Fall 2024 Undergraduate Program Director (UPD) Report

Charlene Guo - 11/22/2024 1:44:26 AM -05:00

Received

Date:

By:

Comment:

Instructions

This is a form for SEBS Governing Council major representatives. The purpose of this form is to encourage student engagement with faculty/department representatives and to identify academic issues that may be addressed by the council.

1. Talk to students in your major, ask around if there are any current academic issues (ex: class conflicts within the major, issues with professors or department, lack of resources).

2. Look at Degree Navigator, write down the course requirements

3. Formulate a list of things you would like to know about the program (corporate connections with the university, current research projects, opportunities for students to get involved, recent changes to the program)

4. Email Undergraduate Program Director and Arrange Appointment

5. Fill out this form and submit by 11:59pm on November 17th, 2024.

> n/a

General Information

Your Name

> Charlene Guo, Avani Pai

Your Email

> scg140@scarletmail.rutgers.edu, app201@scarletmail.rutgers.edu

Represented Major

> Environmental Science

Date of Meeting with UPD

> 11/13/2024

Class Year

> 2027, 2028

UPD Name

> Jeffra Schaefer

UPD Email

> jschaefer@envsci.rutgers.edu

Major/Departmental Website Link (if applicable)

> https://envsci.rutgers.edu/

Major Information

Major Options -- What options are offered within the major? How do they differ?

> Within the major, Environmental Science, Applied Environmental Science, and Environmental Health are offered. The Environmental Science option is more academic, theoretical, and therefore is a good option to get more background information on the subject prior to grad school. The Applied Environmental Science option is similar to the science option, except Calculus 2 and Fate and Transport are not required. There are also four required courses that touch on major areas for environmental science: water and wastewater, solid waste, hazardous waste, and air pollution. The Environmental Health option is a bit different. It has the same foundational courses but students take bio-centric courses for public health such as microbiology. It has a lower credit load and gives students space to do a minor or certificate to fulfill their goals.

Total Number of Students within the Major (estimate if unknown from UPD)

> Approx. 100, but that number fluctuates as it only includes sophomores, juniors, and seniors.

Goals within the Major -- What are expectations of students post-graduation?

> A good amount of students end up working in industry jobs, from environmental consulting and environmental health services jobs as well as government agencies including the NJDEP, EPA, USDA. The non-governmental agency jobs can include private organizations, concerned citizens groups, conservation groups, and non-profits. The experience-based learning requirement and certificate programs offered by SEBS help students reach these goals.

List Upper-Level major courses -- What is the goal of each course?

