

MTH 233, Calculus I

Department of Mathematics and Statistics

Semester

Professor: Dr. Arbitrary Sample
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Office Hours:

Class Times & Place: 11-11:50 MWF, Room 024, Math Building
Lab Time & Place: 12:30 – 1:45 Th, Room 024, Math Building

Monday	Tuesday	Wednesday	Thursday	Friday
9-10, 1:30-3	None	9-10, 1:30-3	9-11, 2-3	9-10

Course description: Topics include limits, continuity, differential calculus of algebraic and transcendental functions with applications, basic antidifferentiation with substitution, definite integrals.

Core Objectives (CO):

- Critical Thinking** [CO 1]: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
- Communication Skills** [CO 2]: to include effective development, interpretation and expression of ideas through written, oral and visual communication
- Empirical and Quantitative Skills** [CO 3]: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

CURRENT Text and Materials: The required textbook is *Single Variable Calculus, Early Transcendentals, 1st edition*, by Soo Tan, ISBN 0534465706. Topics covered this semester are included in chapters 1, 2, 3, and 4 of the textbook. For exams, students may use only a non-programmable, non-graphing calculator.

SAMPLE Exam Calendar: Please note that the dates for our in-class exams below are **subject to change**. The final is university scheduled and cannot be taken at a different time without permission of the Dean of the College of Sciences and Mathematics.

Exam 1 [CO 1, 2, 3]	Thursday, February 7
Exam 2 [CO 1, 2, 3]	Thursday, March 7
Exam 3 [CO 1, 2, 3]	Thursday, April 11
Final [CO 1, 2, 3]	Monday, May 6, 10:30 a.m.—12:30 p.m. in our regular classroom

SAMPLE Course Requirements/Assignments:

- Three in-class exams**—If a student must miss an exam due to an excused absence, special arrangements should be made in advance. Student ID with photo may be required for exams. **No cell phone or graphing calculators will be allowed on exams.** You will need to bring your own scientific calculator to exams. The first three exams consist of problems similar to those practiced in class and homework for which students must think critically [CO 1] to make a plan for solving the problem and incorporate empirical or quantitative reasoning [CO 3] as appropriate to communicate [CO 2] a logically ordered solution with complete and correct notation.
- Weekly in-class quizzes**—We will have weekly in-class quizzes. Weekly quizzes consist of problems similar to those practiced in class and homework for which students must think critically [CO 1] to make a plan for solving the problem, and incorporate empirical or quantitative reasoning [CO 3] as appropriate to communicate [CO 2] a logically ordered solution with complete and correct notation.
- Reading questions on Desire2Learn**—Several questions due before each class meeting will cover the sections that will be discussed in class that day. Each question will require a short answer.
- Lab assignments**—Labs will be turned in and graded. The lab assignments are guided investigations of topics from calculus for which Sage, an open-source mathematical software with features useful in many areas of advanced mathematics, is used to generate data in the form of tables and graphs. Students must think critically [CO 1] and incorporate empirical or quantitative reasoning [CO 3] to generate, use or interpret data from the tables and graphs. Students communicate [CO 2] their logically ordered process by including explanatory text with tables and graphs to support their conclusions.
- A comprehensive final exam**—The final exam is Monday, May 6, 10:30 a.m.-12:30 p.m. The comprehensive final exam consists of problems similar to those practiced in class and homework for which students must think critically [CO 1] to make a plan for solving the problem, and incorporate empirical or quantitative reasoning [CO 3] as appropriate to communicate [CO 2] a logically ordered solution with complete and correct notation.
- Homework**— We will assign exercises from the text from each major topic in the course calendar/outline but will not take up homework for a grade. Students must think critically [CO 1] to make a plan for solving the homework problems and incorporate empirical or quantitative reasoning [CO 3] as appropriate to communicate [CO 2] a logically ordered solution with complete and correct notation.
- Class attendance and participation**—Students are expected to attend all class meetings, arriving on time. If you are absent, you are responsible for determining what you missed and for being prepared for class when you return. Leaving class early without notifying the professor in advance will result in your being counted absent for the class session. Students that sleep in class, send or receive text messages, or conduct other online activities not directly related to class will be counted absent.
- Preparing for class**—Students should be prepared to invest several hours per day outside of class reading the text, practicing examples, and working homework exercises. *Material to be discussed in class should be read before coming to class.* Check your university email regularly, as I may send reminders, assignments, or announcements

Grading Policy:	55%	First Three Exams (top two 20% each, lowest 15%)	Grading Scale:	90% - 100%: A
	10%	In-class quizzes		80% - 90%: B
	5%	Reading Quizzes on D2L		70% - 80%: C
	10%	Labs		60% - 70%: D
	20%	Comprehensive Final Exam		Below 60%: F

Department syllabus: Please read the official Department of Mathematics & Statistics syllabus for MTH 233 at <http://www.sfasu.edu/math/courses/syllabi/MTH233Syllabus.pdf>.

