



RICE NATURAL SCIENCES Biosciences



Biosciences 2021-2022 Advising Packet

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Do this first: Get connected to your community and resources! Very important!

Biosciences Opportunities Canvas List: This is the primary site for advising resources (academic, research, internship and career information) and mailing list for research/career opportunities. Enroll today using your standard Rice netID and password at <https://catalog.rice.edu/>.

Neuroscience clubs and opportunities: The following site contains insider information for those seeking to connect with students and research in Neuroscience including listserv information.
<http://flynn.rice.edu/advising/a-welcome-letter-to-neurds/>

Other resource sites

- Biosciences department website: <https://biosciences.rice.edu/>
- Research in Biosciences and Neuroscience: <http://biosugresearch.rice.edu/>
- Facebook @BiosciencesatRice

Introduction to the Degree Programs in Biosciences

The Biosciences undergraduate curricula provide undergraduate students with numerous rigorous, balanced, yet flexible paths towards either a Bachelor of Arts (BA) or Bachelor of Science (BS) in a wide range of focal areas within the life sciences. The major in **Biosciences** is divided into four distinct major concentrations: **Biochemistry, Cell Biology and Genetics, Ecology and Evolutionary Biology, and Integrative Biology**. Students declaring a major in Biosciences must select one of these four major concentrations.

All major concentrations share the same basic structure: core requirements include introductory coursework in the natural sciences, including biology (BIOS), chemistry (CHEM), physics (PHYS), math (MATH), and statistics (STAT); a combination of required and elective lecture and laboratory courses in biology (BIOS), with a focus on coursework within the area of major concentration; at least one additional lecture course in natural sciences or engineering; and a capstone biology (BIOS) course within the major concentration area.

All major concentrations offer a BA and a BS option. The BA degrees offer a rigorous biological curriculum suitable for many career paths while allowing the flexibility for extended academic exploration in other areas. The BS degrees include similar academic rigor with the addition of experience conducting original research. While undergraduate research is required for the BS degrees, all students regardless of their major are welcome and encouraged to participate in undergraduate research, availing themselves of the numerous research opportunities at Rice and in the Houston community.

Both the BA and BS degrees with the major in Biosciences and all major concentrations provide students with significant biological content knowledge and the skills to evaluate the scientific literature, design experiments, and collect, analyze, and communicate data. These degrees prepare students for graduate, medical, or other professional schools and a wide range of careers in the life sciences and beyond. Qualified students, interested in graduate school, have the option to apply to a specialized BA-MS-PhD program track at the end of their sophomore year.

In addition, a **minor in Biochemistry and Cell Biology** and a **minor in Ecology and Evolutionary Biology** are offered for students interested in these fields who are majoring in other areas. The minor in Biochemistry and Cell Biology includes many of the life science core courses required for the health professions.

The **Neuroscience major** is an interdisciplinary program that is designed to provide multiple paths for students interested in the brain and how it works. This degree path explores the biological basis of cognition, how information is processed by neurons and neural systems, and how the latest mathematical and scientific tools can be utilized to learn more about ourselves.

The **Environmental Science major** explores interconnections between humans and the natural world. This interdisciplinary program, jointly offered by the Department of Biosciences and the Department of Earth, Environmental and Planetary Sciences, is designed to foster the critical thinking required to address the increasing complexities facing our planet and develop solutions to enhance the environment.

Comparison charts for Biosciences major concentrations:BA degrees

Category	BA Biosciences <i>Biochemistry</i> F2021	BA Biosciences <i>Cell Biology & Genetics</i> F2021	BA Biosciences <i>Integrative Biology</i> F2021	BA Biosciences <i>Ecology & Evolution</i> F2021
Math/Stat	MATH 101 MATH 102 STAT 305	MATH 101 MATH 102 STAT 305	MATH 101 MATH 102 STAT 305	MATH 101 MATH 102 STAT 305
Physics	PHYS 125 PHYS 126 or listed substitutions	PHYS 125 or listed substitutions	PHYS 125 or listed substitutions	PHYS 125 or listed substitutions
Intro Chem	CHEM 121/123 CHEM 122/124	CHEM 121/123 CHEM 122/124	CHEM 121/123 CHEM 122/124	CHEM 121/123
Orgo Chem	CHEM 211/213	CHEM 211/213	CHEM 211/213	---
Intro Bio	BIOS 201 BIOS 202	BIOS 201 BIOS 202	BIOS 201 BIOS 202	BIOS 201 BIOS 202
Labs	BIOS 211 BIOS 311 2 elective labs (see GA)	BIOS 211 3 elective labs (see GA)	BIOS 211 BIOS 213 2 elective labs (see GA)	BIOS 213 3 elective labs (see GA)
Upper Level Lecture Courses in Major Area (≥3 credit hours)	BIOS 301 BIOS 302 BIOS 352 2 elective lectures (see GA)	BIOS 301 BIOS 341 BIOS 344 3 elective lectures (see GA)	BIOS 301 BIOS 341 BIOS 332 BIOS 334 2 elective lectures (see GA)	BIOS 312 BIOS 332 BIOS 334 BIOS 338 5 elective lectures (see GA)
Broadening Elective Lecture Courses	1 NSCI/ENGI >200 (≥ 3 credit hours)	1 NSCI/ENGI ≥200 (≥ 3 credit hours)	1 NSCI/ENGI ≥200 (≥ 3 credit hours)	1 NSCI/ENGI ≥200 (≥ 3 credit hours)
Senior Capstone	1 400-level capstone (see GA)	1 400-level capstone (see GA)	1 400-level capstone (see GA)	1 400-level capstone (see GA)

