# Math 131 - 02 Calculus I Fall 2024 Syllabus

**Instructor :** Richard Bartels, PhD

**Contact Information :** MECC 227, 860-297-4244, rbartels@trincoll.edu

Office Hours: MW 1:00 pm - 3:00 pm
or by appointment (email to set up)

**Lecture :** MWF 8:30 - 9:45 am MECC 232,

**Textbook :** *Calculus* ($1^{st}$ edition) by Laura Taalman and Peter Kohn

Note: The hardcover copy of the textbook from the bookstore comes bundled with one semester of Achieve (online homework platform) access. If you buy the book elsewhere, it probably **does not** come with Achieve access, which will need to purchased individually from the publisher's website (see Moodle for details). This semester students will receive free access to the e-book via the Achieve website. See instructions on Moodle for a link to access the textbook.

**Grading :** Course grades will be assigned in the following way. Your final letter grade will be determined from your numerical percentage grade in the standard way (..., $B$ 83-86, $B^+$ 87-89, $A^-$ 90-92,...) using the breakdown below.

Note: it is the policy of the math department to not award the grade of $A+$ in 100-level courses.

| | |
|---|---|
| Attendance/Participation : | 5% |
| Homework & Quizzes : | 25% |
| 3 Exams : | 15% each |
| Final Exam : | 25% |

**Important Dates :**

| | |
|---|---|
| Tues, Sep 10 | Add/Drop Period ends |
| | Last day to declare a class Pass/Low Pass/Fail |
| Tues, Nov 5 | Last day to withdraw from Fall Term courses |
| Oct 28 – Nov 1 | Advising Week |
| Mon, Dec 9 | Last day of classes |
| | Final day to elect to change a Pass/Low Pass/Fail grade to a letter grade |
| Dec 12 - 18 | Final examinations |

**Please read and sign the following declaration regarding academic integrity:**

*In accordance with Article II of the Trinity College Student Integrity Contract, I hereby pledge that the papers, exams, and other academic exercises I submit for this course will represent my own work; that I will properly acknowledge and attribute any and all information and ideas that I have used from other sources; and that no collaboration unauthorized by the instructor of the course will occur in the course of its completion.*

Signature: _____ Date: _____

**Office Hours :** You are encouraged (and expected!) to come to office hours whenever you have questions. It is especially important to come to office hours when you don't understand a question from a previous exam or quiz, but you are always welcome to talk about homework problems and course material. If you are unable to make my regularly scheduled office hours, please email me set up an appointment, or drop in if I'm in my office.

**Tutoring:** Drop-in tutoring is available in the Math Tutoring Center (Q-Center), located in MECC 172, Monday through Thursday 4-10pm and Sunday 7-10pm. The schedule and instructions to access tutoring will be made available in the second week of classes and linked from Moodle as well as at the webpage `https://www.trincoll.edu/quantitative-center/tutoring-support/`

**Exams :** There will be three in-class exams as indicated on the schedule below, and one cumulative final exam which is scheduled by the registrars office based on the time of our class meeting.
**Do not make arrangements to leave for break before the final exam date.**
Final Exam Date and Time: Thursday Decemeber 12, 12:00 - 2:30pm

**Expectations:**

- You should expect to spend at least 8-12 hours per week outside of class working on homework assignments, reading the relevant section from the text, reviewing your notes and supplemental materials, seeking help in office hours or at the Math Tutoring Center, etc.
- You are expected to participate in lecture. The focus should be on keeping up with and understanding what is going on, not on taking notes. Ask questions when you don't understand something! If you fall too far behind, take notes and come to office hours.
- You should have a solid understanding of the precalculus material contained in Chapter 0, and to seek help when you identify any weaknesses in your understanding.

