

# Syllabus - Math 012-01 - Spring 2026

**Instructor/Lecturer:** Haik Stepanian

**Office Hours:** Wednesdays and Fridays, 1:30 - 2:20pm in ACS 330A

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**Teaching Assistant:** Ash Rydell

**Office hours:** Wednesdays 4:00 - 5:00pm and Fridays 1:00 - 2:00pm in ACS 358C

**Email:** [ashrydell@ucmerced.edu](mailto:ashrydell@ucmerced.edu)

**Teaching Assistant:** Spenser Estrada

**Office hours:** Wednesdays 4:30 - 5:30pm and Thursdays 2:00 - 3:00pm in ACS 358C

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**Lecture Section:** There will be one lecture section held this fall:

MATH-012-01: MWF 2:30 - 3:20pm, ACS 120

**Discussion Sections:** There will be six discussion sections held:

|                 |                |         |                 |
|-----------------|----------------|---------|-----------------|
| MATH-012-02D: F | 5:30 - 6:50am, | COB 263 | Ash Rydell      |
| MATH-012-03D: M | 3:30 - 4:50pm, | COB 265 | Ash Rydell      |
| MATH-012-04D: M | 5:30 - 6:50pm, | COB 263 | Spenser Estrada |
| MATH-012-05D: F | 3:30 - 4:50pm, | COB 263 | Ash Rydell      |
| MATH-012-06D: M | 7:30 - 8:50pm, | COB 263 | Spenser Estrada |
| MATH-012-07D: W | 7:30 - 8:50pm, | COB 263 | Spenser Estrada |

**Course Textbook:** The primary source will be the [free] OpenStax book linked here: [Algebra and Trigonometry](#), along with Calculus [Volume 1](#) and [Volume 2](#).

**Course Webpage:** We will be using CatCourses, which may be found at [catcourses.ucmerced.edu](http://catcourses.ucmerced.edu). Also, do check and make sure the email address that CatCourses has for you is the correct one, and one that you will check as I have a tendency to email updates frequently.

**Grades:** Your final grade in this course will be based on your performance of your quizzes. More details below.

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**Learning Objectives:** Upon completion of this course the student should understand:

- how to differentiate and integrate of various classes of elementary functions, especially exponential and logarithmic functions;
- how to solve and interpret simple first-order differential equations;
- how to qualitatively and quantitatively solve the Logistic Differential Equation; and
- how to understand and use sequences and series in mathematics and science;

**Learning Outcomes:** Upon completion of this course, students should be able to:

- compute the antiderivative of elementary functions using the fundamental theorem of calculus;
- identify what substitutions into an integrand would render an otherwise non-integrable function into an integrable one;
- describe the behavior of various functions in extremes;
- be able to interact with differential equations and apply them to real life situations.

**Course Expectations:** During the course, students are expected to:

- Spend time outside of the course and discussions sections working and practicing the material.
- Work on, and complete, all discussion section worksheet problems, as well as the additional problems lists handed out on the CatCourses site.
- Prepare ahead of time by reading the notes, and other material pertaining to the upcoming lecture content.
- Participate discussion sections and get involved in the Math 012-01 course community.

**Lecture:** Math is a human endeavor. This is to say math isn't taught (or done) the same way everywhere. One lecturer may emphasize rigorous proofs and proof techniques, while another may emphasize only problem solving techniques, while another still may focus heavily the geometric intuition underlying the ideas, or even elect to discuss applications alone.

It is important that you are involved in your course to understand where it is going. Come prepared to think about the ideas and ask questions. See the schedule and read a little ahead. You don't need to have solved anything yet or have a deep understanding of the content, even a cursory glance at what's coming up will pay off massively.

**Conduct During Lecture:** You are expected to take notes and be respectful of the lecturer and other students in the lecture hall. This includes, but is not limited to, the following:

- Refrain from eating or drinking in class. See the prior bullet point.
- Put phones and laptops away, they are distractions.
- Set phones on silent.
- Enter and exit the lecture hall quietly.

**Discussion Sections:** You will be required to attend discussion sections in order to practice and develop your problem-solving skills with your fellow classmates and discuss the content of the in-discussion assignments (more below), from which the quizzes will draw heavy inspiration for questions. Bring your book (in whatever format) and all necessary materials.

