MTH 151 Syllabus

Spring 2026

Peter Keep

Welcome to MTH 151 - Calculus II/Analytic Geometry! This course syllabus will serve as a repository for all of the course details, policies, and any other required information to meet college and state requirements.

This document might be a bit hard to navigate, and it can sometimes be hard to read. We'll try to highlight the most important and essential parts for students on the course website.

1 Faculty and Section Information

1.1 Faculty Information

Table 1.1

Instructor Name:	Peter Keep
Email:	keepp@morainevalley.edu
Office:	A230
Mailbox:	C154
Office Phone:	(708) 974-5614
Testing Center File #:	564

1.2 Office Hours

Office hours this semester are:

- Mondays: 12:30pm–2:30pm
- Thursdays: 10:30am–12:30pm

These 4 hours are times when I am *guaranteed* to be in my office.

Note 1.2 If I am unavailable during an office hour or need to re-schedule an office hour temporarily, I will post a note on my office door and send a message to the class.

You do not need to set up an appointment or inform me before-hand that you're coming, unless you'd like for me to prepare something specific for our meeting. Otherwise, these are just drop-in hours for students in my courses.

If you would like to meet outside of these times, then we can set up a time that works in both of our schedules.

1.3 Section Information

Table 1.3

Section Number:	007
Room Number:	D125
Meeting Times:	T/Th 12:30pm–2:45pm
Modality:	Traditional (face-to-face)
First Class:	01/13/2026
Last Class:	05/07/2026
Final Exam (Part 1):	05/05/2026
Final Exam (Part 2):	05/07/2026

2 Course Information

2.1 Course Identification

Table 2.1

Course Number:	MTH 151
Course Title:	Calculus II/Analytic Geometry
Credit Hours:	5 (Lecture/Demonstration)
Total Contact Hours/Week:	5

2.2 Catalog Description

Prerequisites

MTH 150 (Calculus I) with a minimum grade of "C."

Course Description

This course is a continuation of MTH-150 (Calculus I). Topics include applications of the integral, techniques of integration, indeterminate forms, improper integrals, infinite series, conic sections, polar coordinates, and parametric equations.

Illinois Articulation Initiative number: MTH 902

2.3 Major Course Concepts

1. Integration techniques
2. Applications of the integral
3. Improper integrals
4. Sequences and series
5. Conic sections
6. Parametric and Polar equations; plane curves

2.4 Expected Outcomes for Student Learning

Course Student Learning Outcomes

Upon completion of this course, a student will be able to:

1. Use integration to compute the area under a curve and between two curves.
2. Use integration to compute the volume of solids of revolution using the methods of disks, shells and washers.
3. Use integration to compute arc length, surface areas of solids of revolution, and other geometric or physical measurements.
4. Employ various techniques (integration by parts, partial fractions, trigonometric substitution) to find indefinite integrals and to compute the values of definite integrals.
5. Use L'Hopital's Rule to evaluate improper integrals.
6. Identify whether an infinite series is convergent, conditionally convergent, or divergent.
7. Use power series to find derivatives and integrals of functions.
8. Identify, describe and sketch basic conic sections using rotation and/or translation of second degree equations.
9. Graph, differentiate and analyze relations expressed in parametric form.
10. Graph, differentiate and integrate functions in the polar coordinate system.
11. Use a computer algebra system to solve problems that are challenging to attempt by conventional methods.

Common Learning Outcomes

Quantitative Literacy: Use processes, procedures, data or evidence to solve problems and make effective decisions.

3 Books and Supplies

3.1 Textbook

We will not be using a traditional textbook in this course. This semester we will be using a free and open source calculus textbook, called *Discover Calculus*. You can find the link to the textbook website, pdf, and relevant portions of the textbook on Canvas.

3.2 Calculators

Similarly, we will not be using any specific calculators this semester. You can bring a calculator that you're comfortable with to class if you'd like, and we'll make use of free graphing tools like Desmos in class.

Calculators with a computer algebra system are prohibited on any graded work.

4 Classroom Policies and Procedures

4.1 Attendance and Participation

Participation in this class is crucial for student success. This obviously includes the expectation that students will attend class sessions. But more than that, we will expect that you come to class prepared, following along with the schedule, and ready to participate.

4.2 Academic Integrity

Mathematics Department Statement on Academic Integrity

The Department of Mathematics views upholding academic integrity as an integral part of student learning, classroom engagement, and ultimately, the production of student-generated work. The Department believes adherence to the principles stated in the MVCC Code of Academic Integrity preserves the value of assigned grades and other assessments. Instances of academic dishonesty compromise the development of problem-solving skills and other skills necessary for subsequent work in mathematics, depriving students of an authentic learning experience. Overall, we believe integrity in the mathematics classroom translates into ethical behavior beyond academia.

