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Introduction

The purpose of this handbook is to provide students in the Earth and Environmental Science Department’s Master of Environmental Studies (MES) Program with information vital to the successful completion of their program. In this handbook you will find information on academic requirements, recommended courses, program and University policies, and resources both inside and outside of Penn. This handbook is designed to provide general information and does not supplant official publications, University web pages, or regular meetings with your advisor. You should plan to meet with your academic advisor at least once per term to discuss your progress and course selection. In addition, should you have questions that are not answered here or problems that you cannot resolve, you should consult your academic advisor or the MES Director immediately.
I Program Overview

The Master of Environmental Studies (MES) at the University of Pennsylvania is a 12-c.u., non-thesis graduate program designed to prepare students to enter various environmental professions.

The MES encourages a broadly interdisciplinary approach to the study of the environment and requires exposure to sciences, humanities, and social sciences as well as in-depth study of a selected concentration. As a culminating exercise, students must complete an individual project that demonstrates their ability to define a project, develop appropriate methods, complete research, and present the results in a clear and concise manner. Many MES students select a format for this project that represents the profession they hope to enter.

Students may study in the MES program part-time or full-time and may take either day or evening courses in any school at the University of Pennsylvania, provided the courses are pre-approved by the student’s advisor and/or the program director. All required courses and the most popular electives are offered in the evening, and part-time students are expected to complete their degree in no more than four years.

Relationship within the University

The Masters Programs in Earth and Environmental Science are housed in the School of Arts and Sciences (SAS), are overseen by the Director of Professional Masters Programs in Earth and Environmental Science, and located in the Department of Earth and Environmental Science. The programs are administered through the College of Liberal and Professional Studies (LPS), which falls under Professional and Liberal Education (PLE), SAS’s division of continuing education. The program schedules specially designed courses in the evenings that are taught by members of Penn’s standing faculty, affiliated Penn faculty, and experienced environmental professionals from the Philadelphia region. Students in the program may also take graduate courses from any department or school within the University with the approval of a program advisor and permission of the department offering the course.

Your enrollment status (part-time or full-time) will determine which Penn services you are eligible for. Full-time students are enrolled in 3 or 4 courses per semester while part-time students are enrolled in 1 or 2 courses per semester. Students are permitted to change their status from full to part time and vice versa at any point in their career without seeking prior permission. However, international students should be aware that they must maintain their full-time status to meet visa requirements.
II Curriculum

The following is the standard curriculum for MES students. Students in a dual degree program (MBA/MES, MPA/MES, JD/MES, MPH/MES, or International Environmental Management) or sub-matriculates should consult the Dual Degree handbook available on the Earth & Environmental Science Online Community for specific requirements for their program.

Students are required to complete at least 12 c.u.'s of graduate level course work for the MES program. A graduate level course is defined as any Penn course numbered 400 or above. There are two required courses for the MES program: ENVS 601-Proseminar and a research methods course (see below for specific courses that fulfill this requirement). In addition, a Capstone project must be completed. Students also take four foundation courses and 5 concentration courses to round out their program.

ENVS 601-Proseminar: Contemporary Issues in Environmental Studies

The Proseminar introduces MES students to critical issues in the environment and exposes them to current environmental research, analysis, and management practices. Students are challenged to understand the complexity that confounds many environmental issues and are introduced to several environmental professions. The course is comprised of three parts:

- Readings and lectures on basic environmental science
- Readings and class discussions on critical environmental issues (e.g., metabolic, social and political uses of energy; geopolitics of water; climate change; and cause and effect in complex systems).
- Writing in various formats about complex environmental issues to a wide range of audiences.

Foundation (Core) Requirements

Based on the premise that environmental issues and solutions have both scientific and social dimensions, the MES requires students to take coursework in both scientific and social aspects of environmental problems outside of their chosen concentrations. To assure the interdisciplinary breadth necessary to address complex environmental issues, each student selects four courses from the list of topics presented in Table 1. These courses should be chosen to complement the career goals of the student. Only one course from each field may be taken for the foundation (i.e. you may not take 4 Environmental Geology courses) and the foundation courses may not be the same as a student’s concentration. Thus, if a student is concentrating in Environmental Policy he/she may not fulfill any of the foundation courses with an Environmental Policy course. In consultation with an advisor, students may select foundation courses from Earth & Environmental
Science offerings. Foundation courses are not taken in other schools in the University and are restricted to ENVS and GEOL courses.

Table 1. Students take four courses selected from four different disciplines selected from this list. See Appendix for list of courses and what foundation they fulfill.

- Environmental Biology
- Environmental Chemistry
- Environmental Geology
- Urban Environment
- Environmental Health
- Environmental Sustainability
- Advocacy & Education
- Environmental Policy
- Environmental Law
- Resource Management
- Environmental Business
- Energy

Concentrations

In addition to the foundation requirements, each student must develop a five-course concentration that will provide sufficient expertise for them to assume a lead role in analysis and management in that area. The development of a concentration should be done in consultation with a program academic advisor (assigned when the student enters the program). You can find your academic advisor by going to PennInTouch (see Figure 1). If no name appears there, your academic advisor is Dr Bordeaux (bordeaux@sas.upenn.edu).
Ideally, each student builds on previous academic and professional experience when developing a concentration. However, occasionally, a student may seek to move in a different direction. In such cases, additional coursework may be required beyond the 12-credit minimum.

Concentration courses may be selected from among courses developed specifically for the MES, from other graduate courses in the College of Liberal and Professional Studies, from graduate groups in Arts and Sciences and from graduate courses in other schools in the University. **Up to 4 graduate courses in the concentration may be taken outside of the School of Arts and Sciences.**

Graduate courses are those courses numbered 400 or above. Students are expected to work closely with their program advisor and with faculty advisors in selecting courses that will provide cohesive understanding in a specific area. Students are provided with a list of courses within the MES and across the University each semester which are approved for each concentration. Check the Online Community for the most up to date course lists.

A description of the primary concentrations in the MES program follows and specific courses that fulfill each concentration are listed in the Appendix.
• **Environmental Advocacy and Education** - This concentration focuses primarily on preparing students to communicate complex environmental concepts to various audiences. It includes environmental education, journalism, and advocacy. Graduates may find themselves teaching in classroom or non-traditional settings (museums or nature centers), working in not-for-profit organizations doing community outreach and communication, or in media organizations. Among the courses that students in this concentration take are writing courses, communication courses, social science courses, and education courses.

• **Environmental Biology** - This concentration aims to prepare students in the environmental biological sciences. Students may either concentrate in microbial or population studies. Students in this concentration must have the equivalent of an undergraduate major in biology and should expect to take several of their concentration courses in the Biology Department. Graduates may continue environmental research at the Ph.D. level, or work in environmental consulting or in horticulture or wildlife fields as biologists.

• **Environmental Sustainability** – Many graduates with this concentration work in positions labeled “Sustainability Coordinator.” Positions are becoming quite common in the corporate, non-profit, academic, and government sectors. These positions typically require that all aspects of a business or group be examined to determine if they are being managed optimally with an eye to the triple bottom line. Areas such as greenhouse gas emissions, energy use, waste reduction and recycling, storm water runoff, and use of sustainable products all fall under the umbrella of a Sustainability Coordinator.

• **Environmental Policy** – Students concentrating in policy usually fit in one of three areas. Most policy students develop programs around land and water-use planning and land and water-use regulation. These students combine courses developed for the MES with courses in city and regional planning or landscape architecture. These students are preparing for private consulting or public sector work. The second group studies environmental regulation at the federal, state and local level. These students primarily take courses developed for the MES program or in the Fels Program (Government Administration). These students primarily work in the public sector after graduation. The final group of policy students studies business and environment. They take many courses such as risk management and cost benefit analysis in the Wharton School. These students are preparing for careers in business.

• **Resource Management** – This concentration prepares students to work in habitat restoration, land conservation, and land management. Students develop a curriculum that combines science (e.g., ecology, geology, chemistry) with policy (e.g., law and planning) and field techniques. Students are required to have at least one field course and to do a field-based Capstone exercise. Graduates work in land conservation and management positions.
• **Urban Environment** – Students in this concentration, whether studying policy, humanities, or sciences, focus on urban areas. They may study urban brownfield remediation, urban education, community redevelopment or government administration. These students select their courses from MES courses, the Urban Studies Program, and City and Regional Planning. Graduates may work in municipal government or in urban institutions.

• **Individualized** – Occasionally a student’s interests do not fit within one of the above concentrations. Those students develop an individualized concentration under the supervision of a faculty advisor. This must be approved by the Program Director and the Faculty Curriculum Committee.

**Research Methods Course**

Each student must take a semester-long course in methods that will prepare them for the Capstone exercise. This may be done in one of several ways: a field methods course (i.e. ENVS 507, ENVS 606, ENVS 610, etc.); a statistics course; a GIS course; a disciplinary methods course (e.g., ethnography, epidemiology, etc.); or an independent study with emphasis on methods. At the end of the course, each student should have a clear idea of the methods appropriate for their selected capstone project. The student must produce a Capstone proposal that defines the planned Capstone project content and scope, identifies appropriate methods, selects a format and intended audience, and demonstrates sufficient background to undertake the exercise. This proposal must be completed and approved by the faculty committee before undertaking the Capstone project.

**Capstone Project**

The Capstone project is the culmination of an MES student’s graduate study. It reflects each student’s concentration and the coursework that prepared him/her to undertake the proposed Capstone project. Capstone projects may differ from traditional master’s theses. One central difference is that MES Capstone projects tend to be applied rather than basic research.

In the MES program the Capstone draws on methodology from the student’s area of concentration. While it is expected that each MES student have a good working familiarity with the literature in his/her field, the student’s knowledge of this literature need not be as exhaustive as for students writing Master’s theses or doctoral dissertations. Nor is it necessary that the work be publishable in a scholarly journal, although this is highly encouraged.

The Capstone is a requirement for completion of the MES degree and may be taken as a class (ENVS 699 Capstone Seminar), which carries one course unit of credit and reflects the equivalent of one semester of work. The Capstone length varies depending on the scope and format agreed upon by the student and the Capstone readers. Although there are no set guidelines for Capstone projects, there are two common approaches to completing the project. Each approach has some general guidelines.
• In the first approach, the Capstone is an extended research paper, based on primary and/or secondary sources, that demonstrates the student’s ability to understand and synthesize complex environmental problems. In this approach, the Capstone should reflect the student’s MES coursework, but may also build upon the student’s previous academic or professional experience.

• In the second approach, the Capstone is a professional report that serves as a portfolio of professional skills. For example, a student may prepare an environmental inventory of a specific site using GIS technology; another may develop a land management plan for a specific habitat; yet another may evaluate the state of current technology as applied to a specific environmental problem. In this approach, the student should supplement his/her writing with a short analytical piece that outlines the necessary components that comprise a professional report of the type presented and explain what decisions about format, audience and methodology were made and why.

A student completing the Capstone may take the Capstone course ENVS 699, which is offered through the MES Program. This course meets online and serves as a guide to planning and writing a Capstone project. In addition, the student’s Primary Capstone reader will work directly with the student on all technical aspects of the project.

In addition to the final written Capstone, students are also expected to create a poster detailing their work. These posters will be put on display at the end of the academic year for faculty and students to view. The Capstone student is not required to stand with the poster while it is on display. Poster creation and printing will be taught in ENVS 699-Capstone Seminar. Guidelines are also available on the Earth & Environmental Science Online Community. The EES Department has a poster printer, foam board, and easels available for final printing and display.

**The 12th course**

Most students choose to take ENVS 699 Capstone Seminar for their 12th course. This course allows the student to maintain a full time status while working on their capstone project. Students who choose ENVS 699 for their 12th course have access to a writing advisor in addition to their capstone reader and can focus fully on their project. However, the 12th course may be filled by taking an additional course in the student’s concentration or an additional foundation course to fill a gap in the student’s knowledge. Students should discuss the 12th course with their advisor early in their career.

