Professor: Dr. Jane Long  
Email: longjh@sfasu.edu  
Office: 318 (or 103 in JacksTeach) Bush Mathematical Sciences Building  
Office Phone: 936.468.1804  
Class Times & Place: 9:00am – 9:50am MWF, Room 204, Bush Mathematical Sciences Building  
Lab Time & Place: 12:30 – 1:55pm T, Room 358, Bush Mathematical Sciences Math Building  
Office Hours: MWF 10-11am; M 1:30-2:30pm; T 2-3pm  
Office hours will be held in room 318 unless otherwise indicated. For the times in the table below, no appointment is needed; simply attend by dropping by my office. In addition, individual appointments at other times may be scheduled by emailing me in advance.

Course description: Topics include limits, continuity, differential calculus of algebraic and transcendental functions with applications, basic antidifferentiation with substitution, definite integrals. See also https://math.sfasu.edu/docs/syllabi/MATH2313Syllabus.pdf

Course Prerequisites and Corequisites: See general course prerequisites. MATH 2313 and 2113 should be taken concurrently, with corresponding section numbers.

Course Contact Hours and Study Hours: The following is an excerpt from SFA Policy 5.4.

The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:

1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;

2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend a minimum of two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

General Education Core Curriculum


SFA is committed to the improvement of its general education core curriculum by regular assessment of student performance on these six objectives.

By enrolling in MATH 2313/2113 you are also enrolling in a Core Curriculum Course that fulfills the Critical Thinking Skills, Communication Skills, and Empirical and Quantitative Skills requirements. The chart below indicates: (a) The core objectives that are required to be taught in this course per the Texas Higher Education Coordinating Board (THECB), (b) How the required core objectives will be addressed.
Core Curriculum Objective Table

<table>
<thead>
<tr>
<th>Core Objective</th>
<th>Definition</th>
<th>How the Core Objective Will be Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Thinking Skills [CO1]</td>
<td>To include creative thinking, innovation, inquiry, and analysis, evaluation, and synthesis of information.</td>
<td>Midterm exams, Quizzes, Online Homework, Lab Assignments, Final Exam</td>
</tr>
<tr>
<td>Communication Skills [CO2]</td>
<td>To include effective development, interpretation, and expression of ideas through written, oral, and visual communication.</td>
<td></td>
</tr>
<tr>
<td>Empirical and Quantitative Skills [CO3]</td>
<td>To include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.</td>
<td></td>
</tr>
</tbody>
</table>

Text and Materials: The textbook is *Calculus (Early Transcendentals), 4th edition*, by Rogawski, Adams, and Franzosa, ISBN-13 978-1319050740, ISBN-10 1319050743. We will also use some materials from *Active Calculus*, by Matthew Boelkins, freely available at [https://activecalculus.org/](https://activecalculus.org/). For exams, students may use only a non-programmable, non-graphing (examples: scientific or four-function) calculator. If you are unsure whether your calculator is allowed, bring it to ask the instructor in advance.

Exam Calendar: Please note that the dates for our midterm exams (Exams 1 through 4) 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. Be sure to arrange your end-of-semester travel plans accordingly.

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>Tuesday, September 19</td>
</tr>
<tr>
<td>Exam 2</td>
<td>Tuesday, October 17</td>
</tr>
<tr>
<td>Exam 3</td>
<td>Tuesday, November 14</td>
</tr>
<tr>
<td>Final</td>
<td>Wednesday, December 13, 8:00am – 10:00am, Room 204 and Thursday, December 14, 10:30am – 12:30pm, Room 358</td>
</tr>
</tbody>
</table>

Course Requirements:

- **Three midterm exams** — [CO 1, 2, 3] If a student must miss an exam due to an excused absence, special arrangements should be made at least one week in advance (when possible). Students are responsible for bringing their own scientific or four-function calculator to exams; no graphing calculators may be used.

- **Quizzes** — [CO 1, 2, 3] We will have weekly quizzes on Fridays. You will be told each Wednesday prior to a quiz which learning targets will be assessed on that quiz. Because there will be opportunities for reassessment of learning targets, there will be no (traditional) make-up quizzes.

- **Lab assignments** — [CO 1, 2, 3] Labs will be turned in and graded as either Satisfactory (S), Unsatisfactory (U), or Incomplete with No Revision (INR). During the lab meetings, students will investigate various topics in calculus using Desmos or Excel. Possibly more helpful than the actual mathematics in the lab assignments, you will practice organizing your thoughts, develop a working understanding of mathematical and programming operations, and troubleshoot programming errors.

