

STEM Advising Support for First Year Students (Fall 2022)

With fall 2022 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: Larissa Williams, lwillia2@bates.edu):

- **First-year** life science students of any kind (interested in pre-health, bio, neuro, biochem, or ES) should take BIO 195 either in the fall of 2021 or in the winter of 2022.
- **First-year** students interested in pre-health, bio, neuro, or biochem should take CHEM 108 in the winter (having already taken CHEM 107 in the fall).

Chemistry and Biochemistry

(Chair: Matt Côté: mcote@bates.edu)

- Students considering majoring in chemistry or biochemistry typically complete CHEM 107 (fall), CHEM 108 (winter), CHEM 217 (fall), CHEM 218 (winter) by the end of their sophomore year.
- CHEM 212 or 215 are sometimes taken by sophomores but students can hold off until junior year.

Digital and Computational Studies

(Chair: Barry Lawson: blawson@bates.edu)

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

- **Algorithmic Thinking & Programming:** Both courses focus on algorithmic thinking, are designed for students who have no prior programming experience, and are taught using Python.
 - DCS 109: *Introduction to Computing and Programming* (Lawson)
 - DCS 111: *Programming for the Humanities* (Shrout)

- **Data Visualization & Data Science:**
 - *Programming for Data Analysis & Visualization* (TBA)

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: Programming & Computational Thinking (PCT); Critical Digital Studies (CDS) ; Digital & Computational Praxis (DCP). For more information and corresponding course tags, see the [DCS webpage](#).

DCS Courses for Fall 2022 include:

- DCS 109: *Introduction to Computing & Programming* (Lawson). Open to 1st-years. No prerequisites. DCS Minor tags: PCT.
- DCS 111: *Programming for the Humanities* (Shrout). Open to 1st-year students. No prerequisites. DCS Minor tags: PCT.
- DCS 210: *Programming for Data Analysis and Visualization* (TBA). Prerequisite: one DCS course, or permission of the instructor. DCS Minor tags: PCT, DCP.
- DC/HI 212: *Digital History Methods* (Shrout). Open to 1st-year students. DCS Minor tags: CDS, DCP.
- DCS 229: *Data Structures & Algorithms* (Lawson). Prerequisite: DCS 109 or equivalent course. DCS Minor tags: PCT.

Earth and Climate Sciences (formerly Geology)

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

See [Major Requirements](#) for different class years.

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 109: Earth's Climate System

BI/EA 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

EACS 223: Earth Materials

EACS 230: Earth Structure and Dynamics

EACS 240: Environmental Geochemistry

EA/PH 220: Dynamical Climate

Additional courses at the 200-level include EA/ES 226 (Hydrogeology) and EA/ES 217 (Mapping and Geographic Information Systems) (see detailed [EACS Major Requirements](#)).

Environmental Studies

(Chair: Joe Hall, jhall2@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 2023, no prerequisites)

ENVR 204: Environment and Society (fall 2022, winter 2023, no prerequisites)

ENVR 205: Lives in Place (fall 2022, winter 2023, no prerequisites)

There will also be mid-level courses in marine science, climate justice, and the politics of wildlife conservation in the fall that may be suitable for 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) 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, Joe Hall (jhall2@bates.edu), or any of the concentration advisors. Holly Ewing (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: Chip Ross, sross@bates.edu)

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.

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.

Neuroscience

(Chair: Jason Castro, jcastro@bates.edu)

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

- Introduction to Neuroscience (NS/PY160).
- Neuroscience, Ethics, and Society (NRSC 208) (open to first years, but has pre-reqs)

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: Nathan Lundblad, nlundbla@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 107. *Introductory Physics of Living Systems I/Lab*](#). Designed for students majoring in the **life sciences** and/or interested in pre-health studies.

[PHYS 211. *Newtonian Mechanics*](#) (major requirement, typically taken as sophomore)

[PHYS 216. *Computational Physics*](#) (elective)

[ASTR 202. *Galaxies and Cosmology*](#) (elective)

[PHYS 230. *Electronics*](#) (elective)

[PHYS 231. *Laboratory Physics*](#) (major requirement, offered every semester)

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 prerequisite 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.

Prospective majors should be aiming to take PHYS s31 in Short Term this year.

Engineering Combined Plan

(Advisor: Hong Lin, hlin@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:

Nathan Lundblad (Professor of Physics and Astronomy and Natural Sciences and Mathematics Division Chair), April Hill (Wagener Family Professor of Equity and Inclusion in STEM), and Larissa Williams (Associate Professor of Biology and Chair of Biology)