**Field Courses**

Although not specifically required, students in the MES program are encouraged to take at least one field-based course while at the University of Pennsylvania. The MES has developed several field courses to meet the needs of our students.
These courses are designed not only to provide the content that our students need, but to fit with the schedules of working adults. Sample field courses include:

- **ENVS 610-Regional Field Ecology** - Over the course of six weekend field trips, students travel from the barrier islands along the Atlantic Ocean in southern New Jersey to the Pocono Mountains in northeastern Pennsylvania and visit representative sites of the diverse landscapes in the region along the way. At each site they study and consider interactions among geology, topography, hydrology, soils, vegetation, wildlife and disturbance. Students summarize field trip data in a weekly site report. In addition, evening class meetings provide the opportunity to review field trips and reports and preview upcoming trips. Six all-day field trips and one overnight trip are required.

- **ENVS 604-Conservation and Land Management** - Using protected lands in the Delaware Valley, this field-based course explores various strategies for open-space conservation and protection. In addition, students are introduced to land management techniques used on such sites to restore or preserve them in accordance with goals set for their use or protection. Emphasis is placed on developing skills in “reading the landscape” to determine conservation and restoration priorities. Students produce a site assessment report and/or field reports on sites that they visit.

- **ENVS 507-Wetlands** - The course focuses on the natural history of different wetland types including climate, geology, and, hydrology factors that influence wetland development. Associated soil, vegetation, and wildlife characteristics and key ecological processes will be covered as well. Lectures will be supplemented with weekend wetland trips, ranging from tidal salt marshes to non-tidal marshes, swamps, and glacial bogs in order to provide field experience in wetland identification, characterization, and functional assessment. Outside speakers will discuss issues in wetland seed bank ecology, federal regulation, and mitigation. Students will present a short paper on the ecology of a wetland animal and a longer term paper on a selected wetland topic. Readings from the text, assorted journal papers, government technical documents, and book excerpts will provide a broad overview of the multifaceted field of wetland study.

### III Program Policies

#### Academic Standards

Students in the MES are expected to maintain the highest possible academic standards. To assure that students are making satisfactory progress toward their degree, the academic advisors regularly review student performance. The Earth & Environmental Science Faculty Advisory Committee has adopted the following requirements for MES students as they progress toward their degrees:

- Students must take all courses that will count towards the MES degree requirements for a letter grade. Pass/Fail courses will not be counted toward
the degree. The letter grades of “S” or “U” also do not count toward the degree.

- Students must maintain a 3.0 cumulative average in order to be in good standing and to graduate.
- Students cannot receive more than one grade below a B-.
- No grade below a “C” will be accepted toward fulfillment of the 12 cu’s required to complete the program.

Students who receive more than one grade below a B- or who receive a grade below a C for a required course will be reviewed by the Earth & Environmental Science Faculty Committee and placed on academic probation.

With the permission of the Earth & Environmental Science Faculty Committee, students may take additional courses in order to increase their GPA or to fulfill requirements in courses where the student received a grade below a “C”. Students should work with the Program Director to develop an academic plan and facilitate student success; students will not be allowed to register for courses during their probation without an approved plan in place.

**Program Dismissal**

Students who do not meet the terms of academic probation are subject to dismissal from the program. At the end of each term, the Earth & Environmental Science Faculty Committee will review the academic progress made by candidates for academic dismissal and decide whether to remove the student from academic probation, continue academic probation, or dismiss the student from the Program. If the Committee decides that the student is unlikely to successfully complete their degree program, the student will be sent an academic dismissal letter via email and U.S. mail.

**Inactive Status**

Students who do not enroll in courses for four consecutive terms, including summer, will be considered inactive and will be automatically withdrawn from the program during the fourth term. Students who are withdrawn will be required to apply for readmission to the program. Standard application fees will apply.

**Incomplete Grades**

An incomplete grade indicates that a student has not completed all the work in a course and has done so with the instructor’s permission. An instructor who chooses to grant an extension to a student who has not completed a course by the end of the term may grant either an Incomplete (I) or an Extended Incomplete (II). An Incomplete must be made up within the first four weeks of the start of the next term, and an Extended Incomplete must be made up by the end of the next term (including the summer term). In either case, if the Incomplete is not made up by the deadline, it will become an F. An Incomplete is made up only when the official grade is received by the LPS Office and recorded by the Registrar’s office on the student’s official transcript. Once an Incomplete grade is converted to an F, the instructor may change the grade after the student has completed all required
work. Students with two or more Incomplete grades are subject to registration hold and are required to meet with the MES Director to explain the circumstances of the Incompletes and develop a plan to resolve them. Students with two or more outstanding grades of incomplete will not be allowed to register for courses; students with two or more outstanding grades of incomplete who have already registered will be dropped from courses.

**Academic Grievances**

Evaluation of a student's performance in a course is the responsibility of the course instructor. Should a final grade in a course be disputed, the student must submit a written appeal to the instructor within the first two weeks of the academic semester immediately following the semester in which the grade was received. The instructor must respond in writing to the student within two weeks of receiving the written appeal. If, after receiving the written response from the instructor, the student still believes that the grade has been unfairly assigned, the student must submit a written appeal to the EES Faculty Committee. If the Committee believes the appeal demonstrates evidence of negligence or discriminatory behavior, a sub-committee will be formed to review the student's appeal and make a recommendation to the full Academic Committee. The School of Arts & Sciences and the Provost’s Office have policies governing academic grievances. Students should consult these for additional information about the grievance procedure.

**SAS policy for graduate students' grievances:**  
https://www.sas.upenn.edu/graduate-division/resources/academic-grievance-procedure

**Penn Provost’s information on Academic Grievances:**  
http://provost.upenn.edu/policies/pennbook/2013/02/13/student-grievance-procedures

**Leave of Absence**

Students take time away from their studies for a wide variety of reasons that include:

- Manage a medical concern
- Fulfill a family obligation
- Pursue career-related opportunities
- Complete military service
- Work on a political campaign

While interrupting your studies to take time away may seem intimidating, a leave is a means to the successful completion of a degree, not a barrier to graduating. More than three quarters of students who take a leave return to complete their degree within two years.
If you are considering a leave, take time to think carefully about your goals for your time away and for when you return. Speaking with the MES program director is an important first step. Depending on your circumstances you should get advice from other sources as well. Students taking time away in order to manage a medical condition should discuss the leave with their healthcare provider. Your MES program director will help you connect with other campus resources as you prepare to take a leave of absence, such as Student Financial Services, Housing, and International Student and Scholar Services.

Students typically take a leave for a full academic year. Individual circumstances may require more or less time. Students on leave should remain in contact with their MES program director and update them about changes in plans. The return from leave process supports students in a successful re-entry to academic life at Penn. When preparing to return, students must consult their MES program director to develop a plan that includes connection with appropriate resources.

**Leave of absence policy and process:**

**Requesting a Leave of Absence:**

- Students must meet with the MES program director to discuss a leave request.
- The student must submit a written request for leave of absence, detailing the reasons for the desired leave.
- The leave request will be evaluated by the Program. If the request is approved, the Program will stipulate conditions that must be met by the student before returning from leave.
- The student will be notified with the result of the leave request. The Program may deny any request for leave. In granting leaves, the decision of the Program is final.
- A student on leave may not be enrolled in Penn classes and will not receive credit for classes taken elsewhere during the leave unless special approval by the Program is given. Students on leave may not live in University-owned housing during the term of their leave. In addition, a student may not participate in and/or hold a leadership position in a registered University organization.
- Discontinuance of study without permission from the University does not constitute a leave of absence. Students who have requested a leave of absence for a given semester may still be dropped from the University rolls if their previous term's grades qualify them for this action.

**Checklist: Leave of Absence or Withdrawal**

Once a leave of absence or withdrawal has been approved, or you have been dropped, that action will be posted to your transcript. Your PennCard will be deactivated as soon as the leave, drop, or withdrawal has been processed.
Notifications

Be sure to notify all relevant offices of your leave or drop. These offices may include the following, if applicable:

- Student Registration and Financial Services
- Housing and Conference Services
- International Student and Scholar Services (ISSS)
- Student Telephone Services
- Student Health Service
- Office of Student Conduct

While Out

During the term of your leave or drop, you may call the MES program office if you have any questions. Please be aware of the conditions for return outlined in your leave of absence letter, since you will be required to fulfill them before you may re-enroll.

Applying to Return

You must apply to return from leave by the relevant deadline (for the fall semester, July 15; for the spring semester, November 15; for the summer, April 15). At that time you must fill out a request to return from leave form and show that you have fulfilled all of the conditions for return as outlined in your original letter from the MES program. To begin this process, contact the MES program Director well in advance of the deadline. Any return request submitted to the program director later than the above deadlines may be denied. Timely submission of requests and documentation is a condition of all leave returns.

The standard length of a PLE/LPS leave of absence is one year. Students may request an early return from leave after one full semester on leave, but should bear in mind that this request may be denied.

Sub-matriculation

Undergraduate students in their junior year or before the end of their 7th semester at the University of Pennsylvania may apply for sub-matriculation into the MES. Second semester seniors are NOT eligible for this option. Sub-matriculation allows students to take graduate-level courses while still undergraduates, allowing most to complete their bachelor’s and master’s degrees in 5 years. Students should discuss sub-matriculation with the Director of the MES and their major advisor before starting the online application process.

Students sub-matriculated into the MES may double count up to 4 graduate level courses toward both their undergraduate and graduate degrees. These courses must be pre-approved by the student’s MES academic advisor and major advisor.
Four additional courses taken at Penn prior to sub-matriculation are eligible to be used toward completion of the degree requirements in the MES, if approved by the MES Director. Although these additional graduate-level courses are taken during the undergraduate career, they are not counted toward the undergraduate degree.

Students should obtain a “Request for Sub-matriculation Course Double Counting” form from the Online Community (found under “Forms”) to apply for course approval for double counting prior to taking the course. All College student requests for double counted courses must be made no later than 8 weeks into the student’s 8th semester at Penn. LPS students should contact the MES Office for deadlines specific to their program of study.

In addition, undergraduate sub-matriculates who have taken ENVS 200 Introduction to Environmental Analysis and received a B+ or better are not required to take ENVS 601 Proseminar. Students may substitute an additional foundation or concentration course to complete their 12 course units. Students should consult with their MES Academic Advisor to be sure the graduate level course is an acceptable substitute. Students with AP Transfer credit for ENVS 200 must take ENVS 601.

Additional information on sub-matriculation can be found on the College website (http://www.college.upenn.edu/degree-options-policy) and in the Dual Degree Handbook.

**Provisional status**

Many students seeking admission to the MES are returning to school after a long absence or have undergraduate records that do not accurately reflect their academic ability. Some of those applicants are accepted into the MES provisionally. Applicants accepted as provisional admits should adhere to the following procedure:

- Students must complete two graduate level courses at Penn in the MES program. One of the courses must be ENVS 601- Proseminar.
- Students must receive a grade of "B" or better in both courses
- If a student takes three courses in their first semester, all three courses must receive a “B” or better grade.
- Students may not receive an Incomplete (I, NR, GR) in any of these courses.
- Students must receive a favorable recommendation from the instructors in both courses.

Students who meet the above requirements will have their status changed to full admit status. If after two courses, students do not meet the requirements outlined above, students will not be allowed to continue in the MES program.
**Deferred Enrollment**

Students who are admitted to the MES may defer their matriculation for up to one year. Students who wish to defer should notify the MES office in writing of their intentions as early as possible. It is not necessary for deferred students to reapply. However, students must inform the MES program if they enroll at any other institution prior to their matriculation at Penn, and they must submit final official transcripts of any coursework completed prior to their first semester in the MES.

**Transfer Credit**

Students who enter the MES from Penn’s Post-Baccalaureate Undergraduate Studies or Non Traditional Graduate program may count *up to 4 graduate level* courses towards their MES degree. These courses must be submitted to the Faculty Advisory Committee for approval during the first semester of matriculation in the MES. Only courses appropriate to the student’s degree program will be considered for approval.

Students who enter the MES from another graduate program at the University of Pennsylvania for which they did not complete the program may count up to 4 graduate-level courses toward their MES degree. These courses must be submitted to the committee for approval during the first semester of matriculation in the MES program. Only courses appropriate to the student’s degree program will be considered for approval. Courses from completed degrees are not eligible for transfer.

Students who enter the MES from an incomplete graduate program at another university may *count up to 2 graduate-level* courses towards their MES degree. These courses must be submitted to the committee for approval during the first semester of matriculation in the MES program. Only courses appropriate to the student’s degree program will be considered for approval.