- **A comprehensive final exam** — [CO 1, 2, 3] The final exam is Wednesday, December 13, 8:00am – 10:00am and Thursday, December 14, 10:30am – 12:30pm. The final exam will cover all of the core and supplemental learning targets.

- **Online Homework** — [CO 1, 2, 3] through the WebWork system at [https://webwork.sfasu.edu/webwork2/MATH2313-Fall2023-Long/](https://webwork.sfasu.edu/webwork2/MATH2313-Fall2023-Long/) Online assignments allow for practice with computational techniques with immediate feedback (the system will grade your answers upon submission). You are
Welcome to use the textbook (including Active Calculus) and class notes to complete each homework set. Collaboration with your classmates is also welcome but ensure that you are continually striving to master the concepts. Academic integrity should be maintained, as with other assessments on this course. You should not use homework completion services, paid or unpaid, or artificial intelligence in any form to complete homework assignments.

Initially, your WeBWorK login username is the same as your mySFA username. If you run into a technical issue or error with WeBWorK (during submissions, for instance), email me a screenshot of the error you receive. In general, WebWorK assignments will be due on Sunday night at 11:59PM. You will have 3 late homework submission tokens to use if you need them. Redeem them through D2L/Brightspace. Grades will not be affected, positively or negatively, for using late homework submission tokens.

Exercises assigned from the text (the list is found in this syllabus) will not be collected for a grade. However, it is crucial to your understanding of the course material that you practice doing mathematics as preparation for quizzes, exams, and daily participation.

- **Class attendance and participation**—Students are expected to attend all class meetings, arriving on time and actively participating in class discussions. Cell phones and other devices that have the potential to distract you, me, or your classmates should be put away and silenced. If you are absent, you are responsible for determining what you missed and for being prepared for class when you return.

- **Preparing for class**—Students should be prepared to invest several hours per day outside of class reading, practicing examples, completing preview activities, and asking questions. Check your university email regularly, as I may send reminders, assignments, or announcements.

- **Active Calculus access** – You will be required to access freely available calculus materials at [https://activecalculus.org/](https://activecalculus.org/)

- **D2L/Brightspace access** – You will be required to access course materials through SFA’s learning management software at [https://d2l.sfasu.edu](https://d2l.sfasu.edu)

- **Initiative to seek help outside of class** may be necessary to succeed in the course. I am your number one learning resource and champion in this course! Second is our course Supplemental Instructor (SI); more information later.

**Standards-Based Grading**

On semester assignments (midterm exams, weekly quizzes, and labs), grades will be assigned differently than how you may have typically encountered in other courses. Instead of using a percentage or points-based system, your grade will be determined by how well you display a mastery of specific sorts of mathematical tasks called learning targets. Since there are no points, there is no partial credit on most items. Indeed, you will find that the grading system in this course insists that you show consistent excellence in all assignments in the course – outstanding work on quizzes, for example, does not “bring up” poor work on labs. This can be challenging, but there is also a revision and reassessment system in place for most assignments that allows you to try a concept more than once to demonstrate understanding.

**Fair warning:** This may be a little more complicated than you are used to. That’s okay! If at any point in the semester you need clarification on how the system works or your standing in the course, you are encouraged to talk with me. The goal with this system is to give you more control over your grade with less stress and to reflect your effort and improvement (not the result of a single bad test day).

There are 26 learning targets that will be assessed during the semester, divided into two categories: Core and Supplemental. These are listed later in this syllabus. Each of these learning targets focuses on a skill or concept of calculus. The Core Learning Targets are the most essential skills, in which every student must show some competency to

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1 Wording in this section comes from Dr. Robert Talbert of Grand Valley State University and Dr. Kate Owens of the College of Charleston and from Dr. Brittney Falahola at SFA.
pass the course. The Supplemental Learning Targets focus on other important calculus skills. The learning targets are numbered but will not necessarily be covered in sequential order.

The following sections describe the structure of this grading system and how it will work in our class. Pay close attention in each section to definitions of terms (such as “Earn Proficiency” vs. “Master,” or “Satisfactory”).