See GA (<http://ga.rice.edu>) for acceptable course substitutions.

Comparison charts for Biosciences major concentrations:BS degrees

Category	BS Biosciences <i>Biochemistry</i> F2021	BS Biosciences <i>Cell Biology & Genetics</i> F2021	BS Biosciences <i>Integrative Biology</i> F2021	BS Biosciences <i>Ecology & Evolution</i> F2021
Math/Stat	MATH 101 MATH 102 STAT 305	MATH 101 MATH 102 STAT 305	MATH 101 MATH 102 STAT 305	MATH 101 MATH 102 STAT 305
Physics	PHYS 125 PHYS 126 or listed substitutions	PHYS 125 or listed substitutions	PHYS 125 or listed substitutions	PHYS 125 or listed substitutions
Intro Chem	CHEM 121/123 CHEM 122/124	CHEM 121/123 CHEM 122/124	CHEM 121/123 CHEM 122/124	CHEM 121/123
Orgo Chem	CHEM 211/213	CHEM 211/213	CHEM 211/213	---
Intro Bio	BIOS 201 BIOS 202	BIOS 201 BIOS 202	BIOS 201 BIOS 202	BIOS 201 BIOS 202
Labs	BIOS 211 BIOS 311 1 elective lab (see GA)	BIOS 211 2 elective labs (see GA)	BIOS 211 BIOS 213 1 elective lab (see GA)	BIOS 213 2 elective labs (see GA)
Research	9 total credits of research w/ at least 3 credit per semester	9 total credits of research w/ at least 3 credit per semester	9 total credits of research w/ at least 3 credit per semester	9 total credits of research w/ at least 3 credit per semester
Upper Level Lecture Courses in Major Area (≥3 credit hours)	BIOS 301 BIOS 302 BIOS 352 2 elective lectures (see GA)	BIOS 301 BIOS 341 BIOS 344 3 elective lectures (see GA)	BIOS 301 BIOS 341 BIOS 332 BIOS 334 2 elective lectures (see GA)	BIOS 312 BIOS 332 BIOS 334 BIOS 338 5 elective lectures (see GA)
Broadening Elective Lecture Courses	1 NSCI/ENGI >200 (≥ 3 credit hours)	1 NSCI/ENGI ≥200 (≥ 3 credit hours)	1 NSCI/ENGI ≥200 (≥ 3 credit hours)	1 NSCI/ENGI ≥200 (≥ 3 credit hours)
Senior Capstone	1 400-level capstone (see GA)	1 400-level capstone (see GA)	1 400-level capstone (see GA)	1 400-level capstone (see GA)

Red text indicates difference between BA and BS in Biosciences majors

See GA (<http://ga.rice.edu>) for acceptable course substitutions

Additional Majors

See the General Announcements and academic advisors for detailed requirements on the following majors.

- **Neuroscience**—detailed requirements also available at www.neuroscience.rice.edu under the education tab
- **Environmental Science**

Comparison charts for minors

Category	Biochemistry and Cell Biology <i>minor</i>	Ecology and evolutionary Biology <i>minor</i>
Math/Stat/CA AM	MATH 101 MATH 102 or listed substitutions	
Physics	PHYS 125 PHYS 126 or listed substitutions	
Intro Chem	CHEM 121/123 CHEM 122/124	
Orgo Chem	CHEM 211/213 CHEM 212/214 CHEM 215	
Intro Bio	BIOS 201	BIOS 201 BIOS 202
Labs	BIOS 211	BIOS 213
Upper Level Lecture Courses (≥3 credit hours)	BIOS 301 BIOS 341 Select 1 additional lecture course (see GA for list)	Select 4 additional lecture courses (see GA for list)

See GA (<http://ga.rice.edu>) for acceptable course substitutions.