**Additional Notes:**

- Students may not transfer a course that they have taken as part of a completed degree program.
- No course taken as part of an undergraduate program may be transferred into the MES unless the student is a sub-matriculate.
- Transferred courses must have been taken in the last 5 years.

**Courses taken outside of the University of Pennsylvania during a student’s matriculation in the MES program are not eligible for transfer credit.**

**Financial Aid**

**Tuition Support**

MES students are not eligible for University-based fellowships, teaching or research assistantships, or scholarships. United States citizens or permanent
residents are eligible to apply for loans through Penn’s Office of Student Financial Services, [http://www.sfs.upenn.edu/](http://www.sfs.upenn.edu/). Full-time students (students taking 3 or more courses in a semester) are eligible for full loan support. Part-time students (students taking one or two courses in a semester) are eligible for partial loan support. International students are not eligible for loans through the University. Students can seek outside scholarship support. In the recent past MES students have received support from the following organizations (among others):

- Ford Foundation
- National Science Foundation
- Rotary International
- UNESCO
- US Environmental Protection Agency
- World Bank

**Research Support**

The MES program has limited funding available to support costs incurred during the conduct of student research. These funds are awarded on a competitive basis and are available for equipment and lab fees associated with the student’s research. Awards are typically on the order of a few hundred dollars. In addition, MES students may apply for funds to present their research at a conference or scientific meeting.

To be eligible for research funds through the MES program, students must identify an advisor who will work with them on the research project. Students with Incomplete (I) or unreported course grades (NR or GR) are not eligible for these funds. Proposals (including a detailed budget) are accepted on an ongoing basis. *Forms are available on the Online Community under “Forms.”*

Students applying for funds to cover expenses associated with an oral or poster presentation at a conference or meeting must submit a copy of the accepted abstract, the notice of acceptance of that abstract, and a budget of the costs associated with travel to the conference. *There are no deadlines for these requests, but students must submit materials at least 4 weeks prior to travel to allow for processing of such requests.*

**IV Designing Your Program**

**Student Advising**

Each student entering the MES will be assigned an academic advisor. That academic advisor will guide the student through the initial course registration and program introduction as well as throughout their academic career in the MES. Student’s will meet with their advisor during the 1st Year Retreat and define a plan for the remainder of their MES career.
Students should meet with their academic advisor at least once a semester (usually during Advance Registration) to discuss their program progress and choose courses for the following semester. Students should use the student planning worksheet available on Penn InTouch (https://portal.apps.upenn.edu/penn_portal/intouch/splash.html) as well as the plan developed at the Retreat to choose courses each semester and ensure that all degree requirements are fulfilled for graduation.

Course Selection

Prior to Advance Registration each semester approved lists of courses from the MES program and from other departments and schools at Penn will be posted on the Earth and Environmental Science Online Community. In addition, the University’s Course Register, which is available online at http://www.upenn.edu/registrar/register/index.html, provides course descriptions for many courses offered at Penn. Departmental web pages often include course descriptions as well. The Course Timetable appears in March and October and may be viewed online at http://www.upenn.edu/registrar/timetable. Finally, PennInTouch allows students to search for courses online using keyword searches. If a student selects a course that does not appear on the approved lists on the Earth & Environmental Science Online Community, they must seek approval from their advisor before registering as it may not be acceptable for the program.

V Course Registration Procedures

Advance Registration

The course registration process involves two registration periods. The first is Advance Registration during which students enter their requests for courses they wish to take. Students are encouraged to register during this period so that they have the best chance of getting into the courses they prefer. At the end of Advance Registration, a scheduling program processes all registration requests at the same time to determine who gets enrolled in the courses that have been requested. Students will then be able to view their courses online to see which courses they have actually been enrolled. Students may advance register during a two-week period starting in late March for the following summer and fall terms and during a two-week period in early November for the following spring term. Check the LPS website (http://www.sas.upenn.edu/lps/calendar) and/or the Registrar’s website for the exact dates for Advance Registration.

Registration

The regular registration add/drop period opens approximately three weeks after the advance registration request period has closed and students have been notified of their schedules. During the regular registration period students know immediately whether or not they will be able to enroll in the course they are requesting. Students may register for courses through Penn InTouch (on-line
registration). Registering through Penn InTouch requires the use of a personal computer and access to the web and is the only method of registration.

In order to access the system, students must have a PennKey. To establish a PennKey, go to http://www.upenn.edu/computing/pennkey/ and follow the steps there. [Note: A PennKey SetUp Code will be mailed to each new student’s home address to set up a PennKey.] The Penn InTouch web address is: https://portal.apps.upenn.edu/penn_portal/intouch/splash.html

Some important information to remember when registering for courses:

- Check with your academic advisor to be sure the course for which you are registering fulfills a requirement for your degree.
- Courses must be taken for a normal letter grade in order to count toward the MES degree. “Pass/Fail” or “Audit” are not acceptable options.
- Only courses numbered 400 and above (the first set of three digits after the course subject is the course number -- e.g., ENVS 420 001 but not ENVS 001 601 may count toward the degree.
- As a master’s student, permission may be needed from the instructor to register for some graduate courses in other departments or schools (permit procedures can be found on the Online Community under “Course Lists”).
- Full-time students should enroll in 3 or 4 courses. Students are not permitted to enroll in more than 4 courses per semester.
- Part-time students should enroll in 1 or 2 courses per semester.

Permits

Courses that require special permission from the department or instructor are indicated in the course timetable as “Permit Required.” Permits are obtained from the department offering the course and entered electronically into the Student Record System (SRS). A permit is not a registration. Students must “claim” the permit by actually enrolling in the course through Penn InTouch. After both advance registration and regular registration are complete, the Registrar’s Office removes unused permits from students’ records.

Independent Study Courses

Students interested in pursuing an individualized study project should obtain a “Request for Independent Study” form from the Earth & Environmental Science Online Community (under “Forms”). The student should then approach a faculty member and obtain agreement from them to direct their project. It is the responsibility of the student to define the individualized project. Students should not approach a faculty member and request that they define a project for the student. Students must obtain the appropriate signatures from their advisor and the Director of the MES program. Independent Study courses may not duplicate other courses offered during the same semester. Students should bear in mind that faculty members are not required to supervise an Independent Study course."
students may register for up to 2 Independent Study courses during their career. 

**NOTE: Internships cannot be counted for Independent Study credit.**

**Auditing Courses**

MES students may audit courses. However, they will be charged tuition and fees at the MES tuition level. Audited courses will appear on the student’s transcript, but no grade will be issued and the course will not count toward the 12 c.u.’s needed to complete the program. Most courses are open to auditors on a space-available basis.

**Registering for Non-MES Courses (also see “Permits”)**

MES students may register for graduate courses (numbered 400 or above) in other Penn departments and schools, if those courses are appropriate to the student’s program. Students should consult with their academic advisor to determine if the course is appropriate to their program before registering. MES students may need permission to register for courses outside the Department of Earth & Environmental Science. In such cases, students should consult the Permit Procedures document on the Online Community under “Course Lists”. Students wishing to take courses outside of EES may not be able to register until all students in the home department or school have had a chance to register. Permits will then be issued on a first-come-first-served basis. Students should be aware that Law School courses often begin the week before the official start of the semester. They should contact the Law School for the permit application, or visit the Earth & Environmental Science Online Community for a downloadable version of the application.

**Course Changes**

MES students are subject to LPS registration and drop/add deadlines which may be different than deadlines for other schools and departments. Students should consult the current LPS Course Guide or the LPS web site for deadline dates for making registration changes and for the corresponding financial obligations ([http://www.sas.upenn.edu/lps/calendar](http://www.sas.upenn.edu/lps/calendar)). Students are able to make these changes in Penn InTouch. Adherence to LPS deadlines is strictly observed. Should students need to drop or withdraw from a course beyond the deadline, they should petition LPS ([http://www.sas.upenn.edu/lps/students/current/forms-handbooks](http://www.sas.upenn.edu/lps/students/current/forms-handbooks)). It may be necessary to provide documentation of the situation that necessitates the drop or withdrawal, particularly if the student is requesting a refund of tuition.

**Adding a Course**

Students may add a new course through the second week of the term. After that it is not possible to add a course. Students may add a course during the first two weeks of the semester via Penn InTouch.
Dropping a Course

Students may drop a course with no financial obligation until the published Add/Drop deadline posted on the LPS Website (http://www.sas.upenn.edu/lps/about/academic-calendar) (approximately two weeks into the term). Students may also drop a course between the second and fourth weeks of the term, but in so doing they will incur a 50 percent financial obligation for the tuition and fees for the dropped course. Absence from class does not constitute a drop, nor does notifying the instructor. Students can officially drop a course through Penn InTouch through the second week of the term. After the second week of the semester, students must submit a Withdrawal Form to LPS. When making registration changes via Penn InTouch, it is always advisable to double check to make sure the changes have taken effect before logging-out. Students may also want to contact the MES department or their academic advisor to confirm that the dropped courses are no longer on their schedules. Students who fail to drop a course officially may receive a grade of F and will be required to pay the full tuition rate.

Changing Grade or Credit Status of a Course

All MES courses must be taken for a letter grade. However, students may register for courses that they do not want to count for their program on an audit or Pass/Fail basis. Before doing so, however, they should discuss this with their MES academic advisor. Once they have done so, students may change their status in a course from credit to audit, from a letter grade to Pass/Fail or from Pass/Fail to a letter grade until the published deadline on the LPS website (approximately four weeks into the term). No change is permissible after the published deadline. Auditors pay full tuition and fees.

Withdrawing from a Course

Students may withdraw from a course after the deadline to drop a course has passed (approximately four weeks into the term). To withdraw, students must submit a petition to the LPS office (http://www.sas.upenn.edu/lps/students/current/forms-handbooks). Normally, permission is granted and a W (withdrawal) is recorded on the transcript. After the published withdrawal deadline, students are permitted to withdraw only under extraordinary circumstances, which must be documented. Students who withdraw from a course have full financial obligation, except in documented cases of illness, military service, or other extraordinary circumstances, when they may petition for a 50 percent refund.

Note: Dropping a course is not identical with withdrawing from a course. Withdrawing from a course takes place after the sixth week of class and carries with it full financial obligation. In addition, the student’s transcript will read “W” (Withdrawal) next to the title of this course. However, if a student drops a course during the normal Add/Drop period, no record of that course will appear on the transcript and there is no financial obligation.
Master’s Thesis Registration

MES students who have completed all course work toward the degree, but have not completed their Capstone project, will be automatically enrolled in the non-credit Master’s Thesis course (ENVS 990) for every subsequent semester until the Capstone is complete. This includes summer semester, thus if a student does not complete their capstone in May, they will be automatically enrolled in Master’s Thesis in Summer 11 Week. If the capstone is not completed by August, the student will be automatically enrolled in Master’s Thesis for the Fall. The cost of thesis registration is less than the cost of a regular course and keeps the student status active. Students enrolled in Master’s Thesis have access to the library and maintain their Penn e-mail accounts. Should a student wish to extend Master’s Thesis registration beyond two semesters, they must receive permission from the MES Faculty Advisory Committee. Students not completing the program requirements after two semesters of Master’s Thesis may be withdrawn from the program.

Student Status

Students with Visa/Immigration restrictions and/or loan requirements should be aware of their student status. Students are considered full-time if they meet one of the following criteria:

- Student is enrolled in 3 or 4 courses in a single semester
- Student is enrolled in the Capstone course: ENVS 699.
- Student is enrolled in Master Thesis: ENVS 990.

If a student is enrolled in 2 or fewer courses in a single semester (other than Capstone or Master Thesis) they are considered part-time. Students who meet the requirements of a full time student are automatically enrolled in Penn’s student Health Insurance coverage unless the student shows proof of coverage through another source.

VI Capstone and Graduation Procedures

Faculty Readers

Two faculty readers are required for the Capstone Project: one designated as the primary reader and the other as the secondary reader. The primary reader will help the student compile the bibliography, suggest the research methods that should be employed in the Capstone, and ultimately approve both the proposal and the final Capstone Project. The secondary reader will evaluate drafts of the proposal and/or project, though they may also be involved in formulating the project. The primary reader must be an expert in the Capstone topic the secondary need not be.
Capstone faculty readers need not be members of the Penn standing faculty, and one reader may be drawn from outside of Arts and Sciences. However, they must be academically engaged in the student’s Capstone topic. Professors from local universities have served as Capstone readers, as have adjunct faculty members and lecturers. In general, students choose faculty readers from among the professors they have had within the MES program.