How your Final Course Grade is Determined
See the table below for the requirements necessary to earn each letter grade. Both MATH 2313 and MATH 2113 will be awarded the same letter grade based on your fulfillment of the items in the table below. Please note the following definitions:
- To earn PROFICIENCY a learning target, one must earn a Satisfactory (S) grade on that target during a quiz, exam, or reassessment.
- To MASTER a learning target, a second grade of Satisfactory (S) must be earned on that same target during a quiz, exam, or reassessment.

To earn: Do ALL of the following:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Core Learning Targets</th>
<th>Supplemental Learning Targets</th>
<th>Satisfactory Labs</th>
<th>Final Homework Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Earn Proficiency</td>
<td>12 Core Learning Targets</td>
<td>5</td>
<td>85%</td>
</tr>
<tr>
<td>B</td>
<td>Earn Proficiency</td>
<td>10 Core Learning Targets</td>
<td>4</td>
<td>75%</td>
</tr>
<tr>
<td>C</td>
<td>Earn Proficiency</td>
<td>8 Core Learning Targets</td>
<td>3</td>
<td>65%</td>
</tr>
<tr>
<td>D</td>
<td>Earn Proficiency</td>
<td>6 Core Learning Targets</td>
<td>1</td>
<td>50%</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The initial schedule has 6 Labs. If this changes, the table will be updated.

Grading Standards
Learning Targets: Learning targets will also be graded either Satisfactory (S), Progressing (P), or Incomplete (I) based on the following general criteria.

<table>
<thead>
<tr>
<th>Mark</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>The submission gives complete, clearly written, and well-reasoned responses. The solution is organized in a thoughtful manner and the mathematics is correct, up to 1-2 minor errors which do not call into question your understanding of the calculus concepts.</td>
</tr>
<tr>
<td>P</td>
<td>The submission is complete, neatly written up, and partial understanding of concepts is evident, but there are issues in the writing, mathematics, or reasoning that require revision.</td>
</tr>
<tr>
<td>I</td>
<td>The submission has significant omissions or widespread issues so that not enough information is present to determine whether there is adequate understanding.</td>
</tr>
</tbody>
</table>

Lab write-ups: Lab write-ups will be graded either Satisfactory (S), Unsatisfactory (U), or Incomplete with No Revision (INR) based on the following criteria.

<table>
<thead>
<tr>
<th>Mark</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>The submission gives complete, clearly written, and well-reasoned responses to all lab prompts. There may be some minor errors, but an understanding of the calculus concepts is clear. The write-up is neatly done and easy to navigate. The work uses computer technology (Desmos, Excel, etc.) in an effective and appropriate way.</td>
</tr>
</tbody>
</table>
Online Homework: Online homework will be graded automatically through WeBWorK using points. One point is awarded when the problem is correct (or, in the case of some multiple-part problems, when each part is correct), and zero points are awarded otherwise. Partial credit may be given in some multi-part problems.

Revision and Reassessment

Online Homework: You may reattempt any online homework set as many times as you want until the deadline (or your extended deadline if you use a late homework token). After the deadline, your grade on that set is final.

Labs: If you receive a grade of Unsatisfactory (U) on a submitted lab, you will receive feedback on your work which you can use to make corrections and then resubmit your work for regrading. Your lab resubmissions are due by the date listed on your lab grade feedback, typically one week after the graded lab is returned.

Learning Targets: Learning targets (LTs) will be assessed on weekly quizzes as well as on exams. You may reattempt any LT that receives a Progressing or Incomplete grade in two ways:

1. Reattempt a LT during an exam or during certain designated weekly quizzes. Note that not every LT will be available on every quiz; I will specify ahead of time which LTs will be assessed on each quiz. During exams, all LTs will be available.

2. Reattempt a LT on specified reassessment weeks by scheduling a “reassessment quiz” with me ahead of time, subject to the following restrictions:
   - You may reattempt at most three LTs in a given reassessment week. The reassessment weeks are:
     - October 2 – 6, October 30 – November 3, December 4 – 8
     - Schedule reassessment of a LT by completing the appropriate sign-up form on D2L (available before each reassessment week as a quiz in D2L) or emailing me the LT(s) you wish to reattempt AND what you have done to prepare for that reassessment, by the given sign-up deadline on D2L. You must demonstrate productive effort to address errors and misconceptions before reassessing; at my discretion, this may include pre-calculus review topics, for which I will provide additional guidance.

