Performance Requirements

To maintain biochemistry major status and to graduate, students must maintain at least a 2.0 overall GPA and a 2.0 cumulative GPA in coursework in biology, chemistry, and biochemistry.

Degree Requirements

A total of 128 hours is required for graduation. The biochemistry core curriculum includes the following required courses (48 hours): Orientation to Biochemistry; MATH 155 and 156; PHYS 101 and 102 or PHYS 111 and 112; BIOL 115, 117, 219, and 310; CHEM 115, 116, 233, 234, 235, 236.

Following completion of the biochemistry core curriculum, students choose to pursue either a molecular biology area of emphasis or a chemistry area of emphasis. Completion of the molecular biology area of emphasis requires 30 hours beyond the biochemistry core curriculum. The following courses are required (20 hours): BIOC 339 or AGBI 410/411; CHEM 215, 341 and 342; BIOL 313 or 410; Senior Seminar in Biochemistry; and a minimum of four hours of research (BIOL 386 or BIOL 486 or BIOC 492). The remaining ten hours may be selected from the following courses: BIOL 312, 313, 315, 324, 386, 410, 411, 412, 413, 436, 437, 486, 493; BIOC 492.

Completion of the chemistry area of emphasis requires 30 hours beyond the biochemistry core curriculum. The following courses are required (18 hours): BIOC 339 or AGBI 410/411; CHEM 215, 341, 342, 401, 403 (which serve as the capstone experience); BIOL 313 or 410; and Senior Seminar in Biochemistry. The remaining 12 hours may be selected from the following courses: BIOL 313, 436, 493; CHEM 310, 312, 313, 335, 337, 339, 411, 422, 441, 491, 497, 514, 531; BIOC 492. The student's program of study must include at least one CHEM course numbered 310 or higher. CHEM 117 and 118 may be substituted for CHEM 115, 116, and 215.

Biochemistry Program Honors

The option of graduating with biochemistry program honors is available to students with a 3.5 overall grade point average and the approval of the faculty in the department of the student's area of emphasis. Graduation with biochemistry program honors includes a senior thesis based upon an approved research project conducted under the supervision of a faculty mentor. For further information, and to apply for admission, qualified students should consult their advisors.

Biology

Jonathan Cumming, Chair
Jeffrey Wells, Associate Chair for Undergraduate Studies

Degrees Offered

Bachelor of Arts
Bachelor of Science

Nature of Program

The Department of Biology offers two degree programs, the bachelor of science and the bachelor of arts in biology. Pre-medical and environmental biology tracks are available in either degree program. These two programs are structured to meet the foundational needs of all students who are interested in a career in the broad area of the life sciences.

The undergraduate programs in biology provide excellent preparation for students planning to apply to graduate programs in the biological sciences or to professional schools, including medical, osteopathic, dental, physical or occupational therapy, optometry, pharmacy, veterinary medicine, physicians assistant, and chiropractic schools and programs. A degree in biology prepares students for a wide range of careers in the biological sciences including medicine, biotechnology, genetics, forensics, environmental biology, and other biologically-related technical fields in government and private industry. With appropriate electives, a student with a degree in biology may also choose to enter the fields of law, journalism, education, business, health care administration, pharmaceutical sales, or work for a variety of federal agencies.

After completing an initial four-semester core sequence in the biological sciences, students in the biology B.A. program may choose to specialize in courses from four major areas of biology: cellular and molecular biology, organismal biology, ecology and evolution, or integrative biology. Those students pursuing the B.S. degree in biology are required to take at least one course from each of the major areas of biology to ensure an advanced broad-based knowledge of biology.

Irrespective of the degree program chosen, students will experience a wide variety of classroom environments from large lecture sections to small group discussions and intensive laboratory-oriented courses. Laboratory courses include topics such as comparative anatomy, recombinant DNA technology, plant ecology, plant physiology, and molecular endocrinology as well as many other laboratory experiences across the biological disciplines.

The two programs are similar during the first two years. They differ primarily in their mathematics requirements and in their biology requirements—the bachelor of science program requires more upper-division biology courses

Admission Requirements

Requirements for admission to degree programs in biology include completion of BIOL 115, BIOL 117, and CHEM 115 with a minimum of C in each; a minimum GPA of 2.0; and a minimum GPA of 2.0 in all attempted biology courses.

Bachelor of Science Requirements in Biology

The B.S. in biology requires a minimum of 38 hours in biology or approved courses in the biological sciences with 128 hours total required for graduation. Required courses include:

- Biology (BIOL) 115, 117, 219, 221, and 321 which must be taken in this sequence.
- Chemistry (CHEM) 115 or 117 (which should be taken concurrently with BIOL 115 if possible); CHEM 116 or 118; CHEM 233, 234, 235, and 236.
- Mathematics (MATH) 155, Statistics (STAT) 211, MATH 156 (optional).
- Physics (PHYS) 101 or 111 and 102 or 112.

The inclusion of MATH 156 and PHYS 111 and 112 is strongly recommended.

Bachelor of science candidates must take 21 hours of electives selected from any of the following four groups of courses. At least two of the selected courses must have a laboratory and at least one course must be selected from each of the four groups.

