CALCULUS I

COURSE DESCRIPTION

Calculus I is an intensive, higher-level course in mathematics that builds on courses like precalculus. The course aims at serving the needs of a wide student audience, including students in engineering, mathematics, the physical and life sciences, and economics. It is constructed around multiple focal points with the intention of helping students become creative and efficient problem solvers. The course uses technology as a means of discovery for numerical, graphical, and analytical solutions to problems. It also emphasizes communication skills and requires students to interpret, describe, discuss, justify, and conjecture as they search for solutions to problems. Real-life applications provide links with students' everyday life. Topics covered include the Cartesian plane, limits and continuity, problems of tangents, velocity and instantaneous rates of change, rules for differentiation, implicit differentiation, maxima and minima theory, antiderivatives and the indefinite integral, exponential and logarithmic functions, and the area between curves.

COURSE TOPICS

- Functions and graphs
- Limits and their properties
- Differentiation
- Applications of differentiation
- Integration
- Applications of integration

COURSE OBJECTIVES

After completing this course, you should be able to:

CO 1 Demonstrate proficiency with precalculus problems.

CO 2 Integrate technology in graphing and solving calculus problems.

CO 3 Use peer calculus solutions and peers' solutions critiques to further calculus conceptual understanding.

CO 4 Demonstrate a conceptual understanding of limits and their calculation.

CO 5 Demonstrate a conceptual understanding of a derivative and its interpretation.

CO 6   Calculate derivatives with demonstrated solution procedures.

CO 7   Use definite integrals to calculate areas and rate of change.

CO 8   Apply derivatives to solve real-world problems.

CO 9   Apply integrals to solve real-world problems.

COURSE MATERIALS

You will need the following materials to complete your coursework. Some course materials may be free, open source, or available from other providers. You can access free or open-source materials by clicking the links provided below or in the module details documents. To purchase course materials, please visit the [University's textbook supplier](#).

Required Textbook

- Strang, G., & Herman, J. (2020). [*Calculus,* (Volume 1)](#). OpenStax. Licensed under CC BY-NC-SA 4.0.
  [View the book online](#).

Additional Learning Resources

- [Desmos Graphing Tool](#)
- [Geogebra Graphing Tool](#)
- [Khan Academy](#)

Study Guides

For a list of key topics that may appear on your exams, refer to the study guides available in the Examinations section of the course website.

COURSE STRUCTURE

Calculus I is a four-credit, online course consisting of **ten** modules. Modules include an overview, topics, learning objectives, study materials, and activities. Module titles are listed below.

- **Module 1: Functions and Graphs**
  Course objectives covered in this module: CO 1, CO 2, CO 3

- **Module 2: Limits: Part I**

Course objectives covered in this module: CO 1, CO 2, CO 4, CO 5

- **Module 3: Limits: Part II**
Course objectives covered in this module: CO 1, CO 2, CO 4

- **Module 4: Derivatives: Part I**
Course objectives covered in this module: CO 1, CO 2, CO 5, CO 6, CO 8

- **Module 5: Derivatives: Part II**
Course objectives covered in this module: CO 2, CO 5, CO 6

- **Module 6: Applications of Derivatives: Part I**
Course objectives covered in this module: CO 1, CO 2, CO 5, CO 6, CO 8

- **Module 7: Applications of Derivatives: Part II**
Course objectives covered in this module: CO 2, CO 4, CO 5, CO 6, CO 8

- **Module 8: Integration: Part I**
Course objectives covered in this module: CO 1, CO 2, CO 6, CO 7, CO 9

- **Module 9: Integration: Part II**
Course objectives covered in this module: CO 2, CO 3, CO 7

- **Module 10: Applications of Integration**
Course objectives covered in this module: CO 2, CO 7, CO 9

ASSESSMENT METHODS

For your formal work in the course, you are required to participate in online discussion forums, complete practice exercises, problem sets, and technology activities, take quizzes, take a practice midterm and a practice final examination, and take a proctored midterm and final examinations. See below for details.

