

# MATH 150H - Calculus and Analytic Geometry I (Honors)

## 1. Who should enroll?

- o This Calculus course is recommended for any student who majors in STEM and has taken calculus in high school; advanced knowledge of precalculus and some knowledge of calculus is recommended.
- o While many students will see Math 150 in their eligibility list, the department recommends that students consider their prior preparation, as this course does have expectations of students entering.
- o This course (one of Math 150, 150S, or 150H) is part of the required core for the AD-T in mathematics and for the Data Science degree.

## 2. Course Description and Topics Covered

- o This first in a three-semester calculus sequence is designed for highly motivated mathematics, science, and engineering majors. Topics include limits and continuity; differentiation of algebraic functions and their inverses, trigonometric functions and their inverses, and exponential functions and their inverses; integration and the fundamental theorem of calculus; and applications of differentiation and integration. The course provides mathematically talented students the opportunity to obtain a level of rigor above the level currently available in existing courses. It emphasizes logical reasoning, problem solving, and applications. UC CREDIT LIMITATION: Credit for MATH 115, MATH 115S, MATH 150, or MATH 150H. C-ID MATH-211.
- o Concepts are covered with the expectation that students are preparing to take Calculus II and beyond.

## 3. What to expect?

- o **Time:** The most common term lengths are listed below; others would be proportionate. Outside of class time is studying, completing homework, reviewing, etc.

| Term Length<br>(weeks) | In-class (hours<br>per week) | Out-of-class<br>(hours per week) | Total weekly time<br>(all types) | Total Term hours<br>(typical) |
|------------------------|------------------------------|----------------------------------|----------------------------------|-------------------------------|
| 17                     | 5                            | 10                               | 15                               | 255                           |
| 8                      | 11                           | 21                               | 32                               | 255                           |

- o **Technology:** Graphing technology is required, and many instructors use the TI-84CE while others use Desmos and Geogebra. Graphing technology is used regularly.

## 5. What prior knowledge do students need to know to be successful?

- o Solving Equations – quadratic, rational, radical, exponential, logarithmic, polynomial, trigonometric like:  $2\sin(x) - 1 = 0$
- o Inequalities and Interval Notation like:  $2 \geq x > -3$  can be written as  $(-3, 2]$
- o Rational Expressions – factoring, simplifying, long division, completing the square, rationalizing numerators like:  $\frac{x^2-x-6}{x-2} = x + 1 - \frac{4}{x-2}$

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- o Relations and Functions- definitions, evaluating, domain and range like:  $f(x) = \frac{2+x}{x}$   
when  $x = 10 \rightarrow f(10) = \frac{12}{10} = 1.2$
- o Trigonometric Identities – the ability to rewrite and algebraically manipulate trigonometric expressions like:  $\sin(x + y) = \sin x \cos y + \cos x \sin y$