Group I. Cell and Molecular Biology: BIOL 310, 311, 312, 313, 315, 316, 324, 325, 410, 411, 412, 413, 414, and 415.

Group II. Organismal Biology: BIOL 336, 337, 341, 348, 350, 351, 352, 353, 430, 436, 437, 439, 440, 441, 450, and ENVM 341.

Group III. Evolution and Ecology: BIOL 301, 338, 361, 362, 461, 462, 463, 464, ENVM 401, GEOL 331.

Group IV. Integrative Biology: PHYS 293 *Medical Physics*, AGBI 410 *Agricultural Biochemistry*, BIOC 339 *Introduction to Biochemistry*, and BIOL 302 *Biometry*.

Only two of the non-BIOL courses listed above can be used to fulfill the 21-hour elective requirement. With permission from the department, students may enroll in BIOL 386 and 486 for credit; however, only six hours of BIOL 386 and 486 may be used towards the 21-hour elective requirement. Graduate (500-level) courses in biology may be taken if approved by the dean and department.

BIOL 235, 293, 491, 493, and 793 *Independent Study*, do not satisfy the required 21 hours of electives in biology. They can serve as general electives.

Bachelor of Arts Requirements in Biology

The B.A. with a major in biology requires a minimum of 32 hours to a maximum of 42 hours in biology, with 128 hours total required for graduation. Required courses include:

- Biology (BIOL) 115, 117, 219, 221, and 321 which must be taken in this sequence.
- Chemistry (CHEM) 115 or 117 (which should be taken concurrently with BIOL 115), CHEM 116 or 118, 233, 234, 235, and 236. Agricultural Biochemistry (AGBI) 410 may be taken in lieu of CHEM 234 and 236 with permission of the biology graduate and professional schools.

- Mathematics (MATH) 155 and MATH 156 or MATH 150 and Statistics (STAT) 211.
- Physics (PHYS) 101 or 111 and 102 or 112 are required.
- Fifteen hours of required biology electives, one of which must have a laboratory, may be selected from the following list: BIOL 386 (limited to four hours of credit), 486 (limited to four hours of credit), 301, 302, 310, 311, 312, 313, 315, 316, 324, 325, 337, 338, 350, 410, 411, 412, 413, 414, 415, 436, 437, 438, 439, 440, 441, 450, 461, 462, 463, 493 (sections B and up).

Only one approved non-BIOL course can be used to fulfill the 15-hour elective requirement. Permission of the department must be obtained to enroll in BIOL 293, 386, 486, 491, and 493A; however, only four credit hours of 386/486 may be used towards the 15-hour elective requirement. Graduate (500-level) courses in biology may be taken if approved by the dean and department.

BIOL 293, 235, 491, 493A, and 793A do not satisfy the required 15 hours of electives in biology. They can serve as general electives

Biology is the most popular major for students intending to enter medical school both at WVU and nationwide. A biology degree provides the student with all the preparation necessary for medical school and the medical school entrance exam—the MCAT. The courses included in this area of emphasis have been found to improve both performance and confidence of students attending medical school. Students with aspirations to attend top-rank-medical schools should include at least three hours of independent research (BIOL 386 or BIOL 486) in their program of study if they are to be competitive.

Pre-Medical Bachelor of Science Requirements in Biology

Students intending to graduate with a B.S. in biology with a premedical emphasis must take a minimum of 21 hours of upper division courses. In addition to the introductory courses listed for the B.S., students must take the following courses:

- General requirement: Biology 310, 436, and 440.
- Biochemistry requirement: one of AGBI 410, BIOC 339. Seniors with good GPAs may take a 550-level biochemistry course if they obtain departmental permission.
- Ecology and evolution requirement: One of BIOL 338, 461, 464.
- Laboratory requirement: At lease one of BIOL 315, 336, 441, ENVM 341.
- Remaining hours must be chosen from: BIOL 302, 312, 313, 315, 316, 324, 325, 337, 348, 386, 410, 411, 412, 413, 438, 486, or PHYS 293 (medical physics).

Note: Students may only count two of AGBI 410, BIOC 339, ENVM 341, or PHYS 293 towards their 21 hours.

Pre-Medical Bachelor of Arts Requirements in Biology

Students intending to graduate with a B.A. in biology with a premedical emphasis must take a minimum of 15 hours of upper division courses. In addition to the introductory courses listed for the B.A., students must take the following courses:

- General requirement: Biology 310, 436, and 440.
- Biochemistry requirement: One of AGBI 410, BIOC 339. Seniors with good GPA's may take a 550-level biochemistry course if they obtain departmental permission.
- Remaining hours must be chosen from: BIOL 302, 312, 313, 315, 316, 324, 325, 336, 337, 338, 348, 386, 410, 411, 412, 413, 438, 441, 461, 464, 486, or ENVM 341.

Note: Students may only count one of AGBI 410, BIOC 339, ENVM 341, or PHYS 293 towards their 21 hours.

Honors Program

A departmental honors program for qualified students provides the opportunity to do independent research. To be eligible, a student must have a 3.4 overall average and the approval of the departmental honors faculty. Qualified students should consult their advisors about admission.