Course calendar/outline:

Approximate time spent

• Limits and continuity [CO 1, 2, 3]	30%
○ Limits at a point	
▪ Formal definition	
▪ Existence	
▪ Infinite limits/vertical asymptotes	
○ Limits to infinity/horizontal asymptotes	
○ Algebraic evaluation	
▪ Basic rules/techniques	
▪ Sandwich Theorem	
○ Continuity/Intermediate Value Theorem	
• Derivatives and antiderivatives [CO 1, 2, 3]	30%
○ Definition of derivative/interpretations	
○ Derivative rules	
▪ Basic rules	
▪ Transcendental rules	
▪ Product and Quotient rules	
▪ Chain rule/implicit differentiation	
○ Antiderivative rules	
▪ Basic rules	
▪ Transcendental rules	
▪ Substitution	
• Applications of derivatives [CO 1, 2, 3]	25%
○ Related rates	
○ Position, velocity, and acceleration	
○ Extreme values/optimization	
○ Mean Value Theorem	
○ Curve sketching	
○ Newton's method	
○ L'Hopital's Rule	
• Definite integration [CO 1, 2, 3]	10%
○ Definition of the definite integral/interpretations (area, etc.)	
○ Riemann sums	
○ The Fundamental Theorem of Calculus	
○ Definite integrals with substitution	
• Explicit instruction in Critical Thinking, Communication and Empirical and Quantitative Reasoning is in addition to implicit instruction, modeling and practice that occur daily in the discussion of limits and continuity, derivatives and antiderivatives, applications of derivatives and definite integration. This explicit instruction includes explanation of solving mathematical problems by thinking critically, communicating logically ordered solutions with complete and correct notation, and applying empirical or quantitative skills as appropriate to the problem.	5%

Academic Integrity (Policy A-9.1)

Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

The penalty for a student found cheating on any part of an assignment, quiz, or exam in this class will range from a grade of zero on the work to a grade of F in the course, and may result in additional, more severe disciplinary measures. A student who allows another to copy his work and the student copying the work are both guilty of cheating. Do your own work. Do not show your completed work to others. Do not allow others to copy your work.

Definition of Academic Dishonesty

Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an

assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/academic_integrity.asp.

Withheld Grades Semester Grades Policy (A-54)

Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

Students with Disabilities

To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to <http://www.sfasu.edu/disabilityservices>.

Acceptable Student Behavior

Classroom behavior should not interfere with the instructor's ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1 http://www.sfasu.edu/policies/student_conduct_code.asp). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.

Student Learning Outcomes (SLO): At the end of MTH 233, a student who has studied and learned the material should be able to:

1. Find limits using graphs, algebraic techniques, and L'Hopital's Rule. [PLO:2,4], [CO: 1,3]
2. Demonstrate an understanding of the connection between limits and asymptotic behavior in functions. [PLO: 2,4,5], [CO: 1,2,3]
3. Recognize and construct continuous functions. [PLO: 4], [CO: 1,3]
4. Connect the definitions of the derivative and definite integral to their geometric interpretations and applications. [PLO: 1], [CO: 1,3]
5. Find derivatives and antiderivatives of algebraic and transcendental functions, including compositions of functions. [PLO: 2,4], [CO:1,3]
6. Use implicit differentiation to solve related rates problems and to determine derivative rules for inverse transcendental functions. [PLO: 2,4], [CO:1,3]
7. Use information revealed by limits and derivatives to sketch graphs of functions and find extreme values of functions on given intervals. [PLO:2,4,5], [CO: 1,2,3]
8. Convey the connections between limits, derivatives, and integrals. [PLO:1,5], [CO: 1,3]
9. Use the Fundamental Theorem of Calculus to evaluate definite integrals. [PLO: 1,2,4], [CO: 1,3]

Program Learning Outcomes: Students graduating from SFASU with a B.S. Degree and a major in mathematics will:

1. Demonstrate comprehension of core mathematical concepts. [*Concepts*]
(notion of theorem, mathematical proof, logical argument)
2. Execute mathematical procedures accurately, appropriately, and efficiently. [*Skills*]
(calculus, algebra, routine, nonroutine, applied)
3. Apply principles of logic to develop and analyze conjectures and proofs. [*Logical Reasoning*]
(quantifiers, breaking down mathematical statements, counterexamples)
4. Demonstrate competence in using various mathematical tools, including technology, to formulate, represent, and solve problems. [*Problem Solving*]
(calculus tools, algebra tools, applied tools, nonstandard problem solving)
5. Demonstrate proficiency in communicating mathematics in a format appropriate to expected audiences. [*Communication*] (written, visual, oral)