

# STEM Advising Support for First Year Students (Fall 2023)

With fall 2023 registration approaching for first year students, chairs of STEM and STEM-associated departments and programs have offered their advice for students who are interested in these areas and may be considering pursuing a major therein.

Below you will find the chairs' advice and contact information if you have further questions.

## Biology

(Chair: Ryan Bavis, [rbavis@bates.edu](mailto:rbavis@bates.edu)):

- **First-year** life science students of any kind (interested in pre-health, bio, neuro, biochem, or ES) should take BIO 195 in the fall of 2023 or winter of 2024.
- **First-year** students interested in pre-health, bio, neuro, or biochem should take CHEM 107 in the fall.

## Chemistry and Biochemistry

(Chair: Jen Koviach-Côté: [jkoviach@bates.edu](mailto:jkoviach@bates.edu))

- Students with AP, IB, or A-level credit may use that credit in place of Chem 107 and/or 108. We typically recommend that students with credit take Chem 107 in the fall and use their credit for Chem 108. However, students who feel they have a very strong background in chemistry may take Separation Science (Chem 212) in the fall and/or Inorganic Chemistry (Chem 215) in the winter of their first year. First-year students may **not** take Organic Chemistry (Chem 217/218). More information about selecting your first chemistry course is found [here](#), and students with questions are encouraged to speak with the Chair or a Chem 107 instructor.
- Students considering a major in biochemistry should complete Bio 195, Chem 107 and Chem 108 in their first year and consider taking Math 105 and/or 106. By the end of the second year, students should complete Bio 202, Bio 204, Chem 217, Chem 218, Math 105, and Math 106. Students planning to study abroad should take Phys 107 or 109 no later than fall semester of the junior year.
- Students considering a major in chemistry should complete Chem 107, Chem 108, Math 105, and Math 106 in their first year. By the end of the second year, students should complete Chem 217/218 and Chem 212 and/or Chem 215.

Students planning to study abroad should take Math 205 and Phys 107 or 109 no later than fall semester of junior year.

## Digital and Computational Studies

(Chair: Barry Lawson: [blawson@bates.edu](mailto:blawson@bates.edu))

**What courses of interest to 1st- and 2nd-year students (i.e. undeclared students) are being offered?**

- **Algorithmic Thinking & Programming:** The course is designed for students who have no prior programming experience, and is taught using Python.
  - DCS 109: *Introduction to Computing and Programming* (Lawson). DCS Minor categories: PCT.
- **Data Analysis, Visualization, & Data Science:** Both courses use R, and require one previous DCS course, or permission of instructor.
  - DCS 204: *Archives, Data, & Analysis* (Shrout). DCS Minor categories: CDS, DCP.
  - DCS 210: *Programming for Data Analysis & Visualization* (TBA). DCS Minor categories: PCT, DCP.
- **Critical Digital Studies:** These courses ask students to critically interrogate the values and assumptions of the digitized and computational world.
  - DCS 106: *TechnoGenderCulture* (Shrout) – also includes a community engagement component. DCS Minor categories: CDS, DCP.
  - DCS 204: *Archives, Data, & Analysis* (Shrout). CDS, DCP.

**What should an undeclared sophomore thinking about your the DCS minor know in order to be making satisfactory progress toward the minor?**

The [DCS minor](#) consists of six courses, which can include cross-listed courses.

- At least two of the six courses must be at the 200-level or higher.
- Three of the six courses must be taught by Bates faculty (e.g., you could include a transferred AP course, courses from the [Roux Institute's Align Program](#), and/or approved study abroad – subject to no more than three courses can be taught by non-Bates faculty).
- You must take at least one course from two of three primary DCS categories (tags): Programming & Computer Science Theory (PCT); Critical Digital Studies (CDS) ; Digital & Computational Praxis (DCP). For more information and corresponding course tags, see the [DCS webpage](#).

## Earth and Climate Sciences

(Chair: Bev Johnson, [bjohnso3@bates.edu](mailto:bjohnso3@bates.edu))

See [Major Requirements](#).

Students in Earth and Climate Sciences (EACS) “build a foundation in how the earth system works, so they can apply this knowledge to complex and profound issues where geoscience and society intersect”<sup>1</sup>. Topics related to mineral and water resources, natural hazards (such as earthquakes, volcanoes, and extreme weather patterns), human impacts on the environment, and climate change are at the core of the EACS curriculum. The department emphasizes communication, collaboration, and hands-on experiential learning in the field, the laboratory, and the classroom. Select courses from environmental studies, physics, chemistry, biology, mathematics, and digital and computational studies may also count towards the major.

