BIOCHEMISTRY MAJOR

Program Director: Lee Friedman, Ph.D.

The study of molecular and atomic properties and interactions that encompass Chemistry and Biochemistry are central to many scientific disciplines including biology, geology, astronomy, environmental science, materials science and numerous others. Chemistry and Biochemistry majors continue to graduate or professional school, and obtain employment as educators and technical scientists. Courses offered by this department may be found under the following acronyms: BCHM, CHEM

Admission to the Major

Chemistry and Biochemistry are part of a Limited Enrollment program (LEP) within the College of Computer, Mathematical, and Natural Sciences (CMNS). Current UMCP students who wish to declare in CHEM or BCHM must complete a series of gateway courses (CHEM146/CHEM177 (or CHEM131/CHEM132), CHEM237 (or CHEM231/CHEM232), and MATH140 and MATH141) prior to applying to the program. Information is available at: http://lep.umd.edu.

Placement in Courses

The Department of Chemistry and Biochemistry rigorously enforces all of its prerequisites. Enrollment in CHEM131/CHEM132 or CHEM146/CHEM177 requires placement in calculus (MATH120 or MATH135 or MATH140).

Program Learning Outcomes

1. Students should demonstrate mastery of a body of knowledge represented by the curricula in Chemistry and Biochemistry. Students should have mastered the critical knowledge in each level in the curriculum that is necessary to move on to the next level in the curriculum.
2. The ability to read, evaluate and interpret chemical and numerical information for a novel problem using their foundational knowledge in science.
3. Students should have knowledge of appropriate safe-handling procedures and disposal of chemicals.
4. Students at lower level should demonstrate an ability to carry out key experimental techniques used in the chemical and life sciences disciplines.
5. Students at upper level should be able to design experiment to test specific hypotheses, carry out these experiments using appropriate instrumentation and analyze the results.
6. Students should demonstrate the ability to use the broader scientific literature to select appropriate information to support his/her work.
7. Students should effectively communicate, both verbally and in writing, the processes of science and the results of scientific inquiry using appropriate language and models of chemistry (i.e. equations, symbolism, etc).
8. Students should understand the importance of good ethical practices in scientific research.
9. Students should continue their career in science through gainful employment or entrance into a graduate or professional school.

REQUIREMENTS

All required chemistry, biochemistry, and upper-level biological sciences courses must be passed with a minimum grade of "C-". Required supporting courses, including BSCI170 & (BSCI180 or BSCI171), must be passed with a 2.0 grade point average.

Course	Title	Credits
UNIV100	The Student in the University	1
Lower-Level CHEM Courses		
CHEM146 & CHEM177	Principles of General Chemistry and Introduction to Laboratory Practices and Research in the Chemical Sciences	5
CHEM237	Principles of Organic Chemistry I	4
CHEM247	Principles of Organic Chemistry II	4
CHEM276 & CHEM277	General Chemistry and Energetics - Majors and Fundamentals of Analytical and Bioanalytical Chemistry Laboratory	5
Supporting Courses		
BSCI170	Principles of Molecular & Cellular Biology	3
BSCI180	Principles Biology Laboratory	1
or BSCI171	Principles of Molecular & Cellular Biology Laboratory	
PHYS161 & PHYS260 & PHYS261	General Physics: Mechanics and Particle Dynamics and General Physics: Electricity, Magnetism and Thermodynamics and General Physics: Mechanics, Vibrations, Waves, Heat (Laboratory)	7
MATH140	Calculus I	4
MATH141	Calculus II	4
MATH241	Calculus III	4
Required Upper Level CHEM/BCHM Courses		
CHEM395	Professional Issues in Chemistry and Biochemistry	1
CHEM425	Instrumental Methods of Analysis	4
CHEM481 & CHEM483	Physical Chemistry I and Physical Chemistry Laboratory I [1]	5
BCHM461	Biochemistry I	3
BCHM462	Biochemistry II	3
BCHM464	Biochemistry Laboratory	3
BCHM465	Biochemistry III	3
BCHM485	Physical Biochemistry	3
Approved biological science courses		6
Total Credits		**73**

[1] **Note:** All majors and potential majors are encouraged to take MATH241 prior to beginning Physical Chemistry.

- Specific information about course requirements can be obtained in the undergraduate office.
- Students who enroll in the chemistry or biochemistry program at any time following the first semester of study typically will complete all or part of the non-majors introductory sequence (CHEM131,CHEM132, CHEM231/CHEM232, CHEM241/CHEM242 and CHEM271/CHEM272; CHEM132, CHEM232, CHEM242 and CHEM272 are co-requisite laboratory courses). In this situation, completion of an additional approved upper level CHEM or BCHM course may be required to fulfill the lower-level departmental major requirements. Transfer students

who wish to pursue chemistry or biochemistry majors will have their previous chemistry course work carefully evaluated for placement in the appropriate courses.
- More information about and requirements for the Biochemistry major can be found at: http://www.chem.umd.edu/undergraduateprogram/current-students/majoradvising (http://www.chem.umd.edu/undergraduateprogram/current-students/majoradvising/).

GRADUATION PLANS

Click here (https://cmns.umd.edu/undergraduate/advising-academic-planning/academic-planning/four-year-plans/four-year-plans-gened/) for roadmaps for graduation plans in the College of Computer, Mathematical, and Natural Sciences.

Additional information on developing a graduation plan can be found on the following pages:

- http://4yearplans.umd.edu
- the Student Academic Success-Degree Completion Policy (https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-advising/#success) section of this catalog