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The discussion sections are run by the teaching assistant you signed up with. Since you registered for that particular section it means there is no time-conflict with any other course, lab, or discussion section you have. Therefore you should not need to change discussion sections.

It is expected that you come to section having already attempted to solve some or all of the worksheets. You should have also attended 3 hours of lecture the prior week to gain further exposure to the content. These will help you “know where to start.” Your TA will assist groups as needed.

**Worksheets:** Every week you will have a worksheets of approximately twenty problems. These twenty problems are your guide for studying the material in the corresponding section of the book/lecture pertaining to that worksheet.

**Quizzes:** At the end of your discussion section you will be handed a packet of three questions. Two of these three questions will be heavily dependent on the material of that week's worksheets you're working on due at the end of discussion. One of these three questions will come from any prior material.

There are no make-ups for this material. You may not elect to take your quiz in a different discussion. You may have up to two quizzes dropped to account for medical excuses or other issues as they arise.

Come to lecture to learn the material and get practice, go to discussion to make sure you get your final questions answered, and that you're on-time.

Arriving to discussion late will earn you a -25% penalty on your submission that week.

We learn by doing.

**Additional Resources:** It is recommended and encouraged that you make use of a graphing calculator or some other form of computational tool (such as Mathematica, Matlab, Maple, Octave, etc...) as some problems will require you to verify your work by using one of these tools. These tools can be very helpful in the learning process. Be careful, however, not make a habit of using a calculator on every problem you come across as *it will not be permitted on quizzes or the midterms*. You are expected to be able to compute everything you have learned up until now w/o the use of a calculator (i.e. fractions, simple trigonometric expressions, etc...).

Also on Macs there is a built-in program called “Grapher” that allows you to generate many kinds of plots, as well as tangent lines, derivatives, and integrals, which we will need to compute. You can go in and play with these functions in a hands-on manner; it can be quite fun and instructive - I find myself using it from time to time in my own studies and research.

If you do not have access to a Mac you may find a free alternative for the PC called Microsoft Mathematics. It will allow you to plot curves and calculate certain things and can be useful as well.

There also exists online <https://www.desmos.com> which you can use to plot some graphs with not as much functionality as the prior two local programs.

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There also exist many many online integral solvers. Be careful to not blindly copy answers directly from them, seeing does not translate to learning.

**Special Accommodations:** If you qualify for accommodations because of a disability, please submit a letter from Disability Services to the instructor in a timely manner so that your needs may be addressed. Student Affairs determines accommodations based on documented disabilities.

The instructor will make every effort to accommodate all students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance. Please speak with the instructor during the first week of class regarding any potential academic adjustments or accommodations that may arise due to religious beliefs during this term.

**Academic Integrity:** The existing policies of the University of California Merced forbid cheating on examinations, plagiarism, collusion, or the like. This university operates under those policies, violating them is to undermine the university. If you are caught violating any of the policies regarding academic honesty you and your work will be submitted to Student Judicial Affairs. If you are caught cheating during a quiz or exam, you will automatically fail that exam. The current policies may be found at: <https://osrr.ucmerced.edu/academic-integrity>