Courses to Take First

The following fundamental courses are prerequisites for Biosciences upper level offerings. For this reason, it is important for Biosciences majors to take the following courses during their first year (or transfer in AP credit for them):

- *BIOS 201: Introductory Biology I* lecture (required for BIOS, NEUR, and ENVS)
- *BIOS 202: Introductory Biology II* lecture (required for BIOS and ENVS)
- *FWIS 115* or *NSCI 120: Introductory Labs* (recommended; serve as prerequisite for undergraduate research for credit)
- *CHEM 121/123: General Chemistry I & Lab* (required for BIOS, NEUR, and ENVS)
- *CHEM 122/124: General Chemistry II & Lab* (required for BIOS except EEB conc, NEUR, ENVS)

Biosciences Courses Accessible to First-Year Students

LECTURE COURSES FOR FIRST-YEAR STUDENTS

BIOS 201 Introductory Biology I (offered Fall and Spring, 3 credit hours)

The first in a series of two introductory biology courses (BIOS 201, BIOS 202). This course examines chemistry and energetics, cell physiology, cell biology, Mendelian genetics, molecular genetics, developmental biology, and plant physiology.

BIOS 202 Introductory Biology II (offered Fall and Spring, 3 credit hours)

The second in a series of two introductory biology courses (BIOS 201, BIOS 202). This course examines the diversity of life, comparative animal physiology, evolution, ecology, and conservation. An emphasis is placed on evolution as a central framework necessary for a complete understanding of modern biology. Group discussions allow students to explore topics in more detail and discover how they are relevant to our everyday lives.

Prerequisites: BIOS 201

BIOS 300 Paradigms in Biochemistry and Cell Biology (offered Fall only, 3 credit hours)

This course examines paradigms in biochemistry and cell biology with a specific focus on the “central dogma” of molecular biology. It is designed for BIOS majors and minors and recommended strongly for students with Advanced Placement in Biology who do not take BIOS 201 and for students wanting additional foundation before transitioning to other 300-level BIOS lecture courses. BIOS 300 is a great “first” 300-level elective course for Biosciences majors. NOTE: BIOS 300 may be offered in some summer sessions.

BIOS 332 Ecology and *BIOS 334 Evolution*

These are good courses for students with AP biology credit and a relatively strong background in ecology or evolutionary biology. Students interested in these fields but less sure about their preparation can get exposure by taking the *BIOS 213 Introductory Lab in Ecology and Evolution* first.

OTHER LECTURE COURSES

BIOS 340 Integrative Animal Physiology (offered Spring only, 3 credit hours)

This course takes a comparative approach to investigate animal physiology of vertebrates. Students learn how animals are adapted to their environments, including how they meet their energy needs, take up and transport oxygen, and maintain hydration and salt balance. Students read primary literature to explore survival in extreme environments.

Prerequisites: BIOS 201 and BIOS 202 (only available to first-year students with AP credit).

BIOS 341 Cell Biology and *BIOS 344 Molecular Biology & Genetics*— can be considered by students with a strong biology background and AP credit in BIOS 201 and/or BIOS 202. A conversation with the instructor prior to enrolling is strongly advised for these challenging courses.

SEMINAR AND LABORATORY COURSES

BIOS 118 and BIOS 119 First-Year Seminars in Local Biology Research (offered Fall and Spring, 1 credit hour)

These half-semester seminar courses introduce biology-interested first-year students interested in the excitement of research at Rice and across Houston. Small groups will meet weekly with a graduate student or postdoctoral researcher to explore a research article published by a local lab, gaining background information about the subject and exposure to the research techniques. Students will meet researchers and tour labs at Rice and elsewhere in the Houston research community. All first-year, non-transfer students are eligible to enroll. BIOS 119 has an ecology and evolutionary biology focus and meets in the first half of each semester and BIOS 118 has a biochemistry, cell biology and genetics focus and meets in the second half of each semester.

FWIS 115 Exploring Biological Research Challenges (recommended, offered Fall and Spring, 3 credit hours)

This writing-intensive course introduces students to biological research and scientific communication. Student teams work on investigative projects with opportunities to design experiments and share their findings. Recommended for students interested in the Biosciences major who have limited laboratory experience. FWIS 115 fulfills the university requirement for a First-Year Writing Intensive Seminar. NOTE: Students cannot receive credit for both FWIS 115 and NSCI 120.

NSCI 120 Introduction Scientific Research Challenges (recommended, offered Fall and Spring, 3 credit hours)

Students in NSCI 120 will solve client-based problems that require the discovery or application of scientific knowledge, specifically in the fields of biology and chemistry. Students will work in interdisciplinary teams and be involved in shaping their project and implementing the scientific method to find solutions. This course is limited to first-year students only. NSCI 120 fulfills the biology laboratory requirement for medical school applications. NOTE: Students cannot receive credit for both FWIS 115 and NSCI 120.