Students should attempt to identify a reader as early as possible in their academic career. If they are having difficulty identifying faculty readers, the MES academic advisors can recommend likely prospects among the faculty. However, it is the student’s responsibility to contact the potential readers and discuss their project in depth.

Registering for Capstone

Before a student begins the capstone project, a Capstone Project Proposal must be uploaded to the Online Community and an Online Form must be submitted. This proposal must be approved by the MES Faculty Committee prior to the student beginning their research work. **Final capstones submitted without prior approval of subject matter and approved readers, may not be accepted for completion of the degree requirements.**

Writing the Capstone

The Capstone may take one of two forms: an extended traditional academic research paper or a creative piece. For example, students may produce handbooks or create a film for their Capstone. If a student chooses to do a creative Capstone, they must write a brief analytical paper that places the creative piece in an academic context.

Details about what is expected for the Capstone proposal and project, including a timeline for completing the Capstone, are available on the Earth & Environmental Science Online Community in the “Guide to Completing the Capstone” document.

Forms

There are two online forms which need to be completed for the Capstone and Graduation. Links to these forms are available on the Earth & Environmental Science Online Community.

- **Graduation application** – This form should be filled out online at the beginning of the term in which the student intends to complete the program and graduate. The graduation application can be found here: [http://www.sas.upenn.edu/lps/students/current/graduation/application](http://www.sas.upenn.edu/lps/students/current/graduation/application)
- "**Request to begin Capstone**” Form: This is an online form in which the student lists their two readers, capstone title and other pertinent information. The link to this form can be found on your Online Community under “MES Capstone/MSAG Project Design.”
**Capstone Project Timetable and Deadlines**

It is never too early to begin thinking about a Capstone project topic and students are encouraged to discuss Capstone ideas with faculty, academic advisors, and the MES Director. Students should also tentatively select faculty readers as early as possible. Once they have identified both a topic and two readers who have agreed to serve on their Capstone committee, they should submit a request to begin form and upload their proposal to the Online Community. We recommend that students thoroughly read the “Guide to the Capstone” document for more information on selecting readers and writing the proposal. This Guide is available on the Online Community under “MES Capstone/MSAG Project Design.”

Table 2 indicates the deadlines for submitting the necessary forms. Refer to this table and the LPS Academic Calendar to determine when classes begin and end, as these dates change each term and every academic year.

**Table 2. Capstone and Graduation Timetable**

<table>
<thead>
<tr>
<th>Capstone Proposal uploaded to the Online Community</th>
<th>Last Day of Classes in the term prior to the term the student intends to begin the Capstone research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Request to begin</td>
<td>Last Day of Classes in the term prior to the term the student intends to begin the Capstone research</td>
</tr>
</tbody>
</table>
| Graduation Application                             | Spring Term: Feb 1  
|                                                   | Summer Term: June 1 (Feb 1 if you wish to participate in May Ceremony)  
|                                                   | Fall Term: Oct 1 |

**Incomplete Capstone Projects and Master’s Thesis Registration**

Students, who fail to complete their Capstone project by the final deadline, must remain active students in all subsequent terms in order to complete their MES program and graduate. In brief, the final Capstone product is due to the Capstone Readers approximately two weeks prior to the end of term (students should check with their readers to see if they will need additional time for grading) to permit the MES staff to process the grades and audit students for graduation. Any students who have not received two evaluations of their work by the deadline set for the semester for which they intend to graduate will be registered automatically for Master’s Thesis (ENVS 990) in the subsequent term and for each and every term thereafter (including summer) until the completed and approved Capstone is submitted to the MES Program.
In addition to the requirements for enrollment in each term during which students continue to work on the Capstone, graduation posting will also be affected. Students must reapply online for graduation in the term during which they plan to complete the Capstone. Thus if a student does not complete the capstone in the semester in which they originally applied, they must re-apply for graduation in the next semester. The student’s graduation date will be posted for the term in which they complete their capstone and receive a grade, not the term in which the student originally intended to graduate.

VII University Policies and Resources

The Pennbook is a collection of policies that relate to student life at the University of Pennsylvania. These policies govern academic activities such as grading and exams, provide guidance on the use of campus resources, and explain expectations for membership in the university community.

https://provost.upenn.edu/policies/pennbook

Enrollment Status

MES students who are enrolled for three or four courses per term are considered full-time students and will be billed the full general fee. This fee covers access to many of the services described below. MES students enrolled in one or two courses per term are considered part-time students. However, students enrolled in the MES Capstone (ENVS 699) or Master’s Thesis (ENVS 990) are considered full-time.

Student Identification

Once a student is enrolled at Penn, a student I.D. number (Penn I.D.) will be issued; this I.D. is used for registration and other transactions throughout the University. Never give out your social security number via email or fax. Once matriculated, students should never give out their entire social security number; the PennID number or the last four digits of your social security number are all that is necessary.

PennCard and PennCard Center

http://www.business-services.upenn.edu/penncard
2nd Floor of the Penn Bookstore, 36th & Walnut Streets

The PennCard is the official University of Pennsylvania identification for students, faculty, and staff. The PennCard provides access to University facilities, services, cash convenience and more. To obtain a PennCard, students should bring a valid form of photo ID (driver’s license, passport, etc.) to the PennCard Center. Only active students registered for courses in the current or upcoming term may receive a PennCard, which should be carried at all times on campus.
PennKey

http://www.upenn.edu/computing/pennkey/

A PennKey is required to authenticate, or verify, an individual’s identity for many of Penn’s networked computer systems and services. Authorized users need a PennKey and password to access such resources as Penn InTouch (course registration), Canvas (used in most classes/ https://canvas.upenn.edu), certain library resources, and public campus computers. A PennKey is also required to obtain a Penn email address. New students should receive either a letter or an email with information on how to create a PennKey and password within a few days of their admission to the MES.

Penn InTouch

https://medley.isc-seo.upenn.edu/penn_portal/intouch/splash.html

Penn InTouch provides secure access via the Internet to online course registration, class schedules, academic records, future academic planning, billing, financial aid application status and awards, address corrections and updates, and student health information. A PennKey is required to access Penn InTouch.

Email

http://www.sas.upenn.edu/computing/help/students/email

All students enrolled at the University of Pennsylvania are eligible for a Penn email address free of charge. Even if the student plans to use a non-Penn email account, they should also establish a Penn address. The MES program will send out program information to this address and also contact students with important information through this system. Course instructors will be given this address as well and will expect to contact students in this way. Should students wish, they may forward email from their Penn address to another account through Penn’s webmail site. Instructions on how to create and use a Penn email account are available through SAS Computing website above. Students can arrange to forward email from their Penn account to another account at this website.

Academic Support Services

Weingarten Learning Resources Center

3702 Spruce Street, Suite 300

Provides professional consultation services in skills such as academic reading, writing, study strategies, and time management. This academic support is provided through a variety of services and programs including the very popular series of study skills workshops offered at the beginning of each fall and spring
term for students. Consult their website for specific dates and times for these workshops or for more information.

**Access & Achievement Programs**  
http://www.upenn.edu/programs/acadsupport.php  
3820 Locust Walk  
215.898.0809

Offers individual and group tutoring, and mid-term and finals review sessions for all Penn students. The support services help students enhance learning in core academic subjects, manage their time, find financial aid and feel more confident about their abilities. Assistance and counseling are available on an individual basis. For information, consult the Academic Support Program at:

**Student Financial Services**  
http://www.sfs.upenn.edu/paying/paying-grad.htm  
100 of the Franklin Building at 3451 Walnut Street  
215.898.1988

Student financial aid, including applications and disbursement of money, are handled through Student Financial Services (SFS). Call or visit the website for deadlines and procedures.

**Penn Bookstore**  
http://upenn.bkstore.com/  
36th St. and Walnut St  
215.898.7595

The Penn Bookstore carries textbooks and trade books as well as stationery, art supplies, school supplies, gifts, and other items.

**Computer Connection**  
http://cms.business-services.upenn.edu/computerstore  
Second floor of the Penn Bookstore  
215.898.3282

Carries computers, software, and computer supplies at student rates.

**Note that many faculty members use the Pennsylvania Book Center, on 34th Street between Walnut and Sansom Streets, to order their courses' texts. 215.222.7600.**

**Career Counseling**  
http://www.vpul.upenn.edu/careerservices/connectwithus.php  
3718 Locust Walk  
215.898.7530

The University provides career counseling through the Career Services office. Career information specific to the MES program may be found at:  
http://www.vpul.upenn.edu/careerservices/careerfields/#environment.
**Computer Labs**
http://www.sas.upenn.edu/computing/teaching_resources/computer_labs

For a current list of computer labs on campus, along with a list of software installed and eligibility for usage.

**Computer Resource Center**
http://www.upenn.edu/computing/crc/general/location.html  215.898.9085
Suite 202 Sansom West (Grad Tower B), 3650 Chestnut Street

The Computer Resource Center (CRC) offers advice, training, consulting services and computer support to Penn students. Students will need their PennCard for access to the building.

**Libraries**
http://www.library.upenn.edu/
3420 Walnut Street (entrance on College Green)

Van Pelt Library, the main University library has extensive holdings, computers, and the Weigle Information Commons.

**Writing Center**
http://www.writing.upenn.edu/critical/  215.573.2729
Weigle Information Commons at Van Pelt Library

The Writing Center provides free writing consultation by appointment at Weigle Information Commons. Appointments are made online.

**Recreation Facilities**
http://www.upenn.edu/recreation/  215.898.6100

MES students have access to all of the recreation facilities available to the University community. For information on fees, hours, programs, locker rentals, etc. see website above.

**Office of the University Ombudsman**
http://www.upenn.edu/ombudsman  215.898.8261

The Office of the Ombudsman assists individuals in finding solutions to problems that they may not be able to resolve through normal channels. The office is concerned with safeguarding individual rights and promoting better channels of communication throughout the University. It is independent of all administrative offices. The Ombudsman is not an advocate for any one individual or group. He or she is an advocate for fairness, adherence to University regulations, due process, and personal responsibility. The Office supplements, but does not replace, any existing grievance mechanisms or modes
of redress. It can and does recommend changes in the existing rules and practices when necessary.

**Student Health Information**

http://www.upenn.edu/shs 215-662-2850

The university has a number of health-related requirements for students. These include completion and submission of health and immunization records, coverage for outpatient medical care through the Student Health Service (SHS) and maintenance of health insurance coverage for in-patient and catastrophic care. Students are advised to call SHS or consult their web site for the most accurate and up-to-date information on student health requirements.

**Student Health Service**

http://www.upenn.edu/shs 215.746.3535
3535 Market St, 1st floor

The University provides outpatient medical care to students through its Student Health Service. The SHS offers an array of clinical services, including initial and follow-up treatment of acute medical illness and injury, management of chronic health problems, health screening and preventive care. All full-time students must carry coverage for care at the Student Health Service, either through payment of the Clinical Fee or through enrollment in the Penn Student Insurance Plan (PSIP). Full-time students who have private or employer-sponsored insurance do not have to purchase the student plan, but they must still pay the clinical fee for coverage at the Student Health Service. Coverage for the Student Health Service (either through the clinical fee or through enrollment in PSIP) is optional for part-time students. Be sure to bring your PennCard and insurance information whenever you go for medical care. For hours and other information refer to the Student Health web site.

**Student Health Insurance**

The University requires all full-time students to maintain medical insurance with coverage for in-patient care and catastrophic illness and injury. Students may satisfy insurance requirements through private or employer-sponsored plans or through enrollment in PSIP. All full-time students must either enroll in PSIP or submit a waiver indicating alternative coverage. Students who fail to provide information about coverage will be enrolled and billed for PSIP. Part-time students may enroll voluntarily in PSIP, but they are not subject to the insurance requirement, and will not be enrolled by default in PSIP. Coverage for the Student Health Service (either through the Clinical Fee or through enrollment in PSIP) is optional for part-time students.

