



# Biology and Chemistry Department

<http://www.fitchburgstate.edu/academics/academic-departments/biology-chemistry/>

## Undergraduate Student Handbook

Last updated: July 2024

# 1. Vision, Mission & Student Outcomes

## 1.1 Vision Statement

The Department of Biology and Chemistry provides undergraduate students with the opportunity to immerse themselves in the physical and life sciences by focusing on processes, concepts, and critical thinking skills, and to use this foundation to actively participate in scientific inquiry and the discovery of knowledge. Our approach to education and research imparts students with a way of thinking about and understanding our natural world that will guide them throughout their professional and public lives.

The department places a high value on interdisciplinary research, collaboration, and partnerships with other educators on and off campus. A rich collaborative community is fostered through internships, independent studies, and student collaborations with active faculty research programs; an environment that mirrors the diverse world that we share. As a department we work diligently to incorporate innovations in technology, research, and education that build upon our current strengths and meet the demands of a dynamic environment.

## 1.2 Mission Statement

The Biology and Chemistry Department believes that every student deserves a first-class education. We are educators at Fitchburg State because our personal values align with the campus values of equity and excellence. We strive to ensure that our students have the best of what we can offer them as they gain an in-depth knowledge of science that is part of a larger interdisciplinary, multicultural liberal arts and sciences education.

In order to achieve our mission, we undertake to:

- Produce students who are well prepared for diverse careers or advanced study in the biological and chemical sciences or related disciplines as well as gain the skills necessary to successfully adapt to future changes within their disciplines.
- Build lasting relationships with students that will advance their professional growth by recognizing the unique needs of each individual and reflecting our passion for engagement in authentic learning experiences.
- Maintain a high level of scholarly activity in a variety of fields associated with biology, chemistry and science education.
- Serve the needs of the University and specific academic departments through our curricular offerings and involvement in the University community.
- Endeavor to demonstrate leadership as stewards of the environment.

- Provide state of the art pedagogical approaches as well as utilize appropriate equipment, technology, and resources for teaching, learning and research in the sciences and science education.
- Work to support the University's mission of providing leadership and support for the economic, environmental, social, and cultural needs of North Central Massachusetts and the Commonwealth.

### **1.3 Student Outcomes**

Students who successfully complete a major in Biology will:

- Demonstrate a command of key concepts from a broad range of course topics, including cell and molecular biology, genetics, organismal biology, evolution, ecology, developmental biology, and topics from advanced electives.
- Identify and solve biological problems by using critical thinking.
- Propose alternative, testable hypotheses to explain patterns and phenomenon in nature.
- Collect, summarize and interpret empirical and quantitative data.
- Construct and present scientific reports as papers, posters, and oral presentations.
- Possess specific skills and knowledge necessary to pursue careers in the biological sciences.
- Effectively read, analyze, synthesize and write about historical and contemporary advances in the biological sciences.
- Demonstrate technical skills appropriate for jobs in the laboratory, field and/or classroom.
- Understand and perform appropriate practices for lab safety, including health and environmental concerns.
- Recognize ethical dimensions surrounding the decisions made in the name of biological science.
- Understand and express the roles biological sciences play in society.

Students who successfully complete a major in Chemistry will:

- Apply their understanding of all chemistry subdisciplines and use appropriate laboratory skills and instrumentation to solve problems.
- Define problems clearly, develop testable hypotheses, design and execute experiments, analyze data using appropriate statistical methods, understand the fundamental uncertainties in experimental measurements, and draw appropriate conclusions.
- Retrieve information efficiently and effectively by searching the chemical literature, evaluate technical articles critically, and manage many types of chemical information.

- Demonstrate and apply their understanding of the concepts of safe laboratory practices. They should be able to evaluate and assess safety risks associated with laboratory experiences.
- Present information in a clear and organized manner, write well-organized and concise reports in a scientifically appropriate style, and use relevant technology in their communications.
- Interact effectively in a group to solve scientific problems and work productively with a diverse group of peers.
- Understand and demonstrate responsible treatment of data, proper citation of others' work, and the standards related to plagiarism and the publication of scientific results.
- Students should also be able to explain the role of chemistry in contemporary societal and global issues, including areas such as sustainability and green chemistry.

## 2. Faculty and Staff Information

The Department of Biology and Chemistry currently has 17 full-time faculty members – 11 biologists and 6 chemists. In addition, part-time faculty members (adjuncts) are appointed to teach introductory biology and chemistry courses. There is a full-time administrative assistant and three laboratory technicians. These technicians play a vital role in setting up labs, ordering and stocking lab supplies, and most importantly, maintaining and enforcing health and safety regulations. The current Department Chair, Dr. Erin Rehrig, began chair duties on July 1, 2024.