   - More information about reassessment weeks will be announced before the first reassessment week. LT assessments to attain Mastery (earn a second S) are conducted as above.

Learning Targets

Below are the learning targets for our course, divided into Core and Supplemental sections. as a way for you to track Check off one of the spots to the left of a learning target once your performance on that target merits a Satisfactory (S) score to indicate proficiency in that target. Check off the second spot upon receiving a second score of Satisfactory on that target to indicate mastery. Learning targets will not necessarily be addressed in this order.

Core Learning Targets

<p>| O | O | LG | Limits: Graphical. Compute the limit of a function at a specific point using the graph of the function or sketch a graph of a function satisfying certain limit properties. (AC 1.2; RAF 2.2) |
| O | O | CF | Continuity of functions. Using the appropriate limit definitions, determine and justify whether a function (given graphically or by a formula) is continuous, and classify any discontinuities as removable, jump, or infinite. Also, correctly apply the substitution method, if it applies. (AC 1.7; RAF 2.4) |
| O | O | TL | Tangent lines. Find the equation of a tangent line to a function at a point and use the tangent line to approximate function values. (AC 1.3, 1.8; RAF 3.1, 4.1) |
| O | O | DD | Derivatives using the definition. State and use the limit definition of a derivative (at a point or in general) to find derivatives. (AC 1.4; RAF 3.1, 3.2) |
| O | O | RC | Rates of Change. Distinguish between, interpret, and compute average and instantaneous rates of change in applied scenarios. (AC 1.1, 1.5; RAF 2.1, 3.4) |</p>
<table>
<thead>
<tr>
<th>O</th>
<th>O</th>
<th>DBF</th>
<th>Derivatives of basic functions. Properly evaluate derivatives of basic functions (constant functions, polynomials, exponentials, and trigonometric functions). (AC 2.1, 2.2, 2.4; RAF 3.2, 3.6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>PQR</td>
<td>Product and Quotient Rules. Properly apply the Product and Quotient Rules to find derivatives. (AC 2.3; RAF 3.3)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>CR</td>
<td>Chain Rule. Properly apply the Chain Rule to find derivatives. (AC 2.5; RAF 3.7)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>LIG</td>
<td>Local information of functions: Graphical. Given the graph of a function or its derivative, identify intervals of increase and decrease, concavity, local extrema, critical points, and inflection points. Alternatively, use local information and end behavior to sketch a graph of a function. (AC 3.1, 5.1; RAF 4.3, 4.4, 4.6)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>AO</td>
<td>Applied optimization. Set up and solve applied optimization problems. (AC 3.4; RAF 4.7)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>AI</td>
<td>Areas and integrals. Interpret areas under graphs as definite integrals and use a graph of a function to compute a definite integral. (AC 4.1, 4.3, 6.1; RAF 5.1, 5.2)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>FTC</td>
<td>Fundamental Theorem of Calculus. Use the Fundamental Theorem of Calculus to compute definite integrals. (AC 4.4; RAF 5.4)</td>
</tr>
</tbody>
</table>

Supplemental Learning Targets

<table>
<thead>
<tr>
<th>O</th>
<th>O</th>
<th>LS</th>
<th>Limits: Symbolic. Evaluate limits using basic limit laws. (AC 1.3; RAF 2.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>IFA</td>
<td>Indeterminate forms and algebraic methods. Evaluate limits of indeterminate forms algebraically. (AC 1.2; RAF 2.5, 2.6, 2.7)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>LI</td>
<td>Limits at infinity. Determine the end behavior of a function by considering limits at infinity. (AC 2.8; RAF 2.7)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>DG</td>
<td>Derivatives: Graphical. Sketch and/or identify the graph of the derivative of a function using the graph of the original function, or vice versa, correctly attending to possible issues with differentiability at points. (AC 1.4; RAF 3.1, 3.2)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>ID</td>
<td>Implicit differentiation. Compute derivatives of functions given implicitly. (AC 2.5; RAF 3.8)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>DIF</td>
<td>Derivatives of inverse functions. Compute derivatives of inverse functions, including logarithmic and inverse trigonometric functions. (AC 2.1, 2.6; RAF 3.9)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>RR</td>
<td>Related rates. Set up and solve related rates problems. (AC 3.5; RAF 3.10)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>AE</td>
<td>Absolute extrema. Find absolute extrema of a continuous function on a closed interval. (AC 3.3; RAF 4.2)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>LIS</td>
<td>Local information of functions: Symbolic. Given the formula for a function, identify intervals of increase and decrease, concavity, local extrema, critical points, and inflection points. (AC 3.1; RAF 4.3, 4.4)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>IFH</td>
<td>Indeterminate forms and l'Hopital's Rule. Evaluate limits of indeterminate forms using l'Hopital's Rule. (AC 2.8; RAF 4.5)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>ADI</td>
<td>Approximating definite integrals. Approximate a definite integral on a closed interval using left-endpoint, right-endpoint, and midpoint approximations. (AC 4.2; RAF 5.1)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>ABF</td>
<td>Antiderivatives of basic functions. Compute general antiderivatives (i.e., indefinite integrals) of basic functions (constant functions, polynomials, trigonometric functions, exponential functions). (AC 4.4; RAF 5.3)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>IVP</td>
<td>Initial value problems. Solve simple initial value problems. (AC 5.1; RAF 5.3)</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>SMI</td>
<td>Substitution method for integration. Evaluate definite and indefinite integrals using the substitution method. (AC 5.3; RAF 5.7)</td>
</tr>
</tbody>
</table>