BIOS 211 Intermediate Experimental Biosciences (offered Fall and Spring, 2 credit hours). This course is an intermediate level laboratory experience required for Biosciences majors. BIOS 211 is not available to first-year students until the spring semester and requires instructor permission for registration; first-year students wishing to take BIOS 211 should take FWIS 115 or NSCI 120 in the fall. Prerequisite/Corequisite: BIOS 201 NOTES: prospective Neuroscience majors must take BIOS 212 rather than BIOS 211; BIOS 211 may be offered in a summer session.

BIOS 212 Intermediate Experimental Cellular and Molecular Neuroscience (offered Fall and Spring, 2 credit hours). This course is similar to BIOS 211 but designed for and required for Neuroscience majors. BIOS 212 is not available to first-year students until the spring semester and requires instructor permission for registration; first-year students wishing to take BIOS 212 should take FWIS 115 or NSCI 120 in the fall. Prerequisite/Corequisite: BIOS 201 NOTES: prospective Biosciences majors must take BIOS 211 rather than BIOS 212.

BIOS 213 Introductory Lab in Ecology & Evolution (offered Fall and Spring, 2 credit hours). This course, required for Biosciences majors with a major concentration in Ecology & Evolutionary Biology, features experimental, laboratory, and field studies of natural history, ecology, evolution, and animal behavior. Prerequisites: BIOS 202

Be sure to check the course offerings on the Registrar's website to confirm availability of courses:

<https://courses.rice.edu/courses/ISWKSCAT.cat>

Should I take AP credit if I have it? See "Frequently asked questions"

How do I prepare for involvement in undergraduate research? See "Undergraduate Research in Biosciences"

Undergraduate Research in Biosciences

COVID-19 caveat: During the pandemic access to in-person research may be altered. Please check with national, local and institutional covid restrictions when planning your research.

Undergraduate research can enhance the undergraduate experience and provide opportunities for career development. Research experience is becoming a critical element for admission to graduate programs, professional schools or for those intending to go directly into industry research labs. The undergraduate research programs in Biosciences have been designed to flow from observation through participation. Students are encouraged to seek undergraduate research opportunities whenever they are ready and have the time to commit to it. **Research opportunities** are available in active research programs at Rice and beyond, including the Texas Medical Center, Houston Zoo, Houston Museum of Natural Science, Houston Arboretum and Nature Center, Flower Garden Banks National Marine Sanctuary NOAA Office (Galveston), and other off-campus research sites. You can get a taste of research even before you are ready to begin in a faculty lab. **First-year seminars** (BIOS 118 and BIOS 119) provide early exposure to scientific literature and local research and the **laboratory fundamentals courses** (FWIS 115 and NSCI 120) are designed to provide students with the problem-solving and laboratory skills to navigate early entry into faculty labs. *Note: a laboratory course, such as FWIS 115, NSCI 120, BIOS 211, or BIOS 212, is a prerequisite for BIOS 310 independent research.*

Think about the sorts of research that may be of interest to you and talk to students and advisors in that area of research. Explore on your own by searching through different research departments at Rice, at the Texas Medical Center, or in the greater Houston area. You can learn about the research in a particular department by going to the “Faculty” or “People” tab and clicking through the various faculty names and research statements. At the same time, join the “Biosciences Opportunities” Canvas site to receive information about research opportunities at Rice and elsewhere. When you have found a lab of interest, scan through recent research articles from that lab and contact the professor to express your interest. [visit this website for more information: <http://biosugresearch.rice.edu/>]. Determine the nature of your engagement (volunteer, for pay, for credit, for one semester/summer, for multiple years). If you are interested in receiving credit for your research, contact the instructor of the independent research course appropriate to your research topic.

Biosciences Opportunities Canvas List

The Biosciences Opportunities Canvas site offers research, internship, and career information and opportunities related to the biological sciences. It also serves as the portal for advising information for Biosciences majors. To join the site and mailing list go to catalog.rice.edu and then search for “Biosciences Opportunities.” Click on the site and click “enroll” (use your standard Rice netID and password, if prompted).

Contacts for undergraduate research information:

Dr. Dereth Phillips: email: derethp@rice.edu; Expertise: opportunities in biochemistry, cell-biology, genetics, developmental biology; Texas Medical Center opportunities; BIOS 299 and BIOS 310 instructor.