Below is the office location of all faculty and staff members in the department as well as a brief description of their teaching and research interests:

<b>Name</b>	<b>Office</b> (Science Center)	<b>Title</b>	<b>Teaching/Research Interests</b>
Awasabisah, Dennis	335	Associate Professor of Chemistry	bioinorganic, organic, organometallics chemistry
Babineau, Lindsey	220	Administrative Assistant	
Cratsley, Christopher	225	Professor of Biology	behavior ecology, biology education
Downs, Emma	327	Associate Professor of Chemistry	inorganic chemistry
Fiedler, Steven	334	Associate Professor of Chemistry	physical chemistry

Grimm, Lisa	231	Associate Professor of Biology	cell biology, immunology, science education
Hoey, Margaret	228	Professor of Biology	Genetics, evolutionary plant genetics
Kilpatrick, Elizabeth	224	Assistant Professor of Biology	immunology, virology, anatomy, physiology
Kowlzan, Karen	346	Laboratory Technician	Chemistry
Krieser, Ronald	338	Professor of Biology	genetics, molecular biology
Krishnamurthy, Mathangi	227	Associate Professor of Chemistry	organic chemistry, medicinal chemistry
Legare, Melissa	238	Laboratory Technician	Biology
Ludlam, John	226	Professor of Biology	ecology, environmental science
O'Connor, Aisling	330	Associate Professor of Chemistry	analytical & green chemistry, science education
Picone, Christopher	336	Professor of Biology	ecology, environmental science
Rehrig, Erin	220B	Dept. Chair & Professor of Biology	plant biology, science education
Rollins, Sean	237	Professor of Biology	microbiology, infectious diseases

Samulak, Billy	333	Associate Professor of Chemistry	analytical chemistry, biochemistry, science education
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Welsh, Daniel	233	Professor of Biology	fish morphology, ecology, evolution, behavior, natural history
Williams, Eric	235	Associate Professor of Biology	developmental biology, cancer biology, physiology.

### 3. Curriculum (See also Section 4)

The Biology and Chemistry Department offers the following degrees: Bachelor of Science (BS) and Bachelor of Arts (BA) degrees in Biology, and Bachelor of Science (BS) degrees in Chemistry.

All Biology majors follow a general program of study which includes four core courses, and six electives including a capstone course. In the capstone course, students apply their understanding of the process of scientific inquiry to research projects. Within the Biology B.S. major, students may also elect to pursue one of several tracks or concentrations to achieve a more focused course of study in contemporary, specialized fields.

#### **3.1 Required Courses for Biology, BS**

- **Core Courses**

BIOL 1800 - General Biology I

BIOL 1900 - General Biology II

BIOL 2300 - Ecology

BIOL 2800 - Genetics

All Biology majors must take these 4 core courses.

- **Elective Courses:** Biology majors also take six advanced electives at or above BIOL 2000. Independent study, directed study or internship may each count as one advanced BIOL elective in a student's program of study. Courses with a separate lecture and lab registration count as a single elective: the lab portion of a course does not constitute a distinct biology elective. One of these elective courses must be a capstone course.
- **Capstone Course:** One of the six electives must be a designated Capstone course. Students in the Capstone course conduct a research project to demonstrate their skills in research design and analysis. Capstone courses must be taken at

Fitchburg State: courses that transfer as the equivalent course will not fulfill this requirement. Independent studies (BIOL 4903) require approval by the departmental curriculum committee in order to fulfill the Capstone requirement. Current courses offered are:

BIOL 3550 - Developmental Biology

BIOL 3650 - Plant Biology

BIOL 4009 – Cancer Genomics

BIOL 4500 - Molecular Biology

BIOL 4903 - Independent Study (requires department approval)

BIOL/CHEM 3060- Biochemical Techniques

BIOL 4011- Topics Models, Methods, & Analysis

- **Required Courses in Related Sciences Subjects:** In addition to biology courses, Bachelor of Science (BS) students are required to take the following courses in related sciences and two mathematics courses at or above MATH 1300. For most biology majors, we recommend Precalculus (MATH 1300) and Applied Statistics (MATH 1700). Students applying to medical programs should meet with the pre-health advisors to discuss taking Calculus I and II.

CHEM 1300 - General Chemistry I

CHEM 1400 - General Chemistry II

CHEM 2000 - Organic Chemistry I

CHEM 2100 - Organic Chemistry II

PHYS 2300 - General Physics I

PHYS 2400 - General Physics II

### **3.2 Required Courses for Biology, BA**

The core, electives and capstone course requirements for BA students are identical to those for the BS degree as described above.