**Learning Goals:** In this course, we will quickly recall (in Ch 0) some essential facts about functions of a single real variable and their graphs before undertaking a treatment of differential calculus (in Ch 1-3). Throughout, we will focus on gaining a strong intuitive, geometric, and formal understanding of important definitions, theorems, methods, and applications:

- (Ch 1) Understand the concept of "limit", it's essential role in defining "continuous" functions, and important properties of continuity, especially the Intermediate Value Theorem. Be able use algebraic techniques, and results from class to calculate limits for a wide variety of elementary functions.
- (Ch 2) Understand the concept of "derivative", especially how it is defined using a limit, and how it may be interpreted as a rate of change, or the slope of a tangent line. Be able to use algebraic techniques, and results from the class to calculate derivatives for **all** elementary functions.
- (Ch 3) Understand the application of the above to fundamental problems in geometry, physics (especially motion), economics (especially marginal quantities), and other disciplines. Be able to solve various "word problems" using techniques of calculus, especially "related rates" and optimization problems. Be able to sketch accurate graphs given information about the derivatives.
- Be able to communicate mathematics effectively, using complete sentences which blend the English language with mathematical definitions, notation and accompanying figures.

**Quizzes and other in-class assessments:** In-class quizzes will take place roughly every other week on Friday during the first 10-15 minutes of class. Occasionally, in-class group work will be collected and counted towards your Quiz grade. Make-up quizzes will not be given.

**Homework :** One component of your homework grade will be graded problems assigned through the online Achieve system. Information to self-enroll in Achieve will be available on Moodle. You are responsible for checking the website for due dates. Typically there will be one assignment for each 1-2 lectures, with 1-2 assignments due each week.

In addition to the online Achieve assignments, written homework problems will be assigned once every 1-2 weeks. Written homework is due at the beginning of class; late assignments will be penalized 30% per day.

*You are encouraged to form study groups and visit office hours or the Tutoring Center for help with homework problems, but you must write your solutions independently.*

**Students with Accommodations :** Trinity College is committed to creating an inclusive and accessible learning environment consistent with the Americans with Disabilities Act. Students with disabilities who may need some accommodation in order to fully participate in this class are urged to contact the Student Accessibility Resource Center, as soon as possible, to explore what arrangements need to be made to assure access.

If you have approval for academic accommodations, please notify me by the end of week two of classes. For those students with accommodations approved after the start of the semester, a minimum of 10 days' notice is required. Please be sure to meet with me privately to discuss implementation.

Student Accessibility Resources can be reached by emailing SARC@trincoll.edu

**Academic Integrity :** In accordance with the Trinity College Student Integrity Contract, students are expected to abide by the highest standards of intellectual honesty in all academic exercises. Intellectual honesty assumes that student do their own work and that they credit properly those upon whose work and thought they draw. It is the responsibility of each student to make sure that they are fully aware of what constitutes intellectually honest work in every exam, quiz, homework, or other academic exercise submitted for evaluation in a course at Trinity College.

**Course Webpage:** At the webpage https://calculus.domains.trincoll.edu you will find information about the Math Tutoring Center, Calculus workshops, as well as links to helpful desmos graphs and other supplemental materials.

**Calculus Workshops:** The calculus workshop is an optional 0.25 credit (pass/fail) class, which meets once a week for 75 minutes in MECC 172. Each week, you will work in small groups with students from various sections of Math 131 on worksheets of supplemental problems and exercises designed to reinforce and expand your understanding of the material from lecture.

There are four sections. You can enroll as if it were any other class:

| | | | |
|---|---|---|---|
| Math 131-20 | Thursday | 10:50am-12:05pm | MECC 172 |
| Math 131-21 | Thursday | 9:25am-10:40am | MECC 172 |
| Math 131-22 | Tuesday | 10:50am-12:05pm | MECC 172 |
| Math 131-23 | Tuesday | 9:25am-10:40am | MECC 172 |

**Attendance Policy :** Attendance of all lectures is required. Attendance will be taken at the beginning of each lecture and will be counted toward the Attendance/Participation grade at the end of the semester.