Dr. Scott Solomon: email: scott.solomon@rice.edu; Expertise: opportunities in ecology & evolutionary biology; field study opportunities

Dr. Jon Flynn: email: flynn@rice.edu; Expertise: opportunities in neuroscience; Texas Medical Center opportunities; NEUR 310 instructor

BIOS and NEUR 310: Independent Research in Biosciences/Neuroscience

These courses offer credit and structure for your research experiences. Participating students perform research for an average of 3 hours per week per credit hour in faculty laboratories in Biosciences at Rice and elsewhere in the Texas Medical Center, prepare a research proposal, weekly reports and a research paper (Fall) or poster presentation (Spring), and receive course credit for their effort. Those intending to participate in BIOS 310 or NEUR 310 undergraduate research should take FWIS 115, NSCI 120, BIOS 211, or BIOS 212. Please read the Independent Research website for complete information and requirements: <http://biosugresearch.rice.edu/>
If intending to pursue BIOS 310 research off-campus or NEUR 310 research on/or off-campus, please submit an application to the BIOS 310 or NEUR 310 instructor at the indicated link above at least 3 weeks before the start of the semester for permission to enroll. Students working off campus may not take BIOS 310/NEUR 310 for fewer than 3 credit hours (9 hours of research/week).

BIOS 401/402: Honors Research in Biosciences

The Biosciences Honors Research Program is a suite of courses offering our seniors and advanced juniors the opportunity to perform a two-semester, individual research project in a research laboratory in Biosciences at Rice or elsewhere in the TMC and requires substantial time devoted to the research project (minimum 15 hours per week). This immersive program, including intensive research and a thesis, is intended to give students a foretaste of a career in research. Students interested in graduate school are strongly encouraged to apply for consideration for honors research. Information and application can be found at the following site:
<https://biosciences.rice.edu/undergraduate-research>

Independent Research in Biosciences and Beyond

Once you have found a research position, you may be eligible to receive course credit in an appropriate department. All of the following courses may be taken by permission only. Please contact the course instructors for additional details and requirements.

BIOS 310/401/402—Biosciences

NEUR 310/401/402—Neuroscience Program

BIOE 400/401—Bioengineering

CHEM 391/491/492/493—Chemistry

CHBE 499—Chemical & Biomolecular Engineering

ESCI 481—Earth Science

HEAL 495/KINE 495—Kinesiology

UNIV 301—University-wide, zero-credit, for all majors, all types of projects qualify

HONS 470/471 (RUSP)—University-wide companion course for research in all majors

If your internship does not qualify for above courses, you may inquire about:

BIOS 299 – Experiential Education in Biosciences

UNIV 295 – Careers Through Internship (CCD)

Find the course number/department that best matches your research interests. Most departments, including those not listed here, have an independent study/research course.

Note for those interested in the health professions: There are many types of research that can improve human health outside of the biological sciences (health disparities, healthcare economics, medical sociology, psychology of addiction, et al.). For the most fulfilling research experience, make sure to pursue the research that most interests you rather than that which you perceive is desired by medical schools.

Frequently Asked Questions and Tips for Planning a Major in Biosciences

What is the difference between a major and a major concentration? When you declare the major in Biosciences, you must additionally identify and declare one of the four major concentrations, 1) Biochemistry, 2) Cell Biology and Genetics, 3) Ecology and Evolutionary Biology, or 4) Integrative Biology. Because of the common core requirements, it is possible for students to change their major concentration at any time, even after initially declaring the major. NOTE: you may declare only one major concentration.

How do the Biosciences major concentrations differ? While the foundational courses are common to all major concentrations, they diverge in their core lecture and laboratory courses and constrained electives. Please examine the respective degree plans for each! In general, the Biochemistry or Cell Biology and Genetics concentrations feature an exploration of life from the level of the molecule to the level of the organism, whereas Ecology and Evolutionary Biology concentration features a more macro-scale exploration of life through its diversity, environmental interactions, and evolutionary history. Integrative Biology explores life and its interactions at multiple scales.

What is the difference between the BA and the BS? Students pursuing the BS must complete at least 9 credit hours of research either through three semesters of BIOS 310 (taken for 3 or more credits per semester) or two semesters of BIOS 401-402 intensive research with thesis.

Is it better to get a BS rather than a BA? Neither degree is "better" than the other. Graduate schools, medical schools, and employers will look at your overall academic record including performance, research experience, extracurricular activities, etc. For example, you might choose the BA degree because you want to add a double major or the BS if you have been participating in multiple semesters of research in preparation for graduate school.

I want to earn a BS in Biosciences and double major in history. Can I do it? Yes, but because a history major earns a BA degree you would have to meet the requirements for what we call a dual degree. A dual degree is not the same as a double major. You can major in two or more different fields simply by meeting the requirements for both majors provided that the degree earned is either a BA or BS but not both. To earn a dual degree (BA/BS), you must complete the requirements for both majors and complete at least 30 additional semester hours at Rice beyond the hours required for the first degree.

