

## Chemistry Major Courses

Fall Freshman Year (15 or 16 Credits)		Spring Freshman Year (15 Credits)		Professional Opportunities
CHEM 146 (3 credits) Principles of General Chemistry	Prerequisite: Must have math eligibility of MATH140 or higher. Corequisite: CHEM177. Three hours of lecture and one hour of discussion per week. The Periodic Table, inorganic substances, ionic and covalent bonding, bulk properties of materials, chemical equilibrium, and quantitative chemistry.	CHEM 237 (4 credits) Principles of Organic Chemistry I	Three hours of lecture, four hours of laboratory and one hour of discussion per week. The chemistry of carbons: aliphatic compounds, aromatic compounds, stereochemistry arenes, halides, alcohols, esters, and spectroscopy.	
CHEM 177 (2 credits) Laboratory	Introduction to laboratory techniques, including safety practices, scientific ethics, and presentation of current research topics.	CORE/GenEd (3 credits)		
ENGL 101 (3 credits) Introduction to Writing	An introductory course in expository writing.	BSCI 105 (4 credits) Principles of Biology I	Three hours of lecture and three hours of laboratory per week. Prerequisite: placement in MATH 111 or higher. Basic principles of biology with special emphasis on cellular and molecular biology.	
MATH 140 (4 credits) Calculus I	Prerequisite: satisfactory score on the mathematics placement exam, or MATH 115 with a grade of C- or better. Introduction to calculus, including functions, limits, continuity, derivatives and applications of the derivative, sketching of graphs of functions, definite and indefinite integrals, and calculation of area.	MATH 141 (4 credits) Calculus II	Continuation of MATH 140, including techniques of integration, improper integrals, applications of integration (such as volumes, work, arc length, moments), inverse functions, exponential and logarithmic functions, sequences and series.	
CORE/GenEd (3 credits)				
UNIV 100 (1 credit) The Student in the University or UNIV 101 (2 credits) The Student in the University and Introduction to Computer Resources	Two hours of lecture per week for 12 weeks. Introduces students to University life.  Two hours of lecture per week. Introduces students to University life and current computer resources.			

Chemistry Major, Fall Sophomore Year (14 Credits)		Chemistry Major, Spring Sophomore Year (16 Credits)		Professional Opportunities
CHEM 247 (4 credits) Principles of Organic Chemistry II	Three hours of lecture, four hours of laboratory, and one hour of discussion per week. A continuation of CHEM 237 with emphasis on molecular structure, substitution reactions; carbonium ions; aromaticity; synthetic processes; macromolecules.	CHEM 276 (2 credits) General Chemistry and Energetics	Two hours of lecture and one hour of discussion/recitation per week. An introduction to the physical aspects of chemistry for BCHM and CHEM majors. Chemical kinetics, thermodynamics and electrochemistry in the context of current chemistry research.	Howard Hughes Medical Institute Fellowship.  Contact Dr. Kaci Thompson in the College of Chemical and Life Sciences at <a href="mailto:kaci@umd.edu">kaci@umd.edu</a> .
		CHEM 277 (3 credits) Fundamentals of Analytical and Bio-analytical Chemistry Laboratory	One hour of lecture and 6 hours of lab per week. Quantitative analysis, inorganic analytical chemistry, and an introduction to bio-analytical instrumentation and techniques.	
PHYS 161 (3 credits) General Physics	Laws of motion, force, and energy; principles of mechanics, collisions, linear momentum, rotation, and gravitation. Must have completed or be concurrently enrolled in MATH141.	PHYS 260/261 (4 credits) General Physics	Vibrations, waves, fluids; heat, kinetic theory, and thermodynamics; electrostatics, circuits, and magnetism. PHYS260 and PHYS261 must be taken in the same semester and the grade for the courses will be combined into a single grade for both.	
CORE/GenEd (6 credits)		MATH 241 (4 credits) Calculus III Optional course. Could take CORE instead	Introduction to multivariable calculus, including vectors and vector-valued functions, partial derivatives and applications of partial derivatives (such as tangent planes and Lagrange multipliers), multiple integrals, volume, surface area, and the classical theorems of Green, Stokes and Gauss.	
		CORE/GenEd (3 credits)		

Chemistry Major, Fall Junior Year (14 Credits)		Chemistry Major, Spring Junior Year (15 Credits)		Professional Opportunities
CHEM 481 (3 credits) Physical Chemistry I	A course primarily for chemists and chemical engineers.	CHEM 482 (3 credits) Physical Chemistry II	A course primarily for chemists and chemical engineers.	Howard Hughes Medical Institute Fellowship.  Contact Dr. Kaci Thompson in the College of Chemical and Life Sciences at <a href="mailto:kaci@umd.edu">kaci@umd.edu</a> .
CHEM 483 (2 credits) Physical Chemistry Laboratory I	One hour of lecture-recitation and one three-hour laboratory period per week. An introduction to the principles and application of quantitative techniques in physical chemical measurements. Experiments will be coordinated with topics in CHEM 481.	CHEM 484 (2 credits) Physical Chemistry Laboratory II	One hour lecture-recitation and one three-hour laboratory period per week. A continuation of CHEM 483. Advanced quantitative techniques necessary in physical chemical measurements. Experiments will be coordinated with topics in CHEM 482.	
ENGL 39X (3 credits) Junior English		CHEM 395 (1 credit) Professional Issues in Chemistry and Biochemistry	Junior standing. Seminar on professional issues. Professional responsibilities, ethics, interview techniques, career opportunities, graduate/professional school, race and gender issues. (Spring semester only.)	
CORE/GenEd (3 credits)		Adv CORE/GenEd (3 credits)		
Elective (3 credits)		Electives (6 credits)		

Chemistry Major, Fall Senior Year (16 Credits)		Chemistry Major, Spring Senior Year (15 Credits)		Professional Opportunities
CHEM 425 (4 credits) Instrumental Methods of Analysis	Two hours of lecture and six hours of laboratory per week. Modern instrumentation in analytical chemistry. Electronics, spectroscopy, chromatography and electrochemistry.	CHEM 401 (3 credits) Inorganic Chemistry	An overview of basic concepts of the electronic structure of the elements, chemical bonding and reactivity, from simple diatomic molecules to coordination compounds. These are viewed from simple (Lewis) to the most comprehensive molecular orbital theory. Symmetry and group theory are used throughout the course. (Spring semester only.)	<p>Honors Research and Thesis— The Chemistry Honors Program is open to CHEM or BCHM majors (or double majors) with &gt;3.0 GPA who perform at least two semesters of chemical or biochemical research for a minimum of 3 credits total within the department (as CHEM 399) and then, in their final semester at the University, register for CHEM 398, which is the thesis-writing course. At the end of CHEM 398, a written thesis is submitted for judgment by the Honors and Awards Committee and a seminar is presented to the same group.</p> <p>On the basis of that research, thesis, and presentation, the student can graduate with Departmental High Honors, Honors or no honors.</p>
CHEM UL (3 credits)		CHEM UL/Capstone (3 credits)		
Adv CORE (3 credits) If a Capstone is taken the Adv CORE becomes an elective		Electives (9 credits)		
Elective (6 credits)				