Welcome to the Rice University Class of 2020!

This booklet is designed to give you an overview of the departments and undergraduate degree programs available in the Wiess School of Natural Sciences. We’ve included some general advice and reference information, descriptions of each of our departments and programs, and degree summaries and sample degree plans for each science degree.

This booklet is intended as a supplement to, not a replacement for, other department advising materials. While we have double- and triple-checked all of the information in this booklet for accuracy, it is always possible that an error may still be included. The information in the General Announcements is the final authority on degree requirements and academic regulations at Rice.
As an incoming freshman at Rice, you have many advisors available to you. Your College Master has chosen four Divisional Advisors who are associated with your residential college, one from each of the four major undergraduate divisions: engineering, humanities, natural sciences, and social sciences. Each residential college also has a group of Peer Academic Advisors available to assist the Divisional Advisors. These advisors can help you explore the majors in each of the four divisions based on your personal interests and short and long term plans.

When you declare your major, your department will assign you to a Major Advisor. These faculty members represent a specific department or discipline and know all of the requirements for the major or minor. They can provide you with detailed information related to their discipline, including research opportunities, career paths, professional organizations, and graduate school. You do not need to wait until you declare a major to consult with a Major Advisor. If you are interested in pursuing a major and need specific guidance or advice, contact a Major Advisor. You can find the names and contact information for the Major Advisors in the School of Natural Sciences at the back of this booklet.

Start talking to your advisors as early as possible. There are many paths to each degree and the best courses for you may depend on your preparation and career aspirations. Your advisors can provide you with input on taking classes in a sensible order and also on how to pursue research opportunities.
Many Rice freshmen have substantial AP credit, particularly in math, physics, and chemistry. Think carefully about your course plan - just because you have advanced placement does not mean that you have the background needed for the next courses. You do not want to get underwater during your first year. Many students with AP credit for introductory courses still choose to take the introductory sequence at Rice to provide a solid foundation for more advanced coursework. Consult with your advisors to determine the appropriate placement for you.
Degree Planning

Get your prerequisites in early. Identify all prerequisites for future courses so that you are positioned to take the required courses at the right stage in your time at Rice.

Some courses may only be offered once per year or once every other year. Take this into account when planning your schedule.

Remember to look at the courses taught in other departments that overlap with your interests. For example, there are mathematics courses taught in CAAM and STAT that are not offered in MATH.
Choosing a BA or BS Degree

Most of our departments offer both a Bachelor of Arts degree (BA) and a Bachelor of Science degree (BS). If you have the choice between a BS or a BA, consider the requirements of each degree, your planned major(s) and/or minor(s), and your graduate school or career plans.

In general, a BA program contains more free elective hours than its BS counterpart. This flexibility makes it easier for you to pursue your other interests, a double major, or a minor. The major requirements and a sample degree plan for both the BA and BS are included in this booklet. Look through these to understand the different requirements and how they work with your planned course schedule.

If you are planning to go to graduate school or pursue a career in a scientific discipline, you should consider the BS degree. If you are preparing for a career that is not primarily in that scientific discipline and want to pursue other areas of interest, the BA degree might be right for you.

And, as always, you can talk with your peer and faculty advisors to help you decide which is the right path for you.
Participation in science research is encouraged for all students and is required for several of the BS degrees. Mentored research opportunities complement classroom learning and help you build the skills and confidence you need to compete for top job prospects and spots in graduate and medical schools.

There are many opportunities to research with Rice faculty and with our partners at the Texas Medical Center. You are encouraged to begin research as early as possible and can participate for multiple semesters or summers. See the Frank Advice section in each department listing for additional program-specific advice.

**Getting Started**

- Talk to your advisors and to your professors. Did you cover something really interesting in class today? Stay after class for a few minutes or head to office hours to talk to your professor. They can point you towards faculty members who are doing research in that area or working on similar problems.

- Check departmental websites and faculty research pages for descriptions of their research as well as links to their publications.

- Go to departmental seminars and events. Talk to people while you are there; don’t just sit in the back. Attend the Natural Sciences Undergraduate Research Showcase and the Rice Undergraduate Research Symposium (held each spring) to see student research poster presentations. Also, look at the posters in the hallways on your way to or from class or lab.
Research

Contacting a Potential Advisor

• Once you’ve found a group that you might like to join, it’s time to contact your potential advisor. The easiest way to do this is to email the faculty member to set up a meeting. Use an informative subject line to make your purpose clear and open and close your email formally. Provide some of your background information, including what year you are and what your major is. Briefly describe how you found out about their research and express your interest in a specific paper or research topic. Ask them to set up a meeting and provide your availability.

• Show up to your meeting on time and be prepared. Review a few papers and brush up on any appropriate classroom content. Be ready to tell the professor why you are interested in their work, how it fits with your background and your future goals. Also, know your schedule and what time you have available to work in their lab.

• Don’t take a negative response personally. There are many reasons a faculty member might not be able to take you on right now. Keep looking; there is a research experience out there that is perfect for you.
Majoring in a scientific discipline does not increase your chance of acceptance to medical school. However, strong preparation in the sciences and mathematics is required for medical school study. If you are considering a career in health-related occupations, consult with your advising team to ensure that your degree plan includes all of the necessary courses.

The Office of Academic Advising offers specialized advising services for pre-med and other pre-health professions students. Each fall, they present an introduction to the health professions designed to help new, first-year students. This year, the Health Professions Advising Orientation will be offered on Wednesday, August 24, from 6-7 PM in the Grand Hall.

Consider taking a course designed to help you determine if medical school is the right fit for you. **NSCI 399: Medical Professionalism and Observership (MPRO)** consists of lectures to enhance knowledge of medical professionalism, an intense writing experience aimed at reflecting on experiences in both the lectures and clinical settings, and an opportunity to shadow a physician and/or observe in the operating room, intensive care unit or other clinical unit at Houston Methodist hospital.
International experiences are encouraged for all interested students. If you are considering studying abroad, early planning and consultation is highly recommended. Contact a department Major Advisor as early as possible to discuss all of your available options. Departmental Transfer Credit Advisors will also serve as a valuable resource for information about receiving academic credit for courses completed abroad.

Think about your goals. Do you want to study abroad for a semester or a summer? Do you want to fulfill major, minor or distribution requirements or study something entirely new?

Consider your individual four-year program and evaluate what period for study abroad is most compatible with your overall degree plan and post-graduate plans.

Visit the Rice University Study Abroad website (abroad.rice.edu) for all of the information you need to start planning your study abroad experience.
Departments and Programs

In this section, you will find information about each of our departments and programs, including advice and tips to help you choose your major and design your degree plan. The School of Natural Sciences offers 19 majors and seven minors within our departments and interdisciplinary programs. We list the degree requirements and provide a sample degree plan for each major and minor.

Sample Degree Plans

The provided degree summaries and sample degree plans for each of the degrees offered in the School of Natural Sciences are intended to help you compare majors and provide a starting point for designing your own course schedule.

The sample degree plan is only one of many possible schedules. Consult with your advising team to develop a personalized degree plan that takes into account your background and interests.

- The sample degree plans in this booklet assume that you have no AP or transfer credit unless otherwise noted.

- You are assigned a semester in which to take a Freshman Writing Intensive Seminar (FWIS). In all degree plans, the FWIS is shown in the fall semester. If you are assigned to take a FWIS in the spring, swap the Distribution course listed for the spring semester with the FWIS listed for the fall semester.

- All sample degree plans assume that the FWIS will fulfill a Group I or Group II Distribution credit.
Faculty members in the Department of Biosciences have a deep commitment to students even as they pursue their own research programs. They share a love of the natural world that inspires their teaching and mentorship. Students at all levels engage in research in Biosciences laboratories, and many undergraduates publish work in top journals. The multiple major degree paths offered by the department will prepare you for graduate, medical, or other professional schools and a surprisingly wide range of careers in the life sciences.

The Biochemistry and Cell Biology (BIOC) program emphasizes a broad understanding of cell biology and biochemistry and provides room for exploration across Natural Sciences or Engineering. BIOC students are strongly encouraged to pursue their research interests through independent research experiences at Rice or other Houston-area institutions. The BIOC minor incorporates many of the life science core courses required for the health professions and is intended for those with an interest in the life sciences who may be majoring in other areas.

The Ecology and Evolutionary Biology (EBIO) program addresses important ecological and evolutionary questions with collaborative research initiatives and innovative ecological, evolutionary, and genomic tools. The coursework emphasizes a broad understanding of basic biology together with in-depth knowledge of ecology and evolutionary biology. Students pursuing a BS in EBIO are required to conduct independent research under the supervision or co-supervision of an EBIO faculty member, though the research can take place in other locations or institutions such as the Texas Medical Center or at field sites throughout the world. The EBIO minor is intended for those with an interest in the life sciences who are majoring in other areas.

The Biological Sciences degree incorporates elements of the EBIO and BIOC programs to give students a broad understanding of the full range of biological disciplines. Although Biological Sciences majors must distribute their upper-level electives between the two programs, they have few restrictions on which upper-level Biosciences courses they select. This flexibility gives Biological Sciences students the opportunity to design a path that suits their specific interests.
Biosciences

Degrees Offered

Biochemistry and Cell Biology (BIOC)  BS, BA, Minor
Ecology and Evolutionary Biology (EBIO)  BS, BA, Minor
Biological Sciences*  BA

*As the Biological Sciences BA combines coursework from both BIOC and EBIO programs, this major may not be combined with any other Biosciences degree.

Frank Advice

• Take the BIOC prelab exam to prequalify for the BIOC lab sequence (lab exam and registration instructions can be found at: www.clear.rice.edu/bioc111).

• Those without biology AP credit should enroll in BIOC 201, which is a prerequisite for virtually all other biological sciences courses. EBIO 202 is a requirement for those majoring in Biological Sciences and EBIO.

• If you have AP credit and feel confident in your biology background, take BIOC 300 in the fall semester. This course is a transition to the upper level BIOC courses and counts toward a 300-level BIOC requirement if taken before any other 300-level BIOC course.

