Dual Degree Program General Course Requirements
Specific majors may have additional requirements
(see https://engineering.case.edu/dual-degree-program/available-majors)

Wittenberg University

	Engineering Requirements for all majors/departments			
Case Course Code	**Case Course Title**	**Case Semester Credit Hours**	**Case Course Description**	**Comparable Course offered at Wittenberg University**
CHEM 105	Principles of Chemistry I	3	Atomic structure; thermochemistry; periodicity, bonding and molecular structure; intermolecular forces; properties of solids; liquids, gases and solutions. Prereq; One year of high school chemistry.	CHEM 121
CHEM 106	Principles of Chemistry II	3	Thermodynamics, chemical equilibrium; acid/base chemistry; oxidation and reduction; kinetics; spectroscopy; introduction to nuclear, organic, inorganic, and polymer chemistry. Prereq: CHEM 105 or equivalent.	CHEM 162
CHEM 113	Principles of Chemistry Lab	2	A one semester laboratory based on quantitative chemical measurements. Experiments include analysis, synthesis and characterization, thermochemistry and chemical kinetics. Computer analysis of data is a key part of all experiments. Coreq: CHEM 105, CHEM 106, CHEM 111, or ENGR 145.	CHEM 121 and CHEM 162
ENGR 131 Or EECS 132	Elementary Computer Programming (MATLAB) Introduction to Programming in JAVA	3	Students will develop an understanding of, and an appreciation for, the use of algorithms to solve problems, as well as the ability to translate them into good computer programs. The problems dealt with in this course will be chosen to illustrate the fundamentals for computer programming.	COMP 150 (Python)
MATH 121	Calculus for Science and Engineering I	4	Functions, analytic geometry of lines and polynomials, limits, derivatives of algebraic and trigonometric functions. Definite integral, antiderivatives, fundamental theorem of calculus, change of variables. Prereq: Three and one half years of high school mathematics.	MATH 201

MATH 122	Calculus for Science and Engineering II	4	Continuation of MATH 121. Exponentials and logarithms, growth and decay, inverse trigonometric functions, related rates, basic techniques of integration, area and volume, polar coordinates, parametric equations. Taylor polynomials and Taylor's theorem. Prereq: MATH 121.	MATH 202
MATH 223	Calculus for Science and Engineering III	3	Introduction to vector algebra; lines and planes. Functions of several variables: partial derivatives, gradients, chain rule, directional derivative, maxima/minima. Multiple integrals, cylindrical and spherical coordinates. Derivatives of vector valued functions, velocity and acceleration. Vector fields, line integrals, Green's theorem. Prereq: MATH 122.	MATH 212
MATH 224	Elementary Differential Equations	3	A first course in ordinary differential equations. First order equations and applications, linear equations with constant coefficients, linear systems, Laplace transforms, numerical methods of solution. Prereq: MATH 223.	MATH 215
PHYS 121	General Physics I	4	Particle dynamics, Newton's laws of motion, energy and momentum conservation, rotational motion, and angular momentum conservation. This course has a laboratory component. Prereq: MATH 121 or MATH 123 or MATH 125 or one year of high school calculus.	PHYS 201
PHYS 122	General Physics II	4	Electricity and magnetism, emphasizing the basic electromagnetic laws of Gauss, Ampere, and Faraday. Maxwell's equations and electromagnetic waves, interference, and diffraction. This course has a laboratory component. Prereq: PHYS 121 or PHYS 123. Coreq: MATH 122, MATH 124, or MATH 126.	PHYS 203

Case also requires students to complete Humanities and Social Sciences courses totaling at least 21 semester hours, and to complete an English course with college-level writing proficiency, prior to enrollment at Case.