Should I take AP credit if I have it? If you have AP credit, think about whether you feel confident and wish to take next steps or would benefit from taking the introductory courses (BIOS 201 and/or BIOS 202). Earning AP credit for introductory courses does not necessarily mean that a student is prepared for advanced coursework in Biosciences. See the information on "Biosciences Courses Accessible to First-Year Students" to view courses you can take your first year if you have AP for required introductory courses. BIOS 300 is designed as a next step for students with AP credit to prepare them for upper-level BIOS courses. NOTE: AP credit is not accepted for biology laboratory courses. Not all medical schools accept AP credit for med school requirements. *Consult an advisor if you feel uncertain!!!*

What class(es) can I take to get a better feel for the major? Besides BIOS 201, 202, and 300, there are other ways to participate in your Biosciences education. BIOS 118 and 119 are optional 1-credit seminars that introduce students to research and researchers at Rice. For those looking for lab experience, FWIS 115 or NSCI 120 are good courses for first-year students. BIOS 340 (Integrative Animal Physiology), BIOS 332 (Ecology), and BIOS 334 (Evolution) are accessible to first-year students who have credit for BIOS 201 and 202. With AP credit, some students go straight into upper level courses but should be aware that upper level courses are challenging for the first-year of college. For more information see "Courses Accessible to First-Year Students."

What's the difference between FWIS 115, NSCI 120, and BIOS 211 or 212? FWIS 115 (3 credit hours) and NSCI 120 (3 credit hours) are recommended options for students interested in the Biosciences major and should be taken during the first year. A major objective is to prepare students who have limited laboratory experience to move on to courses that require more independent learning and to provide students with fundamental skills that are needed to conduct independent study in a research laboratory in Biosciences. FWIS 115 fulfills the university requirement for a First-Year Writing Intensive Seminar. NSCI 120 fulfills the biology laboratory requirement for medical school applications. (NOTE: Students cannot receive credit for both FWIS 115 and NSCI 120.) BIOS 211/212 (2 credit hours) are intermediate level required laboratory courses designed for Biosciences/Neuroscience majors in their second year.

How do I get involved in research, and can I get credit for this research? If you perform research in a Biosciences faculty lab or perform research off-campus related to cell or molecular biology, biochemistry, structural biology, genetics, ecology, evolution, conservation biology, or other lab or field-based biology you may be able to receive credit for your research (≥ 3 hours of work in the laboratory are required for each hour of credit). Tips for finding research positions and opportunities for receiving credit are found at <http://biosugresearch.rice.edu>.

I want to improve my scientific writing skills. Which courses in the Biosciences department have a stronger emphasis on scientific writing? All of our laboratory courses have a focus on improving scientific writing through practice. Many upper-level classes are also designed to hone writing skills. BIOS 300 (Paradigms in Biochemistry & Cell Biology) will give you practice in writing about science. BIOS 312 (Advanced Communication in Biological Sciences), required for major concentration in Ecology and Evolutionary Biology, focuses on refining communication skills. Most upper level courses have writing requirements.

I'm a premedical student: Should I plan on getting the BCB minor since I'll need to fulfill most of the requirements anyway? Premedical students are not required to complete the BCB minor, but the minor is a good way for non-majors to build a strong science foundation and is one path to completing the Natural Sciences requirements for most medical schools.

What is the best course schedule (which classes to take when) for someone deciding between Biosciences and Bioengineering? The suggested courses for first-year students in BIOE and BIOS are overlapping, but there are additional critical courses to take in your first year to keep on track with each major. Both majors suggest strongly that you take General Chemistry and Calculus in your first year, but BIOE majors should also take Physics and CAAM 210. BIOS majors should take BIOS 201 and 202 (Introductory Biology). Those deciding between the two majors may need to take "all of the above" during the first year.

Should I take Physics 125/126 or Physics 101/102? Both sequences will fulfill physics requirements for the Biosciences Biochemistry concentration and for Neurosciences. PHYS 125/126 is intended for biosciences and premedical students; however, if you are also considering a major in engineering or the physical sciences, then you should take the PHYS 101/102 or PHYS 111/112 series, which is required for most engineering and physical sciences majors.

What are some post-graduation options for me if I graduate with a degree in Biosciences (aside from medical school or graduate school)? You have many options, especially if you are not geographically limited. These include jobs in education, conservation, environmental resource management, biotechnology, science writing, science policy, scientific/medical illustration, forensic science, pharmacology, medicine and any careers seeking graduates trained to be inquisitive, analytical, and communicative.

Post-matriculation transfer credit in the Department of Biosciences

This policy applies to courses taken following a student's matriculation at Rice University. The Department of Biosciences can accept transfer credit for BIOS courses only. Please contact one of the transfer credit advisors explained in the next paragraph. For any other course, please contact the transfer credit advisor for the department that offers that course.