• Research opportunities for undergraduates are available in most Bioscience labs.
  ◦ BIOC students should visit the BIOC 310 course website (www.bioc.rice.edu/bioc310/) for more information and listings of opportunities.
  ◦ EBIO students are encouraged to get involved in research as early as possible. Applications for conducting senior research, required for the BS, are due at the end of the Spring semester one year prior to your anticipated graduation date.
Biosciences

- Not required but highly recommended courses:
  - BIOC 115/EBIO 116 – Freshman Seminar in Local Biology Research
  - BIOC 300 – Paradigms in Biochemistry and Cell Biology
  - BIOC 310/EBIO 306 – Independent Research for Undergraduates
  - EBIO 270 – Ecosystem Management

- Highly qualified students may apply to the Biochemistry & Cell Biology BA-MA-PhD program track. If you are interested in this option, you can find more information on the Biosciences website or talk to your advisor.
Biochemistry and Cell Biology BA - Requirements

MATH 101/102'  Single Variable Calculus I and II
MATH 211    Ordinary Differential Equations
PHYS 125/126'  General Physics I and II
CHEM 121/122/123/124'  General Chemistry I and II and General Chemistry Lab I and II
CHEM 211/212/213/214  Organic Chemistry I and II and Organic Chemistry Discussion
CHEM 215  Organic Chemistry Lab
BIOC 201    Introductory Biology
BIOC 301    Biochemistry I
BIOC 341    Cell Biology

Two courses from:
  BIOC 302    Biochemistry II
  BIOC 344    Molecular Biology and Genetics
  BIOC 352'   Physical Chemistry for the Biosciences

BIOC 211    Intermediate Experimental Biosciences
BIOC 311    Advanced Experimental Biosciences

Two courses from:
  BIOC 313    Introductory Synthetic Biology
  BIOC 318    Laboratory in Applied Microbiology
  BIOC 320/BIOE342    Laboratory in Tissue Culture
  BIOC 413    Experimental Molecular Biology
  BIOC 415    Experimental Physiology
  BIOC 530    NMR Spectroscopy and Molecular Modeling
  BIOC 532    Laboratory Module in Optical Spectroscopy
  BIOC 533    Bioinformatics and Computational Biology
  BIOC 535    Practical X-Ray Crystallography

One independent research experience:
  BIOC 310 (if at least 3 credits)
  HONS 470/471
  BIOC 401/402/412

One BIOC 400-level course

Two NSCI or ENGR 300-level or higher courses

* MATH 111/112 may substitute for MATH 101
CHEM 151/152/153/154 may substitute for CHEM 121/122/123/124
PHYS 101/102/103/104 or PHYS 111/112 may substitute for PHYS 125/126
CHEM 310 or CHEM 311/312 may substitute for BIOC 352
# Biosciences

## Biochemistry and Cell Biology BA

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Biochemistry and Cell Biology BS - Requirements

MATH 101/102*  Single Variable Calculus I and II
MATH 211  Ordinary Differential Equations
PHYS 125/126*  General Physics I and II
CHEM 121/122/123/124*  General Chemistry I and II and General Chemistry Lab I and II
CHEM 211/212/213/214  Organic Chemistry I and II and Organic Chemistry Discussion
CHEM 215  Organic Chemistry Lab

BIOC 201  Introductory Biology
BIOC 301  Biochemistry I
BIOC 341  Cell Biology

BIOC 302  Biochemistry II
BIOC 344  Molecular Biology and Genetics
BIOC 352*  Physical Chemistry for the Biosciences

BIOC 211  Intermediate Experimental Biosciences
BIOC 311  Advanced Experimental Biosciences

Two courses from:

- BIOC 313  Introduction to Synthetic Biology
- BIOC 318  Laboratory in Applied Microbiology
- BIOC 320/BIOE342  Laboratory in Tissue Culture
- BIOC 413  Experimental Molecular Biology
- BIOC 415  Experimental Physiology
- BIOC 530  NMR Spectroscopy and Molecular Modeling
- BIOC 532  Laboratory Module in Optical Spectroscopy
- BIOC 533  Bioinformatics and Computational Biology
- BIOC 535  Practical X-Ray Crystallography

One independent research experience:

- BIOC 310 (if at least 3 credits)
- HONS 470/471
- BIOC 401/402/412

Two BIOC 400-level courses

Two NSCI or ENGR 300-level or higher courses

* MATH 111/112 may substitute for MATH 101
CHEM 151/152/153/154 may substitute for CHEM 121/122/123/124
PHYS 101/102/103/104 or PHYS 111/112 may substitute for PHYS 125/126
CHEM 310 or CHEM 311/312 may substitute for BIOC 352
# Biochemistry and Cell Biology BS

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This is only one of many possible ways to fulfill your degree requirements.
Biochemistry and Cell Biology Minor - Requirements

MATH 101/102*  Single Variable Calculus I and II
PHYS 125/126*  General Physics I and II
CHEM 121/122/123/124*  General Chemistry I and II and General Chemistry Lab I and II
CHEM 211/212/213/214  Organic Chemistry I and II and Organic Chemistry Discussion Lab
CHEM 215  Organic Chemistry Lab

BIOC 201  Introductory Biology
BIOC 211  Intermediate Experimental Biosciences
BIOC 301  Biochemistry
BIOC 341  Cell Biology

One BIOC lecture course at the 300-level or above

* MATH 111/112 may substitute for MATH 101
CHEM 151/152/153/154 may substitute for CHEM 121/122/123/124
PHYS 101/102/103/104 or PHYS 111/112 may substitute for PHYS 125/126
Ecology and Evolutionary Biology BA - Requirements

MATH 101/102\* Single Variable Calculus I and II
EBIO 338 or STAT course Design and Analysis of Biological Experiments
CHEM 121/123\* General Chemistry I and General Chemistry Lab I
PHYS 125\* General Physics I

BIOC 201 Introductory Biology I
EBIO 202 Introductory Biology II
EBIO 325 Ecology
EBIO 334/BIOC 334 Evolution

BIOC 211 Intermediate Experimental Biosciences
EBIO 213 Introductory Lab in Ecology and Evolutionary Biology

EBIO 412 Advanced Communication in the Biosciences

Two lecture courses in Ecology and Evolutionary Biology from the list in the 2016 General Announcements

One lecture course in Biochemistry and Cell Biology from the list in the 2016 General Announcements

One EBIO laboratory course from the list in the 2016 General Announcements

One BIOC laboratory course from the list in the 2016 General Announcements

One NSCI or ENGR course (3 credit hours) at the 300-level or above

\* MATH 111/112 may substitute for MATH 101
CHEM 151/153 may substitute for CHEM 121/123
PHYS 101/103 or PHYS 111 may substitute for PHYS 125
# Ecology and Evolutionary Biology BA

## Sample Degree Plan

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This is only one of many possible ways to fulfill your degree requirements.
## Ecology and Evolutionary Biology BS - Requirements

MATH 101/102 * Single Variable Calculus I and II  
EBIO 338 or STAT course Design and Analysis of Biological Experiments  
CHEM 121/123 * General Chemistry I and General Chemistry Lab I  
PHYS 125 * General Physics I

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<td>Evolution</td>
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<td>EBIO 306</td>
<td>Independent Research (at least 2 credit hours)</td>
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Two lecture courses in Ecology and Evolutionary Biology from the list in the 2016 General Announcements

One lecture course in Biochemistry and Cell Biology from the list in the 2016 General Announcements

One EBIO laboratory course from the list in the 2016 General Announcements

One BIOC laboratory course from the list in the 2016 General Announcements

One NSCI or ENGR course (3 credit hours) at the 300-level or above

* MATH 111/112 may substitute for MATH 101  
CHEM 151/153 may substitute for CHEM 121/123  
PHYS 101/103 or PHYS 111 may substitute for PHYS 125
### Ecology and Evolutionary Biology BS

#### Sample Degree Plan

This is only one of many possible ways to fulfill your degree requirements.

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This is only one of many possible ways to fulfill your degree requirements.
Ecology and Evolutionary Biology Minor - Requirements

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<td>EBIO 213</td>
<td>Introductory Lab in Ecology and Evolutionary Biology</td>
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Four lecture courses from the list in the 2016 General Announcements
Biological Sciences BA - Requirements

MATH 101/102’ Single Variable Calculus I and II
MATH 211 or STAT 305 or EBIO 338 Differential Equations or Biological Statistics or Design
and Analysis of Biological Experiments
CHEM 121/122/123/124’ General Chemistry I and II and General Chemistry Lab I and II
CHEM 211/212/213/214 Organic Chemistry I and II and Organic Chemistry Discussion
CHEM 215 Organic Chemistry Lab
PHYS 125/126’ General Physics I and II

BIOC 201 Introductory Biology
EBIO 202 Introductory Biology II

BIOC 211 Intermediate Experimental Biosciences
EBIO 213 Introductory Lab in Ecology and Evolutionary Biology

Three advanced biology lab courses from the list in the 2016 General Announcements
BIOC 301 Biochemistry

One course from:
- BIOC 302 Biochemistry II
- BIOC 341 Cell Biology
- BIOC 344 Molecular Biology and Genetics
- BIOC 352’ Physical Chemistry for the Biosciences

Three or four EBIO lecture courses from the list in the 2016 General Announcements.
If you choose to complete three EBIO lecture courses, you are required to complete two BIOC lecture courses.

One or two BIOC lecture courses from the list in the 2016 General Announcements.
If you choose to complete one BIOC lecture course, you are required to complete four EBIO lecture courses.

* MATH 111/112 may substitute for MATH 101
CHEM 151/152/153/154 may substitute for CHEM 121/122/123/124
CHEM 320 may substitute for CHEM 212
CHEM 365 may substitute for CHEM 215
PHYS 101/102/103/104 or PHYS 111/112 may substitute for PHYS 125/126
CHEM 310 or CHEM 311/312 may substitute for BIOC 352

A maximum of 3 credits of BIO 390 and 3 credits of EBIO 391 can apply to this major.
# Biosciences

## Biological Sciences BA

### Sample Degree Plan

This is only one of many possible ways to fulfill your degree requirements.

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Biological Sciences BA:

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Chemistry at Rice is where innovation meets collaboration. Two Nobel laureates, dominance in the field of nanoscale science and technology, and significant contributions to both bioscience and materials science have propelled the Department of Chemistry to unparalleled status over the past two decades. Since Chemistry holds a unique position in science and technology, it has been the nucleus of collaboration across departments and schools.

The BS program rigorously prepares students for Ph.D. programs in chemistry and related disciplines. The degree requirements are consistent with the guidelines for certification by the American Chemical Society. BS students complete a series of foundation courses in general chemistry and each of the core areas of chemistry: analytical, biological, inorganic, organic, and physical. Students then complete a specialization in one or more of these areas. This curriculum provides a broad and comprehensive introduction to core areas of chemistry while establishing deep understanding in one or more specific fields.

The BA degree is a more flexible program that provides a broad overview of chemistry, but includes less focused study on any single area. The chemistry BA is an ideal background for premedical students, as it requires only 10 credit hours over the standard premedical requirements. It also couples well with a second major for students who want to pair a science and non-science major for breadth of knowledge.

The Chemical Physics degree is jointly offered by the Department of Chemistry and the Department of Physics and Astronomy. It is designed for students with a strong aptitude in both chemistry and physics. Students take upper-level courses in both chemistry and physics, focusing on the applications of physics to chemical systems. Schedule a meeting with the Major Advisors listed in this booklet if you are interested in this interdisciplinary major.

**Degrees Offered**

- Chemistry: BS, BA
- Chemical Physics: BS
Chemistry

Frank Advice

• If you have chemistry AP credit and are confident in your background and ability to focus, you should be fine taking CHEM 211 as a freshman. If you are unsure whether to go straight to organic, start off going to both CHEM 151 and CHEM 211. Stay in the one that feels appropriate and drop the other. CHEM 211 is offered both semesters, so you can alternatively start organic in the spring (taking either CHEM 151 or no chemistry in the fall).