Consult the Course Calendar for due dates.

Promoting Originality

One or more of your course activities may utilize a tool designed to promote original work and evaluate your submissions for plagiarism. More information about this tool is available in [this document](#).

Discussion Forums

You are required to complete **five** discussion forums. The discussion forums are on a variety of topics associated with the course modules.

Communication with your mentor and classmates is a critical component of online learning. Participation in online class discussions involves two distinct activities: an initial response to a discussion question and at least two subsequent comments on classmates' responses.

All of these responses must be substantial. Meaningful participation is relevant to the content, adds value, and advances the discussion. Comments such as "I agree" and "ditto" are not considered value-adding participation. Therefore, when you agree or disagree with a classmate or your mentor, state and support your position.

You will be evaluated on the quality and quantity of your participation, including your use of relevant course information to support your point of view, and your awareness of and responses to the postings of your classmates. Remember, these are discussions: responses and comments should be properly proofread and edited, mature, and respectful.

Refer to the **Evaluation Rubrics** folder in the course website to view the Discussion Forum rubric for grading.

Consult the Course Calendar for due dates.

📄 *Practice Exercises*

You are required to complete **five** practice exercises. For each assignment, **answer all assigned exercises, and show all work.** Assignment sheets, with all questions typed out in advance for you, are provided for each assignment.

The preferred option for completing your practice exercises is to download the assignment sheet, complete and show all of your work in your downloaded file, and submit the completed file. Use a word processor and whatever equation editor integrates with your word processing software. **Important:** Use the equation editor to insert equations into your word-processed document, not to create the document itself.

The alternate option is to complete your work by hand. This requires writing out and clearly labeling all exercises by number and textbook section, showing all work, scanning your completed document, and submitting your scanned file. All of your labeling and work **must** be clear and legible. **Only** use this option if you are sure that your handwriting and scanned document will be neat and easy for your mentor to read. If your mentor cannot follow your scanned, handwritten document, you will lose credit for your work.

Review the following links for assistance:
- [Write, Insert, or Change an Equation in Microsoft Word](#)
- [Use Equations in a Google Doc](#)
- [Google Docs Equation Tool](#)

📄 *Problem Sets*

You are required to complete **five** problem sets. The problem sets draw on even-numbered exercises from the textbook. For each assignment, **answer all assigned exercises, and show all work.** Assignment sheets, with all questions typed out in advance for you, are provided for each assignment.

📄 *Technology Activities*

You are required to complete **five** technology activities. The technology activities are on a variety of topics associated with the course modules. These activities will use Geogebra and Desmos online calculators to investigate specific content to obtain a deeper understanding of the algebraic and calculus concepts covered in each activity. Each activity has a template file that you will fill out electronically and submit along with the screenshots and/or copies of graphs and files created.

Activities should be prepared electronically, using a word processor and whatever equation editor integrates with your word processing software. (Important: Use the equation editor to insert equations into your word-processed document, not to create the document itself.) Handwritten scanned documents are also allowed, provided that they are clearly legible.

☑ *Quizzes*

You are required to take **five** quizzes. Quizzes are multiple choice, open book, untimed, and unproctored. A graphing calculator is provided as a tool within each quiz. Practice using this calculator as it will also be provided during your online exams.

Each quiz includes some problems that closely resemble those that will appear on your exams. The quiz feedback identifies these problems. To make sure you can solve them, review the solution videos that provide step-by-step explanations. Solution videos will be available the day after the quiz is due.

You are encouraged to take each quiz multiple times for additional practice; you will see some different questions each time. Your highest score will appear in the gradebook.

Think of quizzes as skill-building activities rather than miniature exams. Quizzes provide a low-stress opportunity to focus on each module's key objectives, use feedback to identify your strengths and weaknesses, and practice taking assessments that look and feel similar to your exams.

📄 *Practice Exams*

To reinforce your learning and help you feel confident about the exams, you will take **two** required

practice exams: a practice midterm exam and a practice final exam. They are located in the Examinations section of your course space. The practice exam questions were developed to closely resemble those on the actual exams.