- **Required Courses in Related Sciences:** In addition to biology courses, Bachelor of Arts students are required to take courses in related sciences and two courses in mathematics at or above MATH 1300.

CHEM 1300 - General Chemistry I

CHEM 1400 - General Chemistry II

CHEM 2000 - Organic Chemistry I

One PHYS course

One GEOG course

- **BA Language Requirement:** Foreign language proficiency at the Intermediate Level II. This usually means 2 years of a single language unless the student can take a CLEP test to pass the first year (basic level) courses. In some cases, students have been able to pass both levels of CLEP tests and get 12 credits. Some may come in with A.P. credits as well. See the details of FSU's CLEP acceptance policy in Section 4.6.

### **3.3 Biology Concentrations/Tracks** (BS only)

Students may elect to pursue one of several tracks or concentrations within the major for a more focused course of study in contemporary, specialized fields of biology. The following concentrations are offered:

Biotechnology

Environmental Biology

Health Sciences

Neuroscience and Behavior

Biology with Initial Licensure in Secondary Education (includes a minor in Middle School and Secondary Education)

### **3.4 The Chemistry Major**

There are three options for a chemistry degree. They are:

1. B.S. in Chemistry
2. B.S. in Chemistry with concentration in Biochemistry
3. B.S. in Chemistry with Initial Licensure in Secondary Education  
(includes a minor in Middle School and Secondary Education)

All of the Chemistry degrees above require the same 9 core courses

- General Chemistry I and II
- Organic Chemistry I and II
- General Analytical Chemistry
- Physical Chemistry I
- Inorganic Chemistry



- Biochemistry I
- Chemistry Seminar

Chemistry Major also must take the following courses in Related Disciplines:

- General Biology I
  - Pre-calculus (MATH 1300, if required)
  - Calculus I (MATH 2300) and Calculus II (MATH 2400)
  - General Physics I and II (PHYS 2300-2400) or Calculus-based Physics I and II – PHYS 2600-2700.
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- A B.S. in Chemistry requires all of the above courses plus two electives chosen from chemistry courses at or above 3000-level.
  - A B.S. in Chemistry with concentration in biochemistry requires all the above courses plus Biochemistry II (CHEM 3040), Biochemical Techniques (CHEM 3060), and Genetics (BIOL 2800).
  - A B.S. in Chemistry with Initial Licensure requires all the above required courses, one chemistry elective at or above 3000 and several education courses.
  - Chemistry majors are recommended to take the calculus-based physics sequence (PHYS 2600-2700), if available.
  - In addition to the core courses, students also must take 2 Chemistry electives. Electives that have been recently offered are: Medicinal Chemistry, Environmental Chemistry and Biochemical Techniques, and Metals in Biology.

### **3.5 Four-Year Plans of Study**

Recommended 4-year plans of study are available for all the programs. They can be found at:

<https://www.fitchburgstate.edu/student-support/career-services-and-advising-center/four-year-plans-study-major>

### **3.6 Transfer & Change of Major Students**

Students who transfer from another school or major will need to develop a unique plan for graduation with their advisor. The amount of time it will take to complete the major will depend on the number of relevant courses already taken prior to the transfer into the program.

## **4. Advising, Requirements, and General Policies** (see also Section 3)

Every major in the department is given a faculty member as their advisor. Students are required to see their advisor twice a year (during advising periods - once in the fall semester and once in the spring semester) and are encouraged to see them more often as the advisor may assist with many issues. Students may change an academic advisor for any reason with approval by the Department Chair.

### **4.1 Program Requirements**

The following academic requirements of our majors are intended to assist students towards making adequate progress towards graduating with a degree in Biology or Chemistry.

#### **FOR BIOLOGY MAJORS:**

- **Minimum grade of 2.0 in General Biology I (BIOL 1800) and General Chemistry I (CHEM 1300)** to remain in the Biology major (any concentration). A student failing to make this grade in his/her first attempt (including W) will get one more chance to repeat the course. If the 2.0 is not reached on the second attempt, the department will drop the student from the major and they would be required to meet with an advisor in the Career and Academic Center to choose a new major.

#### **FOR CHEMISTRY MAJORS:**

- **Minimum grade of 2.0 in General Chemistry I (CHEM 1300) and General Chemistry II (CHEM 1400)** to remain in the Chemistry major (any concentration). A student failing to make this grade in his/her first attempt (including W) will get one more chance to repeat the course. If the 2.0 is not reached on the second attempt, the department will drop the student from the major and they would be required to meet with an advisor in the Career and Academic Center to choose a new major.