Course Policy

There is a lot of research literature on cheating, and specifically cheating in math classes. One of the driving motivators for Academic Dishonesty in classes like this one is desperation. I have tried to introduce some grading policies that reduce stress by getting rid of whatever high-stakes exams that I can, but I still want to say: *if you are in a position where you feel the need to cheat in order to succeed, please talk to me first. I am happy to help!* We can set up a plan to retake whatever you're working on in a way that removes the need to cheat within the confines of the semester.

Instead of a list of things that you can or cannot do on individual assessments, just make sure that you are representing your own understanding and learning honestly.

Repeated instances of Academic Dishonesty will result in a failing grade for the course.

A Note on Generative AI and LLMs

The short version of this note is, simply, "Don't use them."

The medium-length version of this note is is that this course is one that will require you, first of all, to think deeply. The course includes calculations, computations, and other things like that, but most important is the deep thinking we'll do about the objects we learn about, the properties of them, and how they interact with each other. My stance is that there is no practical, helpful, or ethical way to use generative AI and large language models to accomplish or assist with this.

I promise you that in whatever task or process you consider, these tools will do a less-than-good job and reduce your opportunity to think deeply. Mathematics is a communal activity, done by communicating with each other. While I hope that this class reflects this, I implore you to choose human communication whenever you might otherwise decide to use a tech company's forgery of dialogue.

For the long version of this note, or for some ideas of productive alternatives to whatever you might think to use a generative AI tool for, please visit me in office hours or send me an email. I'd love to talk with you about ways that we can reduce our reliance on the tech industry.

Last, and equally important, I ask that you respect me and the work I've done by refraining from inputting my textbook, course notes, activities, practice problems, or examples into these tools for any reason.

4.3 Email and Messaging

When you email me or message me on Canvas, make sure to include your name and which class you're in, especially at the beginning of the semester while I get to know everyone. I will try to respond to your emails within 2 business days, but I may take longer depending on the question itself or the timing in the semester.

4.4 Withdrawal Deadline

A student who does not withdraw officially from a course may receive a grade of "F" depending on course progress or course attendance.

Table 4.1

Last date to drop and get a refund:	01/21/2026
Last date to drop with a "W" grade:	04/07/2026

Note 4.2 If you have a hold on your record which prevents you from dropping classes online, you must either visit the Registration Office (S111A) or call (708) 974-2110 to drop classes during normal business hours

4.5 Accommodations

I am committed to creating an environment where every student feels empowered and able to learn. If you anticipate or experience any barriers to learning in this course, please contact me. You can talk with me before or after class, visit my office hours, or email me a note with your concerns. I am happy to talk with you about some possible solutions that don't compromise the intent of the assessments in this class.

If you have a disability or think you may have a disability, please contact the Center for Disability Services (disability.services@morainevalley.edu or 708-974-5711) to learn how to get approved for relevant accommodations. If you have already been approved for accommodations through the CDS, let me know so that we can discuss how to best implement and apply those accommodations that you are entitled to.

5 Grading Policies

This class will use a grading scheme called "Standards Based Grading" this semester. It is different from a traditional points-based grading system in several ways:

- There are no points or number grades on anything. Instead, we'll focus on feedback instead of numbers.
- Every assignment or assessment that is turned in for a grade will be aligned with a topic in the class that you are graded on. Your submitted

work will either meet the expectations for that topic (we'll call these "graded standards") or it will not.

- You can retake things to update your grade on a standard.

5.1 Main Standards

These are the essential topics in the course that anyone can expect a student from this course (or an equivalent one at a different institution) to cover. Students should expect to be able to demonstrate their understanding of all (or almost all) of these topics by the end of the semester.

Continued Learning

Demonstrating that you understand a topic in the class is great, but is not everything. A portion of your grade will be based on whether you are able to continue to demonstrate your understanding of the Main Standards throughout the semester. These Continued Learning requirements are met when you meet a Main Standard for the second time (whether that is by retaking something or demonstrating it on a different assignment)

5.2 Extra Standards

These are topics in the course that are not as critical but still useful, interesting, and commonly included in courses that are equivalent to this one. Sometimes they are extensions of some of the topics from the Main Standards, and sometimes they are truly extra topics that can be discussed in the same way as the main standards.

