

Introductory Sciences at the Keck Science Department

An Informal Advising/Orientation Guide

2023-2024

If you are considering becoming a science or pre-health major, please talk with a Keck Science faculty member before enrolling in your first-semester courses. Science faculty can help ensure that you are enrolled in classes appropriate to your previous experience and can assist with the advanced planning that is often necessary to navigate through the prerequisites required for many upper-division courses.

For the majors listed below, these faculty indicated are available for consultation:

- Biology— Professor Sarah Gilman (sgilman@kecksci.claremont.edu)
- Chemistry— Professor Katie Purvis-Roberts (kpurvis@kecksci.claremont.edu)
- Physics— Professor Scot Gould (sgould@kecksci.claremont.edu (Fall 2023); Professor Adam Landsberg (alandsberg@kecksci.claremont.edu) (Spring 2024)
- Biochemistry— Professor Mary Hatcher-Skeers (mhatcher@kecksci.claremont.edu)
- Biophysics— Professor Scot Gould (sgould@kecksci.claremont.edu (Fall 203); Professor Adam Landsberg (alandsberg@kecksci.claremont.edu) (Spring 2024)
- Economics and Engineering – Professor Kevin Setter (ksetter@kecksci.claremont.edu)
- Environmental Analysis— Professor Colin Robins (crobins@kecksci.claremont.edu)
- Environment, Economics, and Politics (EEP)— Professor Branwen Williams (branwen.williams@cmc.edu)
- Human Biology— Professor Marion Preest (mpreest@kecksci.claremont.edu)
- Management-Engineering— Professor Kevin Setter (ksetter@kecksci.claremont.edu)
- Molecular Biology— Professors Pete Chandrangsu (pchandrangsu@kecksci.claremont.edu), Findley Finseth (ffinseth@kecksci.claremont.edu), and Patrick Ferree (pferree@kecksci.claremont.edu)
- Neuroscience— Professor Jenna Monroy (jmonroy@kecksci.claremont.edu)
- Organismal Biology— Professor Sarah Budischak (sbudischak@kecksci.claremont.edu)
- Science Management— Professor Anna Wenzel (awenzel@kecksci.claremont.edu)

Pre-Health

The *minimal* science requirements for students planning careers in the health professions include: “Basic Principles of Chemistry” (14L and 15L), “Organic Chemistry” (116L and 117L), “Introductory Biology” (43L and 44L), and “General Physics for the Life Sciences” (30L and 31L) or “Principles of Physics” (33L and 34L). Please see the Keck Science Pre-Health website (<http://www.kecksci.claremont.edu/prehealth/>) for additional information on required and recommended courses for pre-health students. Susie Fang, the department’s Pre-Health Professions Advisor, may also be reached at sfang@kecksci.claremont.edu.

Below is some informal course-specific advice we provide to help determine your first year of courses.

Chemistry

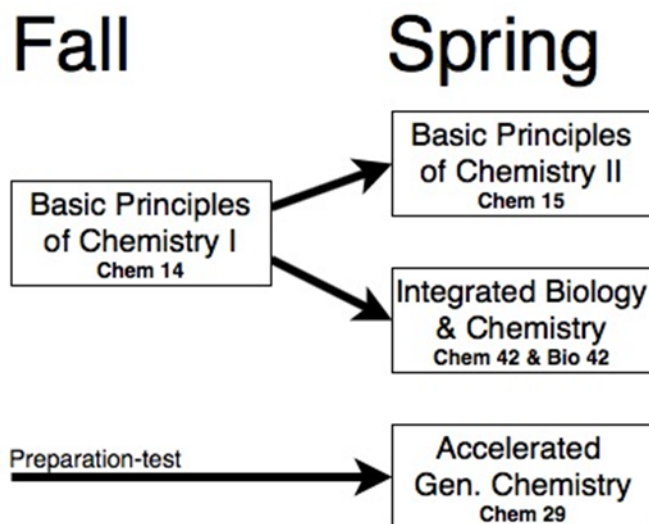
We generally advise potential Chemistry, Biology and pre-health-intended majors to take introductory Chemistry the first year. This allows them to take organic chemistry the following year if needed, which frees up the possibility of studying abroad during the junior year. There are several paths to taking introductory Chemistry at Keck (see Figure 1).

The traditional path is Chem 14 in the Fall and Chem 15 in the Spring. These courses are to be taken in order, and each semester there are multiple lectures/professors with associated weekly laboratory sessions. For those with weaker mathematics preparation there is a section of Chem14 with additional time dedicated to problem-solving, please contact Professor Mary Hatcher-Skeers (mhatcher@kecksci.claremont.edu) for more details on this section.

An interdisciplinary path is to take Chem 14 in the Fall, and Chem/Bio 42 in the Spring. Chem/Bio 42 is an Integrated Biology and Chemistry course that is co-taught by Biology and Chemistry professors. It is not an accelerated course - it has largely the same content as the second semester of introductory chemistry (Chem15), and of introduction to biology (Bio 43), but is taught with an additional emphasis on interdisciplinary connections. There is only one section of it offered this Spring, and entry is via regular pre-registration in the late-Fall (there is no admission-test, and the only prerequisite is Chem 14). For those deciding whether to take Bio 43 in the Fall vs. Integrated Biology and Chemistry in the Spring, please email professors Van Arnam or Jones (evanarnam@kecksci.claremont.edu and ejones@kecksci.claremont.edu).

