

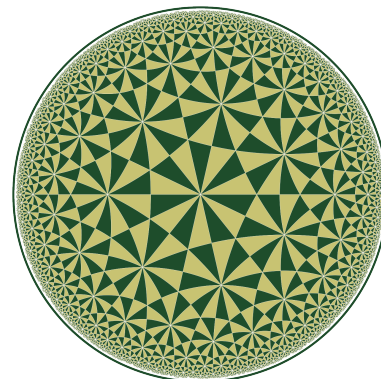
Spring 2027 Math Courses

Discover the ideas that power science, technology, security, and data.

Why take more math?

Mathematics is the language behind encryption, artificial intelligence, climate models, medical imaging, and the internet itself. Our upper-division courses are small, hands-on, and taught by faculty who love their subjects.

- **Build skills employers want:** problem solving, logical reasoning, modeling, and programming.
- **Explore the frontier:** post-quantum cryptography, coding theory, and geometric data analysis.
- **Add a math major or minor:** many of these courses fit into a math major or minor — ask your advisor how.
- **Grow as a thinker:** learn to ask good questions and answer them convincingly.



Every triangle above is the same size — in the hyperbolic plane! Find out how in MATH 470.

Start Here: Foundations

the gateway to upper-division math

MATH 235 Introduction to Proofs

Learn the language of modern mathematics — logic, sets, functions, and induction — and how to write clear, convincing arguments.

Why take it? This is where math shifts from following recipes to creating ideas, and it opens the door to every upper-division course.

MATH 244 Intro to Math Programming **NEW!**

Write code to explore, test, and visualize mathematical ideas, from prime numbers to fractals to simulations.

Why take it? A computer lets you check a conjecture on a million examples in seconds — and programming is a skill every employer values.

MATH 369 Linear Algebra

Study vectors, matrices, linear transformations, eigenvalues, and eigenvectors.

Why take it? It may be the most useful math there is: it runs search engines, machine learning, computer graphics, and data science.

MATH 301 Combinatorics

Master the art of counting with permutations, binomial coefficients, recurrences, generating functions, and graphs.

Why take it? The problems are easy to state and fun to puzzle over, and the ideas drive algorithms, probability, and computer science.

Modeling, Computation & Data

math in action

MATH 340 Ordinary Differential Equations

Model change over time with differential equations, using exact solutions, systems, and qualitative methods.

Why take it? From populations to circuits to epidemics, ODEs are how scientists predict what happens next.

MATH 332 Partial Differential Equations

Solve the heat, wave, and Laplace equations with tools such as Fourier series and separation of variables.

Why take it? PDEs describe sound, heat flow, fluids, and quantum mechanics — they are the math behind physics and engineering.

MATH 350 Numerical Analysis

Design and analyze algorithms that compute accurate approximate answers: root finding, interpolation, integration, and linear systems.

Why take it? Every simulation, from weather forecasts to video-game physics, runs on algorithms like these.

DSCI 473 Intro to Geometric Data Analysis

Use geometry and topology — distances, clustering, dimension reduction, and the shape of data — to find structure in complex, high-dimensional data sets.

Why take it? Data has shape, and learning to see it is a cutting-edge skill in data science and machine learning.

Codes, Secrets & Information

the math of the digital world

MATH 360 Intro to Information Security

Explore the mathematics of keeping secrets: modular arithmetic, classical ciphers, RSA, key exchange, and digital signatures.

Why take it? You rely on this math every time you shop online or send a message, and cybersecurity experts are in high demand.

MATH 460 Information Theory & Coding Theory

Measure information with entropy and design codes that compress data and correct errors in transmission.

Why take it? These ideas let space probes send pictures home across the solar system and keep QR codes and streaming video working.

MATH 463 Post-Quantum Cryptography

Study encryption schemes designed to withstand attacks by quantum computers, built from lattices, error-correcting codes, and other hard problems.

Why take it? In 2024 the U.S. government standardized its first post-quantum algorithms — this is a live research area you can join right now.

MATH 366 Intro to Groups, Rings & Fields

Meet abstract algebra: groups of symmetries, rings of integers and polynomials, and finite fields.

Why take it? One framework explains the Rubik's cube, why there is no formula for solving every quintic equation, and how modern codes work.

Structure & Beauty

the heart of pure mathematics

MATH 317 Advanced Calculus of One Variable

Revisit limits, continuity, derivatives, and integrals with full rigor and discover *why* calculus actually works.

Why take it? You will understand the real numbers at a deep level, which is essential preparation for graduate school in math, statistics, or economics.

MATH 419 Complex Analysis

Do calculus with complex numbers: analytic functions, contour integrals, and residues.

Why take it? It is full of surprises — a function that is differentiable once is differentiable infinitely often, and hard real integrals become easy.

MATH 469 Advanced Linear Algebra

Go deeper into vector spaces, inner products, canonical forms, the spectral theorem, and the singular value decomposition.

Why take it? It sharpens the most widely used tool in mathematics, key to data science, quantum computing, and graduate study.

MATH 470 Euclidean & Non-Euclidean Geometry

Explore what happens when Euclid's parallel postulate fails by comparing Euclidean, spherical, and hyperbolic geometry.

Why take it? You will visit worlds where the angles of a triangle add up to less than 180° — like the tiling on the front page!

Find your path: which course is for you?

Love coding?

MATH 244, MATH 350, DSCI 473

Enjoy puzzles and patterns?

MATH 301, MATH 366, MATH 235

Heading to graduate school?

MATH 317, MATH 419, MATH 469

Fascinated by secrets and security?

MATH 360, MATH 460, MATH 463

Drawn to physics or engineering?

MATH 340, MATH 332, MATH 350

Planning to teach or love geometry?

MATH 470, MATH 235, MATH 369

Ready to register for Spring 2027?

Check your registration time in RAMweb, talk with your academic advisor about which courses fit your plans, and ask any math professor about their course — we love to talk about it!

Department of Mathematics

Colorado State University

math.colostate.edu