Under normal circumstances, missed homework, quizzes or exams cannot be made up and will receive a grade of zero. In the event of an unforeseen unavoidable circumstance which prevents you from attending class on the day of a quiz or homework due date, a suitable make-up assignment, or excusal from the assignment will be granted on a case-by-case basis, provided written documentation of illness or emergency, or a note from the Dean of Students office.

*It is your responsibility to find out what was covered in any lecture that you miss and to arrange for the submission of any assignments before the due date.*

**Course Policies :**

- **Low Exam Policy:** If your grade on the final exam is better than the grade on your lowest midterm exam, your final exam grade will replace your low exam grade. Note: you must take all three midterm exams.
- **Calculator Policy:** The use of a graphing calculator on exams is prohibited. You may use any calculator during class, but not any other electronic devices, except for note taking (this includes cell phones, laptops, and MP3 players). See me if you're unsure if your calculator is appropriate.
- **Use of Moodle:** I will use Moodle to post links to supplemental and review material, copies of homework assignments, solutions, handouts, etc. Please make sure you are able to access the Moodle site and bookmark it.
- **Use of Email:** I will use trincoll email to make mass announcements. Please make sure that your Trinity email account is working and check regularly for announcements.

**Tentative Weekly Schedule :**

| Week number | Monday of week | Textbook sections | Topics |
|---|---|---|---|
| 1 | Sep 4 | 0.1, 0.2 | Review of Functions, Piecewise Functions, Domain, Graphs, Transformations, Inverses |
| 2 | Sep 11 | 1.1, 1.4 | Idea of Limit, Limits from Table, Limits from Graph, Definition of Continuity, Left/Right Continuity, Discontinuities, Intermediate Value Theorem |
| 3 | Sep 18 | 1.5, 1.6 | Limit Rules, Cancellation Theorem, Squeeze Theorem, Infinite Limits, Limits at Infinity, Vertical/Horizontal Asymptotes |
| 4 | Sep 25 | 2.1, 2.2 | Idea of Derivative, Average Rate of Change, Definintion of Derivative, Left/Right Differentiability, Differentiability Implies Continuity, Tangent Line Approximation, Second Derivative |
| 5 | Oct 2 | **[[Exam 1]]**, 2.3 | **EXAM 1 (0.1-0.2, 1.1, 1.4-1.6)**, Basic Derivative Rules, Product Rule, Quotient Rule |
| 6 | Oct 9 | 2.3, 2.4 | Basic Derivative Rules, Product Rule, Quotient Rule, Chain Rule, Implicit Differentiation |
| 7 | Oct 16 | 3.5, 2.6 | Related Rates Word Problems, Trig and Inverse Trig Derivatives |
| 8 | Oct 23 | 2.5 | Exponential Derivatives, Definition of e (handout), Log Derivatives, Logarithmic Differentiation, Inverse Function Theorem |
| 9 | Oct 30 | **[[Exam 2]]**, 3.1 | **EXAM 2 (2.1-2.4, 2.6, 3.5)**, Critical Points, Local Extrema |
| 10 | Nov 6 | 3.1, 3.2 | Rolle's Theorem, Mean Value Theorem, Sign Charts, Increasing/Decreasing, First Derivative Test |
| 11 | Nov 13 | 3.3, 3.4 | Concavity, Inflection Points, Second Derivative Test, Curve Sketching, Global Extrema on Intervals |
| 11* | Nov 20 | 3.4 | Optimization Word Problems |
| 12 | Nov 27 | **[[Exam 3]]**, 3.4 | **EXAM 3 (2.5, 3.1-3.4)**, Optimization Word Problems |
| 13 | Dec 4 | 3.5, 3.6 | Related Rates Word Problems, L'Hopital's Rule, Indeterminate Forms, 0/0, inf/inf, inf-inf, 0*inf, 0^0, 1^inf |
| 13* | Dec 11 | Review | |

*The content, policies, assignments, and schedule listed in this syllabus are subject to change. I will announce any changes in class and via email.*