An accelerated path for a student with a strong high school chemistry preparation is to take Accelerated General Chemistry (Chem 29) in the Spring. Registration is by permission of the instructor, and is informed by a diagnostic worksheet followed by consultation with the instructor. For further information, please contact Prof. Aaron Leconte at aleconte@kecksci.claremont.edu.

The diagnostic worksheet will be available **starting August 15**; please contact Professor Aaron Leconte at aleconte@kecksci.claremont.edu to arrange to take the worksheet at a time mutually convenient. Because space in the class is limited, we ask all students to complete the diagnostic worksheet no later than **5:00pm on August 23**. Any students who complete the diagnostic worksheet after this time can only be accepted into Chem 29 as space allows. For further information, please contact Prof. Aaron Leconte at aleconte@kecksci.claremont.edu.



Biology

Biology majors or any student wishing to take upper division courses in biology are generally advised to complete the two course Introductory Biology series (Bio43 and Bio44) by the end of their second year. These courses serve as prerequisites for all upper division biology courses. The courses may be taken in either order, but Bio43 is usually offered only in the Fall and Bio 44 usually only in the Spring. Note that a Bio43 equivalent may be taken in the Spring through the Integrated Biological Chemistry (IBC) double course. Both Bio 43 and Bio 44 have a laboratory component that meets once each week for four hours.

There are several options for taking the introductory biology series. If a student has taken some Chemistry and Calculus in high school, then taking Bio 43 in the first semester (along with Chem 14) is a possibility. A popular option is to take Bio 44 in the second semester (Spring), and Bio 43 in the third semester (Fall semester of the second year). A student who wishes to have an integrated Biology-Chemistry experience may take IBC in Spring semester of their first year and Bio 44 in Spring semester of their second year. All of these options will allow a student to stay on track with their upper division coursework.

For students wishing to major in biology, it is strongly advised that they complete the introductory chemistry series in their first year. This means enrolling in Chem 14 in fall and Chem 15 (or IBC) in the spring of the first year.

Neuroscience

The neuroscience major requires both semesters of Intro Bio and Intro Chem, which should be taken during the first and second year. Foundations of Neuroscience (Neuro095) is only offered in the Spring and should be taken during the first or second year. It is not advised that Foundations be taken at the same time as two other science courses as that requires taking 3 labs in one semester. It is highly recommended that students take Foundations prior to Neuro1 or Neuro2. The material covered in Neuro1 and Neuro2 are quite integrative and can be a little overwhelming for students with less science background.

Students decide on a 'sequence'; a set of 4 courses in a particular area. These are listed on the neuroscience website neuro.kecksci.claremont.edu. For example, students interested in

psychology-based neuroscience will take 4 psychology-related courses. The courses in the second 'tier' are based on the sequence. Students taking psychology-based courses should take Research Methods and Psych Stats (these usually have to be taken at their home institution), along with math or CS. The non-psychology students should take some combination of biostats, computer science, math, or physics (only one semester of physics counts).

Physics/Biophysics/Engineering

Students contemplating a *Physics major* should take Principles of Physics (Physics 33) in the Fall semester of their first year, followed by Physics 34 in the Spring. Waiting until sophomore year before taking intro physics is strongly discouraged, since it can produce a variety of scheduling challenges later (including with study abroad). Potential physics majors should also plan on finishing *at least* through second-semester college calculus by the end of their first year. (Math 31S at Pomona has a focus on *applied* calculus and might be an especially good choice for science majors who need second-semester calculus.)

Students contemplating a *Biophysics major* have the option of taking either the Principles of Physics (Physics 33-34) intro sequence or the General Physics for Life Science (Physics 30-31) intro sequence (see below), though we recommend starting with Physics 33. Ideally, biophysics majors should take intro physics starting in the fall semester of their first year, though it is possible for biophysics majors to wait until sophomore year.

Students with a potential interest in physics or biophysics should always consult with a physics professor before making their course selections; students with a definitive plan to major in physics or biophysics should switch to a physics professor as their academic advisor.

Students contemplating participating in our *Engineering program* should *immediately* consult with Prof. Kevin Setter, ksetter@kecksci.claremont.edu.

The physics program has two distinct intro physics course sequences: Principles of Physics (Physics 33-34) and General Physics for the Life Sciences (Physics 30-31). Physics, Chemistry, and Engineering majors should take Physics 33-34, while life science majors often take the Physics 30-31 intro sequence; biophysics majors can do either sequence, though 33-34 is preferred. Although the two intro sequences are similar, the key differences are: (a) 33-34 is frequently taught in an integrated lecture-lab format, whereas 30-31 has separate lectures and labs; (b) while both sequences use calculus, 33-34 uses it more heavily; (c) 30-31 has more life science related examples; (d) 33-34 uses numerical software packages more; (e) 34 covers electromagnetism and waves, while 31 covers electromagnetism, waves, and some modern physics.

Environmental Analysis Science Track

The environmental analysis *science track* major requires a semester of Intro Bio (BIOL 044LKS) and Intro Chem (CHEM014LKS), or equivalent, which should be taken during the first and second year. Majors must also take an introductory earth science course (e.g., EA055LKS, GEOL020 PO, or approved alternate). One core course, Introduction to Environmental Studies (EA10PZ or PO) and either Nature, Culture and Society (EA020PO) or Environmental Justice (EA86PZ), or POL1136PO, are not generally prerequisites for other courses, but are required for the major and are recommended to be taken within the first two years. Please check the course

catalog for further major requirements or make sure you consult with an EA-affiliated Keck Science faculty member.