the appropriate authorities on campus. For a complete explanation of the Academic Dishonesty Policy, refer to the most recent SHU catalog.

Accomodations

Siena Heights University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. Our goal is to create learning environments that are usable, equitable and inclusive. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment, please notify the instructor as soon as possible. Students with disabilities should contact the Office of Accessibility (517) 264-7683, or cmathis1@sienaheights.edu, to discuss a range of options for removing barriers in the course, including accommodations. This process is initiated and driven by the student. It is to your advantage to begin the process in a timely manner, since accommodations are not retroactive. Grades earned before verification of a disability and approval of accommodations by the Office of Accessibility will not be changed.

If you have a COVID-19 specific request, please use this form: https://sienaheights.edu/Landing-Pages/COVID-19-Faculty-Staff-Student-Accommodation-Request-Form

Classroom Emergency Preparedness and Response Information

To Report an Emergency or Suspicious Activity
Call the Department of Public Safety at 517-264-7800 (Adrian Campus). If the line is unavailable or you are calling from another University location, dial 911.

Shelter in Place – General Guidance

Although it is unlikely that we will ever need to shelter in place, it is helpful to know what to do just in case. No matter where you are on campus, the basic steps of shelter in place will generally remain the same:

- If you are inside, stay where you are. If you are outdoors, proceed into the closest building or follow instructions from emergency personnel on scene.
- Shelter-in-place in an interior room, above ground level, and with the fewest windows. If sheltering in a room with windows, keep away from the windows. If there is a large group of people inside a particular building, several rooms maybe necessary.
- Shut and lock all windows (locking will form a tighter seal) and close exterior doors.
- Turn off air conditioners, heaters, and fans. Close vents to ventilation systems as you are able. (Facilities staff will turn off ventilation systems as quickly as possible).
- Make a list of the people with you and call the list in to Public Safety so they know where you are sheltering.
- Visit Campus Safety @ Siena for incident updates http://www.sienaheights.edu/campussafety.aspx or call the Information Line 517-264-7900. If possible, turn on a radio or television and listen for further instructions. If your e-mail address or mobile device is registered with SHU Alerts, check for alert notifications.
- Make yourself comfortable and look after one other. You will get word as soon as it is safe to come out.

Evacuation

An evacuation will be considered if the building we are in is affected or we must move to a location of greater safety. We will always evacuate if the fire alarm sounds. In the event of an evacuation, please gather your personal belongings quickly (purse, keys, cell phone, SHU ID card, etc.) and proceed to the nearest exit. ***Ground Floor – Exit doors next to SCI 45; 1st Floor – Exit doors next to SCI 131.*** Do not use the elevator. ****A second way out of the building for both floors - note the exit door by science 40 and the one upstairs on the east end.***

Once we have evacuated the building, proceed to our primary rendezvous location ***Enter Studio Angelico, if needed.*** In the event that this location is unavailable, meet at ***Performing Arts Theater.***

SHU Alerts

SHU Alerts provides free notification by e-mail or text message during an emergency. Visit Campus Safety @ Siena for a link and instructions on how to sign up for alerts pertaining to your campus. If you receive a SHU Alert notification during class, please share the information immediately.

Additional Information

Additional information about emergency preparedness and response at SHU as well as the University's operating status can be found on Campus Safety @ Siena website http://www.sienaheights.edu/campussafety.aspx or by calling the Department of Public Safety at 517-263-0731.

MAT 181 Calculus 1 TENTATIVE *Course Schedule*

This is a tentative schedule for the semester. The actual one will be kept in Canvas as updated as needed. Text is *OpenStax Calculus Volume 1 by Strang, Herman, et. al.(last update Jan 2020)*

Week	Section	Topic
1*	N/A	Function Composition
	N/A	Trigonometric Functions
2	N/A	Trig Functions continued
3	N/A	Exponential & Logarithmic Functions
		Exam1 - Chapter 1
4	2.2	Limit of a Function
	2.3	Limit Laws
5	2.4	Continuity
	2.5	Precise definition of a limit
		Exam 2 – Chapter 2
6	3.1	Definition of the Derivative
	3.2	The Derivative Function
	3.3	Differentiation Rules
7	3.4	Derivative as a Rate of Change
	3.5	Derivatives of Trig Functions
7	3.6	Chain Rule
	3.8	Implicit Differentiation
	3.9	Exponential and Logarithmic Functions
9*		***Exam 3 - Chapter 3***
	4.1	Related Rates
10	4.3	Extreme Values on a Closed Interval
	4.4	The Mean Value Theorem
11	4.5	Derivatives and the Shape of a Graph
	4.6	Limits at Infinity and Asymptotes
	4.7	Optimization Problems
12	4.8	L'Hopital's Rule
		Exam 4 - Ch 4
13*	4.10	Antiderivatives
	5.1	Approximating Areas Under Curves
14*	5.2	The Definite Integral
15	5.3	Fundamental Theorem of Calculus
	5.4	Integration Formulas & Net Change.