### **4.2 Other important aspects of the biology and chemistry curricula**

- General Biology I and II can be taken out of sequence. However, we encourage students to start with Gen Bio I in fall and move to Gen Bio II in spring.

- Genetics requires at least a 2.0 grade in Gen Bio I as a prerequisite.
- Ecology is offered in fall semester only. It is recommended that students take Ecology in fall and Genetics in spring of their sophomore year. A student could wait until the fall of their junior year to take Ecology if it does not fit into the sophomore year schedule. Ecology requires Gen Bio I or II as a prerequisite or co-enrolled with a red card.
- **Grade of 1.7 minimum.** Excluding Gen Bio I and Gen Chem I, most GIOL and CHEM courses that have prerequisites require that the biology majors get at least a 1.7 in the prerequisite courses. For example, biology majors must earn at least a 1.7 in General Chemistry II before they can move on to Organic Chemistry I. Chemistry majors require at least a 2.0 in General Chemistry II to move on to Organic Chemistry I. The only exceptions are a few upper-division biology and chemistry electives that are not prerequisites for other courses.
- **Biochemistry:** Biochemistry I (BIOL/CHEM 3030, 3 cr.) will be offered every fall and Biochemistry II (BIOL/CHEM 3040) every other spring semester. Both courses require Organic I as a prerequisite and Biochemistry I is a prerequisite for Biochemistry II. Biochemistry I can count as an elective for the biology major **or** towards the chemistry minor (if a student takes it as CHEM 3030) but it cannot be counted for BOTH.
- **Biochemical Techniques** (BIOL 3060) is a new course developed for the biochemistry concentration of the Chemistry major, and may be used as one of the 3 required Biology electives for the Biotechnology concentration. This course will be taught in alternate spring semesters when Cell Culture Techniques (BIOL 3350) is not taught.

#### 4.3 Concentrations in the Biology Major

- All biology majors take four core courses:
  - General biology 1
  - General biology 2
  - Ecology
  - Genetics
- The general biology concentration requires five biology electives level 2000 or above and a capstone course.
- Different concentrations in the biology major have different elective requirements (discussed below).
- **Biotechnology concentration** requires taking Cell Biology (BIOL 2250), a Capstone, one additional Biology elective, and three other courses from the

following list:

- BIOL 3060 – Biochemical Techniques
- BIOL 2150 - General Microbiology
- BIOL 4500 - Molecular Biology
- BIOL 3350 - Cell Culture Techniques
- BIOL 4810 - Immunology. In addition, are required to fulfill the Biology elective requirements for the major.

● **Environmental Biology concentration.** Requires 4 Biology elective courses, a Capstone, and the following:

- Conservation Biology
- Two GEOG courses
  - at least one of the GEOG courses must come from the Cluster 1 consisting of: GEOG 2100, GEOG 2500, GEOG 3110, or GEOG 4600.
  - Another course must come from a second cluster of GEOG courses consisting of: GEOG 4500, GEOG 3120, GEOG 4000, GEOG 4400, or GEOG 2400.

● **Health Sciences concentration** requires:

- Biochemistry I
- Human Anatomy and Physiology I and II.
- Biochemistry II, a Microbiology course (Medical Microbiology or General Microbiology), Developmental Biology, and Cell Biology are strongly recommended; so also Applied Statistics.

Those who are interested in medical school should take Introduction to Psychological Sciences and Introduction to Sociology in preparation for the MCAT test on these topics. Please be aware that students interested in pursuing graduate school in the health field do not need to take this concentration as long as they meet the prerequisites for their intended health professional program. You are strongly encouraged to seek advice from one of the Advisors for Health Professions (Drs. Ron Krieser (in Biology) and Monica Maldari (in Exercise and Sport Science)) at the earliest opportunity.

● **Neuroscience and Behavior concentration:** requires 2 biology electives, Capstone as well as:

- BIOL 2650 (Neuroscience) and
- Two courses providing additional perspectives to the study of neuroscience and behavior (BIOL 2600, 3250, 3550 and 4700).
- PSY 1100
- PSY 3500 or 3550

#### **4.4 Chemistry Minor**

The Chemistry minor is very achievable for Biology majors and may open up additional employment opportunities. At least two courses (6 cr) must be taken at FSU and there is a minimum GPA of 2.0 in the CHEM courses. It requires:

- General Chemistry I
- General Chemistry II
- Organic Chemistry I
- Organic Chemistry II, General Analytical Chemistry
- one CHEM course at or above 2000-level (23-24 credit).
- Biochemistry I (BIOL/CHEM 3030) or Medicinal Chemistry (BIOL/CHEM 4020) can only be used as a BIOL elective for the Biology major **or** CHEM elective for the Chemistry Minor, but not both.