We strongly recommend obtaining approval before taking a course that you wish to transfer. To transfer credit for a specific course or to obtain credit for BIOS 390, 391 or 393, department majors should contact Dr. David Caprette, caprette@rice.edu (Biosciences major concentrations in: Biochemistry, Cell Biology & Genetics, Integrative Biology) or Dr. Scott Solomon, scott.solomon@rice.edu (Biosciences major concentrations in: Ecology & Evolutionary Biology, Integrative Biology), who will then contact the relevant professor to determine if a course should transfer. Be prepared to provide the course code, title, brief description, institution and its location, and a complete syllabus or equivalent source that describes the content, textbook, nature of assignments and/or exams, and indicates the level taught (lower or upper division). Majors and non-majors seeking to study abroad should contact Dr. David Caprette, caprette@rice.edu *Fall only, Dr. James Chappell, jc125@rice.edu *Spring only (Biosciences major concentrations in: Biochemistry, Cell Biology & Genetics, Integrative Biology) or Dr. Solomon, scott.solomon@rice.edu (Biosciences major concentrations in: Ecology & Evolutionary Biology, Integrative Biology) about transfer credit.

Upon obtaining approval, please bring a transfer of credit form with your part completed to the instructor or transfer credit advisor for a signature and then take the completed form to the Registrar's Office.

General guidelines for post-matriculation transfer credit:

1. Transfer credit for a BIOS equivalent course will be approved only if the student demonstrates that he or she cannot be reasonably expected to complete the course at Rice, e.g., because of an unavoidable course schedule conflict, absence from campus due to circumstances beyond a student's control, or participation in a study abroad program.
2. An in-person or synchronous remote learning course taken at a four-year accredited institution of higher education will generally transfer as its BIOS equivalent if:

- a. guideline #1 is met AND
- b. the instructor concludes that the content, emphasis (e.g., basic science vs. clinical), assessments, and level taught are consistent with the proposed equivalent AND
- c. the course can fill a requirement for an equivalent major or minor at the institution offering the course*

*Only (a) and (b) need apply if the course does not fill a requirement for a major or minor with Biosciences

3. If approved, an upper division course with no Rice equivalent will transfer as BIOS 390 Transfer Credit in Biochemistry & Cell Biology, BIOS 391 Transfer Credit in Ecology & Evolutionary Biology, or BIOS 393 Laboratory Transfer Credit in Biosciences.
4. If approved, a lower division course with no Rice equivalent will transfer as TRAN 100 Lower Division Transfer Credit.
5. Asynchronous online courses and community college courses will be considered on a case by case basis. Community college courses, if approved, will generally transfer as lower division general credit. Only if the student cannot complete the course work at Rice or as an in-person or synchronous remote learning course will asynchronous online course work be considered for a major requirement.

Transfer Credit Advisors

Dr. David Caprette; caprette@rice.edu; (Study Abroad Transfer Credit for Biochem., Cell Biology & Genetics conc.)*Fall
Dr. James Chappell; jc125@rice.edu; (Study Abroad Transfer Credit for Biochem., Cell Biology & Genetics conc.)*Spring
Dr. David Caprette; caprette@rice.edu; (Biochemistry, Cell Biology & Genetics, Integrative Biology conc.; Neuro.)
Dr. Scott Solomon; scott.solomon@rice.edu; (Ecology & Evolutionary Biology, Integrative Biology concentrations)
Dr. Peter Lwigale; lwigale@rice.edu; (Neuroscience)
Dr. Evan Siemann; siemann@rice.edu; (Environmental Science)

Clubs of interest to Biosciences students

Rice University Biosciences Society

What is the Rice Biosciences Society?

We are a group of students passionate about anything related to the life sciences (including but not limited to: biochemistry, bioengineering, ecology, earth science, biophysics, chemistry, neuroscience, synthetic biology, medicine, etc.). Our goal is to bring together curious scientists at any stage of their journey, from Rice undergraduates to faculty members as well as researchers from the Texas Medical Center, to engage in discussions around a shared interest in the biological sciences that will broaden our perspectives and further the knowledge of our community.



How can I join? Join the Listserv by sending your name and email address to mk104@rice.edu! You can also like our Facebook page (<https://www.facebook.com/riceubiosciencesociety/>), Rice University Biosciences Society, to stay informed about future events!

Student Contacts: Corina Do (cbd1@rice.edu), Julia Kim (gk23@rice.edu)

Faculty Advisor Contact: Dr. Dereth Phillips (derethp@rice.edu)

Rice Catalyst, Rice's premier Undergraduate Science Research Journal, showcases student perspectives on popular science topics and scientific research. For the past thirteen years, we have been committed to fostering interdisciplinary interest in scientific writing and dialogue at Rice and beyond. We are extremely passionate about making science accessible and engaging, and we do this through a variety of written, auditory, and visual media including blog posts, podcasts, and an annual magazine publication. Outreach is very important to us: We have partnered with two high schools in the greater Houston community to provide science mentorship and research guidance, where Catalyst undergraduates interact with students and help them through the process of scientific inquiry and communication. New students are encouraged to stop by the Rice Catalyst Virtual Activities Fair booth to join the club listserv and ask questions about the club.

