Co-terminal (4+1) BS/MS

Environmental Science

Approved December 17, 2019

GPD: Lisa Rodenburg

lisa.rodenburg@rutgers.edu

848-932-5774

Overview

The Graduate Program in Environmental Science is pleased to announce the creation of a 4+1 BS+MS program in Environmental Science (ES). Advantages to students pursuing the BS to MS co-terminal degree include: the possibility of pursuing graduate studies at a top-ranked university, the possibility of continuing undergraduate research projects and transforming them into graduate-level research, the option to complete graduate studies in a reduced timeframe and with cost-effective fee structure, and the possibility to have the GRE application requirement waived.

Resources and logistics

The curriculum for the "+1" MS degree is the same as the general MS curriculum. Currently, we offer both the plan A (thesis) and plan B (non-thesis) MS degree. We expect that most 4+1 students will choose the plan B option, but the plan A will also be available to 4+1 students. We expect that students who have performed undergraduate research, especially those that have done this research as part of a George H. Cook Honors Thesis, will continue this research and expand it into their plan A master's thesis.

Procedures and Policies for Admission

Admission to the program is requested by the student in January of their Junior year through the Graduate School application portal. At the time of application, the student should have completed at least 75 course credits toward their BS. They will be granted conditional admission while they are still undergraduates, and be formally admitted to the MS program once they have successfully completed all the requirements for their undergraduate degree. Students will have to explain in their application how they plan to complete requirements for the BS and MS during their senior year, and will be encouraged to plan for this in conversation with the Directors of the undergraduate and graduate ES programs, and their undergraduate advisor.

Applications to this track will be reviewed by the admissions committee along with all other applicants to the ES MS and PhD programs. The deadline for admissions to all of

these programs for a Fall semester start is January 15th. By allowing 4+1 students to apply during their junior year, a full year before they would apply to outside programs, we can ensure that they receive an admissions decision by May 1, well before they need to think about applying to other graduate programs. **The GRE requirement is waived for students with a GPA of 3.0 or above in their ES major.**

As with all MS students, 4+1 students accepted into the MS program have the option of switching to the PhD program subject to the approval of the Graduate Director. Students may choose to earn the MS degree on the way to the PhD, or may go directly to the PhD program.

Timetable for Degree Completion

Rutgers undergraduates do coursework during the sophomore and junior years towards the completion of their core requirements and ES major. They apply to the 4+1 MS program in January of their Junior year and, if accepted, begin to take graduate-level courses towards the ES MS in the fall of their senior year in addition to the credits required to complete their BS. The MS in ES is conferred upon completion of all five-year program requirements. The MS degree does not need to be completed in the "+1" years allotted. Note that the more graduate courses the student can take during their senior year, the greater the likelihood that the MS can be complete in one additional year. The requirements for the ES MS are as follows (30 credits):

Core courses (12 credits):

Student must the following courses (* courses are taught every year). (If the undergraduate version of these courses was completed with a B or better grade, the requirement is waived and the student can take an additional elective(s) to fulfill their 30-credit requirement):

Chemical processes (one course):

16:375:517 *Applications of Aquatic Chemistry (3)

16:375:522 *Environmental Organic Chemistry (3)

16:375:540 *Atmospheric Chemistry (3)

Biological processes:

16:375:510 *Environmental Microbiology (3)

Physical processes:

16:375:523 *Environmental Fate and Transport (3)

Research methods:

16:375:501 *Environmental Science Analysis (3)

In addition, all student must register for the following three courses:

16:375:612 *Seminar in Environmental Sciences (1)

16:375:613 *Seminar in Environmental Sciences (1)

16:375:511 *Journal club (1)

Research or internship (Optional, up to 6 credits):

16:375:701/702 *Research in environmental science (for Plan A) (3,3)

16:375:844 *Research internship (optional for plan B) (3,3)

Electives (9-15 credits):

Any of the courses listed above may be taken as electives if not used to fulfill the core requirement. Any other 16:375:5xx course may be used as an elective:

16:375:503 Analytical Techniques in Environmental Chemistry (3)

16:375:504 Water and Wastewater Treatment (3)

16:375:509 Groundwater Pollution (3)

16:375:512 Pollution Microbiology Lab (2)

16:375:524 Source Control of Atmospheric Pollution (3)

16:375:527 Process Dynamics in Environmental Systems (3)

16:375:529 Biodegradation and Bioremediation (3)

16:375:530 Hazardous Waste Management (3)

16:375:534 Environmental Sustainability (3)

16:375:536 Air Sampling and Analysis Techniques (3)

16:375:541 Environmental Models (3)

16:375:555 Soil Physics (3)

16:375:563 Geomicrobiology (3)

16:375:573 *Soil Ecology (3)

Other approved electives are listed below. Additional electives may be approved by the Graduate Program Director.

16:960:590 Design of Experiments (3)

16:682:501 *Microbial Life (3)

34:970:523 Environmental Law & Policy (3)

16:712:561 Professional Science Writing & Presentation (3)

16:682:572 Microbial Ecology and Diversity (3)

16:550:545 Intro to Geomatics (3)

16:378:502 Environmental Change (3)

16:712:615 Geophysical data analysis (3)

16:960:668 Bayesian data analysis (3)

Recommended Study Sequence

In compliance with SGS policy, students may take up to 12 undergrad credits to count toward the MS component in excess of the 120 credits applied to the bachelor's degree. In addition, undergraduate students are allowed and encouraged to take graduate courses with permission of the Graduate Program Director before earning their BS. **Note, however, that credits (whether undergraduate or graduate) may never be double-counted, i.e. the same course cannot be counted toward both the BS and the MS (or PhD).**

At the time of application, the student must have completed at least 75 credits toward the BS and demonstrated an ability to complete the BS in ES in a timely manner. Once conditional admission to the MS program has been granted, student may take graduate courses in the following sequence:

Summer before Senior year: research credits, field work, internship (all optional)

Senior year: one or two graduate level courses each semester

Summer after Senior year: research credits, field work, internship (all optional)

MS year: three or four graduate level courses, plus seminar and/or journal club each semester. Students may substitute one 3-credit research or internship course for a graduate course in each semester.

Below is an example of a study sequence, but students are free to devise their own schedules in agreement with the policies described above.

Sample Study Sequence	Fall	Spring	Credits	
			BS	MS
Freshman	core requirements		30	
Sophomore	core and major requirements		30	
Junior	major requirements		15	
		apply to MS program	15	
Senior	major requirements	major requirements	30	6
	MS core 1, ex: 16:375:517	MS core 2, ex: 16:375:510		
MS	MS core 3, ex: 16:375:501	MS core 4, ex: 16:375:523		24
	16:375:612 Seminar	16:375:613 Seminar		
	16:375:511 Journal club	Elective 2		
	Elective 1	Elective 3		
	Research or internship	Research or internship		
		[Thesis submission or MS exam]		
		total	120	30

Faculty

The ES graduate program is primarily housed in the ES department, which currently contains 23 tenured or tenure track faculty and eight NTT faculty. Faculty in other departments, particularly Marine and Coastal Sciences; Ecology, Evolution, and Natural Resources; Human Ecology; and Biochemistry and Microbiology, may teach some of the electives. Faculty in the program are available to supervise student research during the academic year, and most faculty also conduct research over the summer.

The program has a designated Graduate Program Director, Professor Lisa Rodenburg (lisa.rodenburg@rutgers.edu, 848-932-5774), and a Graduate Program Secretary, Martha Pineda (mb6z@envsci.rutgers.edu, 848-932-5761).