#### **4.5 Biology Minor**

The Biology minor is something a chemistry major could add and requires the additional courses of General Biology II plus 10 more credits in biology courses at or above 2000 level. As in the case of Chemistry minor, the Biology minor also requires two courses (6 cr) to be taken at FSU and a minimum 2.0 GPA in BIOL courses taken at FSU. Biochemistry sequence courses and Medicinal Chemistry (all cross-listed courses) cannot be counted in both the minor and major.

#### **4.6 Neuroscience, Behavior, and Cognition Minor**

The Neuroscience, Behavior, and Cognition (NB&C) minor is an interdisciplinary program designed to provide students with the opportunity to explore the biological basis of behavior, consciousness, perception and cognition. All NB&C minors will take two biology and two psychology core courses, two electives in biology or psychology making up the 18 credits required for the minor. Students interested in pursuing a minor are advised to consult with their academic advisor and also should refer to further details in the University Catalog:

[https://catalog.fitchburgstate.edu/preview\\_program.php?catoid=48&poid=11693&returnto=3385](https://catalog.fitchburgstate.edu/preview_program.php?catoid=48&poid=11693&returnto=3385)

#### **4.7 Fitchburg State University's Policies on AP and CLEP Credits**

**AP Credits:** Generally, AP course credits are given for students who score 3, 4, or 5 on the Advanced Placement (AP) examination. See the Academic Glossary of the University Catalog for the advanced placement courses accepted:

<https://catalog.fitchburgstate.edu/content.php?catoid=48&navoid=3383>

Students need to have official AP scores sent by the College Board to the Registrar in order to get credit. The score report you had sent when you applied to FSU may not be

sufficient as it may not have contained scores of all the AP exams you took.

For the **CLEP exams (College Level Examination Program)**, Fitchburg State University adheres to the standards established by the American Council on Education granting credit for tests on which a score of 62 has been achieved. This credit is awarded only to students enrolled in degree programs at Fitchburg State University. The nearest CLEP exam site is at the testing center of Mount Wachusett Community College (978) 630-9244. Here is how the Registrar gives credits for the foreign language tests.

- **French** – based on score; pass-62 will give the student FREN 1000 and FREN 1100. A score of 63+ will grant those two courses, as well as FREN 2000 and FREN 2100.
- **German** – based on score; pass-58 will give the student GER 1000 and GER 1100. A score of 59+ will grant those two courses, as well as GER 2000 and GER 2100.
- **Spanish** – based on score; pass-59 will give the student SPAN 1000 and SPAN 1100. A score of 63+ will grant those two courses, as well as SPAN 2000 and SPAN 2100.

There are CLEP tests in many other disciplines. However, students interested in graduate, medical or P.A. schools are discouraged from taking CLEP tests as these programs would not accept these credits for pre-requisite courses, such as Biology, Chemistry, English, Physics, and Math. In addition, Biology and Chemistry CLEP credits only carry elective course credits – they do not get credit for BIOL 1800 or CHEM 1300. CLEP credits are accepted for other courses not required as prerequisites.

Students planning to take French, Spanish or Latin are required to take a placement test if the student is native speaker of a foreign language or has completed a high school level course in French, Spanish or Latin. This will allow someone to be placed in the appropriate level in these languages. Please see the Placement Test website for additional information:

<https://www.fitchburgstate.edu/student-support/academic-support/academic-coaching-and-tutoring-center/placement-testing>

## 5. Internships and Independent Research Projects

The Department of Biology and Chemistry provides learning and resume building opportunities for students through internships and independent studies. Internships send students into work environments in their chosen fields in order to provide real world experience and networking opportunities. Over the past few years we have had students perform internships in a variety of

industrial and academic lab settings. Examples include:

