GRADUATE PROGRAM AND DEGREE REQUIREMENTS

Environmental Engineering

Effective Spring 2016

Master of Engineering (M.Eng.)

Graduate Program Coordinator: Dr. Shirley Clark Administrative Support: Justine Yelk

Penn State Harrisburg 777 W. Harrisburg Pike W-236 Middletown, PA 17057 <u>https://harrisburg.psu.edu/science-engineering-technology/civil-</u> <u>structural-engineering/master-engineering-environmental-engineering</u>

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PART I: INTRODUCTION

PROGRAM OVERVIEW

The School of Science, Engineering and Technology currently offers a Master of Engineering (M.Eng.) in Environmental Engineering. Admitted students are required to meet the requirements of both the Pennsylvania State University Graduate School and the Environmental Engineering Graduate Program. This handbook describes the requirements for this degree and is a supplement to the Graduate Degree Programs Bulletin. Students are advised to consult the Graduate Bulletin at: http://www.psu.edu/bulletins/whitebook for Graduate School degree requirements. For specific program questions, students should contact the following:

Graduate Program Coordinator	Graduate Administrative Staff Assistant
Dr. Shirley E. Clark	Mrs. Justine Yelk
Olmsted W-236	Olmsted W-236
Middletown, PA 17057	Middletown, PA 17057
717-948-6127	717-948-6124
seclark@psu.edu	jes5437@psu.edu

This handbook is divided into five parts. Part I provides an overview of the program, including graduate program goals, distinctive features of the program and program emphasis areas, graduate studies and research support staff, faculty and areas of study. Part II discusses developing a Plan of Study, Academic support, and adviser and student responsibilities. Part III describes the Graduate School degree requirements. Part IV describes the graduate degree requirements for the program. Part V presents the timeline for graduation and outlines the required activities in the final semester in the program.

PROGRAM GOALS

The goals of the Environmental Engineering Graduate Program are to prepare students for professional practice, graduate study, lifelong learning, and to provide students with the technical expertise to adapt to the changing regulations and engineering requirements as they are adopted in the future. To fulfill this mission, the Program and its faculty support the environmental engineering focus area of the undergraduate Civil Engineering degree, plus both the Masters of Engineering Degree in Environmental Engineering and the Master's and Masters of Science degrees in Environmental Pollution Control. The faculty conducts research and offers graduate study in selected areas of environmental engineering. The faculty also regularly participate in and lead workshops and conference where they disseminate and learn about cutting-edge research and knowledge, which then is brought back to the classroom and labs to be shared with the students, practicing engineers and the public.

DISTINCTIVE FEATURES AND PROGRAM EMPHASES

Being conveniently located in the Chesapeake Bay Basin near the Lower Susquehanna River, the Environmental Engineering program at Penn State Harrisburg focuses primarily on the impacts of water on the environment and human health. The primary faculty in Environmental Engineering are housed in the Civil Engineering department. However, there are many faculty affiliated with the program with primary affiliations in Science/Life Science/Biology, Chemistry, and Mechanical Engineering.

GRADUATE STUDIES AND RESEARCH

The master of engineering (M. Eng.) degree in Environmental Engineering requires 30 credits of coursework and submission of a completed master's paper to demonstrate the student's ability to synthesize existing research as related to a current environmental problem or to generate original research and present it. These master's papers are expected to be of sufficient quality to be eligible for consideration as a conference presentation. Conference submission is not required to graduate, but that level of quality is required in the final document. The M. Eng. Degree is designed for students seeking an advanced degree to enter professional practice, and typically requires between one and two years of study if full time and three to five years if part time.

FACULTY RESEARCH AREAS

The faculty primarily assigned to the Environmental Engineering program focus on the movement and treatment of water to meet human needs. Areas of specialization in the water field include stormwater runoff quantity and quality, drinking water treatment, and wastewater/biosolids treatment. Faculty affiliated with the program have research interests in the areas of geotechnical engineering (dam seepage), environmental microbiology and reuse of waste materials, and sustainable industrial engineering.

PART II: ADMISSION TO THE PROGRAM AND INITIAL PROGRESSION

ASSESSMENT CONSIDERATIONS

Students applying for admission to any Pennsylvania State University graduate program must meet the requirements for admission to the Graduate School, including the provisions for English language proficiency. TOEFL/IELTS requirements will not be waived. While every effort is made to keep this handbook current, prospective students are encouraged to consult with the official Penn State Graduate Bulletin for current requirements (<u>http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission/</u>). This page outlines the requirements for GPA and English proficiency, in addition to other admissions requirements.