Individual original research, a senior thesis, and a seminar are required parts of the honors program, which requires three semesters to complete.

Suggested Biology (B.A.) Curriculum

First Year

First Semester	Hrs.	Second Semester	Hrs.
BIOL 115	4	BIOL 117	4
CHEM 115	4	CHEM 116	4
MATH 155	4	MATH 156	4
UNIV 101	1	GEC Electives	3
Total	**13**	ENGL 101	3
		Total	**18**

Second Year

First Semester	Hrs.	Second Semester	Hrs.
BIOL 219	4	BIOL 221	3
CHEM 233	3	BIOL 321	2
CHEM 235	1	CHEM 234	3
PHYS 101	4	CHEM 236	1
Foreign Language 101	3	PHYS 102	4
ENGL 102	3	Foreign Language 102	3
Total	**18**	GEC Electives	3
		Total	**19**

Third Year

First Semester	Hrs.	Second Semester	Hrs.
BIOL Elective	3 (or 4)	BIOL Elective	3 (or 4)
Foreign Language 203	3	Foreign Language 204	3
GEC Electives	6	GEC Electives	9
Total	**15 (or 16)**	**Total**	**15 (or 16)**

Fourth Year

First Semester	Hrs.	Second Semester	Hrs.
BIOL Elective	3	BIOL Electives	6
General Electives	12	General Electives	9
Total	**15**	**Total**	**15**
		Total Hours	**128**

Suggested Biology (B.S.) Curriculum

First Year

First Semester	Hrs.	Second Semester	Hrs.
BIOL 115	4	BIOL 117	4
CHEM 115 (or 117)	4 (or 5)	CHEM 116 (or 118)	4 (or 5)
MATH 155	4	STAT 211	3
GEC Electives	3	ENGL 101	3
UNIV 101	1	GEC Electives	3
Total	**16 (or 17)**	**Total**	**17 (or 18)**

Second Year

First Semester	Hrs.	Second Semester	Hrs.
BIOL 219	4	BIOL 221	3
CHEM 233, 235	4	BIOL 321	2
PHYS 101 (or 111)	4	CHEM 235, 236	4
ENGL 102	3	PHYS 102 (or 112)	4
Total	**15**	General Elective	3
		Total	**16**

Third Year

First Semester	Hrs.
BIOL Elective	3 (or 4)
GEC Electives	6
General Electives	6
Total	**15 (or 16)**

Second Semester	Hrs.
BIOL Elective	4
BIOL Elective	3
GEC Elective	3
General Elective	6
Total	**16**

Fourth Year

First Semester	Hrs.
BIOL Electives	6 (or 7)
General Electives	6
GEC Electives	6
Total	**18 (or 19)**

Second Semester	Hrs.
BIOL Electives	6 (or 7)
GEC Elective	6
General Elective	3
Total	**15 (or 16)**
Total Hours	**128**

Bennett Department of Chemistry

Harry O. Finklea, Chair
Jeffrey L. Petersen, Associate Chair

Degrees Offered

Bachelor of Arts, Bachelor of Science

Nature of Program

The Bennett Department of Chemistry offers three degree programs: the bachelor of science (chemistry), the bachelor of arts with a major in chemistry, and the bachelor of arts in biochemistry with an area of emphasis in chemistry. These programs meet the needs of all students who have an interest in the broad field of chemistry.

The Department of Chemistry is located in Clark Hall, a state-of-the-art teaching facility for chemistry. Clark Hall offers many new instruments, numerous safety features, excellent ventilation and ample hoods, and complete accessibility for the physically handicapped. The department also has modern research facilities in the adjacent Chemistry Research Laboratory building, where advanced undergraduates may participate in research projects.

The bachelor of science (chemistry) is approved by the American Chemical Society. This program is for students who desire to qualify for professional positions in industrial and governmental laboratories as well as those who plan to do graduate work in chemistry or allied areas in preparation for research careers in industry or academia.

The bachelor of arts with a major in chemistry is for students who pursue careers requiring a good background in the basic principles of chemistry. Areas such as medicine, dentistry, or other health-related sciences; secondary school teaching; chemical laboratory technical work; law or business may be pursued with a proper choice of electives.

The two programs are similar during the first two years. Students in the B. S. program should complete the calculus requirement as soon as possible as a prerequisite for both the physics and physical chemistry sequences. The two degree programs differ primarily in the chemistry requirements. The B.S. program requires more upper-level chemistry courses than the B.A. program.

Chemistry Scholarships

In addition to financial aid offered by the University, the department maintains five scholarship programs specifically for chemistry majors. The John A. Moore Trust Scholarships, the Charles L. Lazzell Scholarship, the Carpenter Family Scholarship, the Robert L. and Patricia Miller Stultz Chemistry Scholarship, and the Hodge Scholarships are awarded to students in either the B. S. or B. A. programs with records of outstanding achievement and demonstrated financial need. Several of these scholarships are restricted to West Virginia residents. Scholarship recipients are expected to remain as chemistry majors and to maintain a 3.0 average in their degree programs in order to be eligible for continued support.