**Immunization**

Students enrolled in the MES are part of the University community and benefit from the University’s efforts to provide a safe and healthy environment. All MES students are required to comply with immunization requirements upon first enrolling in credit courses.
To comply, students should complete a Pre-Matriculation Health Record obtained from the Student Health Service. Please note: Students born on or before January 1, 1957 are exempt from the above requirements. The Student Health Service can provide missing immunizations at a fee that covers costs. In the event of an outbreak of a communicable disease in any Penn class, all students in that class would be required to comply immediately with the University’s immunization requirements. Contact the Immunization Coordinator at 215.349.5047 for more information.

**Code of Conduct and Code of Academic Integrity**

Provost’s Code of Academic Integrity:
https://provost.upenn.edu/policies/pennbook/2013/02/13/code-of-academic-integrity

Provost’s Code of student conduct:
https://provost.upenn.edu/policies/pennbook/2013/02/15/code-of-student-conduct

Student Guide to Academic Integrity:
http://www.upenn.edu/academicintegrity/

Inasmuch as the standing of an educational institution and the value of a degree from that institution are dependent upon the integrity of study and research carried on at that institution, the Code of Academic Integrity is drawn to make clear the policy of the University concerning academic honesty. Each student attending the University must abide by this code, the text of which appears in the Pennbook and is found at the website above.

**Confidentiality of Student Records**

https://provost.upenn.edu/policies/pennbook/2013/02/13/confidentiality-of-student-records

Pursuant to the Family Educational Rights and Privacy Act of 1974, as amended, in general, personally identifiable information can be disclosed to people outside the University only with the written consent of the student or alumnus/na involved. A statement setting forth specific University policy concerning (1) disclosure of information to people outside the University, (2) disclosure of information to people within the University, (3) permitting students to inspect and review records and (4) providing students with the opportunity to seek the correction of their records appears in the Pennbook and is found at the website above.
Nondiscrimination Policy

www.upenn.edu/affirm-action

3600 Chestnut Street, Sansom Place East, Suite 228

The University of Pennsylvania values diversity and seeks talented students, faculty and staff from diverse backgrounds. The University does not discriminate on the basis of race, color, sex, sexual orientation, religion, national or ethnic origin, age, disability or status as a disabled or Vietnam Era veteran in the administration of its educational policies, programs, or activities, admissions policies and procedures, scholarship and loan programs, employment, recreational athletic or other University administered programs. Questions or concerns regarding the University’s equal opportunity and affirmative action programs and activities or accommodations for people with disabilities should be directed to the Director of Affirmative Action.

Also see:
https://provost.upenn.edu/policies/pennbook/2013/02/13/student-grievance-procedures
Equal Opportunity and Affirmative Action Policy:
https://provost.upenn.edu/policies/pennbook/2013/02/13/equal-opportunity-and-affirmative-action-policy

Rules Governing Exams

Provost’s Policy on Common Midterm Examinations:
https://provost.upenn.edu/policies/pennbook/2013/02/13/policy-on-common-midterm-examinations
Rules Governing Final Examinations:
https://provost.upenn.edu/policies/pennbook/2013/02/13/rules-governing-final-examinations

Holidays

Provost’s Policy on secular and religious holidays:
https://provost.upenn.edu/policies/pennbook/2013/02/13/policy-on-secular-and-religious-holidays

The University observes the following holidays: Martin Luther King, Jr. Day, Memorial Day, Independence Day, Labor Day, Thanksgiving and the day after, and New Year’s Day.

The University also recognizes that there are several religious holidays that affect large numbers of University community members, including Christmas, Rosh Hashanah, Yom Kippur, the first two days of Passover and Good Friday. In consideration of their significance for many students, no examinations may be given and no assigned work may be required on these days. Students who observe these holidays will be given an opportunity to make up missed work in both laboratories and lecture courses. If an examination is given on the first
class day after one of these holidays, it must not cover material introduced in
class on that holiday.

Student Responsibility
While advisors, faculty, and staff will assist the student in every aspect of their
graduate study, it is the responsibility of the student to ensure that all steps and
necessary paperwork have been completed and submitted to the Program
Director and or LPS as appropriate. Grant proposals, awards, accepted
publications and other records of achievement should also be submitted to the
Director.

Office of Student Conduct
http://www.upenn.edu/osc/ 215.898.5651
207 Duhring Wing, 236 S. 34th Street

The Office of Student Conduct (OSC) is responsible for acting on behalf of the
University in matters of student discipline. OSC deals with alleged instances of
academic dishonesty and other student misconduct, in order to determine how
best to resolve these allegations consistent with the goals and mission of the
University as an educational and intellectual community.

Mission
It is the purpose of the student disciplinary system to further the educational
mission of the University by resolving alleged violations of the Code of Student
Conduct, the Code of Academic Integrity and other applicable policies
regarding student behavior. There are numerous ways complaints about alleged
student misconduct can be resolved. These include the formal disciplinary
process as outlined in the Charter of the Student Disciplinary System, referral to
the University Mediation Program, and referral to other University resource
offices.

The Office of Student Conduct at Penn has twin goals: to help create a safe
environment where academic life can flourish; and to promote the development
of students.

Our student disciplinary process is meant to set the standard for behavior on our
campus and to determine a student's standing in the community. It is not meant
to replace or substitute for the criminal justice system or other legal avenues.
However, the student disciplinary process provides an important additional
forum to respond to the interests of the Penn community. Our processes are
designed to educate and, where appropriate, sanction those students who violate
our rules. We seek both to promote a student's sense of responsibility by
enforcing accountability, and to protect our community by, where necessary,
removing or restricting those who may pose a threat to others.

Finally, our Mediation Program is available to everyone in the Penn community
to facilitate the constructive resolution of disputes (excluding academic integrity
complaints). Our intention is to emphasize the peaceful and productive handling of conflict when possible and where appropriate.

**Student Codes of Conduct Enforced**

In addition to the Code of Academic Conduct, Penn students are expected to adhere to the provisions of all other codes as well. More information on these codes is available at the above link. They are:

* Code of Student Conduct
* Code of Academic Integrity
* Policy on Acceptable Use of Electronic Resources
* Guidelines on Open Expression
* Acquaintance Rape and Sexual Violence Policy
* Sexual Harassment Policy
* Anti-hazing Policy
* Alcohol and Drug Policy
* Bicycle Policy

*The Student Disciplinary System does not handle alleged violations of the University's parking regulations*.

**Counseling and Psychological Services**


3624 Market Street, First Floor, West

CAPS provides professional psychological and psychiatric services to all Penn students who need help in dealing with academic stress, social difficulties, situational crises, managing personal problems, developing greater self-awareness and skills for life-long learning. Students presenting with more serious concerns like depression, anxiety, and eating disorders, among others, are seen as well. Licensed psychologists, psychiatrists, and social workers provide confidential short term psychotherapy for individuals, group counseling, emergency crisis services, medication evaluations, workshops, career assessments/development counseling, and referrals free of charge.

**Office of Alcohol and Other Drug Initiatives**

[www.vpul.upenn.edu/alcohol/](http://www.vpul.upenn.edu/alcohol/) 215.573.3525

3611 Locust Walk

This office seeks to identify methods to reduce substance abuse and violence, control and mitigate campus environments where potential abusive behavior exists, and foster a campus culture in which healthy living efforts are plentiful and successful.
Student Disability Services (SDS)  
www.vpul.upenn.edu/lrc  
215.573.9235 or TDD 215.746.6320  
(click on Student Disabilities)  
Stouffer Commons, 3702 Spruce Street, Suite 300

The Weingarten Learning Resources Center houses the Office of Student Disabilities Services (SDS), which provides comprehensive professional services and programs for students with disabilities to ensure equal academic opportunities and participation in University-sponsored programs. Reasonable accommodation to a qualified student’s known disability may be provided to assure equal access. Penn invites students with disabilities to self-identify at any time during their course of study as enrolled students. Although the self-identification process is confidential and completely voluntary, it is required for those requesting accommodation.

Office of Student Affairs  
osa@dolphin.upenn.edu/  
215.898.6533

The Office of Student Affairs, a department within the Division of University Life, serves as a primary source of information and advice about co-curricular opportunities and resources. Staff members assist students in becoming involved in campus life, conduct leadership development programs, provide continuity for organizations from year to year, manage organizational finances, educate students about University policies, mediate disputes, advise event planners, and help students put classroom learning into practice through the techniques of experiential education. A full list of services provided by the Office is available.

The Office of Student Affairs seeks to provide a range of co-curricular experiences designed to supplement students’ classroom experience and contribute significantly to their personal development. Staff members encourage students to create and participate in intellectual, artistic, social, recreational and multicultural activities; to assume campus leadership and governance responsibilities; to develop positive interpersonal relationships and skills within groups; to explore different cultures, ideas and experiences; and to put their learning into practice in the laboratory of co-curricular programs. Staff members support students through various forms of advocacy, through the encouragement of proactive approaches to campus problems and concerns, and through a commitment to the creation of a Penn community.

OSA provides information on student organizations categorized as follows. Students can learn more by visiting their website.

- Academic and Educational
- Cultural and Support
- Environmental Organizations
- Governmental and Umbrella
- Hobbies and Recreation
- Honor Societies
- Performing Arts
Penn Violence Prevention (PVP)

https://secure.www.upenn.edu/vpul/pvp/

The University of Pennsylvania is committed to the safety of all students, and is at the forefront of handling cases involving sexual violence, relationship violence, and stalking. The Penn Violence Prevention (PVP) is a collaborative program that grew out of the Penn Women’s Center. PVP aims to engage the Penn community in the prevention of sexual violence, relationship violence, and stalking on campus. The goal is to not only ensure students have access to safe and effective resources, but to provide preventative education focused on building healthy relationships, understanding consent, reaching out to friends in need, and being an active bystander.

Please go to the following links for specific concerns or issues.

Sexual Violence, Relationship Violence, and Stalking Policy:

https://provost.upenn.edu/policies/pennbook/2013/02/15/sexual-violence-relationship-violence-and-stalking-policy

Student disciplinary procedures for resolving complaints of sexual assault, sexual violence, relationship violence and stalking:


Sexual Harassment Policy:

https://provost.upenn.edu/policies/pennbook/2013/02/15/sexual-harassment-policy
Appendix

MES COURSE LIST

NOTE: This is a comprehensive list of courses offered in Earth & Environmental Science as of 7.1.2015 that may be taken to fulfill Foundation and Concentration requirements in the MES curriculum. Be aware that new courses are being offered all the time and some courses are being discontinued due to faculty availability. Please consult the latest course lists each semester for the most up to date lists.

The parentheses indicate which sector the course fulfills and the brackets indicate the semester when the course is typically offered. Not all courses are offered every year. Check current course listings for which courses are offered each semester. Some courses may fulfill more than one Foundation or Concentration sector and may also fulfill the Research Methods requirement in some cases. Check with your academic advisor for these alternatives.

ENVS 404 Urban Environments: Speaking About Lead in West Philadelphia (Env. Health) [Fall]

Lead poisoning can cause learning disabilities, impaired hearing, behavioral problems, and at very high levels, seizures, coma and even death. Children up to the age of six are especially at risk because of their developing systems; they often ingest lead chips and dust while playing in their home and yards.

In ENVS 404, students learn about the epidemiology of lead poisoning, the pathways of exposure, and methods for community outreach and education. Penn students collaborate with middle school and high school teachers in West Philadelphia to engage middle school children in exercises that apply environmental research relating to lead poisoning to their homes and neighborhoods.

ENVS 406 Community Based Environmental Health (Env. Health) [Spring]

From the fall of the Roman Empire to Love Canal to the epidemics of asthma, childhood obesity and lead poisoning in West Philadelphia, the impact of the environment on health has been a continuous challenge to society. The environment can affect people's health more strongly than biological factors, medical care and lifestyle. The water we drink, the food we eat, the air we breathe, and the neighborhood we live in are all components of the environment that impact our health. Some estimates, based on morbidity and mortality statistics, indicate that the impact of the environment on health is as high as 80%. These impacts are particularly significant in urban areas like West Philadelphia. Over the last 20 years, the field of environmental health has matured and expanded to become one of the most comprehensive and humanly
relevant disciplines in science.