Suggested Exercises and Course Outline

Below are suggested exercises from each section we will discuss. While these exercises will not be collected, they will provide an excellent source of practice outside of class as you work to master each calculus topic.

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active Calculus</strong></td>
</tr>
<tr>
<td><strong>Sections</strong></td>
</tr>
<tr>
<td>1.1 How do we measure velocity?</td>
</tr>
<tr>
<td>1.2 The notion of limit</td>
</tr>
<tr>
<td>1.3 The derivative of a function at a point</td>
</tr>
<tr>
<td>1.4 The derivative function</td>
</tr>
</tbody>
</table>

<p>| Notes |</p>
<table>
<thead>
<tr>
<th>Section</th>
<th>Page Range</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpreting, estimating, and using the derivative</td>
<td>1.5.4</td>
<td></td>
</tr>
<tr>
<td>1.6 The second derivative</td>
<td>1.6.5</td>
<td></td>
</tr>
<tr>
<td>1.7 Limits, continuity, and differentiability</td>
<td>1.7.5</td>
<td></td>
</tr>
<tr>
<td>1.8 The tangent line approximation</td>
<td>1.8.4</td>
<td></td>
</tr>
<tr>
<td>2.1 Elementary derivative rules</td>
<td>2.1.5</td>
<td></td>
</tr>
<tr>
<td>2.2 The sine and cosine functions</td>
<td>2.2.3</td>
<td></td>
</tr>
<tr>
<td>2.3 The product and quotient rules</td>
<td>2.3.5</td>
<td></td>
</tr>
<tr>
<td>2.4 Derivatives of other trigonometric functions</td>
<td>2.4.3</td>
<td></td>
</tr>
<tr>
<td>2.5 The chain rule</td>
<td>2.5.5</td>
<td></td>
</tr>
<tr>
<td>2.6 Derivative of inverse functions</td>
<td>2.6.6</td>
<td></td>
</tr>
<tr>
<td>2.7 Derivatives of functions given implicitly</td>
<td>2.7.3</td>
<td></td>
</tr>
<tr>
<td>2.8 Using derivatives to evaluate limits</td>
<td>2.8.4</td>
<td></td>
</tr>
<tr>
<td>3.1 Using derivative to identify extreme values</td>
<td>3.1.4, 3.2.3 #2</td>
<td></td>
</tr>
<tr>
<td>3.3 Global optimization</td>
<td>3.3.4</td>
<td></td>
</tr>
<tr>
<td>3.4 Applied optimization</td>
<td>3.4.3</td>
<td></td>
</tr>
<tr>
<td>3.5 Related rates</td>
<td>3.5.3</td>
<td></td>
</tr>
<tr>
<td>4.1 Determining distance traveled from velocity</td>
<td>4.1.5</td>
<td></td>
</tr>
<tr>
<td>4.2 Riemann sums</td>
<td>4.2.5</td>
<td></td>
</tr>
<tr>
<td>4.3 The definite integral</td>
<td>4.3.5</td>
<td></td>
</tr>
<tr>
<td>4.4 The fundamental theorem of calculus</td>
<td>4.4.5</td>
<td></td>
</tr>
<tr>
<td>4.5 L'Hopital's Rule</td>
<td>4.5.1</td>
<td></td>
</tr>
<tr>
<td>5.1 Constructing accurate graphs of antiderivatives</td>
<td>5.1.5</td>
<td></td>
</tr>
<tr>
<td>5.2 The second fundamental theorem of calculus</td>
<td>5.2.5</td>
<td></td>
</tr>
<tr>
<td>5.3 Integration by substitutions</td>
<td>5.3.5</td>
<td></td>
</tr>
<tr>
<td>6.1 Using definite integrals to find area and length</td>
<td>6.1.5</td>
<td></td>
</tr>
<tr>
<td>5.4 Fundamental Theorem of Calculus, I</td>
<td>5.4.1</td>
<td></td>
</tr>
<tr>
<td>5.5 Fundamental Theorem of Calculus, II</td>
<td>5.5.1</td>
<td></td>
</tr>
<tr>
<td>5.7 Substitution Method</td>
<td>5.7.1</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** I, Dr. Long, reserve the right to make changes to any part of this syllabus as necessary, in the interest of the class. Students will be notified of any changes via email or D2L/Brightspace, and in class.
Academic Integrity