To be considered for admission, applicants should have at least a 3.0 junior/senior grade-point average (GPA); a GPA of 3.5 or higher is preferred for applicants from non-engineering backgrounds.

Students with an ABET-accredited undergraduate engineering degree are admitted without deficiencies. Students may be admitted to the program from other backgrounds (international non-ABET-accredited engineering degrees and non-engineering degrees), but their transcripts will be reviewed to determine if they have met the course requirements for admissions. Students who have not met those course requirements may be admitted in provisional status due to course deficiencies. Students will have two semesters if full-time and four semesters if part-time to make up the

deficiencies; this time limit may be extended for full-time students who start in either Math 140 or E MCH 211. The courses required to make up for deficiencies will NOT count toward the graduate degree. The course requirements for admission are the following (Table 1 outlines the Penn State courses that satisfy these admissions requirements):

- Mathematics: one year of general calculus, plus one semester of differential equations (partial differential equations is recommended) and one semester of statistics
- Chemistry: one year of general college chemistry, or one semester of general college chemistry and one semester of environmental chemistry
- Physics: one year of calculus-based college physics
- Fundamentals of Fluid Movement: one semester of fluid mechanics (NOTE: For students choosing to fulfill this requirement at Penn State, fluid mechanics has prerequisites of statics and dynamics. Fluid mechanics is the 3rd semester course in the mechanics series).

Students may petition to use other related courses to satisfy these admission requirements or substitute work experience (for example in wastewater and water treatment chemistry for the admissions requirement of second-semester college chemistry or environmental chemistry). Students are encouraged to meet with their adviser to discuss these requirements.

Course Topic	Penn State Course
Advanced mathematics typical of engineering undergraduate programs (calculus through partial differential equations plus statistics)	MATH 140 Calculus With Analytic Geometry MATH 141 Calculus With Analytic Geometry II MATH 250 Ordinary Partial Differential Equations STAT 200 Elementary Statistics
One year of college chemistry	CHEM 110 Chemical Principles I CHEM 112 Chemical Principles II
One year of physics	PHYS 211 General Physics: Mechanics PHYS 212 General Physics: Electricity & Magnetism
One course in fluid hydraulics or mechanics	C E 360 Fluid Mechanics

Table 1. Minimum Entrance Requirements for all Applicants.

Because these courses have been selected to ensure that the student is adequately prepared for graduate level coursework, these deficiency courses must be taken for a letter grade and a minimum grade of a C is required for acceptance. Students may NOT take these courses as an audit or pass-fail if they want to use them to meet a course deficiency requirement. If deficiency courses are taken at another university, official transcripts must be submitted to the department prior to enrollment in any course that lists the deficiency course as a prerequisite.

The Pennsylvania State University is committed to an equal access policy for all persons, assuring equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University

prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, or veteran status. Direct all inquiries regarding the nondiscrimination policy to:

Affirmative Action Director The Pennsylvania State University 201 Willard Building University Park, Pa 16802-2801 Tel (814) 865-4700/V (814) 863-1150/TTY.

DEVELOPING A PLAN OF STUDY

All Environmental Engineering masters' students are required to develop a *Plan of Study* early in the program, preferably by the end of the first semester of study for full-time students and the end of the second semester and no later than the end of the third semester of study. In developing the Plan, students are assisted by their academic adviser and the posted three-year schedule of environmental engineering courses. Master's students are expected to develop a broad knowledge of the field of Environmental Engineering through the completion of the core requirements, as well as a general knowledge of research designs and methods. They also will be expected to specialize in an area of environmental engineering (water and wastewater treatment, water resources, sustainable engineering, etc.).

Students may use a limited number of courses from outside the 3-year schedule of environmental engineering courses and the courses listed under the 5 core areas, including courses from mechanical engineering, biology, chemistry, earth sciences, mathematics, computer science, public administration, and business administration. These courses should be outlined on the Plan of Study and must be approved by the academic adviser and Graduate Program Coordinator. In most cases, the student should prepare a brief justification for why a course not listed in the 3-year schedule or on the list of approved courses should be considered as applicable to the M. Eng. in Environmental Engineering.

