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Note about Edition: This is the last semester that the 3\textsuperscript{rd} edition of this text will be used at SFA. If you take Calculus II in Fall 2021 and/or Calculus III in Spring 2022, then you will also use this 3\textsuperscript{rd} edition. However, Calculus I courses will begin using the 4\textsuperscript{th} edition in Fall 2021. Calculus II courses will begin using the 4\textsuperscript{th} edition in Spring 2022 and Calculus III courses will begin using the 4\textsuperscript{th} edition in Fall 2022. Be aware!

Course description: Topics include limits, continuity, differentiation of algebraic, trigonometric, and other transcendental functions, and applications of differentiation, including optimization and curve sketching, antiderivatives, integration by substitution, definite integrals, the Fundamental Theorem of Calculus, and application of integration to areas of regions in the plane.

Method of Instruction: This course is taught entirely in face-to-face & traditional format. There are no Zoom lectures or recordings. Lectures are NOT recorded. All instruction and office hours are face-to-face. There is no online, virtual, hybrid or Zoom component at all.

COVID Protocols: None. The classrooms and labs are not social distanced and masks are not required. I will not mask during lecture, labs or in my office. You should feel free to wear a mask in any location and at any time if you so choose. Enrollment in the course will be 10 or less and so there will be plenty of space in each classroom to spread out despite no longer officially being social distanced. If you have any special health needs related to COVID-19 or in general, do not hesitate to discuss them with me in person or via email.

Exam Schedule (these dates are fixed and will not change)

- Exam 1: Thursday, July 8 from 10:00 AM – 12:00 PM.
- Exam 2: Monday, July 19 from 10:00 AM – 12:00 PM.
- Exam 3: Monday, August 2 from 10:00 AM – 12:00 PM.
- Final Exam: Friday, August 6 from 10:00 AM – 1:00 PM.

We will have class following Exam 1 on Thursday, July 8 from 12:10 to 1:40 PM.

If you so choose, you may show up 10 minutes early to exams to get a head start. This is 100\% optional. After you finish Exam 2 and Exam 3, you are “done for the day”. There is no lecture following these exams.

\textbf{All final exams in Calculus I at SFA are cumulative and cover all material from the semester.}
Exam 1 includes material covered from 6/28 through 7/6
Exam 2 includes material covered from 7/7 through 7/15
Exam 3 includes material covered from 7/20 through 7/29
The final includes all course material (cumulative)

Exams are returned two or three days after they are taken – usually three. They are NEVER returned the day after they are taken. Every effort will be made to return Exam 3 on Wednesday, August 4.

**Homework:** Homework in Calculus I is incredibly important. More so than in any mathematics course you have taken prior to this one. It is absolutely imperative that you leave large amounts of time in the evenings and on the weekends for working homework problems. The number of homework problems assigned is fairly heavy compared to other mathematics courses leading up to this one. Homework is assigned after every lecture. You should discuss homework problems with your classmates and myself regularly.

**Quizzes:** *(You may use your completed homework on the quizzes.)*
The quizzes are based off of homework problems assigned and they are technically completely “open” quizzes in that you may use your completed homework, class notes and the text. However, and again – the quizzes are based off of the assigned homework. Quizzes are given once lectures are done and after you turn them in, you are free to leave for the day. Typically, they are given once class is formally over (say, 11:40-11:50). They are meant to be brief, but are untimed, and usually consist of only two or three problems that are similar to homework. Occasionally, a quiz question will be an exact replica of a homework problem. We will have seven quizzes and here is a detailed schedule:

<table>
<thead>
<tr>
<th>Quiz 1: Wednesday, June 30</th>
<th>Covers HW from 6/28 and 6/29</th>
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<tbody>
<tr>
<td>Quiz 2: Monday, July 5</td>
<td>Covers HW from 6/30 and 7/1</td>
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<td>Quiz 3: Monday, July 12</td>
<td>Covers HW from 7/7 and 7/8</td>
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<td>Quiz 4: Wednesday, July 14</td>
<td>Covers HW from 7/12 and 7/13</td>
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<td>Quiz 5: Thursday, July 22</td>
<td>Covers HW from 7/20 and 7/21</td>
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<td>Quiz 6: Monday, July 26</td>
<td>Covers HW from 7/22</td>
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<tr>
<td>Quiz 7: Wednesday, July 28</td>
<td>Covers HW from 7/26 and 7/27</td>
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**Labs & Lab Reports:** The lab section (2113) is handled differently in the summer than it typically is in the Fall or Spring semesters. Typically, during the Fall/Spring, the “lab hours” are a mixture of lecture, computer experimentation and discovery. During the summer, we tend to fracture the “lab hours” into days that are “purely lecture” and others that are “purely computer experimentation and discovery”. For us, “lab days” will be Tuesday afternoons with the exception of the first Tuesday of the course. So, we will work on computer experimentation, exploration and discovery on the following five Tuesdays from 12:00 PM to 1:40: 7/6, 7/13, 7/20, 7/27 and 8/3. At the end of these discovery periods, I will assign you a lab report. Lab reports may be turned in whenever you wish. The format for the report will be detailed on each assignment.