Math 12 Spring 2026 Schedule

| Week | Date          | Book Section         | Lecture Topic                                                      | Worksheet         | NOTE                 |
|------|---------------|----------------------|--------------------------------------------------------------------|-------------------|----------------------|
| 1    | Jan 21        | -                    | Introductions                                                      | -                 | -                    |
|      | Jan 23        | Notes                | Review of Functions and Limits                                     |                   |                      |
| 2    | Jan 26        | A&T 6.1              | Exponential Functions                                              | Worksheet Week 2  | Quiz Week 2          |
|      | Jan 28        | A&T 6.2              | Graphs of Exponential Functions                                    |                   |                      |
|      | Jan 30        | A&T 6.3              | Logarithmic Functions                                              |                   |                      |
| 3    | Feb 2         | A&T 6.4              | Graphs of Logarithmic Functions                                    | Worksheet Week 3  | Quiz Week 3          |
|      | Feb 4         | A&T 6.5              | Logarithmic Properties                                             |                   |                      |
|      | Feb 6         | A&T 6.6              | Exponential and Logarithmic Equations                              |                   |                      |
| 4    | Feb 9         | A&T 6.7              | Exponential and Logarithmic Models: Growth and Decay               | Worksheet Week 4  | Quiz Week 4          |
|      | Feb 11        | A&T 6.7              | Exponential and Logarithmic Models: Logistic Growth                |                   |                      |
|      | Feb 13        | -                    | Review/Flex                                                        |                   |                      |
| 5    | <b>Feb 16</b> | -                    | <b>Presidents Day Holiday</b>                                      | Worksheet Week 5  | <b>No Discussion</b> |
|      | Feb 18        | Vol. 1 Ch. 3.1 - 3.3 | Review of Derivatives: Derivative Rules                            |                   |                      |
|      | Feb 20        | Vol. 1 Ch. 3.6 - 3.7 | Review of Derivatives: The Chain Rule and Implicit Differentiation |                   |                      |
| 6    | Feb 23        | Vol. 1 Ch. 3.9       | Review of Derivatives: Exponentials and Logarithms                 | Worksheet Week 6  | Quiz Week 6          |
|      | Feb 25        | Vol. 1 Ch. 4.5       | Review of Applications of Derivatives                              |                   |                      |
|      | Feb 27        | Vol. 1 Ch. 4.5       | Review of Applications of Derivatives                              |                   |                      |
| 7    | Mar 2         | 1.2                  | The Definite Integral                                              | Worksheet Week 7  | Quiz Week 7          |
|      | Mar 4         | 1.3                  | The FTC                                                            |                   |                      |
|      | Mar 6         | 1.4                  | The FTC                                                            |                   |                      |
| 8    | Mar 9         | 1.5                  | Substitution                                                       | Worksheet Week 8  | Quiz Week 8          |
|      | Mar 11        | 1.5                  | Substitution                                                       |                   |                      |
|      | Mar 13        | 1.6                  | Integrals involving Exp and Log Functions                          |                   |                      |
| 9    | Mar 16        | 3.1                  | Integration by Parts                                               | Worksheet Week 9  | Quiz Week 9          |
|      | Mar 18        | 3.1                  | Integration by Parts                                               |                   |                      |
|      | Mar 20        | -                    | Review                                                             |                   |                      |
| 10   | <b>Mar 23</b> | -                    | <b>Spring Recess</b>                                               | -                 | <b>No Discussion</b> |
|      | <b>Mar 25</b> | -                    | <b>Spring Recess</b>                                               |                   |                      |
|      | <b>Mar 27</b> | -                    | <b>Cesar Chavez Holiday</b>                                        |                   |                      |
| 11   | Mar 30        | 1.7 and 3.4          | Arctan Integrals, and Partial Fraction Decomposition               | Worksheet Week 11 | Quiz Week 11         |
|      | Apr 1         | 3.4                  | Partial Fraction Decomposition                                     |                   |                      |
|      | Apr 3         | 3.4                  | Partial Fraction Decomposition                                     |                   |                      |
| 12   | Apr 6         | 3.7                  | Improper Integrals                                                 | Worksheet Week 12 | Quiz Week 12         |
|      | Apr 8         | 3.7                  | Improper Integrals                                                 |                   |                      |
|      | Apr 10        | 4.1                  | Basics of Ordinary Differential Equations                          |                   |                      |
| 13   | Apr 13        | 4.2-4.3              | Direction Fields and Separability                                  | Worksheet Week 13 | Quiz Week 13         |
|      | Apr 15        | Notes                | Autonomous ODEs                                                    |                   |                      |
|      | Apr 17        | 4.3                  | Separability                                                       |                   |                      |
| 14   | Apr 20        | 4.5                  | First-Order Linear ODEs                                            | Worksheet Week 14 | Quiz Week 14         |
|      | Apr 22        | 4.4                  | The Logistic Equation                                              |                   |                      |
|      | Apr 24        | 4.4                  | The Logistic Equation                                              |                   |                      |
| 15   | Apr 27        | Notes                | Predator-Prey or Lotka-Volterra Equations                          | Worksheet Week 15 | Quiz Week 15         |
|      | Apr 29        | Notes                | Predator-Prey or Lotka-Volterra Equations                          |                   |                      |
|      | May 1         | -                    | TBA                                                                |                   |                      |
| 16   | May 4         | -                    | TBA                                                                | Worksheet Week 16 | Quiz Week 16         |
|      | May 6         | -                    | TBA                                                                |                   |                      |
|      | May 8         | -                    | Review/Flex                                                        |                   |                      |