• Each student working towards a BS degree must complete advanced work in one specialization: Biological and Medicinal Chemistry, Inorganic Chemistry and Inorganic Materials, Organic Chemistry, or Physical and Theoretical Chemistry.

• BS students should complete three semesters of research, each with three or more credits. Seniors planning to pursue a Ph.D. should take Undergraduate Honors Research (CHEM 492 and 493), which includes independent research, a public presentation of findings, and a formal thesis.

• The best way to connect with a research advisor is to take the Freshman Chemistry Seminar, CHEM 110, which will introduce you to chemistry research labs at Rice and the Texas Medical Center.
Chemistry BA - Requirements

CHEM 151/152/153/154*  Honors Chemistry I and II and Honors Chemistry Lab I and II
CHEM 211/213  Organic Chemistry I and Organic Chemistry Discussion
CHEM 330  Analytical Chemistry
CHEM 360  Inorganic Chemistry
BIOC 301  Biochemistry I

Two courses from:
- CHEM 311  Physical Chemistry I
- CHEM 312  Physical Chemistry II
- BIOC 352  Physical Chemistry for the Biosciences

MATH 101/102  Single Variable Calculus I and II
MATH 212*  Multivariable Calculus

PHYS 101/103 or 111 or 125  Mechanics (with lab) and Mechanics Discussion or Mechanics (with lab) or General Physics (with lab)
PHYS 102/104 or 112 or 126  Electricity & Magnetism (with lab) and E & M Discussion or Electricity & Magnetism (with lab) or General Physics II (with lab)

Three courses from:
- CHEM 365  Organic Chemistry Laboratory
- CHEM 366  Inorganic Chemistry Laboratory
- CHEM 367  Materials Chemistry Laboratory
- CHEM 368  Chemical Measurement Laboratory
- BIOC 311  Advanced Experimental Biosciences

Two courses (six credit hours) from advanced chemistry work:
- 400-level courses or above
- CHEM 212  Organic Chemistry II
- CHEM 320  Organic Chemistry II
- BIOC 302  Biochemistry II

* CHEM 121/122/123/124 may substitute for CHEM 151/152/153/154
MATH 221/222 may substitute for MATH 212
# Chemistry BA

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## Chemistry BS - Requirements

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<tr>
<td>CHEM 151/152/153/154*</td>
<td>Honors Chemistry I and II and Honors Chemistry Lab I and II</td>
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<td>CHEM 211/213</td>
<td>Organic Chemistry I and Organic Chemistry Discussion</td>
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<tr>
<td>CHEM 311/312</td>
<td>Physical Chemistry I and II</td>
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<td>CHEM 330</td>
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<td>CHEM 360</td>
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<tr>
<td>BIOC 301</td>
<td>Biochemistry I</td>
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<tr>
<td>MATH 101/102</td>
<td>Single Variable Calculus I and II</td>
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<td>MATH 212</td>
<td>Multivariable Calculus</td>
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<tr>
<td>PHYS 101/103 or 111 or 125</td>
<td>Mechanics (with lab) and Mechanics Discussion or Mechanics (with lab) or General Physics (with lab)</td>
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<tr>
<td>PHYS 102/104 or 112 or 126</td>
<td>Electricity &amp; Magnetism (with lab) and E &amp; M Discussion or Electricity &amp; Magnetism (with lab) or General Physics II (with lab)</td>
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</table>

* Three courses from:
  - CHEM 365: Organic Chemistry Laboratory
  - CHEM 366: Inorganic Chemistry Laboratory
  - CHEM 367: Materials Chemistry Laboratory
  - CHEM 368: Chemical Measurement Laboratory
  - BIOC 311: Advanced Experimental Biosciences

* Eight credit hours of research from the list in the 2016 General Announcements. CHEM 391 must be for at least three credit hours.

* Each student must complete the requirements for one specialization.

### Specialization in Biological and Medicinal Chemistry

<table>
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<td>CHEM 212/214 or CHEM 320</td>
<td>Organic Chemistry II and Organic Chemistry Discussion or Organic Chemistry II</td>
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<td>BIOC 302</td>
<td>Biochemistry II</td>
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* Six credit hours of advanced coursework in chemistry

### Specialization in Inorganic Chemistry and Inorganic Materials

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<td>Physical Methods in Inorganic Chemistry</td>
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<td>CHEM 495</td>
<td>Transition Metal Chemistry</td>
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* Six credit hours of advanced coursework in chemistry

### Specialization in Organic Chemistry

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<td>Organic Chemistry II and Organic Chemistry Discussion or Organic Chemistry II</td>
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<td>CHEM 401</td>
<td>Advanced Organic Chemistry</td>
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* Six credit hours of advanced coursework in chemistry

### Specialization in Physical and Theoretical Chemistry

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<tr>
<td>CHEM 430</td>
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<td>CHEM 420</td>
<td>Classical and Statistical Thermodynamics</td>
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<td>CHEM 415 or 450 or 531 or 559</td>
<td>advanced course in physical chemistry</td>
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* One course (three credit hours) MATH or PHYS at 400-level or above

* CHEM 121/122/123/124 may substitute for CHEM 151/152/153/154
* MATH 221/222 may substitute for MATH 212
## Chemistry BS

### SAMPLE DEGREE PLAN
This is only one of many possible ways to fulfill your degree requirements.

### Freshman

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33
Chemical Physics BS - Requirements

CHEM 121/122/123/124  General Chemistry I and II and General Chemistry Lab I and II
CHEM 211/213  Organic Chemistry I and Organic Chemistry Discussion
CHEM 215  Organic Chemistry Lab
CHEM 311  Physical Chemistry I
CHEM 312  Physical Chemistry II

PHYS 101/103 or PHYS 111  Mechanics (with lab) and Mechanics Discussion
or Mechanics (with lab)
PHYS 102/104 or PHYS 112  Electricity & Magnetism (with lab) and E&M Discussion
or Electricity and Magnetism (with lab)

PHYS 201  Waves and Optics
PHYS 202  Modern Physics
PHYS 231  Elementary Physics Lab II
PHYS 301  Intermediate Mechanics
PHYS 302  Intermediate Electrodynamics
MATH 101/102  Single Variable Calculus I and II

Three courses from:

PHYS 311  Intro to Quantum Physics I
PHYS 312 or CHEM 430  Intro to Quantum Physics II or Quantum Chemistry
CHEM 360  Inorganic Chemistry
CHEM 415  Chemical Kinetics and Dynamics
CHEM 420 or PHYS 425  Classical and Statistical Thermodynamics
or Statistical and Thermal Physics

Four courses from:

CHEM 365  Organic Chemistry Lab
CHEM 366  Inorganic Chemistry Lab
CHEM 367  Materials Chemistry Lab
CHEM 368  Chemical Measurement Lab
PHYS 331  Junior Physics Lab I
PHYS 332  Junior Physics Lab II
CHEM 491 or PHYS 461/462  Research for Undergraduates (up to 2 hours)
or Independent Research

Two courses (six hours) of MATH or CAAM at the 300-level or above

* CHEM 151/152/153/154 may substitute for CHEM 121/122/123/124
### Sample Degree Plan

This is only one of many possible ways to fulfill your degree requirements.

### Chemical Physics BS

#### Fall

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#### Senior

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Earth Science

Do you want to climb active volcanoes, sail around Antarctica, explore the world’s oceans, help the global environment, join geophysical expeditions, learn advanced laboratory skills, study the Earth’s deep interior, and gain valuable job experience? Explore these opportunities with a degree from Rice in Earth Science.

The Department of Earth Science offers undergraduate students the opportunity to pursue exciting careers in energy, the environment, government, education, and academia. Our recently revised curriculum teaches skills that prepare students for the challenges of the 21st Century in geology, geophysics, geochemistry, environmental sciences, and more.

The BS major offers five tracks: geology, geochemistry, geophysics, environmental Earth science, or a self-designed track designed by the student and a faculty member (subject to the approval of a department undergraduate advisor). All of the programs of study include experiences with analytical equipment, computer systems, and fieldwork. The BA major provides greater flexibility of course choices.

Degrees Offered

Earth Science BS, BA

Frank Advice

• Each student working towards a BS degree must complete advanced coursework for one track: Geology, Geochemistry, Geophysics, Environmental Earth Science, or a Self-Designed Track. Talk to older students, your professors, and your advisors to choose the track that best suits you.

• If you have math AP credit, consider taking more advanced MATH classes during your freshman year.

• Most Earth Science majors participate in undergraduate research, either through the course ESCI 481 Undergraduate Research or through summer research internships. Many undergraduates also present their own research projects at national and international professional conferences.

• Not required but highly recommended courses: Statistics, Environmental Science
Earth Science BA - Requirements

MATH 101/102  Single Variable Calculus I and II
CHEM 121/123 or 151/153  General Chemistry I and General Chemistry Lab I or Honors Chemistry I and Honors Chemistry Lab I
CHEM 122/124 or 152/154  General Chemistry II and General Chemistry Lab II or Honors Chemistry II and Honors Chemistry Lab II
ESCI 301  Introduction to the Earth
ESCI 321  Earth System Evolution and Cycles
ESCI 322  Earth Chemistry and Materials
ESCI 323  Earth Structure and Deformation
ESCI 324  Earth's Interior
ESCI 334  Geological Techniques

Four additional ESCI courses

Two courses from NSCI or ENGR 200-level or above

Two to four courses (minimum six credit hours) from one of the following groups:

**Introductory Biology I and II**
- BIOC 201  Introductory Biology I
- EBIO 202  Introductory Biology II

**Intermediate Experimental Biosciences and Lab Modules**
- BIOC 211  Intermediate Experimental Biosciences
- EBIO 213  Intro Lab in Ecology and Evolutionary Biology

**MATH/COMP/CAAM Options**
- MATH 211  Differential Equations
- COMP 110/NSCI 230 or CAAM 210  Computation in Natural Science or Introduction to Engineering Computation

**Mechanics and Electricity and Magnetics**
- PHYS 101/103 or PHYS 125  Mechanics (with lab) and Mechanics with Lab Discussion or General Physics I (with lab)
- PHYS 102/104 or PHYS 126  Electricity & Magnetism (with lab) and E & M Discussion or General Physics II (with lab)
# Earth Science BA

**FRESHMAN**

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**SPRING**

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<tr>
<td>ESCI 323</td>
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<td>Earth Structure &amp; Deformation</td>
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<tr>
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**SOPHOMORE**

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**SENIOR**

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<td>NSCI/ENG</td>
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</tbody>
</table>

This is only one of many possible ways to fulfill your degree requirements.
Earth Science BS - Requirements