This course will examine not only the toxicity of physical agents, but also the effects on human health of lifestyle, social and economic factors, and the built environment. Topics include cancer clusters, water borne diseases, radon and lung cancer, lead poisoning, environmental tobacco smoke, respiratory diseases and obesity. Students will research the health impacts of classic industrial pollution case studies in the US. Class discussions will also include risk communication, community outreach and education, access to health care and impact on vulnerable populations. Each student will have the opportunity to focus on Public Health, Environmental Protection, Public Policy, and Environmental Education issues as they discuss approaches to mitigating environmental health risks.

This seminar will consist of lectures, guest speakers, readings, student presentations, discussions, research, and community service. The students will have two small research assignments including an Environmental and Health Policy Analysis and an Industrial Pollution Case Study Analysis. Both assignments will include class presentations. The major research assignment for the course will be a problem-oriented research paper and presentation on a topic related to community-based environmental health selected by the student. In this paper, the student must also devise practical recommendations for the problem based on their research.

ENVS 407 Urban Environments: Prevention of Tobacco Smoking in Adolescents (Env Health) [Spring]

This course will examine the short and long term physiological effects of smoking, social influences, the effectiveness of cessation programs, tobacco advocacy and the impact of the tobacco settlement. Penn Students will work with middle school students on a campaign to prevent addiction to tobacco.

ENVS 408 Urban Environments: The Urban Asthma Epidemic (Env. Health) [Fall]

This course will examine the epidemiology of asthma, the potential causes of asthma, the public health issues and environmental triggers. Penn students will collaborate with the Children's Hospital's clinical research study - Community Asthma Prevention Program. Students will conduct environmental triggers classes in the community.

ENVS 410 Clean Water Green Cities (Urban Env or Resource Mgmt) [Fall]

This course will provide an overview of the cross-disciplinary fields of civil engineering, environmental sciences, urban hydrology, landscape architecture, green building, public outreach and politics. Students will be expected to conduct field investigations, review scientific data and create indicator reports, working with stakeholders and presenting the results at an annual symposium. There is no metaphor like water itself to describe the cumulative effects of our practices, with
every upstream action having an impact downstream. In our urban environment, too often we find degraded streams filled with trash, silt, weeds and dilapidated structures. The water may look clean, but is it? We blame others, but the condition of the creeks is directly related to how we manage our water resources and our land. In cities, these resources are often our homes, our streets and our communities. This course will define the current issues of the urban ecosystem and how we move toward managing this system in a sustainable manner. We will gain an understanding of the dynamic, reciprocal relationship between practices in a watershed and its waterfront. Topics discussed include: drinking water quality and protection, green infrastructure, urban impacts of climate change, watershed monitoring, public education, creating strategies and more.

**ENVS 494 Sustainable Initiatives in Higher Education (Urban Env. Or Sustainability) [Fall]**

In a February 5, 2007 press release President Amy Gutmann stated that Penn will develop a "comprehensive sustainability plan by 2009. This includes completing a comprehensive inventory of all its greenhouse gas emissions; purchasing at least 15 percent of its electricity from renewable sources; adopting an energy efficient appliance purchasing program; committing to a policy that new construction be built to the US Green Building Council LEED Silver standards, or equivalent; and providing access to public transit for faculty, students, and staff." This course will examine Penn's "environmental footprint", what is being done to reduce this footprint, and present ideas for further improvements. The students will build on the work of others, document existing efforts, and benchmark against other universities. The course will explore the issues mentioned above and will also address issues such as storm water management, the greening of campus, and leadership in the nearby community. The students will establish baseline data and measurement strategies so that success can be measured, and then will develop strategies to collect and analyze additional data. Included in the course will be the concepts of environmental management systems, secondary impacts [eg, commuting habits of Penn employees], pollution prevention, and life-cycle analysis. Each student or group of students will select an area of focus for their research exercise [eg, energy, recycling, green buildings] and develop a report that can be used by the Penn administration to advance Penn's efforts toward sustainability. The students will also develop a cumulative class report summarizing their ideas for improvement. This report will be delivered the President's Office.

**ENVS 507 Wetlands (Env. Biology) [Fall]**

The course will focus on the natural history of different wetland types including the factors of climate, geology, and hydrology which influence wetland development and associated soil, vegetation, and wildlife characteristics and key ecological processes. Lectures will be supplemented with weekend trips to different wetland types ranging from tidal salt marshes to non-tidal marshes, swamps, and glacial bogs in order to provide field experience in wetland identification, characterization, and functional assessment. Outside speakers will discuss issues in wetland seed bank ecology, federal regulation, and mitigation. Students will present a short paper on the ecology
of a wetland animal and a longer term paper on a selected wetland topic. Readings from the text, assorted journal papers, government technical documents, and book excerpts will provide a broad overview of the multifaceted field of wetland study.

**ENVS 541 Modeling Geographic Objects (Resource Management) [Fall]**

This course offers a broad and practical introduction to the acquisition, storage, retrieval, maintenance, use, and presentation of digital cartographic data with both image and drawing based geographic information systems (GIS) for a variety of environmental science, planning, and management applications. Its major objectives are to provide the training necessary to make productive use of at least two well-known software packages, and to establish the conceptual foundation on which to build further skills and knowledge in late practice.

**ENVS 601 Proseminar (Required Course) [Spring & Fall]**

A detailed, comprehensive investigation of selected environmental problems. This is the first course taken by students entering the Masters of Environmental Studies Program.

This course does not fulfill any requirement in the undergraduate Environmental Studies Major or Minor.

**ENVS 604 Conservation and Land Management (Resource Management) [Summer]**

Using protected lands in the Delaware Valley, this field-based course will explore various strategies for open space conservation and protection. In addition, students will be introduced to land management techniques used on such sites to restore or preserve them in accordance with goals set for their use or protection. Emphasis will be placed on developing skills in “reading the landscape” to determine conservation and restoration priorities. Students will produce a site assessment report and/or field reports on sites that they visit, and a final paper.

**ENVS 605 Assessment and Remediation of the Environment Using Biological Organisms. (Env. Biology)**

This course is an introduction to current and developing techniques for analyzing environmental contamination and remediation of damaged environments. Knowledge of these options will be important for both students interested in policy/law options, as well as providing a starting point for those pursuing a more science-oriented understanding of environmental issues. The first portion of the course will address bioindicators—the use of living systems to assess environmental contamination. Many new methods of rapidly-analyzing environmental samples are becoming available. These include systems ranging from biochemical assays to monitoring of whole organisms or ecosystems, as well as techniques ranging from laboratory to field and satellite surveys. The course will survey these approaches to familiarize the student with this rapidly developing field. The second portion of the course will introduce techniques for bioremediation—the use of living organisms to restore contaminated
environments. Several case studies will be provided (perhaps with external speakers). Students will be expected to prepare a final paper examining a particular technique in detail.

**ENVS 606 Ornithology (Resource Mgmt. or Env Biology) [Fall]**

This class will explore the foundations of avifaunal biology and ecology using a combination of hands-on classroom and in-the-field experiences. Classroom content includes physiology, anatomy, and morphology of birds. The fall migration of birds in North America is an epic and often tragic event. Sampling birds in migration has resulted in foundational understandings about stopover habitats, species-specific energy budgets and has helped realize the complete life cycle of hundreds of species. We will enter the field and participate in actual ornithological research, explore avifaunal ecology through birdwatching, and meet with regional leaders in the ornithological field.

**ENVS 607 Field Study of Puerto Rico’s Ecology (Env. Biology or Resource Mgmt) [Spring]**

Puerto Rico has a varied climate, geology, and topography that combine with periodic disturbance from earthquakes, landslides, hurricanes, floods, and the occasional tsunami (such as 1918 Puerto Rico Tsunami) to produce a rich diversity of ecological systems (see Miller and Lugo, 2009). Human use of the island’s mineral and biological resources together with agricultural production, military operations, industrial, commercial, and residential development and tourism have greatly reduced the area of intact systems and put pressure on surviving remnants. Fortunately, there are protected natural areas (see map by Gould et al., 2011) that provide the opportunity to observe and come to understand important ecological patterns and processes of tropical areas.

The course will include regular classes leading up to the trip over spring break during which we will review the literature and learn from Penn researchers about the ecological systems of the island, especially in the Luquillo Experimental Forest (see Harris et al., 2012). Students will work collaboratively on a specific system or location that we will visit and present to the class before we leave. Upon our return, students will work individually on a research topic of interest related to the field trip and present findings and analysis in class and in a paper.

**ENVS 609 Creating Gateways to the Land with Smarter Conservation (Env. Biology or Resource Mgmt) [Fall]**

Conservationists were long accused of ignoring the needs of human communities. Indeed land preservation has often been thought of as protecting land from people. Now, the conservation movement is embracing a different view—protecting land with and for people. As a result innovative programs have been developed that connect people to nature, thereby helping to facilitate land conservation. This interdisciplinary course will integrate concepts in scientific method, study design, ecology, and conservation with a focus on birds in order to
foster an understanding of how research can inform management of wildlife populations and communities. Topics will include wildlife management, habitat restoration, geographical information systems (GIS), sustainable agriculture, integrated land-use management, and vegetation analysis. This course will also provide opportunities for field research and application of techniques learned in the classroom.

**ENVS 610 Regional Field Ecology (Env. Biology) [Summer]**

Over the course of six Saturday field trips, we will travel from the barrier islands along the Atlantic Ocean in southern New Jersey to the Pocono Mountains in northeastern Pennsylvania and visit representative sites of the diverse landscapes in the region along the way. At each site we will study and consider interactions between geology, topography, hydrology, soils, vegetation, wildlife, and disturbance. Students will summarize field trip data in a weekly site report. Evening class meetings will provide the opportunity to review field trips and reports and preview upcoming trips. Six all-day Saturday field trips are required.

**ENVS 611 Environmental Law (Foundation-Env.Law) [Fall]**

This course will provide an introduction to environmental law and the legal process by which environmental laws are implemented and enforced. The course will examine the common law roots of environmental regulation in tort principles such as nuisance, negligence and trespass. We will examine important Constitutional principles in substantive and procedural law as well as significant environmental laws and approaches. Finally, we will examine emerging theories of citizen's rights and the government's role in environmental law and regulation. Students will learn how to read and analyze course decisions and apply some of the elements of legal thinking to actual cases and current problems.

**ENVS 616 Risk Assessment: Science & Policy Challenges (Env Policy) [Fall]**

How do government policy-makers make decisions about potential threats to human health and the environment in the face of scientific uncertainty? The course develops the concept of Risk Assessment from the publication of 1983 National Research Council (NRC) report commonly known as the “Red Book” which was used to rank the initial hazardous waste sites under the Superfund program. Using a variety of teaching tools, including lectures, panel discussions, and case studies, the course examines how public policy decisions regarding environmental risk are made and how effective those decisions are at reducing risks to affected populations. The course focuses on the complex interaction of science, economics, politics, laws, and regulations in dealing with environmental and public health risks. The course will begin with a review of the policy process and methods used in evaluating human health and environmental risks, including the traditional steps in the risk assessment process, including quantitative and qualitative aspects of hazard identification, dose-response assessment, exposure assessment, and risk characterization. The course will then focus on how scientific uncertainty, risk perceptions, socio-economic disparities, risk communication, and politics influence environmental risk-based decision-
making. Issues such as special populations (e.g., children, elderly, immune-compromised, woman of pregnancy age, etc.) must be considered when developing risk reduction strategies. The use of the “precautionary principle” will be discussed in the context of different types of environmental stressors (e.g., pesticides, chemicals, climate change, air pollution, water quality, and land use) and how this important controversial principle is applied differently in contrasting national and European risk management policies.

ENVS 617 Innovative Environmental Management Strategies (Env. Policy) [Spring]

This course will evaluate innovative environmental management strategies used by corporations, governments, the public, and NGOs including approaches such as the concept of pollution prevention, environmental management systems, green buildings, green product design, product labeling, environmental education, the power of information, market-based techniques, and industrial ecology. Some professionals believe that these innovative approaches have the potential to result in more environmental improvement than will be realized by additional regulatory requirements. This course will address which approaches work best and identify critical elements needed to ensure the best approaches to specific problems. Students will be exposed to real-life situations through expert guest lecturers, case studies, and "hands on" projects.