> 375:201 Biological Principles of Environmental Science: Learn about hazardous agents, pollution, population interactions and dynamics; biogeochemical cycles in damaged and remediated ecosystems; environmental risk, management, and remediation; human health impacts. 375:202 Chemical Principles of Environmental Science: Learn about biogeochemical cycles: mass balances within and among environmental reservoirs; importance of water; chemical properties of water and aquatic chemistry. 375:203 Physical Principles of Environmental Science: Learn about physical properties of water, air, and soils; energy and water in the earth system; kinetic and potential energy; and soil/plant/atmosphere relations. 375:302 Water and Wastewater Treatment: Introduction to unit operations that constitute the state-of-the-art of water and wastewater treatment. 375:303 Numerical Methods in Environmental Science: Understand the formulation and solution of environmental science problems by applying analytical and numerical techniques. Principles of data analysis. Generation and solution of mass and energy balances. 375:307 Solid Waste Management and Treatment: Understand the generation, storage, transport, processing, ultimate disposal, and regulation of municipal solid wastes, including discussion of agricultural and hazardous wastes and recovery of resources. 375:310 Analytical Environmental Chemistry Lab: Analysis of environmental samples; environmental sampling procedures; experimental ethics; data analysis; HPLC; GC; and atomic adsorption spectroscopic analysis of inorganic substances. 375:312 Environmental Microbiology Lab: Hands-on introduction to microbiological techniques related to environmental issues. Bacterial growth and nutrition, nutrient cycles, waste treatment, and water quality testing. 375:322 Energy, Technology, and Environment: Critical consideration of energy technology acceptable in a world faced with global warming, environmental pollution, and declining supplies of oil. Examines traditional (oil, natural gas, coal, nuclear), renewable (solar, wind, biomass), and reduced carbon emission sources (co-generation, fuel cells). 375:340 Environmental Applications of Organic Chemistry: Apply concepts from organic chemistry to environmental systems: physico-chemical properties; acid-base, nucleophilic substitution, and redox reactions; prediction of lifetimes of organic chemicals in the environment; whether chiral compounds (PCBs, pesticides) have undergone biotransformation. 375:346 Introduction to Atmospheric Chemistry: Understand components of the atmosphere, the processes within, and how the atmosphere interacts with the earth's surface and outer space. Topics include the Antarctic ozone hole, ozone smog, acid rain, air toxics, greenhouse gases, and aerosols. 375:360 Soils and Water: Understand the physical and chemical properties of soils, soil-water interactions, erosion, etc. Soil properties important to environmental planning. Soil survey interpretation and use. 375:380 Tropical Environments and Society: Understand the contemporary challenges facing the environments and people of the tropics, including climate change, threats to ecosystem function and biodiversity, deforestation, and agriculture and food security. 375:390 Careers in Environmental Sciences: Prepares students for a professional life after Rutgers: set career goals, prepare job and graduate school application materials, practice the interview process, and network with past alumni. 375:407 Environmental Toxicology: Understand basic principles and applications of toxicology to environmental problems. 375:411 Environmental Microbiology: Understand the role of microorganisms in carbon, nitrogen, sulfur cycling, biogeochemical processes, and water and wastewater treatment systems; biodegradation strategies and pathways; and bioremediation of toxic contaminants in the environment. 375:421 Principles of Air Pollution: Understand the fundamental factors of atmospheric contamination; effect of pollution on man and environment; principles of measurement and survey; methods of control; air cleaning; legal aspects. 375:423 Environmental Fate and Transport: Understand the fate and transport of chemicals to determine chemical exposures in aquatic systems and predict future conditions. Emphasis on water quality problems introduced by addition of nutrients, metals, and toxic organic chemicals to water, soil, and air. 375:424 Air Sampling Techniques: Gain theoretical and laboratory experience in ambient and indoor air sampling. Calibration, classical air sampling, direct-reading instrumentation. Measurement and analysis of airborne nanoparticles and biological agents. 375:430 Hazardous Wastes: Understand hazardous waste management through case studies, RCRA and other legislation and regulations, treatment and disposal technology, sampling and analysis, fate in the environment, site cleanup. 375:434 Principles of Industrial Hygiene: Learn to identify, evaluate, and control chemical and physical stresses of an industrial environment including gases, aerosols, nonionizing radiation, noise, lighting, ergonomics, industrial ventilation, heat, and health standards. Includes 40-h OSHA HAZWOPER certification. 375:444 Water Chemistry: Understand the chemistry of natural and polluted waters; water quality; equilibrium models for several chemical systems in natural waters; stability of organic compounds. 375:450 The Terrestrial Carbon Cycle: Understand the major land processes that affect the amount of carbon in the global atmosphere. Topics include: a simplified global carbon cycle, general land use change, wetlands, peatlands, and blue carbon, de-/re-forestation and carbon offset schemes, agricultural practices and urban landscapes all through the lens of carbon cycle impacts. 375:453 Soil Ecology: Understand soil microbial contribution to ecosystem function, microbial diversity, nutrient cycling, soil enzymes, fate of soil amendments, soil flora and fauna, energy cycling, quantification of soil biological processes. 375:474 Coastal Biogeochemical Cycles in a Changing World: Understand sea level rise, ocean acidification, and eutrophication in 4 coastal environments from the poles to the tropics while building skills in analysis software.

Student Issues

Are there concerns with classes within the major? Are there any suggestions for solutions to these concerns?

> Students have mentioned that taking Calculus 2 for just the Environmental Science option, the fact that a lot of the classes have pre-reqs, and that a lot of the classes need knowledge of different subjects tend to be common concerns. Some solutions are to encourage students to communicate their concerns and sign up for math and chemistry study groups as those are the classes with the most concerns.

From the perspective of the UPD or other major faculty members, what can currently be improved upon in the major or department? Are there any suggestions for solutions to these issues?

> Students have reported wanting a community. Due to the flexibility within the major, there's no unform cohort of students that go through the same classes at the same time together. It is also unclear what students want/what they want to do. The

> department has tried to arrange study groups, mentorship programs, and math support between engineering and environmental sci, meteorology, etc majors, and alumni events. There has also been interest within the department to have a liaison to communicate with students and the dept. Some other suggested solutions have been to make the website more accessible and to send more emails.

Are there any Visitor Events/Talks/Seminars/etc. going on within the major?

> Within the major, there are career-focused courses. There have also been student-centered events hosted by the department, but with very low student attendance, so they need students' input on what type of events they should host.

Suggestions for students in this major (ex: organizations to join, news to pay attention to)

> The main suggestion for students is to communicate their concerns, either to Dr. Schaefer or their advisor, as soon as they have them and not be passive.

Changes within the major for the upcoming year

> In the upcoming year, the staff plans on making information more accessible and communicating which courses are offered only in the fall and spring semesters.

Any other suggestions, comments, concerns?

> Dr. Schaefer is very interested in continuing working with us to help establish a community, gauge student interests, and address other concerns in the future.