5.3 Grading Scale

Instead of focusing on a number grade for any assignments, the focus will be on feedback and growth. I will try to leave helpful comments when your answers are incorrect so that you can continue to learn.

For every grade, you will get marked categorically:

- *Cannot Assess:* the answers might be incomplete or missing, so that I cannot assess what you know.
- *Needs Work:* there are enough mistakes, or big enough mistakes, where it is clear that some more work is needed on this topic.
- *Meets Expectations:* these answers are good, and while there may be some small mistakes, they are inconsequential enough that it is still clear that you understand the concepts we're testing.
- *Continued Learning:* this is the second time that you have demonstrated understanding of this topic!

  Note 5.1 Continued Learning will only be a relevant grade for the Main Standards.

5.4 Grade Composition

Your grade will be calculated based on your progression through the different types of standards. Below is a chart denoting how many standards need to be met from each category to earn each letter grade.

Table 5.2

	A	*B*	*C*	*D*
Main Standards (20)	19	16	13	11
Continued Learning (20)	8	4	2	0
Extra Standards (7)	5	3	1	0
Practice Problem Reflections (14)	7	7	7	0

You will end the semester with the highest letter grade for which you have met the requirements in all four categories. In other words, each column represents the minimum requirements for that letter grade.

5.5 Assessments and Assignments

Practice Problem Reflections

Practice problems for the semester will be posted on Canvas. These problems will not be graded in the traditional sense. Instead, you will be asked to work on these problems at your own pace outside of class and report on your progress in a weekly "Practice Problem Reflection" assignment. In an effort to find a balance between flexibility and encouraging effective practice and reflection, these weekly reflections will be graded based on sufficient completion.

Practice Problem Reflections will be due every week on Friday (beginning during Week 2 and ending on Week 15) and will be submitted on Canvas.

Checkups

The course will feature "checkups" throughout the semester, each testing on an approximately equal portion of the course content. Each checkup will cover specific standards, listed in the course schedule.

Since the goal is that your grade at the end of the semester reflects what you've learned throughout the whole semester, the course will have replaceable checkups through retakes. The main goal with this grading scheme is to make sure that you can find out where you are misunderstanding something or where you have yet to grow in your knowledge, and then to make sure that you have the opportunity to demonstrate that you have fixed your misunderstandings or grown in your knowledge. To realize this goal, students will be offered consistent opportunities to retake previous checkups in order to update their grade as they update their understanding of the topics

All students will work on the checkups independently unless otherwise noted. All checkups (and retakes) will be proctored in-person.

6 Graded Standards

6.1 Main Standards

M.1. *Net Change and Antiderivatives* In applications with position, velocity, and acceleration, find total displacement and distance traveled of an object, or other net changes. Find antiderivatives given an initial value.

M.2. *Area Between Curves.* For a region between curves, set up and evaluate integral expressions with regard to x or y, whichever is reasonable to represent the area of the region.

M.3. *Volumes of Solids of Revolution.* For a solid of revolution around an axis, set up and evaluate integral expressions to represent the volume of the solid using the disk or washer method as well as using the shell method.

M.4. *Physical Applications of Integrals.* Use Riemann sums to build and evaluate integral expressions for physical applications (including Mass and Work).

M.5. *Improper Integrals.* Describe the characteristics of improper integrals, and use limit notation to find evaluate improper integrals.

M.6. *u-Substitution.* Use substitution to find indefinite integrals and evaluate definite integrals.

M.7. *Algebraic Manipulations of Integrals.* Use algebraic manipulations of the integrand to find indefinite integrals and evaluate definite integrals.

M.8. *Integration by Parts.* Use integration by parts to find indefinite integrals and evaluate definite integrals.

M.9. *Integrating Powers of Trigonometric Functions.* Find indefinite integrals and evaluate definite integrals involving different powers of trigonometric functions.

M.10. *Introductory Sequences.* Describe the properties of a sequence using terminology, and find limits of sequences.

M.11. *Introductory Series.* Find partial sums of an infinite series and describe the convergence or divergence of a series through interpreting the sequence of partial sums.

M.12. *Divergence Test.* Apply the Divergence Test to a series and interpret the results.

M.13. *Alternating Series Test.* Apply the Alternating Series Test to an alternating series and interpret the results.

M.14. *Common Series Types.* Identify whether a given series is geometric, a p-series, or neither of these common series types. Interpret convergence or divergence for geometric series and p-series.

M.15. *Comparison Tests.* Use a Direct or Limit Comparison Test to compare a series to a common series in order to infer convergence or divergence.

M.16. *Ratio and Root Tests* Apply the Ratio and Root Tests to an infinite series and interpret the results.