- Animal Adventures Family Zoo & Rescue Center (Bolton, MA)
- Associates of Cape Cod
- Biomaterials and Engineering, MIT
- Cape Cod Museum of Natural History
- Charles River Labs Inc. (Wilmington, Shrewsbury, Worcester, MA)
- Cities of Fitchburg and Leominster Conservation Commission
- Crocker Elementary School (Fitchburg, MA)
- Devens Natural Resource Management
- MA Environmental Protection Agency
- FLO Chemical Corporation (Ashburnham, MA)
- Food and Drug Administration (Washington Center Internships)
- Lancaster Animal Hospital
- Leominster Conservation & Land Use Office
- Leominster Health Alliance Hospital
- MA Department of Conservation and Recreation
- Magic Wings Butterfly Conservatory (South Deerfield, MA)
- Maribeth Crupi Physical Therapy (Wilmington, MA)
- Massachusetts General Hospital
- Museum of Science (Boston, MA)
- National Renewable Energy Laboratory (Golden, CO)
- New England Wildlife Center (Weymouth, MA)
- Oxbow Associates, Inc. – Environmental Consultants (Boxborough, MA)
- Pediatric Medicine at Southboro Medical Group (Southboro, MA)
- Pepperell Logging Services (Pepperell, MA)
- PCI Synthesis Inc. (Newburyport, MA)
- Psychiatric Associates (Wellesley, MA)
- Quest Diagnostics (MA)
- Second Chance Animal Shelter (East Brookfield, MA)
- Solid Biosciences (Charlestown, MA)
- Southwick Zoo
- Sunny Slope Farm (NH)
- UMass Medical School
- University of Connecticut
- US Army Corps of Engineers
- Vivitide (Gardner, MA)
- Wachusett State Park
- Washington Center Internships (Washington, D.C.)
- Westborough Pediatrics (Westborough, MA)

If students are interested in internships, they should contact their advisors who will help them initiate the process which will include selection of an internship site, development of a resume and cover letter and completion of paperwork including the Internship Contractual Agreement. On the second floor of the Science building, there is a bulletin board designated to provide information about internship opportunities. Additional information is also posted on the various Blackboard sites specifically for students in various concentrations. The Fitchburg State Internship Handbook (PDF) provides additional information including forms, evaluation process

and academic credit. Please see more information here:

Website:

<https://www.fitchburgstate.edu/academics/undergraduate-academics/undergraduate-and-graduate-internships>

Internship Handbook:

<https://www.fitchburgstate.edu/media/4301>

**Introduction to Research:** Students who are in the beginning of their academic career in the department (first and second years) are offered opportunities to assist in research projects conducted by faculty, thus gaining exposure to the research being carried out by the faculty member. They can earn one academic credit by registering for BIOL 1600 or CHEM 1600: Introductory Research. This course provides students with the opportunity to engage in scientific research. Participants work under the supervision of faculty to contribute to current, ongoing research projects. This course may be repeated once but only a maximum of two credits can be earned in total. This course is restricted to biology and chemistry majors, and enrollment requires permission from the instructor. The student is expected to work 3 hours per week in the lab of the faculty investigator for each credit earned and is graded on a S/U scale. Please contact your advisor or the appropriate faculty member if you are interested in participating.

**Independent Study:** During independent studies, more advanced students (third or fourth years) participate in original research under the guidance of a faculty member of the student's choosing. Independent studies allow students to engage in the scientific process, improve critical thinking skills, and learn new techniques not taught in courses. Each spring, the entire university community at Fitchburg State recognizes the achievements of undergraduate student scholars and researchers at the Undergraduate Conference for Research and Creative Practice. At this event, many biology and chemistry majors present their research in the form of a poster presentation or talk and are provided the opportunity to share and receive feedback from the larger campus community. An Independent study course shows up on the transcripts as BIOL4900 or CHEM4900. Up to 3 credits of an independent study can count as an elective course in the major.

If students are interested in participating in an independent study, they should contact the faculty member whose research interests align with their own. The research areas of each faculty member are summarized in the table above in Section 2, and in the Faculty Profiles link that can be accessed via the Department of Biology and Chemistry website at: [https://www.fitchburgstate.edu/academics/faculty-profiles?department=148&major=All&name\\_contains=](https://www.fitchburgstate.edu/academics/faculty-profiles?department=148&major=All&name_contains=) (please click on Faculty members' names to see their research interests).

## 6. Graduate and Professional School Preparation and



## Opportunities

Admission into programs in the health professions such as medicine, dentistry, nursing, pharmacy, optometry and veterinary medicine are highly competitive and require careful preparation and planning. Our pre-health professions program has two advisors, Drs. Ronald Krieser (in Biology/Chemistry) and Monica Maldari (in Exercise and Sport Science), with the knowledge to advise students interested in pursuing these careers. They work with students to help them with course selection, exam preparation and other admissions requirements. Drs. Krieser and Maldari work as a complement to your academic advisor to prepare you to be a

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competitive candidate for these programs. For students interested specifically in veterinary medicine, students should contact our Pre-Vet advisor, Dr. Daniel Welsh.