MATH 101/102  Single Variable Calculus I and II
CHEM 121/122/123/124  General Chemistry I and II and General Chemistry Lab I and II
PHYS 101/103 or PHYS 111  Mechanics (with lab) and Mechanics Discussion
or Mechanics (with lab)
PHYS 102/104 or PHYS 112  Electricity & Magnetism (with lab) and E & M Discussion
or Electricity and Magnetism (with lab)
ESCI 301  Introduction to the Earth
ESCI 321  Earth System Evolution and Cycles
ESCI 322  Earth Chemistry and Materials
ESCI 323  Earth Structure and Deformation
ESCI 324  Earth's Interior
ESCI 334  Geological Techniques

*CHEM 151/152/153/154 may substitute for CHEM 121/122/123/124

Each student must complete the additional courses for one specialization

Geology Specialization

MATH 211  Ordinary Differential Equations & Linear Algebra
ESCI 390  Geology Field Camp (at least 3 hours)
COMP 110 or CAAM 210  Computation in Natural Science or Introduction to Engineering Computation
ESCI 412 or ESCI 430  Advanced Petrology or Principles of Trace-Element and Isotope Geochemistry

Two courses must be completed from Group A and Group B (four courses total):

Group A

ESCI 421  Paleoeceanography
ESCI 427  Sequence Stratigraphy
ESCI 431  Geomorphology
ESCI 435  Mechanics of Sediment Transport
ESCI 504  Siliciclastic Depositional Systems
ESCI 506  Carbonate Depositional Systems
ESCI 552  Marine Geology Systems

Group B

ESCI 410  Optical Mineralogy and Petrography
ESCI 418/CEVE 418  Quantitative Hydrogeology
ESCI 419  Materials Characterization
ESCI 426  Interpretation of Regional 2D Seismic Data
ESCI 429  Magmatic, Volcanic and Hydrothermal Processes
ESCI 442  Exploration Geophysics
ESCI 463  Structure and Evolution of Tectonic Systems
ESCI 464  Global Tectonics
ESCI 467  Geomechanics
Earth Science BS - Requirements

**Geochemistry Specialization**

- BIOC 201  Introductory Biology
- MATH 211  Ordinary Differential Equations and Linear Algebra
- ESCI 391  Earth Science Field Experience (at least 3 hours)

*Four courses from:*

- ESCI 340/EBIO 340/ENST 340  Global Biogeochemical Cycles
- ESCI 410  Optical Mineralogy and Petrography
- ESCI 412  Advanced Petrology
- ESCI 419  Materials Characterization
- ESCI 421  Paleoclimatology
- ESCI 425/CHEM 425/ENST 425  Organic Geochemistry
- ESCI 426  Interpretation of Regional 2D Seismic Data
- ESCI 429  Magmatic, Volcanic and Hydrothermal Processes
- ESCI 430  Principles of Trace-Element & Isotope Geochemistry

*Two courses from:*

- ESCI 300-level courses or above
- BIOC 211  Intermediate Experimental Biosciences
- CAAM 210  Introduction to Engineering Computation
- CEVE 401  Chemistry for Environmental Engineering & Lab Science
- CEVE 434/534  Fate & Transport of Contaminants of the Environment
- CEVE 550  Environmental Organic Chemistry
- CHEM 211/213  Organic Chemistry I & Organic Chemistry Discussion
- CHEM 212/214  Organic Chemistry II & Organic Chemistry Discussion II
- CHEM 310  Physical Chemistry
- CHEM 415  Chemical Kinetics and Dynamics
- CHEM 495  Transition Metal Chemistry
- COMP 110/NSCI 230  Computation Science and Engineering
- EBI O 202  Introductory Biology
- MATH 212  Multivariable Calculus

**Geophysics Specialization**

- COMP 110/NSCI 230 or  Computation in Natural Science or Introduction to
- CAAM 210  Engineering Computation
- ESCI 391  Earth Science Field Experience (at least three hours)
- MATH 211  Ordinary Differential Equations and Linear Algebra
- MATH 212  Multivariable Calculus
- PHYS 201  Waves and Optics
- PHYS 231  Elementary Physics Lab II
Earth Science BS - Requirements

(continued)

Two courses from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ESCI 418/CEVE 418</td>
<td>Quantitative Hydrogeology</td>
</tr>
<tr>
<td>ESCI 426</td>
<td>Interpretation of Regional 2D Seismic Data</td>
</tr>
<tr>
<td>ESCI 442</td>
<td>Exploration Geophysics</td>
</tr>
<tr>
<td>ESCI 450/CEVE 450</td>
<td>Remote Sensing</td>
</tr>
<tr>
<td>ESCI 452</td>
<td>GIS for Scientists</td>
</tr>
<tr>
<td>ESCI 461</td>
<td>Seismology I</td>
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<td>ESCI 462</td>
<td>Tectonophysics</td>
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<tr>
<td>ESCI 463</td>
<td>Tectonic Systems</td>
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<td>ESCI 464</td>
<td>Global Tectonics</td>
</tr>
<tr>
<td>ESCI 467</td>
<td>Geomechanics</td>
</tr>
<tr>
<td>ESCI 542</td>
<td>Seismology II</td>
</tr>
<tr>
<td>ESCI 440</td>
<td>Geophysical Data Analysis: Digital Signal Processing</td>
</tr>
<tr>
<td>ESCI 441</td>
<td>Geophysical Data Analysis: Inverse Methods</td>
</tr>
<tr>
<td>ESCI 564</td>
<td>Seismic Reflection Data Processing</td>
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</table>

Two courses from:

Any course from ESCI course offerings between ESCI 410 and ESCI 475, except for research and special studies
Any course from MATH, CAAM, or PHYS course offerings at the 300-level or above

CHEM 311       Physical Chemistry

Environmental Earth Science Specialization

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>BIOC 201</td>
<td>Introductory Biology</td>
</tr>
<tr>
<td>ESCI 391</td>
<td>Earth Science Field Experience (at least 3 hours)</td>
</tr>
<tr>
<td>MATH 211</td>
<td>Ordinary Differential Equations and Linear Algebra</td>
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<tr>
<td>STAT 280</td>
<td>Elementary Applied Statistics</td>
</tr>
<tr>
<td>COMP 110 or CAAM 210</td>
<td>Computation in Natural Science or Introduction to Engineering Computation</td>
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11 hours from the following, including at least two ESCI courses:

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>CEVE 401</td>
<td>Chemistry for Environmental Engineering &amp; Science Lab</td>
</tr>
<tr>
<td>CEVE 406/ENST 406</td>
<td>Introduction to Environmental Law</td>
</tr>
<tr>
<td>CEVE 412</td>
<td>Hydrology and Water Resources Engineering</td>
</tr>
<tr>
<td>CEVE 434</td>
<td>Fate &amp; Transport of Contaminants in the Environment</td>
</tr>
<tr>
<td>CHEM 211/213</td>
<td>Organic Chemistry and Organic Chemistry Discussion</td>
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<td>Physical Chemistry</td>
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<td>EBI 202</td>
<td>Introductory Biology</td>
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<tr>
<td>ESCI 340/EBIO 340/ENST 340</td>
<td>Global Biogeochemical Cycles</td>
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<td>ESCI 410</td>
<td>Optical Mineralogy and Petrography</td>
</tr>
<tr>
<td>ESCI 418</td>
<td>Quantitative Hydrogeology</td>
</tr>
<tr>
<td>ESCI 419</td>
<td>Materials Characterization</td>
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</tbody>
</table>
| ESCI 421    | Paleooceanography                                | (continued)
Earth Science BS - Requirements

(continued)

ESCI 425/CHEM 425/ENST 425  Organic Geochemistry
ESCI 426  Interpretation of Regional 2D Seismic Data
ESCI 429  Magmatic, Volcanic and Hydrothermal Processes
ESCI 431  Geomorphology
ESCI 435  Mechanics of Sediment Transport
ESCI 442  Exploration Geophysics
ESCI 452  GIS for Scientists
ESCI 463  Structure and Evolution of Tectonic Systems
ESCI 467  Geomechanics
ESCI 504  Siliciclastic Depositional Systems
ESCI 506  Carbonate Depositional Systems
ESCI 540  Earth's Atmosphere
ESCI 552  Marine Geology Systems
PHYS 201  Waves and Optics
PHYS 231  Elementary Physics Lab II

Self-Designed Specialization

Interested students are expected to submit a statement of rationale by the beginning of the third year.

Students must complete the following course:

ESCI 391  Earth Science Field Experience (at least 3 hours)

Two courses from:

BIOS 201  Introductory Biology
COMP 110/NSCI 230  Computation in Natural Science
CAAM 210  Introduction to Engineering Computation
CHEM 311/312  Physical Chemistry I and II
MATH 211  Ordinary Differential Equations and Linear Algebra
MATH 212  Multivariable Calculus
PHYS 201  Waves and Optics

Six courses (18 hours) of additional 300-level courses or above targeting a coherent theme and selected with approval of the department undergraduate advisor
## Earth Science BS/Geology Specialization

### SAMPLE DEGREE PLAN

This is only one of many possible ways to fulfill your degree requirements.

### FALL

<table>
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<tr>
<th>FRESHMAN</th>
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<td>ESCI 323</td>
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<td>MATH 101</td>
<td>Single Variable Calculus I</td>
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<td>MATH 102</td>
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<tr>
<td>CHEM 121</td>
<td>General Chemistry I</td>
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<td>CHEM 123</td>
<td>General Chemistry Lab I</td>
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<td>FWIS</td>
<td>First Year Writing-Intensive Seminar</td>
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<td>LPAP</td>
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### SOPHOMORE

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<tr>
<td>ESCI 321</td>
<td>Earth System Evolution &amp; Cycles</td>
</tr>
<tr>
<td>PHYS 101</td>
<td>Mechanics (with lab)</td>
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<tr>
<td>PHYS 103</td>
<td>Mechanics Discussion</td>
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<td>MATH 211</td>
<td>Differential Equations</td>
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### JUNIOR

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<td>ESCI 322</td>
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<td>Exploration Geophysics</td>
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### JUNIOR SUMMER

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### SENIOR

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<td>DIST</td>
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<td>Open Elective</td>
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</table>
Environmental Studies

The interdisciplinary Environmental Studies program explores interconnection between humans and the natural environment, drawing courses from Biosciences, Earth Science, Civil Engineering, and across Humanities and Social Sciences. This program is designed to foster the critical thinking required to address the increasing complexities facing our planet and to develop solutions to enhance the environment.

Degrees Offered

- Environmental Science BS, BA
- Environmental Studies Minor

Frank Advice

- The environmental science majors address environmental issues in the context of what we know about Earth, ecology, and society. Students declare a concentration in ecology and evolutionary biology or Earth science, which enhances the depth of study in that field.

- The environmental studies minor provides a cross-disciplinary holistic understanding of the challenges and solutions for creating a sustainable world. Undergraduates from a broad range of academic backgrounds undertake a cohesive program of study offering foundational literacy in the social, cultural, and scientific dimensions of environmental issues.