The practice exams are required, unproctored, weighted activities, and you can take them multiple times (you'll see the same questions each time). The score from your first attempt will be the only one recorded in the gradebook. The practice exams have 27 multiple-choice questions and a 3-hour time limit, just like the actual exams, and they provide the same calculator that is provided on all quizzes and exams. These required activities were created specifically to help you succeed on the midterm and final exams.

The practice exams provide feedback and solution videos, so make note of any topics that you need to review. By using this feedback, referring to the Midterm Exam Study Guide and the Final Exam Study Guide, and reviewing the solution videos from selected quiz questions, you'll know what to expect on the exams and can make sure you're prepared for them. The solution videos will be available after you complete your practice exam.

📋 *Examinations*

You are required to take **two** proctored online examinations: a midterm exam and a final exam. In addition to the quiz solution videos and practice exams described above, exam study guides for the midterm and final exams are available in the Examinations section of the course space. The exam study guides provide details about the exams and comprehensive lists of the topics that will appear on the exams. Take advantage of all of these resources to ensure you are well prepared for your midterm and final exams.

 Both exams require that you use the University's [Online Proctor Service](#) (OPS). Please refer to the "Examinations and Proctors" section of the Online Student Handbook (see [Student Handbooks](#) in the General Information area of the course website) for further information about scheduling and taking online exams and for all exam policies and procedures. You are strongly advised to schedule your exam within the first week of the semester.

Online exams are administered through the course website. Consult the Course Calendar for the official dates of exam weeks.

Note: You will be permitted to use a scientific, graphing or financial calculator (no phones or tablets) during your exams. If you take your exam online, a graphing calculator is provided as a tool within the exam.

Midterm Examination

The proctored online midterm exam is multiple choice and covers all material assigned in Modules 2 through 6 of the course. You will have 3 hours to complete the exam.

Note: The exam is an open book exam, but not open notes. You are permitted to use a calculator (scientific, graphing, or financial) but *may not* use a calculator on a phone, PDS, or any similar device. An

online graphing calculator is available within your exam's Assessment Navigator as an additional or alternative calculator. Prior to taking your exam, you may want to practice using the [online Desmos graphing calculator](). You may use one piece of scratch paper at a time.

Final Examination

The proctored online final exam is multiple choice and covers all material assigned in Modules 7 through 10 of the course. You will have 3 hours to complete the exam.

Note: This exam is an open book exam, but not open notes. You are permitted to use a calculator (scientific, graphing, or financial) but ***may not*** use a calculator on a phone, PDA, or any similar device. An online graphing calculator is available within your exam's Assessment Navigator as an additional or alternative calculator. Prior to taking your exam, you may want to practice using the [online Desmos graphing calculator](). You may use one piece of scratch paper at a time.

Statement about Cheating

You are on your honor not to cheat during the exam. Cheating means:

- Looking up any answer or part of an answer in an unauthorized textbook or on the Internet, or using any other source to find the answer.
- Copying and pasting or in any way copying responses or parts of responses from any other source into your online test. This includes but is not limited to copying and pasting from other documents or spreadsheets, whether written by yourself or anyone else.
- Plagiarizing answers.
- Asking anyone else to assist you by whatever means available while you take the exam.
- Copying any part of the exam to share with other students.
- Telling your mentor that you need another attempt at the exam because your connection to the Internet was interrupted when that is not true.

If there is evidence that you have cheated or plagiarized in your exam, the exam will be declared invalid, and you will fail the course.