For more information please visit the Catalyst website: <http://ricecatalyst.org>

To contact student representatives please email: ricecatalyst@gmail.com

Rice Environmental Society (RES) Umbrella organization that unites all eco-affiliated groups and individuals at Rice University. RES hosts Earth Week every year and co-hosts many other events with our membership. Membership includes over 15 eco-groups and a number of passionate individuals.

For more information: <https://www.facebook.com/RiceEnvironmentalSociety>

Rice International Genetically Engineered Machine (iGEM)

Who are we? We are a competitive undergraduate team for the International Genetically Engineered Machine (iGEM) competition!

What do we do? We conduct scientific research in synthetic biology, a field that puts together “genetic circuits” of DNA to introduce to a cell (most often non-toxic strains of *E. coli*) so it can perform new functions! We also have 4 subteams that focus on Research, Software & Hardware, the social side to research and web development

Who should join? Any undergraduate student interested in scientific research at the interface of biology and engineering! We are particularly looking for students who can help us with computational modeling and programming, so if you’re interested, you’re welcome to join us!

Team Leader: TBD

Faculty Advisors: Dr. Beth Beason-Abmayr (bbeason@rice.edu), Dr. Joff Silberg (joff@rice.edu), Dr. James Chappel (jc125@rice.edu),

Follow us on Instagram at RiceuniversityiGEM

Check us out at iGEM.rice.edu and <https://2019.igem.org/Team:Rice>



BrainSTEM:

making neuroscience accessible to all

BrainSTEM works to develop critical thinking skills, educational success, and enthusiasm for science, helping to guide middle school and high school students of all backgrounds into STEM majors and careers. Through interactive small-group activities, our organization focuses on creating long-lasting relationships between our mentors and your students over the course of the year. With BrainSTEM, you can gain more than teaching experience – our mentors become leaders, project managers, and science communicators.

Club Contact: brainstem@rice.edu

Faculty Advisor: Dr. Jon Flynn (flynn@rice.edu)

Rice Neuroscience Society

RNS is the primary organization that provides support for undergraduates in neuroscience. This group holds numerous advising and social events focused on increasing interest in neuroscience at Rice University

Club Contact: riceneuro@gmail.com

Faculty Advisor: Dr. Jon Flynn (flynn@rice.edu)

Advisor Information

BIOSCIENCES ADVISORS

Prospectives, First-Year Students, and Undeclared Sophomores

Major concentrations: Biochemistry, Cell Biology and Genetics, Integrative Biology

Caroline Ajo-Franklin	caroline.ajo-franklin@rice.edu
Beth Beason-Abmayr	bbeason@rice.edu
Matthew Bennett	matthew.bennett@rice.edu
Dan Carson	daniel.d.carson@rice.edu
Jamie Catanese	djc98@rice.edu
Alma Novotny	novotnya@rice.edu
Dereth Phillips	derethp@rice.edu

Major concentrations: Ecology and Evolutionary Biology, Integrative Biology

Evan Siemann	siemann@rice.edu
Scott Solomon	scott.solomon@rice.edu

Declared Majors and Minors

Major concentrations: Biochemistry, Cell Biology and Genetics, Integrative Biology

Minor: Biochemistry and Cell Biology

Kate Beckingham	kate@rice.edu	(Last name A-H)
Dave Caprette	caprette@rice.edu	(Last name I-P)
Charles Stewart	crs@rice.edu	(Last name Q-Z)

Major concentrations: Ecology and Evolutionary Biology, Integrative Biology

Minor: Ecology and Evolutionary Biology

Dave Caprette	caprette@rice.edu	(Integrative Biology concentration only)
Scott Solomon	scott.solomon@rice.edu	

Transfer Credit Advisors (see transfer credit page for more information)

NEUROSCIENCE ADVISORS

Prospectives, First-Year Students and Undeclared Sophomores

Jon Flynn flynn@rice.edu
Nele Lefeldt nele.lefeldt@rice.edu

Declared Major and Minor

Dave Caprette caprette@rice.edu
Jon Flynn flynn@rice.edu
Nele Lefeldt nele.lefeldt@rice.edu
Peter Lwigale lwigale@rice.edu

Transfer Credit Advisors (see transfer credit page for more information)

ENVIRONMENTAL SCIENCES

(Concentration in Ecology and Evolutionary Biology)

Prospectives, First-Year Students and Undeclared Sophomores

Amy Dunham aed14@rice.edu
Evan Siemann siemann@rice.edu

Declared Major and Minor

Amy Dunham aed14@rice.edu (Spring 2022 only)
Adrienne Correa ac53@rice.edu (Fall 2021 only)

Transfer Credit Advisors (see transfer credit page for more information)