- No sample degree plans are shown for environmental studies as individual degree plans will vary widely based on the student’s focus within the major. Consult the Major Advisors to create a personalized degree plan that best suits your needs.
Environmental Science BA - Requirements

- BIOC 201: Introductory Biology
- EBIO 202: Introductory Biology II
- CHEM 121/122/123/124*: General Chemistry I and II and General Chemistry Lab I and II
- MATH 101/102*: Single Variable Calculus I and II
- STAT 280 or STAT 305: Elementary and Applied Statistics or Introduction to Statistics for the Biosciences

- ENST 100: Environmental Culture and Society
- ESCI 107 or ESCI 109 or ESCI 201: Oceans and Global Change or Oceanography or Science Behind Global Warming
- EBIO 213: Introduction to Experimental Ecology and Evolutionary Biology
- EBlO 325: Ecology
- ESCI 301: Introduction to the Earth
- ENST 4xx: SEMINAR: Topics in Environmental Science

One to two courses (2-3 credit hours) of field experience courses from the list in the 2016 General Announcements

One advanced Social Sciences elective from the list in the 2016 General Announcements

One advanced Humanities and Architecture elective from the list in the 2016 General Announcements

One advanced Natural Science and Engineering elective from the list in the 2016 General Announcements

Students must complete the requirements for one major concentration:

**Major Concentration: Ecology and Evolutionary Biology**

**Two courses from:**
- EBIO 270: Ecosystem Management
- EBIO 323/ENST 323: Conservation Biology
- EBIO 372: Coral Reef Ecosystems

**One course from:**
- EBIO 270: Ecosystem Management
- EBIO 321: Animal Behavior
- EBIO 323/ENST 323: Conservation Biology
- EBIO 326: Insect Biology
- EBIO 331/BIOC 331: Biology of Infectious Disease
- EBIO 334/BIOC 334: Evolution
- EBIO 336: Plant Diversity
- EBIO 338: Design and Analysis of Biological Experiments
- EBIO 365: Introductory Phycology
- EBIO 366: Applied Phycology
- EBIO 372: Coral Reef Ecosystems
Environmental Science BA - Requirements

Major Concentration: Earth Science

Two courses from:

- ESCI 321  Earth Systems and Cycles
- ESCI 323  Earth Structure and Deformation
- ESCI 340/EBIO 340/ENST 340  Global Biogeochemical Cycles

One course from:

- ESCI 321  Earth Systems and Cycles
- ESCI 322  Earth Chemistry and Materials
- ESCI 323  Earth Structure and Deformation
- ESCI 340/EBIO 340/ENST 340  Global Biogeochemical Cycles
- ESCI 380/FOTO 390  Visualizing Nature (if not selected for field course)
- ESCI 418/CEVE 418  Quantitative Hydrogeology
- ESCI 421  Paleooceanography
- ESCI 425/CHEM 425/ENST 425  Organic Geochemistry
- ESCI 430  Principles of Trace-Element and Isotope Geochemistry
- ESCI 431  Geomorphology
- ESCI 435  Mechanics of Sediment Transport
- ESCI 452/CEVE 453  Geographic Information Science
- ESCI 467  Geomechanics

* CHEM 151/152/153/154 may substitute for CHEM 121/122/123/124
* MATH 111/112 may substitute for MATH 101/102
Environmental Science BS - Requirements

BIOC 201   Introductory Biology
EBIO 202   Introductory Biology II
CHEM 121/122/123/124*  General Chemistry I and II and General Chemistry Lab I and II
MATH 101/102*  Single Variable Calculus I and II
STAT 280 or STAT 305  Elementary and Applied Statistics or Introduction to Statistics for the Biosciences
PHYS 101/103*  Mechanics (with lab) and Mechanics Discussion
PHYS 102/104*  Electricity and Magnetism (with lab) and E & M Discussion
ENST 100  Environmental Culture and Society
ESCI 107 or ESCI 109 or ESCI 201 Oceans and Global Change or Oceanography or Science Behind Global Warming
EBIO 213  Introduction to Experimental Ecology and Evolutionary Biology
EBIO 325  Ecology
ESCI 301  Introduction to the Earth
ENST 4xx  SEMINAR: Topics in Environmental Science

One to two courses (2-3 credit hours) of field experience courses from the list in the 2016 General Announcements

One advanced Social Sciences elective from the list in the 2016 General Announcements

One advanced Humanities and Architecture elective from the list in the 2016 General Announcements

One advanced Natural Science and Engineering elective from the list in the 2016 General Announcements

One course (at least three credit hours) from:

ESCI 390  Geologic Field Camp
ESCI 391  Earth Science Field Experience
EBIO 403 or 404  Undergraduate Honors Research
ESCI 481  Undergraduate Research in Earth Science

Students must complete the requirements for one major concentration:

Major Concentration: Ecology and Evolutionary Biology

Two courses from:

EBIO 270  Ecosystem Management
EBIO 323/ENST 323  Conservation Biology
EBIO 372  Coral Reef Ecosystems  (continued)
Environmental Science BS - Requirements

Ecology and Evolutionary Biology (continued)

One course from:

- EBIO 270 Ecosystem Management
- EBIO 321 Animal Behavior
- EBIO 323/ENST 323 Conservation Biology
- EBIO 326 Insect Biology
- EBIO 331/BIOC 331 Biology of Infectious Disease
- EBIO 334/BIOC 334 Evolution
- EBIO 336 Plant Diversity
- EBIO 338 Design and Analysis of Biological Experiments
- EBIO 365 Intro Phycology
- EBIO 366 Applied Phycology
- EBIO 372 Coral Reef Ecosystems
- ESCI 340/EBIO340/ENST 340 Global Biogeochemical Cycles

Major Concentration: Earth Science

Two courses from:

- ESCI 321 Earth Systems and Cycles
- ESCI 323 Earth Structure and Deformation
- ESCI 340/EBIO 340/ENST 340 Global Biogeochemical Cycles

One course from:

- ESCI 321 Earth Systems and Cycles
- ESCI 322 Earth Chemistry and Materials
- ESCI 323 Earth Structure and Deformation
- ESCI 340/EBIO 340/ENST 340 Global Biogeochemical Cycles
- ESCI 380/FOTO 390 Visualizing Nature (if not selected for field course)
- ESCI 418/CEVE 418 Quantitative Hydrogeology
- ESCI 421 Paleoeceanography
- ESCI 425/CHEM 425/ENST 425 Organic Geochemistry
- ESCI 430 Principles of Trace-Element and Isotope Geochemistry
- ESCI 431 Geomorphology
- ESCI 435 Mechanics of Sediment Transport
- ESCI 452/CEVE 453 Geographic Information Science
- ESCI 467 Geomechanics

* CHEM 151/152/153/154 may substitute for CHEM 121/122/123/124
  MATH 111/112 may substitute for MATH 101/102
  PHYS 111/112 or PHYS 125/126 may substitute for PHYS 101/102/103/104
Environmental Studies Minor - Requirements

ENST 100  Environment, Culture and Society

*One course from:*
EBIO 124  Introduction to Ecology and Evolutionary Biology
ESCI 101  The Earth
ESCI 107  Oceans and Global Change
ESCI 109  Oceanography
ESCI 201  The Science Behind Earth Global Warming and Climate Change

Two Architecture, Humanities, and Social Sciences courses from the list in the 2016 General Announcements

Two Engineering and Natural Science courses from the list in the 2016 General Announcements
Global Health Technologies

The Rice 360° Institute for Global Health collaborates with multiple departments to offer students a minor in Global Health Technologies. The minor is open to Rice undergraduate students from all disciplines. In the capstone course, multidisciplinary teams of undergraduate students work together to design and implement solutions to existing global health challenges in the developing world. Students benefit from receiving guidance and mentorship from Rice faculty and graduate students as well as from the Texas Medical Center, partner organizations in developing countries, and clinicians to design low-cost, effective health technologies.

Degree Offered

Global Health Technologies Minor

Frank Advice

• The minor in global health technologies (GLHT) is a unique, multidisciplinary program that educates and trains students to reach beyond traditional disciplinary and geographic boundaries to understand, address, and solve global health disparities.

• The GLHT minor aims to create future leaders who can develop effective solutions to significant world health challenges. Many students pursuing the GLHT minor enter careers in medicine, public health, public policy, and international development.

• You are not required to start the GLHT minor in your freshman year; it can be started as late as the Fall semester of your junior year. It is possible for students to receive credit for GLHT minor courses that also fulfill a requirement within their major.
Global Health Technologies Minor - Requirements

GLHT 201  Bioengineering for Global Health Environments
GLHT 360  Appropriate Design for Global Health

One course from:
- PSYC 370  Introduction to Human Factors and Ergonomics
- SOCI 345  Medical Sociology
- SOCI 381  Research Methods
- ANTH 381  Medical Anthropology
- GLHT 392  Needs Finding and Development in Bioengineering
- GLHT 464/BUSI 464  Social Entrepreneurship

GLHT 451/452  Global Health Design Challenges I and II

Three credit hours in science/engineering elective courses from the list in the 2016 General Announcements

Three credit hours in humanities/social science elective courses from the list in the 2016 General Announcements

Note: The sequence indicated is the required sequence, as prerequisites do apply.
Kinesiology

The Kinesiology department is home to two distinct programs (Health Sciences and Sports Medicine) and is one of the first of its kind in the nation to allow students to concentrate their studies in one of these specific sub-disciplines. A flexible curriculum permits undergraduate majors to tailor their coursework to their particular postgraduate needs and also permits them to study abroad, pursue internships, and conduct undergraduate research. With a median class size of 19, students find an active, close-knit community of scholars, teachers, and mentors who take a personal interest in every student major. The Kinesiology programs have one of the largest number of academic majors in the School of Natural Sciences and are among the largest choice of student majors at Rice.

The Health Sciences program provides students with a fundamental background in health promotion and disease prevention. Viewing health from the broader community level, students acquire the knowledge and skills for careers in public health related positions.

The Sports Medicine program provides a strong basic science foundation and then interfaces this foundation with application to the human body. It is the only academic specialization on campus that provides detailed instruction in human anatomy and human physiology in addition to nutrition, biomechanics, motor learning and exercise physiology among other topics.

Degree Offered

Kinesiology  BA

Frank Advice

• Students choosing to major in Kinesiology must choose a concentration in either Health Sciences or Sports Medicine when declaring their major. Consult with the department advisor for your program as well as the Health Professions Advising service to ensure that you are choosing the correct pre-requisites as you are planning your degree.

• Be mindful when degree planning of courses that may only be offered once every other year.
Kinesiology

• If you are a Sports Medicine major, take KINE 300, Human Anatomy, as soon as possible. Most KINE classes refer to some elements of human anatomy.

• Qualified students are encouraged to participate in an independent study. This independent study allows integral involvement in basic or applied research directed by a faculty advisor. Opportunities are available with a variety of institutions in the Texas Medical Center.