Fitchburg State University has partnerships with other institutions in the areas of medicine, dentistry, pharmacy and biotechnology that provide students with an opportunity to gain acceptance without having to go through the regular application process. These opportunities include the following:

- **The Lake Erie College of Osteopathic Medicine (LECOM) Early Acceptance Program** permits students to apply for early, provisional acceptance into the following programs: Doctor of Osteopathic Medicine, Doctor of Dental Medicine and Doctor of Pharmacy. Students with qualifying SAT scores and GPA can apply within the first two years of their program of study. Interested students should talk with Drs. Krieser and Maldari and visit the following link:  
<https://lecom.edu/college-of-osteopathic-medicine/com-entrance-requirements/>
- **Joint B.S./Pharm.D. (3+4) program with Husson University, Bangor, Maine.** This program will allow students in Biology – Health Sciences and Chemistry B.S. to spend three years at FSU and then transfer to Husson University to pursue the degree of Doctor of Pharmacy. After successfully completing the first year of the Pharm.D. curriculum, students would be eligible to earn the B.S. degree from Fitchburg State. This represents saving a year in the student's pursuit of becoming a pharmacist. For details, please see Dr. Ron Krieser.
- Any student with a B.S. in biology or chemistry and with a minimum GPA of 3.2 will be automatically eligible for admission into the **Northeastern University College of Science MS in Biotechnology Program**. This is a non-thesis graduate program designed to prepare students for careers in biotechnology and includes a six-month co op assignment with an industry employer to provide real world experience. For more information about the program, visit the following link:  
<https://graduate.northeastern.edu/program/master-of-science-in-biotechnology-boston-14250/>
- Other partnership programs are being developed and will be announced as soon as they are in place. Students are encouraged to talk with their advisor to inquire about other

opportunities.

## 7. Student Resources

### 7.1 Biology & Chemistry Departmental Resources:

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- Biology & Chemistry Department Office (SCI 220) is located in the Antonucci Science Complex

**Dr. Erin Rehrig**, Chairperson (e-mail: [erehrig@fitchburgstate.edu](mailto:erehrig@fitchburgstate.edu))

**Lindsey Babineau**, Administrative Assistant (Phone: 978-665-3246;  
e-mail: [lbabine3@fitchburgstate.edu](mailto:lbabine3@fitchburgstate.edu))

Dr. Rehrig prefers to be contacted via e-mail except for emergencies, when she can be reached by calling the department office, staffed by Lindsey Babineau, Administrative Assistant. She can answer many student questions or put you in contact with someone who can! She also has copies of departmental and university forms. In addition, she can help you to contact faculty members.

Other resources that students should be aware of include:

- Faculty Mailboxes SCI 222: Each faculty member has a mailbox in this room. They are arranged alphabetically by last name. Adjunct faculty mailboxes are grouped together, also alphabetically by last name. Students can use the mailboxes to drop off assignments, forms, etc. for faculty members.
- Advisors: Every biology major is assigned a faculty advisor. If you are not sure who is your advisor, you can find the information on DegreeWorks (Web4) or by contacting Lindsey Babineau in the department office.
- Pre-Health Advisor: Dr. Ron Krieser (in Biology and Chemistry) serves as the pre-health advisor for the Biology and Chemistry Department. Any students interested in a career in the health sciences should contact him.
- Pre-Veterinary Advisor: Dr. Daniel Welsh serves as the university's pre-veterinary advisor. Any students interested in a career in veterinary medicine should contact him.
- Faculty Offices: The faculty offices are located on the second and third floors of the Condike Science wing. Office room numbers are posted outside the department office (SCI 220) and also at the entrance to the

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Condike Wing from the Liscotti Pavilion.

- Faculty Schedules: All faculty members have their class and office hour schedules posted on a noticeboard on the 2<sup>nd</sup> floor of the Condike Science wing between SCI 218 and SCI 220.
- Job/Internship Noticeboard: This noticeboard is located on the 2<sup>nd</sup> floor of the Condike Science wing.
- Facebook Page:  
<https://www.facebook.com/FitchburgStateUniversityBioChem/>
- Biology & Chemistry Club: The goal of the Biology and Chemistry Club is to develop a community of students interested in the fields of biology, chemistry, and other natural and applied sciences. In addition, they foster interaction between the students and faculty of the Biology and Chemistry department. Meetings are generally held on Tuesdays at 3:30 pm and many events are scheduled throughout the year. See their website for further information:  
<https://fitchburgstate.campuslabs.com/engage/organization/biology-and-chemistry-club>
- Major/Concentration Specific Blackboard Sites. Students in the Chemistry Major, Biotechnology Concentration, Environmental Biology Concentration, Health Sciences Concentration and Neuroscience and Behavior Concentration are automatically enrolled in the corresponding Blackboard course (site) for the major/concentration. This is where faculty usually post information on research, graduate studies, internships, research opportunities, etc.  
<http://blackboard.fitchburgstate.edu/>

## **7.2 Campus Wide Resources:**

The Academic Support Center in the Hammond Building houses a number of academic and personal support services, which are available for all students.