### **What courses of interest to first- and second-year students (i.e. undeclared students) are being offered?**

If a student is interested in exploring the field for the first time, they should join any of the EACS 100-levels listed below:

- EACS 103: Earth Surface Environments and Environmental Change
- EACS 104: Plate Tectonics and Hazards
- EACS 107: Katahdin to Acadia: Field Geology in Maine
- EACS 109: Earth's Climate System
- EACS / BIO 113: Marine Science

If students have already taken a 100-level EACS course, they should begin to take the 200-level core courses as early as the second semester of their first year. Four out of five of these 200-level courses are required for the major.

- EACS 210: Sedimentary Processes and Environment/Lab (fall semester only)
- EACS / PHYS 220: Dynamical Climate (winter semester only)
- EACS 223: Earth Materials (winter semester only)
- EACS 230: Earth Structure and Dynamics (fall semester only)
- EACS 240: Environmental Geochemistry (winter semester only)

Additional elective courses at the 200-level include EA/ES 226 (Hydrogeology) and EA/ES 217 (Mapping and Geographic Information Systems).

## **Environmental Studies**

(Chair: Sonja Pieck, [spieck@bates.edu](mailto:spieck@bates.edu))

### **What courses of interest to first- and second-year students (i.e. undeclared students) are being offered?**

- ENVR 203: Scientific Approaches to Environmental Issues (winter 2024, no prerequisites)
- ENVR 204: Environment and Society (fall 2023 and winter 2024, no prerequisites)

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<sup>1</sup> Mosher, S. and Keane, C. editors, 2021. Vision and Change in the Geosciences: The Future of Undergraduate Education. American Geosciences Institute.  
<https://www.americangeosciences.org/change/>

ENVR 205: Lives in Place (fall 2023 and winter 2024, no prerequisites)

There will also be mid-level courses on “Disasters and Displacement,” “Politics of Wildlife Conservation,” and one or two as yet to be determined mid- and upper-level humanities courses in the winter that may be suitable for first- or (in the latter case) second-year students with the needed prerequisites.

Introductory science and math courses such as CHEM 108, PHYS 107, BIO 195, EACS 103, MATH 106, and the 200-level courses with environmental themes that build from those courses are all appropriate for students interested in environmental science. Students interested in environmental science, in particular, might look to the Ecology and Earth Systems concentration within environmental studies and contact Holly Ewing ([hewing@bates.edu](mailto:hewing@bates.edu)) with any questions.

**What should an undeclared sophomore thinking about your major know in order to be making satisfactory progress toward the major?**

From the College Catalog: *"It is recommended that students complete ENVR 204, 205 and either 203 or another introductory science course as early as possible, preferably within their first two years. These courses are not open to senior majors. In addition to ENVR 203, 204 and 205, the environmental studies committee recommends that all students interested in environmental studies take a related course in biology, chemistry, physics, earth and climate sciences, or environmental science during their first year."*

If there happen to be no seats remaining in the introductory core courses, students should petition for entry. If a petition is not accepted, students can still make progress in the major by consulting the course requirements for the concentration of their choice and registering for available electives.

In general, we recommend that students who are interested in an ES major contact the ES Program Chair, Sonja Pieck ([spieck@bates.edu](mailto:spieck@bates.edu)), or any of the concentration advisors. Holly Ewing ([hewing@bates.edu](mailto:hewing@bates.edu)) advises students interested in environmental science and is happy to talk with students at any stage. More information about the core, the concentrations, and the concentration advisors, can be found [here](#).

## **Mathematics**

(Chair: Katy Ott, [kott@bates.edu](mailto:kott@bates.edu) )

Our major requirements have changed recently to give more pathways to interested students (including adding a requirement of a "computational" or "applied" course and the reduction of requirements of "proof-heavy" courses). We also offer two options for senior capstone: thesis or seminar. Our major is pretty flexible and a good partner to other majors.