STUDENT ACADEMIC SUPPORT

Upon admission to the graduate program (and included in the admissions letter), students are assigned an interim academic adviser by the Graduate Program Coordinator. The academic adviser has been selected based on the interests indicated by the student in his/her application essay. The eventual research/paper adviser will be based on mutual career and research interests of the student and faculty. All academic advisers are full-time Environmental Engineering faculty with Graduate Faculty status.

Academic Adviser Responsibilities

The academic adviser acts as the student's primary academic and career mentor at Penn State. The adviser's primary responsibilities are the following:

- (1) to assist in the development of a *Plan of Study* depending on degree;
- (2) to advise on and approve of course(s) election each semester;

Research Adviser Responsibilities

to assist with professional development activities (internships, attending and presenting at conferences, authorship and co-authorship of journal articles and book chapters, developing teaching portfolios, etc.) that would enhance academic and research preparedness and career prospects; and
 to serve as the chair (or co-chair) of the student's master's committee.

Student Responsibilities

Communication between the graduate student and his/her advisers is a key factor in the progression through the graduate program. It is the student's responsibility to consult with her/his adviser and committee regularly throughout the course of study. Contact may be made by telephone, e-mail, or in person by appointment. All advisers offer open office hours every week and also take appointments for meetings at times outside of office hours. Advising notes are documented and available for student review on eLion/LionPATH. Advisers are not responsible for the delayed graduation of students who do not follow their approved *Plan of Study* and who do not contact their adviser for a periodic academic review.

CHANGING ADVISERS

A student may change her/his academic adviser; often the student and academic adviser choose to make the change once the student has selected a research adviser and the research adviser has agreed to assume both responsibilities. Either the student or the academic adviser may suggest this change. Proposed changes should be discussed between the affected parties prior to any official action. An adviser change must be made with the consent of the student, the new adviser, and the current adviser. Notification will need to be made to the Graduate Administrative Staff Assistant in W-236 Olmsted.

SARI REQUIREMENTS

Starting with the fall 2009 incoming class, all students must complete SARI (Scholarship and Research Integrity) requirements.

The SARI program at Penn State is designed to offer graduate students comprehensive, multilevel training in the responsible conduct of research (RCR), through a two-part program: an online course to be completed in the first semester of graduate study, followed by five hours of discussion-based RCR education prior to degree completion. The five hours of in-class research ethics discussions are covered in two required seminar courses in the M. Eng. ENVE degree: EPC 590 Colloquium and ENVE 591 Research Methods in Environmental Engineering.

SUPPORT SERVICES

The University provides numerous resources and services to support prospective and current graduate students.

As part of the Campus Life and Intercultural Affairs department, Penn State Harrisburg supports adult learners (students greater than 23 years of age). There are a variety of resources available for students, both online and in person. Online resources include the following:

- Helping Your Child Series
- Commission for Adult Learners
- Child Care Subsidy
- No or Low Cost Community Services

Penn State for Adult Students website lists programs and other services available for adult students, often working in conjunction with Continuing Education. Alpha Sigma Lambda is the honor society for adult students.

The Student Government Association has both undergraduate and graduate representatives and addresses a variety of issues important to adult learners (<u>http://harrisburg.psu.edu/student-government-association</u>).

The Russell E. Horn Learning Center provides academic support to the entire Penn State Harrisburg student body. Tutoring is available for most lower-level classes, such as those listed as program deficiencies. Typically of most use to the graduate students is the Writing Support. Writing tutors will meet with students to review and revise graduate papers, both for class submissions and for the masters' research project. Students with weak writing skills or for whom English is not their native language are strongly encouraged to use this resource. More information on the Learning Center, including links to schedule an appointment with a tutor or writing specialist, can be found at http://harrisburg.psu.edu/learning-center.

For students involved in research, a limited number of travel grants are available and are designed to support students in presenting their work at regional and national conferences.

Information pertaining to other student services such as Career Services, Counseling and Psychological Services, Disability Services, etc., can be found at <u>http://harrisburg.psu.edu/current-students</u>.

PART III: GRADUATE SCHOOL DEGREE REQUIREMENTS

The Pennsylvania State University Graduate School publishes minimum requirements for all graduate degrees awarded by the University. Additional graduate degree requirements are established by Environmental Engineering Program. Graduate School graduate degree requirements are published on the Graduate School website in the Graduate Degree Bulletin at the following URL (and sub-URLs for specific requirements for the Master's of Engineering degree:

http://bulletins.psu.edu/graduate/degreerequirements/masters

The published Bulletin contains comprehensive Penn State University Graduate School requirements that must be met by students to complete the respective degree. It is the responsibility of the student to read, understand, and discuss these requirements with her/his academic adviser, and if applicable,

thesis adviser. The Penn State University Graduate School graduate degree requirements supersede any conflicting requirements.

