MATH 005B Single Variable Calculus II Fall 2026
76172 TTh 1:15 – 3:45 pm C-351 5 units

Instructor: Dr. Matt Henes **E-mail:** mthenes@pasadena.edu **Phone:** (626) 585-7456
Website: www.matthenes.com **Office:** V-216F
Office Hours: MW 11:30-12:45 pm in V-216F; W 4-5 pm and TTh 5-6 pm via Zoom 310 291 0470

Text: "Calculus," 9th ed. by Stewart, Clegg, and Watson with WebAssign ISBN 978-1-337-62418-3. Available at the PCC bookstore or through Cengage.

Prerequisite: Math 005A or Math 005AH.

Course description: Differentiation and integration of trigonometric, exponential, logarithmic, hyperbolic functions, polar, and parametric equations; applications and techniques of integration; indeterminate forms and infinite sequences and series. As an honors course, students will be expected to complete additional assignments involving more extensive proofs and problem solving to gain deeper insight of single variable calculus theory and applications.

Student Learning Outcomes: Upon successful completion of this course you will be able to:

1. Differentiate and integrate transcendental functions; evaluate limits in indeterminate form.
2. Select appropriate techniques and correctly perform a specific integration.
3. Solve application problems involving integration.
4. Perform differentiation and integration on parametric and polar curves.
5. Represent functions as power series, test these power series for convergence, and use the theory of power series in applications.

Course Content: Lectures, assignments, and assessments will be based on most of chapters 6, 7, 8, 10, 11, and some of chapter 9.

Required Materials:

Pencils	1 ½" (or larger) binder with dividers
Eraser(s)	OR in lieu of the above, a tablet device
Lined paper	Scientific calculator

Homework (15% of your grade): The best way to learn math is to do it. Homework is your opportunity to practice working problems and learn the math you'll see in class. Homework for this course is assigned through WebAssign, so you'll need to purchase access from the PCC bookstore or directly from Cengage by going to GentEnrolled.com. Use Class Key **pasadena 8374 3403** to access my course. Math tends to build on itself , and one of the best ways to be successful in this course is to do homework regularly and complete assignments on time. Most assignments will be due on Thursday and Sunday and will close at 11:59 on the day they are due. Though homework represents a relatively small portion of your overall grade, it is when most of your learning will happen; the time you spend on assignments each week is an investment toward ensuring success on exams. Your four lowest homework scores will be dropped (this is about 10 percent of the homework assignments for the course).

Exams (60% of your grade): Exams are your opportunity to show what you've learned in this course, so they account for the largest portion of your grade. In this class, we'll have four exams, tentatively scheduled for **Tue 9/15 (Ch 6)**, **Tue 10/6 (Ch 7)**, **Tue 11/10 (Ch 11)**, and **Tue 12/1 (Ch 8-10.2)**. I ask that you please these them into account when planning your personal schedule. Arranging for make-up tests can be challenging, so optimally, everyone will take exams in class as scheduled. If something comes up, I'll consider make-ups for missed exams on a case-by-case basis.

Because exams are intended to reflect what you've learned, and because this course is intended to prepare you for future STEM classes, all exam scores will be included in your final grade.

Final Exam (25% of your grade): Tuesday, December 8, 1 - 3 pm
The final includes material from throughout the course (that's Ch 6 – Ch 10), so when you prepare for the exam, you'll be able to reinforce the concepts you've learned throughout the term. To pass the class, you are required to take the final exam.

Academic Dishonesty: Academic integrity is important to ensure that the grades I submit are meaningful. Unfortunately, I need to address cheating. Any student caught cheating on an exam will receive a grade deduction for the exam and can possibly receive a score of zero for that exam. I am required to report the violation to the Office of Student Life for potential further action. According to PCC policy, any form of academic dishonesty can be grounds for receiving a grade of F and possibly dismissal from the college. Please make sure you have an official photo ID (such as a PCC ID card, a driver license, or a passport), as it will be checked during this class to verify that students in the class are those who are officially enrolled. If I'm unable to verify your ID, then I can't assign a passing grade for the class.