- Academic Coaching and Tutoring Center (ACT): The Tutor Center's peer tutors offer free individual and group peer tutoring in a variety of subjects. Location: Hammond 306 / Phone Number: 978-665-3499.  
<https://www.fitchburgstate.edu/student-support/academic-support/academic-coaching-and-tutoring-center>

- **Counseling Services**: The Counseling Services Office offers a range of services including individual, couples and group counseling, crisis intervention, psychoeducational programming, outreach workshops, and community referrals. Counseling services are confidential and are offered at no charge to all enrolled students. Location: Hammond 317 / Phone Number: 978-665-3152.  
<https://www.fitchburgstate.edu/student-support/health-and-wellness/counseling-services>
- **Disability Services**: Disability Services provides reasonable and appropriate accommodations for Fitchburg State students with documented disabilities, allowing equal access to all university programs and services. Location: Hammond 303 / Phone Number: 978-665-4020.  
<https://www.fitchburgstate.edu/student-support/disability-services>
- **Career Support (Career Services and Advising Center)**: This center provides services such as career counseling, academic coaching, advising for Pre Majors and advising/support for students experiencing academic difficulty. Location: Hammond 318 / Phone Number: 978-665-3151.  
<https://www.fitchburgstate.edu/student-support/career-services-and-advising-center>
- **Math Tutoring**: See the Academic Coaching and Tutoring Center (ACT) for free individual and group peer tutoring in Math for all Fitchburg State University students. Location: Hammond 306A / Phone Number: 978-665-3499.  
<http://fitchburgstate.edu/act>
- **TRIO Student Support Services Program (formerly Expanding Horizons)**: TRIO is a federally funded student support services program for first generation undergraduate university students, low income students, or students with disabilities. Location Hammond 315 / Phone Number: 978-665-3576.  
<https://www.fitchburgstate.edu/student-support/academic-support/trio/trio-student-support-services-sss>
- **Writing Center**: At the Writing Center, individual writing tutoring is provided by peer tutors. Writing Peer Tutors work together with writers at all levels, in all stages of the writing process, and in all areas of study. Location: Hammond 306 / Phone Number: 978-665-3499.  
<https://www.fitchburgstate.edu/student-support/academic-support/academic-coaching-and-tutoring-center/writing-center>

- Office of International Education: This office supports students seeking study abroad opportunities (including faculty-led study abroad courses offered throughout the year and in summer), as well as providing support to undergraduate and graduate international students. In addition, they promote cross-cultural awareness on campus. Location : Hammond 316 / Phone Number: 978-665-3089.  
<https://www.fitchburgstate.edu/student-support/international-education>
- Placement Test Center: This center oversees and administers required placement tests in math, reading and writing for new freshman and transfer students. Foreign language placement testing is also offered. On the Placement Test Center webpage, there is a list of Massachusetts schools other than the FSU site where Placement tests may be taken. Location: Office - Hammond 306, Test Site – Hammond 101 / Phone Number: 978-665-3499.  
<https://www.fitchburgstate.edu/student-support/academic-support/academic-coaching-and-tutoring-center/placement-testing>
- Center for Diversity and Inclusiveness (CDI): The center coordinates and maintains a campus-wide program that reflects the University's mission to support the development of the whole person, by engaging students, in an inclusive environment, through the promotion of active involvement, collaboration, education and leadership opportunities and ensuring each student's goal fulfillment. Location: Hammond G04 / Phone Number: 978-665-3399.  
<https://www.fitchburgstate.edu/student-support/diversity-equity-and-inclusion/center-diversity-and-inclusiveness>
- The Falcon Bazaar and Professional Clothing Closet: Food insecurity is a growing issue and it certainly can affect student learning. The ability to have access to nutritious food is incredibly vital. The Falcon Bazaar Necessities and Food Pantry is stocked with food, basic necessities, and can provide meal swipes to support all Fitchburg State students experiencing food insecurity for a day or a semester. Location: Hammond G15.  
<https://www.fitchburgstate.edu/campus-life/office-student-development/falcon-bazaar>