DEPARTMENT OF MATHEMATICS
CALCULUS 1
MATH 2313-001/2113-001 FALL 2021
COURSE SYLLABUS

Instructor: Jacob Pratscher  
Email: Jacob.Pratscher@sfasu.edu
Office: Math Building Room 348  
Phone: (936)468-1869
Office hours: MWR 10-10:50 AM, MW 12-1PM
Class Meetings: MWF 9:00-9:50 AM Math Building Room 212
R(Lab) 11 AM-12:15PM Math Building Room 358
Course Link: http://www3.sfasu.edu/math/docs/syllabi/MATH2313Syllabus.pdf

COVID PRECAUTIONS: Currently, we will be meeting face-to-face. If you feel more comfortable in the class, please feel free to wear a mask. You are encouraged but not required to wear a mask. In general, the syllabus may also change according to the needs of the course/class by Dr. Jacob Pratscher. If changes do occur, you will receive an email and/or an announcement in class.

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

TEXT/MATERIALS: The required textbook is Calculus (Early Transcendentals), 4th edition, by Rogawski and Adams, ISBN 9781319050740. Topics for MATH 2313 are included in chapters 2, 3, 4, and 5 of the text.

SUPPLEMENTAL MATERIAL: A resource the instructor will occasionally draw from is M. Boelkins, Active Calculus, 2018 Updated Edition (2019), http://activecalculus.org

CALCULATORS: Each student will need a scientific calculator to use during exams. No graphing calculators or cell phone calculators will be allowed during exams. Having software available like Desmos, will be useful in this course.

WITHDRAWL: The last day to withdraw from a full-session course with a grade of W is November 29, 2021. Note: You can find the withdrawal dates and procedures on: https://www.sfasu.edu/registrar/registration-information/dates-deadlines and https://www.sfasu.edu/registrar/registration-information/how-to-drop-withdraw

GRADING: Grades will be assigned according to the following percentages.
- 3 one hour exams worth 15% each, dates on Tentative Class Schedule
- Homework worth a total of 15%
- Quizzes worth a total of 10%
- Final exam worth 20%
- Discussions/Activities/Labs worth a total of 10%

HOMEWORK: Homework assignments, will be assigned weekly and due by class time of the announced day.

DISCUSSIONS/ACTIVITIES/LABSE: There will be various discussions and activities held throughout the course. Discussions will be graded according to participation. Participation means well thought out and respectful responses and answers to the proposed questions. Students are also expected to respond to work proposed from fellow classmates in a respectful manner. Discussions will be on D2L where activities will occur during course time. Activities/Labs will be graded by participation, correctness, and clarity of work. Labs will be turned into to the DropBox on D2L.

QUIZZES: Will be done outside of class on D2L. I highly suggest that you use no course materials besides a scientific calculator to take a quiz. Note that each quiz has a time limit. You may take the quiz at most three times before the due date.
**UNIT EXAMS:** There will be three one hour exams, each exam is worth 15 percent of the grade. The exams will be given in class. You may find dates on the tentative schedule, note that dates may change due to pace of course.

**MAKE-UP and LATEWORK POLICIES:** No make-ups are allowed without prior discussion beforehand with the instructor, or in case of emergency. If there are concerns with completing any work on-time or being prepared for an exam please contact the instructor immediately. The decision of a make-up or accepting late work is left to the discretion of the instructor and is final.

**FINAL EXAM:** The Final is scheduled for Wednesday December 8th of 2021 from 8:00 AM to 10:00 AM. The final exam will be a comprehensive examination, worth 20% of the final grade.

**GRADING SCALE**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90%-100%</td>
</tr>
<tr>
<td>B</td>
<td>80%-89.99%</td>
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<tr>
<td>C</td>
<td>70%-79.99%</td>
</tr>
<tr>
<td>D</td>
<td>60%-69.99%</td>
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<tr>
<td>F</td>
<td>59.99% and Lower</td>
</tr>
</tbody>
</table>