• Students are encouraged to pursue any of a variety of highly competitive internships, which provide practical experience tailored to your interests. The close proximity of Rice to the Texas Medical Center allows you to find experience in a medical setting for potentially every medical specialty in practice.

• Not required but highly recommended: Take KINE 120, Scientific Foundations of Kinesiology, during the summer before freshman year or the spring of freshman year to get an overview of Kinesiology.
Kinesiology BA/Health Sciences - Requirements

HEAL 119  Introduction to Health and Wellness
HEAL 222  Principles of Public and Community Health
HEAL 313  Foundations of Health Promotion and Education
HEAL 407  Epidemiology
HEAL 422  Theories and Models of Health Behavior
HEAL 460  Planning and Evaluation of Health Promotion and Education
KINE 319  Statistics for the Health Professional

Eight courses (24 hours) from:

ANTH 210  Anthropology of Death
ANTH 381  Medical Anthropology
ANTH 386  Medical Anthropology of Food and Health
ANTH 388  The Life Cycle: A Biocultural View
ANTH 446  Advanced Biomedical Anthropology
BIOC 201  Introductory Biology
BIOC 122  Fundamental Concepts in Biology
BIOE 360  Appropriate Design for Global Health
ENGL 272  Literature and Medicine
ENGL 273  Medicine and Media
ENST 315  Environmental Health
GLHT 201  Bioengineering and World Health
HEAL 103  Nutrition
HEAL 132  Medical Terminology
HEAL 208  Chemical Alterations of Behavior
HEAL 212  Consumer Health and the Media
HEAL 306  Human Sexuality
HEAL 350  Understanding Cancer
HEAL 360  Violence in America: A Public Health Perspective
HEAL 379  Internship in Health Sciences
HEAL 380  Disparities in Health in America
HEAL 485  Seminar on International Health Problems
HEAL 495/496  Independent Studies in Health Sciences
HEAL 498  Special Topics in Health Sciences
KINE 300  Human Anatomy
KINE 301  Human Physiology
KINE 326  Exercise Epidemiology
KINE 440  Research Methods
PHIL 314  The Philosophy of Medicine
PHIL 315  Ethics, Medicine and Public Policy
PHIL 336  Topics in Medical Ethics
POLI 329  Health Policy
PSYC 345  Health Psychology
SOCI 313  Demography
SOCI 345  Medical Sociology
SOCI 355  Sociology of Drugs and Alcohol
SOCI 465  Gender and Health
SOSC 330  Health Care Reform in the 50 States
SOSC 398  Pharmaceutical Politics and Policy
SOSC 430  The Shaping of Health Policy
# Kinesiology BA/Health Sciences

## Sample Degree Plan

This is only one of many possible ways to fulfill your degree requirements.

### Fall

<table>
<thead>
<tr>
<th>Freshman</th>
<th>15 credits</th>
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<tbody>
<tr>
<td>HEAL 119</td>
<td>Intro to Health &amp; Wellness</td>
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<tr>
<td>FWIS</td>
<td>First Year Writing-Intensive Seminar</td>
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<td>Distribution Course</td>
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### Sophomore

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<tbody>
<tr>
<td>HEAL 222</td>
<td>Principles of Public &amp; Community Health</td>
<td>3</td>
<td>HEAL 313</td>
</tr>
<tr>
<td>KINE 319</td>
<td>Statistics for the Health Professional</td>
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<td>ELECT</td>
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### Junior

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<tbody>
<tr>
<td>HEAL 407</td>
<td>Epidemiology</td>
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<td>HEAL 422</td>
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<td>Health Sciences Elective</td>
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### Senior

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<tbody>
<tr>
<td>HEAL 460</td>
<td>Planning &amp; Evaluation of Health Promotion &amp; Education</td>
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<td>Health Sciences Elective</td>
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<td>OPEN</td>
<td>Open Elective</td>
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</tbody>
</table>
Kinesiology BA/Sports Medicine - Requirements

HEAL 103  Nutrition
KINE 300  Human Anatomy
KINE 301  Human Physiology
KINE 302  Biomechanics
KINE 310  Psychological Aspects of Sport and Exercise
KINE 311  Motor Learning
KINE 319  Statistics for the Health Professional
KINE 321  Exercise Physiology
KINE 323  Exercise Physiology Laboratory
KINE 325  Motor Learning Laboratory
KINE 440  Research Methods

Five courses (15 hours) from:
- BIOC 201  Introductory Biology
- BIOC 211  Introductory Experimental Biosciences
- BIOC 301  Biochemistry I
- BIOC 302  Biochemistry II
- BIOC 311  Advanced Experimental Biosciences
- BIOC 313  Introductory Synthetic Biology
- BIOC 372  Immunology
- CHEM 121/123  General Chemistry I and General Chemistry Lab I
- CHEM 122/124  General Chemistry II and General Chemistry Lab II
- CHEM 151/153  Honors Chemistry I and Honors Chemistry Lab I
- CHEM 152/154  Honors Chemistry II and Honors Chemistry Lab II
- E BIO 202  Introductory Biology II
- KINE 120  Scientific Foundations of Kinesiology
- HEAL 132  Medical Terminology
- KINE 351  Human Anatomy Lab
- KINE 326  Exercise Epidemiology
- KINE 375  Sports Medicine Internship
- KINE 403  Sports Nutrition
- HEAL 407  Epidemiology
- KINE 410  Case Studies in Human Performance
- KINE 412  Motor Control
- KINE 421  Adv. Topics in Exercise Phys. & Preventative Medicine
- KINE 441  Muscle Physiology and Plasticity
- KINE 495/496  Independent Study in Sports Medicine
- KINE 498  Special Topics in Sports Medicine
- KINE 499  Teaching Practicum in Sports Medicine
- PHYS 101/PHYS 103  Mechanics (with lab) and Mechanics Discussion
- PHYS 102/PHYS 104  Electricity & Magnetism (with lab) and E & M Discussion
- PHYS 125  General Physics I (with lab)
- PHYS 126  General Physics II (with lab)
- PSYC 202  Introduction to Social Psychology
- PSYC 203  Introduction to Cognitive Psychology
- PSYC 321  Developmental Psychology
# Kinesiology BA/Sports Medicine

## FALL

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tr>
<td>HEAL 103</td>
<td>Nutrition</td>
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<td>FWIS</td>
<td>First Year Writing-Intensive Seminar</td>
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<td>ELECT</td>
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<tr>
<td>KINE 120</td>
<td>Foundations of Kinesiology (Elective)</td>
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## SOPHOMORE

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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>KINE 319</td>
<td>Statistics for the Health Professional</td>
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## JUNIOR

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<tr>
<td>KINE 311</td>
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<tr>
<td>KINE 325</td>
<td>Motor Learning Lab</td>
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<td>KINE 301</td>
<td>Human Physiology</td>
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<td>Distribution Course</td>
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## SENIOR

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>KINE 302</td>
<td>Biomechanics</td>
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<td>Open Elective</td>
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</tbody>
</table>

This is only one of many possible ways to fulfill your degree requirements.
Mathematics is the study of structure that provides a language and tools for interpreting our world. The Mathematics Department offers training in the traditional areas of pure mathematics: analysis, algebra, geometry, and topology, as well as courses in combinatorics, computational algebraic geometry, and mathematical biology. Rice’s Computational and Applied Mathematics (CAAM) and Statistics (STAT) departments offer an array of other mathematical courses. Undergraduates seeking a math degree are also trained in problem solving, analytical thinking, and the logical and precise communication of their ideas. In the marketplace, law schools, and business schools, it is precisely these skills that make math majors a valuable commodity.

The BS program prepares students for Ph.D. programs in mathematics and related disciplines. It requires courses from each of the subfields of mathematics.

The BA program is extremely flexible; it allows students to design their own programs in conjunction with their advisors. This also makes Math a popular double major. Today’s budding scientist, engineer, computer scientist, economist, or social scientist needs much more mathematical training than did previous generations. The ease and flexibility of the double major in math allows students to get degree credit for their work.

**Degrees Offered**

- Mathematics: BS, BA, Minor

**Frank Advice**

- The Math department provides detailed information about choosing the proper math course for your first semester at Rice. Visit their website, looking under Academics > Undergraduate > Advising and Transfer Credit for their advice on class selection for first-year students.
Mathematics

• If you have AP credit for MATH 101-102, have a strong math background, and are interested in a major with a substantial math component, consider taking Honors Calculus 221-222 and MATH 354 Honors Linear Algebra in your first year.

• MATH 499 offers a non-lecture undergraduate research experience. You should also consider Research Experiences for Undergraduates and other summer research programs if you are thinking of applying to graduate school in Math. www.ams.org/programs/students/students

• Not required but highly recommended courses:
  ◦ MATH 221 – Honors Calculus III
  ◦ MATH 222 – Honors Calculus IV
  ◦ MATH 354 – Honors Linear Algebra
  ◦ MATH 356 – Abstract Algebra I
  ◦ MATH 321 – Introduction to Analysis I
Mathematics BA - Requirements

MATH 101  Single Variable Calculus I
MATH 102  Single Variable Calculus II

MATH 211 and 212  Ordinary Differential Equations and Linear Algebra and
                  or
                  MATH 221 and 222  Multivariable Calculus or
                                        Honors Calculus III and IV

Eight courses (24 hours) of MATH courses at the 300-level or above

No sample degree plan is shown for the Math BA as individual degree plans will vary widely based on your background and interests. Consult one of the Major Advisors to create a personalized degree plan that best suits your needs.
Mathematics BS - Requirements

MATH 101  Single Variable Calculus I
MATH 102  Single Variable Calculus II

One course from:
- MATH 211  Ordinary Differential Equations and Linear Algebra
- MATH 381  Intro to Partial Differential Equations
- MATH 423/CAAM 423  Partial Differential Equations I

One to two courses from:
- MATH 212  Multivariable Calculus
- MATH 221 and 222  Honors Calculus III and IV

One course from:
- MATH 221  Honors Calculus III
- MATH 354  Honors Linear Algebra
- MATH 355  Linear Algebra

Two courses from:
- MATH 321  Intro to Analysis I
- MATH 322  Intro to Analysis II
- MATH 425  Integration Theory

MATH 356  Abstract Algebra I
MATH 463  Abstract Algebra II

One course from:
- MATH 370  Calculus on Manifolds
- MATH 401  Differential Geometry
- MATH 402  Differential Geometry

One course from:
- MATH 382  Complex Analysis
- MATH 427  Complex Analysis

One course from:
- MATH 443  General Topology
- MATH 444  Geometric Topology
- MATH 445  Algebraic Topology

A total of at least 33 hours of MATH course offerings at the 300-level or above is required
# Mathematics BS

This sample plan assumes AP credit.

