

Courses required of all majors:

Category/ Columbia	Hamilton College	Current Texts
Mathematics/ Calc I, II, III, IV V1101, 1102, V1201, V1202	Math113F,S Calculus I. Introduction to the differential and integral calculus of a single variable. Topics include limits, continuity, derivatives, max-min problems and integrals. (Quantitative and Symbolic Reasoning.) Four hours of class.	Calculus, Early Transcendentals Author: STEWART Edition: 7TH Publisher: CENGAGE L ISBN: 9780538497909
	Math116F,S Calculus II. A continuation of the study begun in 113. Methods of integration, improper integrals, applications of integration to volume and arc length, parametric equations, sequences and series, power series, vectors, and an introduction to 3-dimensional coordinate systems with equations of lines and planes. Prerequisite, 113 or placement by the department.	Calculus, Early Transcendentals Author: STEWART Edition: 7TH Publisher: CENGAGE L ISBN: 9780538497909
	Math215S Vector Calculus. Topics in vector calculus, generalizing those from 114, including divergence, curl, line and surface integrals, Stokes theorem and applications to science, engineering and other areas. (Quantitative and Symbolic Reasoning.) Prerequisite, 114 or consent of instructor.	Vector Calculus Author: LOVRIC Edition: 4TH Publisher: CENGAGE L ISBN: 9781133109037
	Math224F,S Linear Algebra. An introduction to linear algebra: matrices and determinants, vector spaces, linear transformations, linear systems and eigenvalues; mathematical and physical applications.	Elem. Linear Algebra w/Applications Author: KOLMAN Edition: 9TH Publisher: PEARSON ISBN: 9780132296540
	Math235F,S Differential Equations. Theory and applications of differential equations, including first-order equations, second-order linear equations, systems of equations, and qualitative and numerical methods. Prerequisite 224.	Differential Equations Author: BLANCHARD Edition: 4TH Publisher: CENGAGE L ISBN: 9781133109037

Category/ Columbia	Hamilton College	Current Texts
Physics/Mech. And Thermo; C1401	Phys200F Physics I The first semester of a year-long calculus-based sequence (200-205) for scientists and pre-med students who require a year of physics. Topics include Newtonian mechanics, conservation laws, fluids, kinetic theory and thermodynamics. Three hours of lecture and three hours of laboratory.	Fundamentals of Physics, Extended, Authors: Halliday, Resnick, Walker 10 th ed., Wiley ISBN: 9781118230725
Physics/ Electricity, Magnetism, and Optics C1402	Phys205S Physics II The second semester of a year-long calculus-based sequence (200-205) for pre-med students and other scientists who require a year of physics. Topics include electricity and magnetism, optics, relativity, atomic physics and nuclear physics. Three hours of lecture and three hours of laboratory.	Fundamentals of Physics, Extended, Authors: Halliday, Resnick, Walker 10 th ed., Wiley ISBN: 9781118230725
Chemistry/ General Chemistry; C1403	Chem120F Principles of Chemistry. Exploration of the central principles and theories of chemistry including stoichiometry, thermodynamics, equilibrium, reaction kinetics, and molecular structure and bonding. (Quantitative and Symbolic Reasoning.) Three hours of lecture and three hours of laboratory.	Chemistry Author: Gilbert Edition:3 rd Publisher: Norton ISBN:9780393141108
Computer Science/ Introduction to Computer Science and Programming; W1003, W1004, W1005, W1007, or W1009	110F,S Introduction to Computer Science. The first course in computer science is an introduction to algorithmic problem-solving using the Python programming language. Topics include primitive data types, mathematical operations, structured programming with conditional and iterative idioms, functional abstraction, objects, classes and aggregate data types. Students apply these skills in writing programs to solve problems in a variety of application areas. No previous programming experience necessary.	Object Oriented Programming in Python Author: GOLDWASSER Edition:08 Publisher:PEARSON ISBN: 9780136150312

Category/ Columbia	Hamilton College	Current Texts
Humanities and Social Sciences/ Principles of Economics; Econ W1105	101F,S Issues in Microeconomics. The price system as a mechanism for determining which goods will be produced and which inputs employed; profit-maximizing behavior of firms under differing competitive conditions; pricing of factors of production and income distribution; taxation, discriminatory pricing and government regulation; theory of comparative advantage applied to international trade.	Principles of Microeconomics Author: MANKIW Edition:6TH Publisher: CENGAGE L ISBN: 9780538453042
Humanities and Social Sciences/ English Composition; Engl C1010	Hamilton College Writing Program (Graduation Requirement): requires student to complete 3 writing intensive courses before end of junior year. Only one course of the three may be chosen from foreign languages or math.	Many disciplines offer writing intensive courses: English, Philosophy, History, Government, etc.

Additional courses that support an interest in various fields within engineering:

Almost all Hamilton College students have gone to the 3-2 program at Columbia after pursuing a major in physics here. All students must declare a major in their sophomore spring term. Since we require students considering engineering to maintain appropriate progress in a Hamilton major through their time here, they normally will have completed the following courses at the conclusion of the junior spring term.

Recommended/Required	Hamilton College	Current Texts
Required of physics majors; Recommended for pre-electrical engineering	290F Quantum Physics. Wave-particle duality, the nuclear atom, the development of Schrödinger's wave mechanics and the quantum theory of atoms. Three hours of class and three hours of laboratory. Prerequisite, 195 or 105 or 205, and Mathematics 116.	Quantum Physics, 2 nd ed. Author: Eisberg and Resnick Publisher: Wiley ISBN: 9780471873730
Required of physics majors; Recommended for pre-electrical engineering.	295S Electromagnetism. Introduction to the mathematical description of the electric and magnetic fields, their sources and their interactions with matter. Exploration of Maxwell's laws with emphasis on the relationship between the physics and the mathematics needed to describe it. Three hours of class. Prerequisite, 290.	Electricity and Magnetism, 3 rd ed. Authors: Purcell and Morin Publisher: Cambridge U. ISBN: 9781107014022
Recommended for physics majors and for those interested in mechanical engineering, electrical engineering, or civil engineering among others.	245S Electronics and Computers. Hands-on introduction to the concepts and devices of electronics. Study of analog and digital circuits, computer architecture, assembler programming and computer interfacing. Six hours of laboratory.	Text written by Prof. Brian Collett (course instructor)

Columbia's Math courses (from their on-line catalog):

MATH V1101x or y Calculus I 3 pts. Prerequisites: see Courses for First-Year Students. Functions, limits, derivatives, introduction to integrals.

MATH V1102x or y Calculus II 3 pts. Prerequisites: [MATH V1101](#) or the equivalent. Methods of integration, applications of the integral, Taylor's theorem, infinite series.

MATH V1201x or y Calculus III 3 pts. Prerequisites: [MATH V1101](#) with a grade of B or better or *Math* [V1102](#), or the equivalent. Vectors in dimensions 2 and 3, complex numbers and the complex exponential function with applications to differential equations, Cramer's rule, vector-valued functions of one variable, scalar-valued functions of several variables, partial derivatives, gradients, surfaces, optimization, the method of Lagrange multipliers.

MATH V1202x or y Calculus IV 3 pts. Prerequisites: [MATH V1102](#), [V1201](#), or the equivalent. Multiple integrals, Taylor's formula in several variables, line and surface integrals, calculus of vector fields, Fourier series.