Calculators: Use of scientific calculators will be allowed on exams. Use of any other electronic device will be considered cheating.

Assigned grades are based on performance on exams and homework, not on extra credit or external factors such as GPA and transfer. Course grades will be no lower than those shown below.
A: 90-100% B: 80-89% C: 73-79% D: 60-72% F: below 60%

Canvas: Class notes and grades will be recorded on Canvas. Please let me know of any discrepancies or mistakes in posted scores within one week of being posted so I can correct them in a timely manner.

Attendance/Classroom Policies:

- Attend regularly
- Arrive on time
- Don't leave early
- Silence cell phone
- No food or drinks except bottled water
- No visitors (including children)

Additional Information: Tutoring is available at the Math Success Center (R-406), as well as the Zone for athletes (GM-112A). The office of Disabled Student Programs and Services (D-209) provides support for students with documented disabilities; please let me know of any accommodations for which you qualify.

Important Dates:
9/7 Last Day to Add or Drop Without a "W"
9/7 Labor Day (no classes)
11/11 Veterans Day (no classes)
11/13 Last Day to Drop With a "W"
11/26-11/29 Thanksgiving Break (no classes)

Math 05B Course Outline

Student Performance Objectives (numbering corresponds to Student Learning Outcomes)

1.1 Find derivatives and integrals involving logarithmic, exponential trigonometric and hyperbolic functions and their inverses.
1.2 Evaluate limits in a variety of indeterminate forms using L'Hospital's Rule and algebraic techniques.

2.1. Perform different techniques of integration, including partial fractions, trigonometric integrals, trigonometric substitutions and integration by parts.
2.2. Utilize numerical integration techniques including trapezoidal and Simpson's rule.
2.3 Evaluate improper integrals.

3.1. Solve applied problems involving arc length, area of a surface of revolution, moments, center of mass, separable differential equations, and growth and decay.
3.2. Revisit applications including work and volume.

4.1. Graph, integrate and differentiate parametric and polar functions.
4.2 Solve applied problems with parametric and polar functions including finding tangent lines and computing area.

5.1. Test infinite series for convergence by using the following tests: integral, ratio, root, alternating series and comparison.
5.2. Find Taylor series for basic functions (trigonometric, exponential, logarithm, inverse trig., root). and determine the radius and interval of convergence.
5.3 Use Taylor series in applications including integration and estimation.

Course Content Outline

Exponential and Logarithmic Functions

1.1 Inverse functions
1.2 Natural logarithmic function
1.3 Natural exponential function
1.4 Differentiation and integration
1.5 Growth and decay

Transcendental Functions

2.1 Trigonometric Functions
2.2 Inverse trigonometric functions
2.3 Hyperbolic functions
2.4 Inverse hyperbolic functions

Techniques of Integration

3.1 Integration by parts
3.2 Trigonometric integrals
3.3 Trigonometric substitution
3.4 Partial fractions
3.5 Rationalizing substitution
3.6 Numerical integration
    3.6.a Trapezoidal Rule
    3.6.b Simpson's Rule
3.7 Applications of Integration
    a. Arc Length
    b. Area of a Surface of Revolution
    c. Moments and Centers of Mass
    d. Separable Differential Equations

Define and graph curves using parametric equations

4.1 Compute rates of change along parametric curves
4.2 Compute arc lengths of parametric curves
4.3 Compute definite integrals of parametrically defined curves

Define and graph curves using polar equations

5.1 Compute rates of change along polar curves
5.2 Compute arc lengths of polar curves
5.3 Compute definite integrals of polar functions
5.4 Compute area of polar regions

Indeterminate Forms

6.1 L'Hospital's Rule
6.2 Improper integrals

Infinite Sequences and Series

7.1 Convergence of Sequences
7.2 Series
7.3 Tests for convergence of series including: Comparison, Limit Comparison, Alternating Series, Integral, Ratio and Root tests
7.4 Power series, Radius and Integral of Convergence
7.5 Representing functions as power series.
7.6 Differentiation and integration of power series
7.7 Taylor and Maclaurin series
7.8 Binomial series
7.9 Applications of power series including integration and estimation