**TENTATIVE SCHEDULE:** Note that material dates may change according to pace of the course.

<table>
<thead>
<tr>
<th>Week of</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Thursday(Lab)</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/23-8/27</td>
<td>Introduction/Syllabus/ Sec 2.1</td>
<td>Sec 2.1</td>
<td>Sec 2.2</td>
<td>Sec 2.2/2.3</td>
</tr>
<tr>
<td>8/30-9/3</td>
<td>Sec 2.3</td>
<td>Sec 2.4</td>
<td>Sec 2.4</td>
<td>Sec 2.5</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Quiz 1</td>
</tr>
<tr>
<td>9/6-9/10</td>
<td>Sec 2.6</td>
<td>Sec 2.6/2.7</td>
<td>Sec 2.7</td>
<td>Sec 2.8</td>
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<td></td>
<td>Quiz 2</td>
</tr>
<tr>
<td>9/13-9/17</td>
<td>Sec 2.9</td>
<td>Review</td>
<td>Exam 1</td>
<td>Sec 3.1</td>
</tr>
<tr>
<td>9/20-9/24</td>
<td>Sec 3.2</td>
<td>Sec 3.3</td>
<td>Sec 3.3/3.4</td>
<td>Sec 3.4</td>
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<td></td>
<td>Quiz 3</td>
</tr>
<tr>
<td>9/27-10/1</td>
<td>Sec 3.5</td>
<td>Sec 3.6</td>
<td>Sec 3.7</td>
<td>Sec 3.7</td>
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<td>Quiz 4</td>
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<tr>
<td>10/4-10/8</td>
<td>Sec 3.8</td>
<td>Sec 3.9</td>
<td>Sec 3.10</td>
<td>Sec 3.10</td>
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<td>Quiz 5</td>
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<tr>
<td>10/11-10/15</td>
<td>Sec 4.1</td>
<td>Review</td>
<td>Exam 2</td>
<td>Sec 4.2</td>
</tr>
<tr>
<td>10/18-10/22</td>
<td>Sec 4.3</td>
<td>Sec 4.4</td>
<td>Sec4.3/4.4</td>
<td>Sec 4.5</td>
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<td>Quiz 6</td>
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<tr>
<td>10/25-10/29</td>
<td>Sec 4.5</td>
<td>Sec 4.6</td>
<td>Sec 4.7</td>
<td>Sec 4.8</td>
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<td>Quiz 7</td>
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<tr>
<td>11/1-11/5</td>
<td>Review</td>
<td>Review</td>
<td>Exam 3</td>
<td>Sec 5.1</td>
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<tr>
<td>11/8-11/12</td>
<td>Sec 5.2</td>
<td>Sec 5.2/5.3</td>
<td>Sec 5.3</td>
<td>Sec 5.4</td>
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<td>Quiz 8</td>
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<tr>
<td>11/15-11/19</td>
<td>Sec 5.4</td>
<td>Sec 5.4/5.5</td>
<td>Sec 5.5</td>
<td>Sec 5.6</td>
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<td></td>
<td></td>
<td>Quiz 9</td>
</tr>
<tr>
<td>11/22/11/26</td>
<td>No</td>
<td>Class</td>
<td>Thanksgiving</td>
<td>Break</td>
</tr>
<tr>
<td>11/29-12/3</td>
<td>Sec 5.7</td>
<td>Sec 5.7</td>
<td>Sec 5.8</td>
<td>Review</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Quiz 10</td>
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</tbody>
</table>
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: See general course prerequisites.

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
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.

Academic Integrity
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 (SFA policy 4.1):**
Academic dishonesty includes both cheating and plagiarism. Cheating includes, but is not limited to:
- using or attempting to use unauthorized materials on any class assignment or exam;
- falsifying or inventing of any information, including citations, on an assignment;
- helping or attempting to help other student(s) in an act of cheating or plagiarism.

Plagiarism is presenting the words or ideas of another person as if they were one’s own. Examples of plagiarism include, but are not limited to:
- submitting an assignment as one's own work when it is at least partly the work of another person;
- submitting a work that has been purchased or otherwise obtained from the Internet or another source;
- incorporating the words or ideas of an author into one's paper or presentation without giving the author credit.

**Withheld Grades Semester Grades (SFA 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 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](http://www.sfasu.edu/disabilityservices).

**SFASU Mental Health Statement:** SFASU values students’ mental health and the role it plays in academic and overall student success. 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:**
SFASU Counseling Services
[www.sfasu.edu/counselingservices](http://www.sfasu.edu/counselingservices)
3rd Floor Rusk Building
936-468-2401

SFASU Human Services Counseling Clinic
[www.sfasu.edu/humanservices/139.asp](http://www.sfasu.edu/humanservices/139.asp)
Human Services Room 202
936-468-1041

**Crisis Resources:**
Burke 24-hour crisis line 1(800) 392-8343
Suicide Prevention Lifeline 1(800) 273-TALK (8255)
Crisis Text Line: Text HELLO to 741-741
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. 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.

Date of document: 08/9/2021