On Tuesday, 6/29 and all “lab hours” on Thursdays, we will just have a continuation of typical class days/lecture. This is required due to the amount of material contained in each of Calculus I, II and III.

**Grading Breakdown:**
Exam 1, Exam 2, Exam 3, Quiz Average, Lab Report Average: 16% each (for 80% total)
Final Exam: 20%
Grading Scale:  
- 90% to 100%: A
- 80% to 89%: B
- 70% to 79%: C
- 60% to 69%: D
- 59% to 0%: F

Note on grading policy: A student that does not take all four exams will be assigned a grade of “F” no matter what scores they have earned on other exams, quizzes or lab reports. In order to earn a grade of A, B, C or D, a student must take all four exams. Also, I do not take into consideration any necessary prerequisite grade requirements in determining grades of “C” vs. “D”. If you plan to take Calculus II, you will need a “C” or better to continue. The grade scale listed above applies to all students uniformly and fairly without regard to whether you need a “C” to continue or not.

Pace: The course is six weeks long. Fall and Spring are at least 15 weeks long. That’s 2.5 times longer. That means that the material taught during summer school has to be processed at 2.5 times the speed as it would be in the long semester. That’s why a full load is 2.5 times six = 15 hours in a long semester. The key number in summer school is “2.5”. The amount of time studying has to be upped by a factor of 2.5 because the material is being taught 2.5 times faster than normal.

Course Coverage: Calculus I covers all of the material in our textbook in Chapters 2-5, with the exception of Section 5.9. Chapter 1 is an algebra/precalculus review chapter and is not covered in Calculus I, although some facts contained in Chapter 1 are provided as reminders to students as we progress through the course.

Advice & Such About Calculus:
- Accept it isn’t easy. Pretty much no one has ever said “calculus is easy”.
- “You know what I mean” doesn’t get you any credit.
- No matter what the text or I ask you to do, it is always implied in the question that you should “Explain”. “Explain” is a part of EVERY question. Full credit can never be had without sufficient and precise explanation. Don’t just do. Explain what you are doing.
- Good calculus answers often involve lots of words along with symbols. To be good at calculus, you need to be a good writer.
- You just simply cannot fall behind. It is basically impossible to catch up. Every section builds on the ones prior to it. If you miss one, you get burned – no matter what.
- It’s A-OK to think things are “cool” that you used to not think were “cool”. I think calculus is cool. You have to allow yourself the chance to believe that yourself.
- The three traits that I think make an excellent college student: 1) Time Management Skills, 2) Perseverance, 3) Adaptability. Notice, “smarts” or “intelligence” didn’t make the list.

Amidst doing difficult things, people that look for interesting things usually find them. While working hard, people that seek out fun and happiness generally find it. People that are open to the possibility that math is cool usually wind up thinking it is. Attitude and commitment have a lot to do with it.

Calculus can be a subject you enjoy, get a benefit from, see the world differently because of, and generally appreciate instead of just some check box on your degree plan. I guess, generally it depends on whether you are open to being inspired as a general rule in your life or instead you go around thinking life is just a big “to do” list. So, which is it with you?
General Education Core Curriculum
The Texas Higher Education Coordinating Board has identified six core learning objectives: Critical Thinking Skills (CO 1), Communication Skills (CO 2), Empirical and Quantitative Skills (CO 3), 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.

Course schedule:

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<th>Approximate time spent</th>
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- 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%

Student Learning Outcomes (SLO): At the end of MTH 2313, 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)

Academic Integrity (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.

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/.

SFASU 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 at least 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.