ENVS 622 Environmental Enforcement (Environmental Policy) [Fall]

The goal of the course is to provide students with an introduction to the role of enforcement in federal, state and local environmental regulatory programs. Emphasis will be placed on federal enforcement actions initiated by the U.S. Environmental Protection Agency and U.S. Department of Justice. The course will provide students with an introduction to the American Legal System and legal concepts, like standing, jurisdiction, and burden of proof. A number of case studies and classroom exercises will be utilized as part of the discussion of civil and criminal enforcement actions. For example, a detailed case study will be presented concerning a successful prosecution by the federal government of a wastewater treatment plant operator (from the receipt of the initial tip through the sentencing of the defendant). A theme of all classes, presentations and assignments will be the role of the environmental professional in the enforcement context (e.g., the environmental professional who testifies as an expert in a judicial proceeding, or performs an audit that becomes the subject of a self-disclosure to EPA).

ENVS 624 NEPA: America’s National Charter for Environmental Protection (Env Policy) [Fall]

This course explores the history of the federal statute that is the National Environmental Policy Act (NEPA) and its implementation through the regulations of the Council on Environmental Quality. It describes the circumstances that trigger NEPA compliance and provides an overview of the environmental process, including the integration of social, environmental, and economic factors within the framework.
of existing laws, regulations, policies, and guidance for project decisions. It examines
the components of the NEPA process, including purpose and need, scoping,
alternatives development and analysis, impact analysis, public involvement,
interagency coordination, mitigation, and documentation. The course will touch on
practical processes that are involved in preparing and reviewing NEPA documents,
cumulative effects assessments, and technical issues such as impacts on threatened or
endangered species, wetlands, national historic preservation activities, environmental
justice communities, etc. Case studies involving multiple governmental entities and
nongovernmental stakeholders will be examined to highlight the essential steps and
components needed to design, implement, and participate effectively in a
collaborative NEPA process.

**ENVS 626 History & Science of Climate Change (Env Geology) [Summer]**

This course will provide an understanding of the Earth’s climate system and how and
why this has changed through time. The emphasis will be placed on spatial and
temporal scales in the modern system while exploring the evidence for past change,
possible mechanisms to explain these changes, and the implications of these changes
to past, present, and future global climate. Students will learn to reconstruct the
history and scales of climate change through the use of proxies; understand the
mechanisms that act to drive climate change; show an understanding of the long-term
natural climate variability on a global and regional scale; understand the importance
of natural environmental change, against which to assess human impacts, recent
climate change and issues of future environmental change.

**ENVS 629 The US Water Industry in the 21st Century (Env Policy)[Spring]**

This course is taught by the Philadelphia Water Commissioner, the CEO of a $1
billion water, wastewater and stormwater utility. The objective of the course is to
expose the student to the inner workings and management of the US water industry
and the transformation of this industry to a 21st-century sustainable utility model.
Influences from new technologies and aging infrastructure, acceptable levels of risk,
public and private sector competition, climate change, the bottled water industry,
resource recovery, rates and affordability and other issues will be investigated.

The context of the class discussions will center on how politics, vision and leadership
are used to create and implement change in a traditional utility structure. The role of
environmentalism, infrastructure financing, water/wastewater treatment facility
operations, public affairs and media, and designing a capital improvement program
are examples of other topic areas.

**ENVS 631 Current Environmental Protection (Env Policy) [Fall]**

The regulatory approach continues to be the foundation of environmental protection
in the US. This course provides an overview of key environmental laws and
regulations, and the processes used to write permits, conduct inspections and take
enforcement actions. It is taught mainly from the perspective of the federal
government and will also include perspectives from the states, NGOs, and the
regulated community. Techniques used to set priorities, ensure fairness, and encourage compliance are included. Current issues in major regulatory programs will be reviewed and future directions will be discussed.

ENVS 632 Energy Waste & the Environment (Energy) [Spring]

The aim of this course is to provide an incentive to use geochemical and mineralogical principles to address and solve major environmental problems. The students identify the problems that are associated with different types of waste. This course covers a wide range of problems associated with the waste arising from the generation of electricity. The main topics will be the uranium cycle, characterization of nuclear waste, and the containment and disposal of nuclear waste. Based on insights from the nuclear fuel cycle, solutions are presented that diminish the environmental impacts of coal and biomass combustion products, incineration of municipal solid waste, toxic waste due to refuse incineration, and landfills and landfill gases.

ENVS 635 Major Global Environmental Problems of Today and how we must deal with them tomorrow. (Env Policy) [Spring]

Global environmental problems of today are some of the greatest challenges of the new millennium. Almost everyone is in some way part of the problem and increasingly will be asked to be a part of the solution. The problems that we face today often differ from those of the past because it is sometimes difficult for the international community to agree on the extent, causes, and impacts of the problem and how to allocate responsibility for the resolution of the problem. Governments, businesses and NGOs around the world have recognized the need to take the initiative and address these issues through regulation, voluntary approaches, and cooperation on an international level. How best to manage these problems is the constant challenge. This course will provide an overview of several of the major global environmental problems facing the world today, and how they are connected by common causes, underlying themes and concepts critical to the understanding and management of these issues. It will examine the over-arching concepts of sustainability and globalization as well as frameworks for assessing and managing the issues.

The course will also consider the role of the major players/stakeholders in the situation, including governments, non-government organizations, and private sector individuals/participants, and where appropriate, touch on such issues as intergenerational aspects and the potential long-term irreversibility. With the assistance of regional and national experts, we will address specific problems, such as: human populations and their environmental impact; issues surrounding resources such as food, water, habitats, and energy; global climate change; the ozone layer; and problems of international/environmental terrorism, catastrophes, and disease. Each student will prepare a report and presentation on some aspect of a topic discussed during the term.
ENVS 636 Water Issues of India and Other Developing Countries (Env Policy)[Summer]

This course will give students a good knowledge and understanding of water issues in developing countries. It explores the issues of water and sanitation of urban and rural areas of developing countries to meet Millennium Development Goals (MDGs), and to identify problems and potential solutions to achieve these goals with a primary focus on India. It describes background and overview of historical development, social and economic factors that implicates in successful implementation of water and sanitation programs in India. The course describes conditions of existing infrastructures of water and sanitation facilities, identify deficiencies, management problems, political interference, institutional and financial problems, and analyze economics, and sustainability of urban and rural water systems. Rural water quality issues such as arsenic in drinking water will be closely examined. The course will also use comparisons of performances of large water systems of South and Southeast Asia of various governing system such as municipally owned, privately owned and independent authority owned systems, using performance indicators, and their applications to demonstrate the essential steps and components needed to improve performance.

ENVS 637 Global Water Issues (Env. Policy) [Spring]

Water-related illnesses are estimated by some to kill up to 5000 people per day worldwide and many of these casualties are children. This course will explore the causes of this global crisis and what is being done to address the issue. It will provide an overview of international agreements, wastewater and water supply issues, technological advances, political/financial/cultural and other barriers to success, and what students can do to become involved in resolving the issues. Guest lecturers and case studies will provide insights to problems in problem areas around the world. Students will be asked to evaluate specific problems and suggest improved approaches to improving access to clean water.

ENVS 638 Global Water Management: Governance & Finance (Env Business) [Fall]

Providing safe drinking water and adequate sanitation to people is one of the world’s biggest environmental/health challenges. The statistics are staggering. Globally, there almost 800 million people without safe drinking water and over 2.5 billion people without sanitation. This results in a person, usually a child, dying every 20 seconds. The United Nations has established the UN Millennium Development Goals (MDGs) for water and sanitation. These goals are, by the year 2015, to reduce by half the percentage of people without safe water and adequate sanitation. Significant progress has been made in some areas but much has yet to be done.

This course will review the extent of the problem and progress made to date. It will explain the efforts being made by the world community to address these issues and the barriers that exist with the main focus being on two broad management themes.
that are particularly important — ie, governance and finance. The course will draw heavily on case studies of existing situations around the globe and will also present model approaches that have been used in the US and elsewhere in addressing these issues. Guest speakers from government, the private sector, and NGOs will participate in the course.

**ENVS 639 Policy to Practical in Environmental Management: Water Issues (Env. Policy) [Spring]**

This course explores some of the most challenging national and global water-related topics and includes guest lectures by and trips to meet representatives from several of the leading organizations addressing these issues. Examples of these topics include meeting the UN Millennium Development Goal of halving the number of people worldwide who do not have adequate drinking water and sanitation; the control of polluted runoff from farms and urban areas; the management of multi-state water pollution programs; and assessment of the impacts of low-level toxics in water. In addition to learning about the environmental issues, students will also visit regional and global experts in such places as the Philadelphia, Washington DC, and New York City. Students must attend two full-day field trips and one afternoon trip.

**ENVS 641 World Water Forum (Env Policy) [Spring]**

This one-week course will be held as part of the World Water Forum. This tri-annual Forum is the world's largest gathering of those interested in global water issues and over 25,000 are expected to attend. Attendees at the Forum will include world leaders in water, sanitation, and health issues and will represent governments, NGOs, academia, the private sector, and the general public. Students will be involved in some combination of the following: (1) planning, organizing and/or conducting an event at the Forum; (2) delivering a presentation/poster; (3) assisting international organizations at the Forum, (4) researching specific topics related to the Forum; (5) interviewing world experts at the Forum; and (6) participating in special networking meetings with leaders from around the world. Students will be responsible for their own travel, accommodations and conference registration. Pre-trip meetings are required.

**ENVS 643 The Historical, Scientific, & Policy Dimensions of "Brownfields" (Env. Policy) [Spring]**

This course gives an overview of the development of policies and programs that encourage the redevelopment of brownfields – “real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.” (U.S. Environmental Protection Agency) Especially over the last 20 years, these programs have cleaned up and reinvested in such properties in order to protect the environment, reduce blight, and take development pressures off green spaces and working lands. The course will place the Brownfield problem in the broader context of the growth and decline of industrial base cities like Philadelphia. Students will study the general constitutional
and statutory framework within which we approach the problems of orphan, polluted sites and the disposal of contemporary solid wastes. They will also analyze the principal actions that have been taken by federal, state, and local governments to address remediation and redevelopment of abandoned industrial sites. In addition, the course will explore environmental equity issues and link the redevelopment of these urban sites to the broader challenge of controlling urban sprawl.

**ENVS 648 Issues in Food and Agriculture Policy (Env Policy or Urban Env) [Fall]**

Food is central to our daily lives, yet we seldom think about the political or social implications of what we eat. In this course, students will study how societies produce, distribute, market and consume food, with an emphasis on American politics and food systems to develop an understanding of how policies are shaped by power relations, institutions, and ideas. Topics include food systems, food and agriculture industries, farming practices, sustainable agriculture, food security, genetically modified foods, hunger, obesity, nutrition policy, food labeling and marketing, fast food, junk food, and more.

**ENVS 655 Professional Communication Strategies in Environmental Science and Policy (Research Methods) [Summer]**

Writing effectively for a variety of audiences is a required skill for professional master’s students, both inside the classroom and in the workplace. This online seminar introduces writing and communication strategies and skills for all graduate professional students, with special attention to the environmental and geoscience fields. Students will learn academic writing principles and professional practices that will enable them to respond to a variety of workplace scenarios as well as influence and inspire others through effective written communication strategies. Through frequent writing assignments, hands-on exercises during class sessions, and writing on blogs and in group projects, students will learn how to write concise prose, summarize and evaluate documents and scenarios effectively, develop technical skills in writing clear instructions, write persuasive project recommendations individually and in a group, and employ effective rhetorical strategies for academic, professional, and general audiences. The class will focus on strategies for effective critical thinking and writing, as well as how to write persuasively for multiple audiences, ranging from the general public to scientists and engineers. There will be special attention to analysis of genres and audiences, and effective writing and revision strategies. Most importantly, you will be able to use the skills developed in this class throughout your academic and professional careers.