## FALL 15 credits

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<tbody>
<tr>
<td>MATH 221</td>
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<td>MATH 354</td>
<td>Honors Linear Algebra</td>
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<td>FWIS</td>
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## SPRING 16 credits

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<td>Honors Calculus IV</td>
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<tr>
<td>MATH 302 or 304</td>
<td>Elements of Analysis or Elements of Knot Theory</td>
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<td>LPAP</td>
<td>Lifetime Physical Activity Elective</td>
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## SOPHOMORE 15 credits

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<tr>
<td>MATH 331</td>
<td>Honors Analysis</td>
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<td>MATH 365</td>
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## SOPHOMORE 15 credits

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<tbody>
<tr>
<td>MATH 322</td>
<td>Intro to Analysis II</td>
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<td>MATH 356</td>
<td>Abstract Algebra I</td>
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## JUNIOR 15 credits

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<tbody>
<tr>
<td>MATH 423</td>
<td>Partial Differential Equations I</td>
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<td>MATH 463</td>
<td>Abstract Algebra II</td>
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<td>MATH 368</td>
<td>Topics in Combinatorics</td>
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## JUNIOR 15 credits

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<tbody>
<tr>
<td>MATH 370</td>
<td>Calculus on Manifolds</td>
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<td>MATH 443</td>
<td>General Topology</td>
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## SENIOR 15 credits

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<tbody>
<tr>
<td>MATH 401</td>
<td>Differential Geometry</td>
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<td>MATH 425</td>
<td>Integration Theory</td>
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<td>MATH 444</td>
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## SENIOR 15 credits

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<tr>
<td>MATH 427</td>
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<td>MATH 499</td>
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<tbody>
<tr>
<td>MATH 444</td>
<td>Geometric Topology</td>
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<td>DIST</td>
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<table>
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<tbody>
<tr>
<td>MATH 444</td>
<td>Geometric Topology</td>
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<td>DIST</td>
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<tr>
<td>OPEN</td>
<td>Open Elective</td>
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</table>

This is only one of many possible ways to fulfill your degree requirements.
Mathematics Minor - Requirements

One course from:
 MATH 302  Elements of Analysis
 MATH 321  Introduction to Analysis I
 MATH 381  Introduction to Partial Differential Equations
 MATH 382  Complex Analysis

One course from:
 MATH 356  Abstract Algebra
 MATH 365  Number Theory
 MATH 368  Topics in Combinatorics

One course from:
 MATH 221  Honors Calculus III
 MATH 354  Honors Linear Algebra
 MATH 355  Linear Algebra

Three additional courses (nine hours) from MATH course offerings
Neuroscience is the study of the brain and nervous system: how it develops, how it works, and what happens when it doesn’t work properly. Neuroscience is a multidisciplinary field that encompasses most areas of modern science, from genetics and biology, to mathematics and engineering, to social and physical sciences, to medicine. The goal of neuroscience is to understand the brain, the most complex organ ever studied in the known universe and to use that information to enrich humankind and to treat and cure brain disorders.

The neuroscience minor is administered by the Department of Biosciences and involves participation in core and elective courses at Rice, Baylor College of Medicine, and the University of Texas Health Sciences Center as well as research in active faculty laboratories throughout the Texas Medical Center.

**Degrees Offered**
- Neuroscience Minor

**Frank Advice**
- Each student undertaking a minor in neuroscience chooses one of two unique tracks. The Humanities and Social Sciences track represents cognitive and behavioral approaches to neuroscience, while the Natural Sciences and Engineering track represents genetics, cellular/molecular, bioengineering, computation, and systems-level investigations.
- There is one required core course for the minor (NEUR 380) and two elective core courses dependent on the chosen track (NEUR 362 and NEUR 385). All three courses are offered in the Spring and any of them are an appropriate first course to choose as an introduction to the neuroscience minor.
- NEUR 485 gives credit for research. One 3 credit course can count toward the minor, but you can repeat the course as often as you wish. It is fine to do research in different labs, but if you find a lab you like, stick with it so you may be able to accomplish a project and have your name on a scientific journal article.
Neuroscience Minor - Requirements

NEUR 380/PSYC 380/BIOC 380  Fundamental Neuroscience Systems

Each student must also complete the requirements for one track.

Humanities and Social Sciences Track
NEUR 362/PSYC 362  Cognitive Neuroscience: Exploring the Living Brain

Three courses from the Humanities and Social Science electives listed in the 2016 General Announcements

One course from the Natural Sciences and Engineering electives listed in the 2016 General Announcements

Natural Sciences and Engineering Track
NEUR 385/BIOC 385  Fundamentals of Cellular and Molecular Neuroscience

Three courses from the Natural Sciences and Engineering electives listed in the 2016 General Announcements

One course from the Humanities and Social Science electives listed in the 2016 General Announcements
Physics and Astronomy

Students in the Department of Physics and Astronomy will acquire and demonstrate a solid foundation of knowledge in physics and/or astronomy and deeper knowledge of subdivisions of the field related to their interests. They will build the theoretical, computational, and laboratory skills necessary to succeed in graduate school or in the workplace and become leaders in their chosen discipline. Students will develop the ability to identify, formulate, and solve challenging scientific and technical problems as encountered in physics and astronomy. They will acquire basic skills in reading the scientific literature and learn how to communicate scientific results orally and in writing with scientists and the general public.

The BA degrees in physics and astronomy provide a broad liberal education with a concentration in physical science, while allowing time to pursue other interests. Graduates typically seek employment in a range of professional fields or in secondary teaching.

The BS degrees in physics and astrophysics are intended to provide intensive pre-professional training. Options for specialized study include applied physics, biological physics, and computational physics. Most graduates continue in graduate study or find immediate employment in a technical field.

The Chemical Physics degree is jointly offered by the Department of Physics and Astronomy and the Department of Chemistry. It is designed for students with a strong aptitude in both chemistry and physics. Students take upper-level courses in both chemistry and physics, focusing on the applications of physics to chemical systems. See the Chemistry Department section for degree requirements and a sample degree plan.

Degrees Offered

- Physics: BS, BA, minor
- Astronomy: BA
- Astrophysics: BS
- Chemical Physics: BS
Frank Advice

- Talk to the PHYS 111 instructor about AP physics. It is usually better to take PHYS 111/112 rather than jumping straight into PHYS 201. If you are unsure what to do, speak with the PHYS 111 instructor.

- The BA degree, particularly, can be solid preparation for medical school, law school, or teaching, but you will need additional course work specific to those areas.

- A senior research project and thesis are required for the BS degrees. Prior to that, there are summer research experiences available with faculty in the department and at many other universities and national labs. Announcements are distributed to majors via email regularly.

- Not required but highly recommended: You should have some exposure to computer programming and numerical mathematics, at least at the level of CAAM 210.
Physics BA - Requirements

PHYS 101/103 or 111  Mechanics (with lab) and Mechanics Discussion or Mechanics (with lab)
PHYS 102/104 or 112  Electricity and Magnetism (with lab) and E & M Discussion or Electricity and Magnetism (with lab)
PHYS 201  Waves and Optics
PHYS 202  Modern Physics
PHYS 231  Elementary Physics Laboratory
PHYS 301  Intermediate Mechanics
PHYS 302  Intermediate Electrodynamics
PHYS 311  Introduction to Quantum Physics I
PHYS 331  Junior Physics Laboratory I
PHYS 425  Statistical and Thermal Physics
One 400-level PHYS or ASTR course (three hours)

MATH 101/102  Single Variable Calculus I and II
MATH 211*  Ordinary Differential Equations and Linear Algebra
MATH 212*  Multivariable Calculus

One course from:
NSCI 230/COMP110  Computation in Science and Engineering
CAAM 210  Introduction to Engineering Computation
One MATH or CAAM course at 300-level or above

* MATH 221/222 may substitute for MATH 211/212
## Physics BA

### SAMPLE DEGREE PLAN

This is only one of many possible ways to fulfill your degree requirements.

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PHYSICS & ASTRONOMY

Physics BS - Requirements

PHYS 101/103 or 111 Mechanics (with lab) and Mechanics Discussion or Mechanics (with lab)
PHYS 102/104 or 112 Electricity and Magnetism (with lab) and E & M Discussion or Electricity and Magnetism (with lab)
PHYS 201 Waves and Optics
PHYS 202 Modern Physics
PHYS 231 Elementary Physics Laboratory
PHYS 301 Intermediate Mechanics
PHYS 311 Introduction to Quantum Physics I
PHYS 425 Statistical and Thermal Physics
PHYS 491/493 Undergraduate Research and Undergraduate Research Seminar
PHYS 492/494 Undergraduate Research and Undergraduate Research Seminar
MATH 101/102 Single Variable Calculus I and II
MATH 211 or 221 Honors Calculus III

Each student must complete the additional courses for one major concentration.

**Major Concentration: General Physics**

PHYS 302 Intermediate Electrodynamics
PHYS 312 Introduction to Quantum Physics II
PHYS 331 and 332 Junior Physics Laboratory I and II
PHYS 411 Introduction to Nuclear and Particle Physics
PHYS 412 Solid State Physics

*Two courses from either the MATH or CAAM course groups:*

MATH 381 and 382 Introduction to Partial Differential Equations and Complex Analysis
CAAM 335 and 336 Matrix Analysis and Differential Equations in Science and Engineering
CHEM 121/122/123/124 General Chemistry I and II and General Chemistry Lab I and II

**Major Concentration: Applied Physics**

PHYS 302 Intermediate Electrodynamics or ELEC 306 Applied Electromagnetics
PHYS 312 Introduction to Quantum Physics II or ELEC 361 Quantum Mechanics for Engineers

*Two courses from:*

- PHYS 331 Junior Physics Lab I
- PHYS 332 Junior Physics Lab II
- ELEC 364 Photonics Measurements

PHYS 412 Solid State Physics (or approved substitute in applied physics)
ELEC 242 Fundamentals of Electrical Engineering II and ELEC 244 Fundamentals of Electrical Engineering II Lab
or ELEC 243 Electronic Measurement Systems
ELEC 305 Introduction to Physical Electronics
MATH 381 Introduction to Partial Differential Equations or CAAM 336 Differential Equations in Science and Engineering
CHEM 121/122/123/124 General Chemistry I and II and General Chemistry Lab I and II

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Physics BS - Requirements

Major Concentration: Biological Physics

PHYS 302 Intermediate Electrodynamics  
PHYS 312 Introduction to Quantum Physics II  
PHYS 355 Introduction to Biological Physics  
BIOC 201 Introductory Biology  
BIOC 211 Intermediate Experimental Biosciences  
BIOC 301 or 341 Biochemistry I or Cell Biology  
CHEM 121/122/123/124* General Chemistry I & II and General Chemistry Lab I & II  
CHEM 211/213 Organic Chemistry and Organic Chemistry Discussion  
MATH 381 or CAAM 336 Introduction to Partial Differential Equations or  
Differential Equations in Science and Engineering

