Key Topics in Prerequisite Courses

Calculus: algebra (graphing linear equations, solving systems of linear equations); functions (characteristics of functions in one variable, logarithmic functions, exponential functions); calculus of one variable (derivatives, definite and indefinite integrals); calculus of more than one variable (partial derivatives, total derivatives); first-order differential equations (discrete and continuous time, rates of decay, initial conditions)

Statistics: descriptive statistics, probability distributions, hypothesis testing, confidence intervals, correlation and simple linear regression, and simple ANOVAs

Microeconomics: supply and demand, elasticity, analysis of theories of consumer behavior, production cost; equilibrium analysis in product markets under different market structures, such as perfect competition, monopoly, monopolistic competition, oligopoly; cartels and conglomerate mergers; antitrust policy, economics of regulation; and analysis of different types of factor markets and factor price determination

Principles of Ecology: energy transformations in ecosystems, nutrient flows, community structure, trophic levels, spatial structure of ecosystems and populations, population dynamics, a little physiological ecology, predator/prey and competitive dynamics

Chemistry: core concepts required for organic chemistry, including atomic and molecular structure, chemical equilibrium with applications to acids and bases, thermodynamics, chemical kinetics, and reaction mechanisms; relevance and integrated nature of these concepts illustrated through applications to a modern theme in chemistry, e.g. in biological, materials, or environmental chemistry

Organic Chemistry: the structures and reactions of the compounds of carbon and the impact of selected organic compounds on society; laboratory techniques of separation, organic reactions and preparations, and systematic identification of compounds by their spectral and chemical properties

Physics: calculus-based course with core topics in kinematics, dynamics, systems of particles, conservation laws, statics, fluids, oscillations, waves; electric fields, circuits, magnetic fields, Faraday's law, Maxwell's equations, electromagnetic waves, properties of light, geometric optics, wave optics; additional topics; sound, diffusion, thermodynamics, selected applications, and optical instrumentation and quantum physics