**ENVS 665 Industrial Ecology (Env Sustainability) [Spring]**

With sustainability being identified as a critical issue for society and industry, the question that has been raised is how this translates to action by an individual company. This course will examine the evolution from environmental controls to sustainable engineering. The responses to environmental issues have traditionally been seen as necessary but not productive, bolt-on treatment of waste that create overhead costs. A sustainable approach looks to change core business activities that consume resources and generate waste (now to be seen as by-products) so that the
new business model will not only have a beneficial impact on the environment but also generate better products, reduce costs, and improve trust between society and the company. The implementation of industrial ecology, which looks to align business operations within the natural cycle, has the potential for significant benefit for industry as well as for the long-term survival of mankind. The application of a "design for sustainability" and life cycle assessments will be reviewed as critical tools to be incorporated into business strategy. This review of environmental sustainability will also be put in context of both economic and social sustainability. The implications and impacts of government policy, laws, and regulations on industrial ecology will also be reviewed.

ENVS 667 Sustainable Goods (Env Sustainability) [Fall]
The study of sustainability—the long term viability of humans in harmony with the environment—has been identified as a critical issue for society and industry and is evolving to examine how society should conduct itself in order to survive. This issue impacts the consumer goods that we use in our lives, the processes that are designed to make these goods, and the raw materials that we obtain to create these goods. The questions that we will examine will be: can these goods be obtained, made, and consumed in a fashion that allows the current quality of life to be maintained (or enhanced) for future generations? Can these processes be sustainable? A review of consumer goods is necessary as the starting point in order to understand the basic needs of people in society and why people consume goods as they do. Subsequently, each student will choose a product to examine in detail and will research the product for its impact with respect to natural resource selection, production, use, and disposal/reuse.

ENVS 669 Corporate Sustainability Strategies (Env Sustainability) [Spring]
Before the year 2000, “environmental management” for a business was typically driven by the need to respond to restrictions imposed by environmental regulation. But, at the dawn of the new millennium, leading businesses began to change their concept of environmental management to look beyond simply meeting governmental dictates. These organizations began to evolve and utilize “environmental strategy” to create new ways of growing their business by bringing sustainability to the core of their business strategy. This seismic shift in view was accompanied by a bottom line emphasis that, in some cases, turned sustainability efforts into profit centers.

Sustainability increasingly is not hidden within the silo of environmental, health, and safety departments, but has become much more seamlessly integrated into the operations of corporate functional disciplines. Today, to effectively work in senior management, an executive needs to be knowledgeable not only about his or her specific business function, but also, how his or her business will be impacted by governmental regulations & policies, corporate sustainability initiatives, green marketing regulations, industry guidelines or ‘best practices’, new sustainable technologies, energy planning, environmental performance metrics, and required reporting on the environmental impact of their business unit.

This course will focus on corporate sustainability strategies within this new paradigm. It is meant to be introductory, yet provide a comprehensive overview of emerging
approaches to business and its relationship with the environment. While it will cover academic research and overarching management theories, the class will be integrative and practical in its application of corporate sustainability strategies, management, tactics, and tools.

ENVS 671 Sustainable Development Strategies: Purposes & Coverage (Env. Sustainability) [Spring]

This course has several objectives. The central focus will be on developing a comprehensive understanding of the principles of sustainable development, an idea that was given prominence in the 1987 Report of the United Nations' World Commission in Environment and Development. This report defined sustainable development as: "... development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Behind this deceptively simple statement, however, lie a number of complex concepts: What is "development"? What types of "present needs" are we talking about? How will the "needs" of future generations be measured? What threats, practices, or processes will "compromise" these future needs? What changes in the distribution of wealth, access to health care, access to education, and participation in societal governance will be necessary to produce a truly "sustainable" society? The course will introduce students to the various dimensions of sustainable development.

ENVS 672 Water Sustainability and Business (Env Sustainability) [Summer]

As water sustainability issues are being understood and society begins to react, businesses around the world are beginning to integrate water issues into their strategic plans. The approach that companies take in responding to the water sustainability issue can not only impact their ability to function, but it can also influence their reputation in society. This course will examine the nature of water concerns around the world as a foundation for understanding why this is becoming such an important factor for industry. A broad review of common issues for industry will be undertaken with an emphasis on structuring strategic plans and designing solutions that have applicability for all companies. The role that government has played and can play around the world will be reviewed as it pertains to industry. The partnership between companies and NGOs will be examined to determine the potential liabilities as well as the benefits to all parties. We will then invite representatives of different industrial sectors to come in to discuss the specific concerns for their industry as well as their plans for the future. The tools that are useful in examining and solving water problems will be discussed in class. Students will research water problems in different industries as well as formulating solutions that could be considered by industry.

ENVS 673 The Future of Water (Env Business) [Fall]

From Wall Street to rural Sub-Saharan Africa, technology innovation to aging infrastructure—this course will explore the impact of water and consider what future leaders need to know about the dynamics of the industry, investment and business opportunities, and water-related risk; Opportunities for water are booming around the
world, in large part because of existing or looming shortages and decades of underinvestment, population growth, rapid industrialization and urbanization, pollution, and climate change. Water is the only irreplaceable natural resource on the planet. Its critical role in every aspect of the global economy, could, in fact, lead it to be the next gold or the next oil; This course will address the fundamentals of the water sector from an international perspective. The future of water will be critical to our global economic, social and political development and will likely become one of the most influential factors in business decisions for the future. Furthermore, it is essential for leaders across all sectors— from pharmaceuticals to financials, energy to agriculture—to understand how to sustainably manage and account for water resources, capitalize on new technologies, mitigate water-related risks and navigate through complex and dynamic policy and regulation. The course will engage students in high-level discussion and strategy formation, challenging them to develop creative and sustainable solutions to some of the greatest challenges facing environmental, business and water industry leaders today. Interactive sessions and projects will provide an introduction to appropriately managing, valuing and investing in water assets to create sustainable and compelling business opportunities.

ENVS 674 Life Cycle Analysis (Env Sustainability) [Fall]

In order to make sensible decisions on products or projects, people need to understand the environmental impacts of these actions. Life cycle assessment (LCA) is a process to assess environmental impacts throughout the different stages of a product or project’s life. This seminar is intended to be comprehensive and covers material extraction, processing, manufacture, distribution, use and end of life reuse, recovery or disposal. The objective of conducting an LCA is to compare the full range of environmental impacts that emanate from the provision of these products or services and then use that information to improve the situation to minimize or eliminate harm. The focus of this class will be to understand the phases of an LCA as well as conduct LCAs that compare the impacts of two related options. This course will enable the student to conduct LCAs and examine the use of software that could be used in this regard.

ENVS 681 Modeling Geographic Space (Resource Mgmt.) [Spring]

This course explores the nature and use of digital geographic information systems (GIS) for the analysis and synthesis of spatial patterns and processes through 'cartographic modeling'. Cartographic modeling is a general but well defined methodology that can be used to address a wide variety of analytical mapping applications in a clear and consistent manner. It does so by decomposing both data and data-processing tasks into elemental components that can then be recomposed with relative ease and with great flexibility.

ENVS 683 Foundations of Environmental Education (Advocacy & Education) [Spring]

For more than 100 years, educators have been striving to build an environmentally literate society. This course introduces the philosophical, historical, theoretical, and methodological processes of the environmental education movement, tracing its roots
from 19th century nature study to newest trends. Topics include the field's goals and objectives, its broad literature, controversies in the field, obstacles to environmental literacy, and practice in hands-on instruction. Visits from EE practitioners and visits to an EE center are included.

**ENVS 699 MES Capstone Seminar (Required) [All semesters]**

This course is designed to help students successfully complete their MES Capstone. A set of milestones will be set and regular meetings will be held in groups and individually to aid the student as they complete the research portion of their degree. We will be working together to complete a series of steps towards the final project. These steps fall into five major areas: 1) Reviewing the literature; 2) Finding a model; 3) Framing your research; 4) Managing data; and 5) Writing your results. Throughout the semester, we will also discuss career goals and the job search.

**SELECTED GEOLOGY COURSES FOR MES**

**GEOL 403 Meteorology and Atmospheric Science (Env Geology) [Spring]**

In general terms this course covers how the atmosphere and ocean work in tandem to produce the local and global climate systems of Earth. Topics covered are based on studying (quantitative and qualitative ways) the basic physics and chemistry laws of the atmosphere and hydrosphere and how these laws control the movement of Earth's two spheres. Major topics covered in this course include: air and water mixing in the atmosphere, different kinds of storms, clouds formation and why few clouds precipitate, the Ozone layer, ocean bathymetry and plate tectonics, ocean temperature and salinity, ocean currents and their connection to the biological productivity in the ocean, ocean water density and atmospheric forcing, ice in climate systems, climate changes over the history of Earth and how might climate changes in the future, global warming, and how climate impacts humans and how do humans impact climate.

**GEOL 503 Earth Systems and Earth Hazards (Env Geology) [Spring]**

This course will examine the hazards that arise from living on an active planet from a large-scale systems standpoint. We will briefly survey the Earth's major systems, emphasizing energy generation, storage, and flow within the Earth, and then proceed to an examination of the hazards that result. This will include earthquakes and tsunamis, volcanic eruptions, river and coastal flooding, and hurricanes, tornadoes, and other major storms. We will touch briefly on global warming and other current topics.

**GEOL 508 The Geology and Geography of Energy Resources (Energy) [Spring]**

This course will survey the way geology controls the formation and location of energy resources. Questions we'll address include, "How are oil and gas fields formed?", "Why does the Middle East have so much oil?", "What are the best locations in the US for wind and solar energy generation, and why?" We will discuss hydrocarbon, nuclear, solar, wind, and tidal energy sources.
GEOL 528 Aqueous Geochemistry (Env Chem) [Fall]

Chemical composition and interactions of soils and soil water with applications to current problems.

GEOL 604 Geostatistical Analysis (Research Methods) [Spring]

Univariate and multivariate approaches to the analysis of spatial correlation and variability. Many disciplines, including geology, ecology and the environmental sciences regularly need to analyze and make predictions from data that is spatially autocorrelated. Mine reserve estimation, pollutant dispersal and the use of randomization tests in ecology are examples of where spatial statistics may be applied.

GEOL 618 Fundamentals of Air Pollution (Env Chemistry) [Spring]

This course will cover various topics related to Air Quality. Initial lectures will cover the history of air pollution and composition of the atmosphere. We will then progress to discussion of atmospheric pollutants and sources of those pollutants. Additional topics will include: fate of atmospheric pollutants (transport and dispersion mechanisms), effects of air pollution (health and environmental effects), urban smog, acid rain, climate change, ozone depletion in the stratosphere, air quality criteria, and engineering controls.

GEOL 648 Watershed Science (Resource Mgmt) [Summer]

Water Resource Management is an important issue worldwide. Most countries have adopted watershed management plans or developed programs to govern this important natural resource. As issues of climate change, point source and non-point source pollution, and quantity become acute an understanding of watersheds becomes critical. The main goals of any watershed management program are to manage the land and water to maintain water quality, healthy aquatic ecosystems, and natural and human hydrologic functions, such as storm water run-off and floodplain management. This course will use the science of watersheds at various spatial scales as a basis to address these goals. We will examine the influence of geology, soils, and climate, and of man’s land management practices on watershed and stream geomorphology. Basic principles of hydrology including water budgets will be used to quantitatively describe the continuous movement of water through the hydrologic cycle, and to understand man’s impacts on the hydrologic regimens of watersheds.

GEOL 652 Physical Geology for Environmental Professionals (Env Geology) [Fall]

Study of the genesis and properties of earth materials (minerals, rocks, soil, water); consideration of volcanic, erosional, glacial, and earthquake processes along with the characterization of the earth's deep interior crustal and near-surface structure. Classroom study of minerals, crystals, fossils, and rocks as time permits.
GEOL 653 Introduction to Hydrology (Env Geology) [Fall]

Introduction to the basic principles of the hydrologic cycle and water budgets, precipitation and infiltration, evaporation and transpiration, stream flow, hydrograph analysis (floods), subsurface and groundwater flow, well hydraulics, water quality, and frequency analysis.

GEOL 661 Environmental Groundwater Hydrology (Env Geology) [Spring]

This course is designed to introduce the major definitions and concepts regarding groundwater flow and contaminant transport. The theory underlying concepts, including mathematical derivations of governing equations used to model groundwater flow and contaminant transport, will be discussed and applications to environmental problems addressed.

Upon completion of this course, students should expect to have attained a broad understanding of and familiarity with groundwater flow and contaminant transport concepts, and to have acquired the skills necessary to pursue work in flow and transport modeling.