M.17. *Polynomial Approximation of Functions.* Construct a Taylor polynomial of a specified degree centered at some specified value to approximate a function. Comment on the accuracy of the approximation.

M.18. *Power Series Convergence.* For a power series, find the interval and radius of convergence.

M.19. *Building Taylor Series.* Using the formula for terms in a Taylor series as well as some "known" Taylor series representations of specific functions, construct the Taylor series representation for a given function, and report the interval and radius of convergence.

M.20. *Parametric and Polar Curves.* Analyze and graph relations expressed in parametric and polar form.

6.2 Extra Standards

E.1. *Volumes with Shifted Axes.* For a solid of revolution around a vertical or horizontal line (shifted away from the axes), set up and evaluate integral expressions to represent the volume of the solid.

E.2. *Arc Length and Surface Area.* Set up integral expressions representing the length of a curve between two points and the surface area of a solid of revolution.

E.3. *Trigonometric Substitution.* Use trigonometric substitution to find indefinite integrals and evaluate definite integrals.

E.4. *Partial Fractions.* Decompose a rational function into partial fractions and find indefinite integrals and evaluate definite integrals involving these partial fractions.

E.5. *Integral Test.* For an infinite series, decide whether or not the integral test is appropriate, and when it is, apply it and interpret the results.

E.6. *Conditional and Absolute Convergence.* For a converging alternating series, explain whether it converges conditionally or absolutely, as well as the difference between the two.

E.7. *Calculus with Parametric and Polar Curves.* Differentiate, find slopes of tangent lines, and evaluate definite integrals for parametric curves and polar curves.

7 Schedule

Note 7.1 This schedule is an outline and it may change throughout the semester. Any changes will be announced.

Table 7.2 Tentative Course Schedule

Week	Date	Agenda
Week 1:	Jan. 13	Welcome to Class!
	Jan. 15	M.1. Net Change and Antiderivatives
Week 2:	Jan. 20	M.2. Area Between Curves
	Jan. 22	M.3. Volumes of Solids of Revolution
Week 3:	Jan. 27	E.1. Volumes with Shifted Axes
	Jan. 29	E.2. Arc Length and Surface Area
		Checkup 1: M.1, M.2, M.3
Week 4:	Feb. 3	M.4. Physical Applications of Integrals
		M.5. Improper Integrals
	Feb. 5	M.6. u-Substitution
Week 5:	Feb. 10	M.7. Algebraic Manipulations of Integrals
	Feb. 12	M.8. Integration by Parts
		Checkup 2: M.3, E.1, E.2, M.4
Week 6:	Feb. 17	M.9. Integrating Powers of Trigonometric Functions
	Feb. 19	E.3. Trigonometric Substitution
Week 7:	Feb. 24	*Staff Development Day: No Class*
	Feb. 26	*Checkup 3: M.5, M.6, M.7, M.8*
		Retakes for Checkups 1-2
Week 8:	Mar. 3	E.4. Partial Fractions
	Mar. 5	M.10. Introductory Sequences
	Mar. 9-15	*Spring Break: No Classes*
Week 9:	Mar. 17	M.11. Introductory Series
	Mar. 19	M.12. Divergence Test
		Checkup 4: M.6, M.8, M.9, E.3, E.4
Week 10:	Mar. 24	E.5. Integral Test
		M.13. Alternating Series Test
	Mar. 26	E.6. Conditional and Absolute Convergence
		M.14. Common Series Types
Week 11:	Mar. 31	M.15. Comparison Tests
	Apr. 2	*Checkup 5: M.10, M.11, M.12, E.5, M.13*
		Retakes for Checkups 3-4
Week 12:	Apr. 7	M.16. Ratio and Root Tests
	Apr. 9	*No Class*
Week 13:	Apr. 14	M.17. Polynomial Approximations of Functions
	Apr. 16	M.18. Power Series Convergence
		Checkup 6: M.13, E.6, M.14, M.15, M.16
Week 14:	Apr. 21	M.19. Building Taylor Series
	Apr. 23	M.20. Parametric and Polar Curves
Week 15:	Apr. 28	E.7. Calculus with Parametric and Polar Curves
	Apr. 30	*Checkup 7: M.17, M.18, M.19, M.20, E.7*
		Retakes for Checkups 5-6
Week 16:	May 5	*Final Exam (Part 1)*
	May 7	*Final Exam (Part 2)*

Weekly *Practice Problem Reflection* assignments are due on Friday of every week starting in Week 2 and ending in Week 15. They can be submitted on Canvas.