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Plagiarism is the appropriation of material that is attributable in whole or in part to another source or the use of one’s own previous work in another context without citing that it was used previously, without any indication of the original source, including words, ideas, illustrations, structure, computer code, and other expression or media, and presenting that material as one’s own academic work being offered for credit or in conjunction with a program course or degree requirements.

Collusion is the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on academic dishonesty, including disclosing and/or distributing the contents of an exam.

Misrepresentation is providing false grades or résumés; providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment for the purpose of obtaining an academic or financial benefit for oneself or another individual or to injure another student academically or financially.

I may opt to ask for an in-person oral examination if I have any reason to suspect that work that you present is not your own. Possession of materials that can be used to cheat, whether or not they are used, is considered academic dishonesty. Consequences for academic dishonesty will be determined in accordance with university policy at the time of the violation.

Withheld Grades Semester Grades Policy (5.5)
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 coursework 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 to compute the grade point average. For additional information, go to https://www.sfasu.edu/policies/course-grades-5.5.pdf.

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 promptly may delay your accommodation. For additional information, go to http://www.sfasu.edu/disabilityservices/.

Student Wellness and Well-Being
SFA values students’ overall well-being, mental health and the role it plays in academic and overall student success. Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, emotional well-being, alcohol and other drugs, identities, finances, etc.
If you are experiencing concerns, seek help. SFA provides a variety of resources to support students’ mental health and wellness. Many of these resources are free, and all of them are confidential.

**On-campus Resources:**
**The Dean of Students Office** (Rusk Building, 3rd floor lobby)
www.sfasu.edu/deanofstudents
936.468.7249
dos@sfasu.edu

**SFA Human Services Counseling Clinic** Human Services, Room 202
www.sfasu.edu/humanservices/139.asp
936.468.1041

**The Health and Wellness Hub** “The Hub”
Location: corner of E. College and Raguet St.

To support the health and well-being of every Lumberjack, the Health and Wellness Hub offers comprehensive services that treat the whole person – mind, body and spirit. Services include:

- Health Services
- Counseling Services
- Student Outreach and Support
- Food Pantry
- Wellness Coaching
- Alcohol and Other Drug Education

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**Crisis Resources:**
- Burke 24-hour crisis line: 1.800.392.8343
- National Suicide Crisis Prevention: 9-8-8
- Suicide Prevention Lifeline: 1.800.273.TALK (8255)
- johCrisis Text Line: Text HELLO to 741-741

**Questions about Standards-Based Grading:**
Write down any questions you have about the grading system. See if this syllabus addresses your question first, then if further clarification is needed, please ask me for an explanation.

**Resources and Artificial Intelligence**
Calculus is an important subject, and many resources are available. As your professor, my goal for you – and your goal for yourself – should be to learn calculus so that you can do it on your own. Calculators can be used for arithmetic and to compute values of functions with precision. **You should not use homework completion services (paid or unpaid), other people or artificial intelligence in any form to complete graded assignments** – this is expressly prohibited. Using resources to study and enhance your understanding is not prohibited but be aware that resources not connected with our class may use different notation and vocabulary; they may present topics in a different order; and they may be inaccurate. The professor is your number one resource! Meeting with students outside of class is an important part of my job, and I can give suggestions for ways to study. I really love mathematics and talking with people about mathematics – please come see me!
Course description: Topics include limits, continuity, differential calculus of algebraic and transcendental functions with applications, basic antidifferentiation with substitution, definite integrals.