Major Concentration: Computational Physics

PHYS 302 Intermediate Electrodynamics  
PHYS 312 Introduction to Quantum Physics II  
PHYS 416 Computational Physics  
CAAM 335 Matrix Analysis  
CAAM 336 Differential Equations in Science and Engineering  
CAAM 210 Introduction to Engineering Computation  
CAAM 453 Numerical Analysis I  
CAAM 519 Computational Science I

One course from:  
CAAM 435 Dynamical Systems  
CAAM 454 Numerical Analysis II  
CAAM 520 Computational Science II  
CAAM 536 Numerical Methods for Partial Differential Equations

CHEM 121/123 General Chemistry I and General Chemistry Lab I

* CHEM 151/153 may substitute for CHEM 121/123  
CHEM 152/154 may substitute for CHEM 122/124
## PHYSICS & ASTRONOMY

### Physics BS / Major Concentration: General Physics

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This is only one of many possible ways to fulfill your degree requirements.
# Physics Minor - Requirements

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Nine additional credit hours of PHYS coursework at the 300-level or above

* MATH 221/222 may substitute for MATH 211/212
Astronomy BA - Requirements

PHYS 101/103 or 111 Mechanics (with Lab) and Mechanics Discussion or Mechanics (with lab)
PHYS 102/104 or 112 Electricity and Magnetism (with Lab) and E & M Discussion or Electricity and Magnetism (with Lab)
PHYS 201 Waves and Optics
PHYS 202 Modern Physics
PHYS 231 Elementary Physics Laboratory
PHYS 301 Intermediate Mechanics
PHYS 302 Intermediate Electrodynamics
ASTR 230 Astronomy Laboratory
ASTR 350 Introduction to Astrophysics - Stars
ASTR 360 Introduction to Astrophysics - Galaxy and Cosmos
ASTR 400 Undergraduate Research Seminar (two credits)

One course from:

- ASTR 451 Astrophysics I – Sun and Stars
- ASTR 452 Astrophysics II – Galaxies and Cosmology
- ASTR 470 Solar System Physics
- PHYS 480 Introduction to Plasma Physics

MATH 101/102 Single Variable Calculus
MATH 211* Ordinary Differential Equations and Linear Algebra
MATH 212* Multivariable Calculus
MECH 200 Classical Thermodynamics

One course from:

- PHYS 331 Junior Physics Lab I
- NSCI 230/COMP 110 Computation in Science and Engineering
- CAAM 210 Introduction to Engineering Computation

* MATH 221/222 may substitute for MATH 211/212
## Astronomy BA

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### SAMPLE DEGREE PLAN

This is only one of many possible ways to fulfill your degree requirements.
Astrophysics BS - Requirements

PHYS 101/103 or 111  Mechanics (with lab) and Mechanics Discussion or Mechanics (with lab)
PHYS 102/104 or 112  Electricity and Magnetism (with lab) and E & M Discussion or Electricity and Magnetism (with lab)
PHYS 201  Waves and Optics
PHYS 202  Modern Physics
PHYS 231  Elementary Physics Laboratory II
PHYS 301  Intermediate Mechanics
PHYS 302  Intermediate Electrodynamics
PHYS 311  Introduction to Quantum Physics I
PHYS 425  Statistical and Thermal Physics
PHYS 491/493  Undergraduate Research and Undergraduate Research Seminar
PHYS 492/494  Undergraduate Research and Undergraduate Research Seminar
ASTR 230  Astronomy Lab
ASTR 350  Introduction to Astrophysics - Stars
ASTR 360  Introduction to Astrophysics - Galaxy and Cosmos
ASTR 400  Undergraduate Research Seminar (two credits)

Three courses from:

ASTR 451  Astrophysics I – Sun and Stars
ASTR 452  Astrophysics II – Galaxies and Cosmology
ASTR 470  Solar System Physics
PHYS 312  Introduction to Quantum Physics II
PHYS 480  Introduction to Plasma Physics

MATH 101/102  Single Variable Calculus I and II
MATH 211*  Ordinary Differential Equations and Linear Algebra
MATH 212*  Multivariable Calculus
CAAM 336  Differential Equations in Science and Engineering
NSCI 230/COMP 110  Computation in Science and Engineering or
or CAAM 210  Introduction to Engineering Computation
MECH 200  Classical Thermodynamics

* MATH 221/222 may substitute for MATH 211/212
# PHYSICS & ASTRONOMY

## Astrophysics BS

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<tr>
<td>PHYS 103</td>
<td>Mechanics Discussion</td>
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<tr>
<td>MATH 101</td>
<td>Single Variable Calculus I</td>
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<tr>
<td>FWIS</td>
<td>First Year Writing-Intensive Seminar</td>
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<tr>
<td>LPAP</td>
<td>Lifetime Physical Activity Elective</td>
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### Spring Credits: 16

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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<tbody>
<tr>
<td>PHYS 102</td>
<td>Electricity &amp; Magnetism (with lab)</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 104</td>
<td>E &amp; M Discussion</td>
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<tr>
<td>MATH 102</td>
<td>Single Variable Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>DIST</td>
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<tr>
<td>OPEN</td>
<td>Open Elective</td>
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### Sophomore Credits: 16

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>PHYS 201</td>
<td>Waves and Optics</td>
<td>3</td>
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<tr>
<td>PHYS 231</td>
<td>Elementary Physics Lab</td>
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<tr>
<td>MATH 212</td>
<td>Multivariable Calculus</td>
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<tr>
<td>DIST</td>
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<tr>
<td>OPEN</td>
<td>Open Elective</td>
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### Junior Credits: 17

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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<tbody>
<tr>
<td>PHYS 301</td>
<td>Intermediate Mechanics</td>
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<tr>
<td>PHYS 311</td>
<td>Intro to Quantum Physics I</td>
<td>3</td>
</tr>
<tr>
<td>ASTR 350</td>
<td>Intro to Astrophysics - Stars</td>
<td>3</td>
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<tr>
<td>ASTR 400</td>
<td>Undergraduate Research Seminar</td>
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<tr>
<td>CAAM 336</td>
<td>Differential Equations in Science and Engineering</td>
<td>3</td>
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<tr>
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### Senior Credits: 15

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>PHYS 425</td>
<td>Statistical and Thermal Physics</td>
<td>3</td>
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<tr>
<td>PHYS 491</td>
<td>Undergraduate Research</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 493</td>
<td>Undergraduate Research Seminar</td>
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<tr>
<td>ASTR 451</td>
<td>Astrophysics I - Sun and Stars</td>
<td>3</td>
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<tr>
<td>DIST</td>
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<td>3</td>
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<tr>
<td>OPEN</td>
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### Senior Credits: 18

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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</tr>
</thead>
<tbody>
<tr>
<td>PHYS 492</td>
<td>Undergraduate Research</td>
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<tr>
<td>PHYS 494</td>
<td>Undergraduate Research Seminar</td>
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<tr>
<td>ASTR 452</td>
<td>Astrophysics II - Galaxies and Cosmology</td>
<td>3</td>
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<td>Distribution Course</td>
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</tr>
<tr>
<td>OPEN</td>
<td>Open Elective</td>
<td>3</td>
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<tr>
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<td>Open Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

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This is only one of many possible ways to fulfill your degree requirements.
Degree Requirements

From Rice University’s *General Announcements*, in order to graduate from Rice University, all students must:

- Be registered at Rice full time for at least four full fall and/or spring semesters
- Complete the requirements of at least one major degree program
- Complete at least 120 semester hours (some degree programs require more than 120 hours)
- Complete at least 60 semester hours at Rice University
- Complete at least 48 hours of all degree work in upper-level courses (at the 300 level or higher)
- Complete more than half of the upper-level courses in degree work at Rice
- Complete more than half of the upper-level courses in their major work at Rice (certain departments may specify a higher proportion)
- Complete at least 60 hours outside of their major for Bachelor of Arts and Bachelor of Science degrees (exceptions: requirement does not apply to Bachelor of Science degrees with an engineering major; Architecture majors are required to complete only 36 hours outside the major)
- Complete all Rice courses satisfying degree requirements with a cumulative grade point average of at least 1.67 or higher
- Complete all Rice courses that satisfy major and/or minor requirements (as designated by the department) with a cumulative grade point average of at least 2.00 or higher
- Satisfy the Writing and Communication requirement
- Complete one Lifetime Physical Activity Program (LPAP) course for one credit. Students with disabilities may make special arrangements to satisfy this requirement
- Complete courses to satisfy the distribution requirements (see below)
- Otherwise be a student in good academic and disciplinary standing and not under investigation
Distribution Requirements
Each student is required to complete at least 12 semester hours of designated distribution courses in each of Groups I, II, and III. The 12 hours in each group must include courses in at least two departments in that group.

Students must complete the distribution requirements in each group by taking courses that are designated as a distribution course at the time of course registration, as published in that semester’s Course Offerings.

Dual-Degree Requirements
To earn a second four-year bachelor’s degree, also known as a dual degree, currently enrolled undergraduates who have not yet completed their first bachelor’s degree must:

- Be accepted for the second major by the department
- Fulfill all requirements for the second degree
- Complete at least 30 additional semester hours at Rice beyond the hours required for their first degree (these hours are applied to the second degree)
Major Advisors

BIOSCIENCES

Biochemistry and Cell Biology

Pre-prospective and prospective students/freshmen and undeclared sophomores
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Liz Eich  lizmc@rice.edu
Kathy Matthews  ksm@rice.edu
James McNew  mcnew@rice.edu
Alma Novotny  novotnya@rice.edu
Dereth Phillips  derethp@rice.edu
Yousif Shamoo  shamoo@rice.edu

Declared Majors and Minors
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David Caprette (I-P)  caprette@rice.edu
Charles Stewart (Q-Z)  crs@rice.edu

Study Abroad Transfer Credit
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Transfer Credit
Dave Caprette  caprette@rice.edu

Ecology and Evolutionary Biology
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Scott Solomon  scott.solomon@rice.edu

Study Abroad Transfer Credit and Transfer Credit
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CHEMISTRY  (listed by residential college)

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Hanszen
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Sid Rich
Ken Whitmire  whitmir@rice.edu

Wiess
Christy Landes  cflandes@rice.edu

Will Rice
Julianne Yost  jyost@rice.edu

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Major Advisors

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Geology and Geochemistry
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Geology and Geophysics
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Transfer Credit
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Dale Sawyer dale@rice.edu

ENVIRONMENTAL STUDIES

ENVIRONMENTAL SCIENCE

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Minor Advisor
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Augusto Rodriguez axr1@rice.edu

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Bruce Etnyre etnyre@rice.edu

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Stephen Wang sswang@rice.edu

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Stephen Semmes semmes@rice.edu

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Transfer credit
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Simon Fischer-Baum simon.j.fischer-baum@rice.edu
David Dickman david.dickman@rice.edu

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Paul Padley padley@rice.edu

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Applied Physics
Douglas Natelson natelson@rice.edu

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Computational Physics
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Transfer Credit
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Stan Dodds dodds@rice.edu (Physics)