GRADING AND EVALUATION

Your grade in the course will be determined as follows:

- **Discussion forums (5)** —10%
- **Practice exercises (5)**—15%
- **Problem sets (5)**—15%
- **Technology activities (5)**—15%
- **Practice exams (2)**—2%
- **Quizzes (5)**—8%
- **Midterm exam (Modules 2–6)**—15%
- **Final exam (Modules 7–10)**—20%

All activities will receive a numerical grade of 0–100. You will receive a score of 0 for any work not submitted. Your final grade in the course will be a letter grade. Letter grade equivalents for numerical grades are as follows:

A	= 93–100	C+	= 78–79
A–	= 90–92	C	= 73–77
B+	= 88–89	C–	= 70–72
B	= 83–87	D	= 60–69
B–	= 80–82	F	= Below 60

To receive credit for the course, you must earn a letter grade of C or better (for an area of study course) or D or better (for a course not in your area of study), based on the weighted average of all assigned course work (e.g., exams, assignments, discussion postings).

STRATEGIES FOR SUCCESS

First Steps to Success

To succeed in this course, take the following first steps:

- Read the entire Syllabus carefully, making sure that all aspects of the course are clear to you and that you have all the materials required for the course.

- Take time to read the entire Online Student Handbook. The Handbook answers many questions about how to proceed through the course, how to schedule exams, and how to get the most from your educational experience at Thomas Edison State University.

- Arrange to take your examination(s) by following the instructions in this Syllabus and the Online Student Handbook.

- Familiarize yourself with the learning management systems environment—how to navigate it and what the various course areas contain. If you know what to expect as you navigate the course, you can better pace yourself and complete the work on time.

- If you are not familiar with web-based learning, be sure to review the processes for posting responses online and submitting assignments before class begins.

Study Tips

Consider the following study tips for success:

- To stay on track throughout the course, begin each week by consulting the Course Calendar. The Course Calendar provides an overview of the course and indicates due dates for submitting assignments, posting discussions, and scheduling and taking examinations.

- Check Announcements regularly for new course information.

Using AI Ethically: A Guide for TESU Students

TESU's Academic Code of Conduct permits student AI use in support of their writing and research process--not as a replacement for original writing. Document AI use with an acknowledgment statement at the end of each assignment, noting the tools and prompts used. Cite any AI-generated content on the References page. Please review Using AI Ethically: A Guide for TESU Students for more detailed information.

Peer Tutoring and Coaching Support

The Peer Tutoring and Coaching program provides a great opportunity for students to connect with current or former TESU students who can relate to your experience and help with your progress. TESU's peer tutors for math, English, and writing will assist you with essential course content and help you develop skills for your academic success. Our peer coaches can help with your transition as a new TESU student and provide support, guidance, and strategies for overcoming challenges along the way. There is no cost to you for peer tutoring and coaching support.

If you are interested in or just curious about the program and want more details, please email the Peer Support team directly at peersupport@tesu.edu. You can also access the Peer Support Program course space here.

COMMITMENT TO DIVERSITY, EQUITY, AND INCLUSION

Thomas Edison State University recognizes, values, and relies upon the diversity of our community. We strive to provide equitable, inclusive learning experiences that embrace our students' backgrounds, identities, experiences, abilities, and expertise.

ACCESSIBILITY AND ACCOMMODATIONS

Thomas Edison State University adheres to the Americans with Disabilities Act (ADA, 1990; ADAAA, 2008) and Section 504 of the Rehabilitation Act of 1973. The Office of Student Accessibility Services (OSAS) oversees requests for academic accommodations related to disabilities; a student who is pregnant, postpartum, or a student parenting a newborn who is not the birth parent [as covered under NJSA18A]; and students requesting academic accommodation for a short-term/temporary illness and/or injury. Information can be found on the Office of Student Accessibility Services webpage and questions can be sent to ADA@tesu.edu.

ACADEMIC POLICIES

To ensure success in all your academic endeavors and coursework at Thomas Edison State University, familiarize yourself with all administrative and academic policies including those related to academic integrity, course late submissions, course extensions, and grading policies.

For more, see:

- [University-wide policies](#)
- [Undergraduate academic policies](#)
- [Undergraduate course policies](#)
- [Graduate academic policies](#)
- [Graduate course policies](#)
- [Nursing student policies](#)
- [Nursing graduate student policies](#)
- [International student policies](#)
- [Academic code of conduct](#)