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

Credit hours: 3

The following is an excerpt from SFA Policy 5.4:
The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:

1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;

2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend a minimum of two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

Course Prerequisites and Corequisites: MATH 1318 or MATH 2212

General Education Core Curriculum: This course has been selected to be part of SFA’s core curriculum. The Texas Higher Education Coordinating Board has identified six objectives for all core courses: Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills, Teamwork, Personal Responsibility, and Social Responsibility. SFA is committed to the improvement of its general education core curriculum by regular assessment of student performance on these six objectives. Assessment of these objectives at SFA will be based on student work from all core curriculum courses. This student work will be collected in D2L, the assessment management system selected by SFA to collect student work for core assessment.

By enrolling in MATH 2313/2113 Calculus I you are also enrolling in a Core Curriculum Course that fulfills the Mathematics Core Objective requirement.

The chart below indicates: (a) The core objectives that are required to be taught in this course per the Texas Higher Education Coordinating Board (THECB), (b) How the required core objectives will be addressed.
Core Curriculum Objective Table

<table>
<thead>
<tr>
<th>Core Objective</th>
<th>Definition</th>
<th>How the Core Objective Will be Addressed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Thinking Skills</td>
<td>To include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.</td>
<td>Related Rates and Optimization Modules</td>
</tr>
<tr>
<td>Communication Skills</td>
<td>To include effective development, interpretation and expression of ideas though written, oral, and visual communication.</td>
<td>Calculus Lab Reports—students gather evidence to communicate ideas using charts and graphs and calculus concepts</td>
</tr>
<tr>
<td>Empirical and Quantitative Skills</td>
<td>To include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.</td>
<td>First and Second Derivative Tests for Curve-Sketching Module</td>
</tr>
</tbody>
</table>

Course outline:
- Limits and continuity [CO 1, 2, 3]
  - 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]
  - 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]
  - Related rates
  - Position, velocity, and acceleration
  - Extreme values/optimization

Approximate time spent
- Limits and continuity [CO 1, 2, 3] 30%
- Derivatives and antiderivatives [CO 1, 2, 3] 30%
- Applications of derivatives [CO 1, 2, 3] 25%
Mean Value Theorem
Curve sketching
Newton’s method
L’Hospital’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%

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

1. Written Communication - SFA Mathematics majors communicate mathematical ideas effectively in written form, integrating mathematical notation correctly and consistently.

2. Verbal Communication - SFA Mathematics majors communicate mathematics effectively to diverse audiences.

3. Mathematical Maturation - SFA Mathematics majors grow from a computational understanding of mathematics to an integrated approach which includes critical thinking proficiency, computational facility, conceptual understanding, and problem-solving persistence.

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’Hospital’s Rule. [PLO:1,23], [CO: 1,3]
2. Demonstrate an understanding of the connection between limits and asymptotic behavior in functions. [PLO: 1,2,3], [CO: 1,2,3]
3. Recognize and construct continuous functions. [PLO: 1,2,3], [CO: 1,3]
4. Connect the definitions of the derivative and definite integral to their geometric interpretations and applications. [PLO: 1,2,3], [CO: 1,3]
5. Find derivatives and antiderivatives of algebraic and transcendental functions, including compositions of functions. [PLO: 1,2,3], [CO: 1,3]
6. Use implicit differentiation to solve related rates problems and to determine derivative rules for inverse transcendental functions. [PLO: 1,2,3], [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: 1,2,3], [CO: 1,2,3]
8. Convey the connections between limits, derivatives, and integrals. [PLO: 1,2,3], [CO: 1,3]
9. Use the Fundamental Theorem of Calculus to evaluate definite integrals. [PLO: 1,2,3], [CO: 1,3]

This course meets educator preparation standards for one or more certification programs; a complete listing of all the educator preparation standards this course meets can be found at: [https://sfasu.edu/docs/jacksteach/jacksteach-standards-alignment-chart.xlsx](https://sfasu.edu/docs/jacksteach/jacksteach-standards-alignment-chart.xlsx).

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**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 10.4](#)). 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.

*Date of document: 08/23/2023*