**What should my first math course be?**

Even if you do not have official credit, if you have a strong background in Calculus, we urge you to sign up for the next level after what you have completed. Successful completion of MATH 106 (Calculus II) fulfills any Bates requirements for MATH 105 (Calculus I). Successful completion of MATH 206 fulfills any Bates requirements for both MATH 105 (Calculus I) and MATH 106 (Calculus II). This includes the Bachelor of Science (B.S.) degree.

Students with moderate or more calculus experience on their high school transcript are normally not permitted to enroll in Math 105. If such a student would like to take Physics 107 without concurrently or previously taking Math 106, Math 205, or Math 206, the student should email the Physics 107 instructor to request a prerequisite override.

In general, we encourage you to not repeat a course you have already taken and understood. Some students find repeating a course boring and unmotivating. Others have difficulty learning similar material from a different textbook. Additionally, you must give up your AP/IB/A-level math credit before you can sign up for a course in which you have already earned credit.

You can find the information above, along with a non-binding calculus-placement exam, on the webpage

<https://www.bates.edu/mathematics/academics/selecting-first-math-course/>.

**What should an undeclared sophomore thinking about your major know in order to be making satisfactory progress toward the major?**

College credit for MATH 105/106 (The Calculus I/II sequence) is not required for the math major, which begins with MATH 205 and 206 (Linear Algebra and Multivariable Calculus, respectively). MATH 205 and 206 should be taken at the latest by the end of the sophomore year. Also, students interested in a math major absolutely should complete MATH 221, Introduction to Abstraction, no later than the second semester of the sophomore year. Many upper level electives require MATH 221 course as a prerequisite.

## **Neuroscience**

**What courses of interest to first- and second-year students (i.e. undeclared students) are being offered?**

- Introduction to Neuroscience (NS/PY160).

**What should an undeclared sophomore thinking about your major know in order to be making satisfactory progress toward the major?**

There's a very chemistry and biology-heavy front-end to our curriculum. If BIO195 and CHEM107 & CHEM108 are not completed by the end of sophomore year it's much more difficult to find a viable path through the major.

Moreover, BIO202 and CHEM217 should also be completed by the end of sophomore year. It's still technically possible to complete the major taking BIO202 and CHEM217 junior year instead of sophomore year, but it makes completing the major difficult and the possibility of study abroad would be greatly diminished.

## Physics and Astronomy

(Chair: Jeff Oishi, [joishi@bates.edu](mailto:joishi@bates.edu))

**What courses of interest to first- and second-year students (i.e. undeclared students) are being offered?**

[PHYS 109. \*Energy, Matter, and Motion\*](#). This is the introductory physics course for students interested in majoring in the **physical sciences**. Its sequel course, [PHYS s31](#), is offered in Short Term.

[PHYS 211. \*Newtonian Mechanics\*](#). Typically taken in the fall of the second year; **occasionally taken by well-prepared first-years**.

[PHYS 107. \*Introductory Physics of Living Systems I/Lab\*](#). Designed for students majoring in the **life sciences** and/or interested in pre-health studies.

**What should an undeclared sophomore thinking about your major know in order to be making satisfactory progress toward the major?**

They should be taking PHYS 211 in the Fall of their sophomore year, and PHYS 222 in the Winter of their sophomore year. PHYS 301 (required for the major, and a prereq for PHYS 308) is often taken in the Winter of the sophomore year. They should be aware that PHYS 308 (required for the major) is only offered in the Fall, and is typically (but not always) taken as a junior. They should be aiming to take [PHYS s31](#) in Short Term this year.

## Engineering Combined Plan

(Advisor: Nathan Lundblad, [nlundbla@bates.edu](mailto:nlundbla@bates.edu))

Students interested in potentially pursuing the engineering combined plan ("3-2") should consult the following web page and if necessary discuss with the engineering combined plan advisor.

<https://www.bates.edu/physics-astronomy/academics/engineering/>

Regardless of the somewhat variable prerequisite requirements of our partner institutions, students pursuing this path should be taking introductory physics ([PHYS 109](#) and [S31](#) under the new physics system in place) in their first or second year, a programming-centered DCS course in their first or second year, Chem 107 in their first or second year, and be making good progress on the Mathematics 105-106-205-206-219

sequence throughout. For further prerequisites please consult the combined plan advisor and the above website.

*Please note that need-based financial aid for the years spent at the partner institution is separately determined by that institution (e.g. Columbia), and is typically unavailable for international students.*

*Advising information gathered and arranged by:*

*Larissa Williams (Associate Professor of Biology)*