In summary, the Penn State University Graduate School requirements address issues related to the following:

M. Eng. specific requirements:

- minimum grade-point average required for graduation
- maintaining good academic standing
- M. Eng. time limitation
- advanced standing and transfer credits

SARI (Scholarship and Research Integrity) requirements

- Online CITI Exam (completed the first year of study)
- 5 hours of discussion-based seminars (3 hours are met with attendance at all ethics classes in EPC 590; 2 hours are met with attendance at all ethics classes in ENVE 591)

The above summary is not exhaustive and does not include program requirements that may be in addition to the Graduate School requirements. All graduate students in the Environmental Engineering masters' program are strongly encouraged to familiarize themselves with all Graduate School degree requirements. Two important ones, transferring credits and termination of the degree program based on unsatisfactory scholarship, are summarized in the following sections. These summaries do not supersede the requirements as written in the Bulletin by the Graduate School, but instead should be seen as a reference. It is the student's responsibility to read the language of the Graduate School requirements and ensure that they have met those requirements prior to graduation.

TRANSFER CREDITS

Transfer of Credits from a Penn State Undergraduate Transcript

In certain cases students may apply no more than 15 credits they earned in 400-, 500-, and 800-series courses while undergraduates at Penn State toward a graduate degree at Penn State. These credits must be approved by the student's adviser and Graduate Program Coordinator as being relevant to the Environmental Engineering master's program and students must have received grades no lower than a B. These credits must not have been used to satisfy the PSU undergraduate degree or another master's degree at PSU or another university. These courses also must have been completed within any time guidelines set by the university for courses (typically they must not be more than 3 - 5 years old).

Transfer of Credit from an External Institution or from Penn State Hershey School of Medicine or School of Law

A maximum of 10 credits of high-quality graduate work done at a regionally accredited U.S. institution or an officially recognized degree-granting international institution may be applied toward the master's degree, if these credits have not been applied to another degree and if they are approved by the student's academic adviser and the Graduate Program Coordinator as being relevant to the Environmental Engineering master's degree. Transfer credits must meet the following criteria:

- Must be of "A" or "B" grade value ("B-" grades are not acceptable; pass-fail grades are not transferable unless substantiated by the former institution as having at least "B" quality);
- Must appear on an official graduate transcript;
- Must be earned within the five years prior to the date of enrollment in the first class to a degree program at Penn State.

Transfer of PSU Nondegree Graduate Credits

Approval to apply nondegree graduate credits toward a degree program must be granted by the student's academic adviser, the Graduate Program Coordinator, and the Graduate School. A maximum of 15 credits earned as a nondegree student may be applied to a degree program. The credits must have been earned within 5 years preceding entry into the degree program. Only A, B, and C grades will be transferred. Non-degree seeking students are strongly recommended to apply for formal admission to the graduate program as soon as possible because the student is bound by the program requirements at the time of formal admission. If the program changes between the time the non-degree classes are taken and the time of formal admission, courses taken in nondegree status will only be accepted for transfer and counted toward the formal degree if they are relevant to the Environmental Engineering master's program at the time of admission.

GRADE-POINT AVERAGE

A minimum grade-point average of 3.00 for work done at the University in the degree program is required for graduation. If a student's GPA at any point in his/her PSU career drops below a 3.00, a formal notice is sent to the student and to the Program. A follow-up notice will be sent by the Graduate Program Coordinator to the student at the student's PSU email. This email will constitute formal notice to the student that he/she is at risk of being dropped from the Degree Program for unsatisfactory scholarship. The student will schedule a meeting with his/her academic adviser and develop a plan or modify the existing Plan of Study to address the GPA deficiency. This could involve options such as reducing the student's course load in the current and future semesters, or may involve a discussion on whether the Environmental Engineering master's degree is an appropriate fit for the student or whether the student adviser and signed by both, will be kept in the student's file. Two consecutive semesters, excluding summer semester, of a GPA below 3.00 will flag the student as a candidate for termination from the program and termination procedures will be instituted as described below.

TIME LIMITATION

Graduate students are required to complete their program of study within six (6) years of first enrollment. Extensions beyond the six-year limit where graduation will occur less than eight (8) years after first enrollment must be approved by the Environmental Engineering Graduate Admissions Committee. Extensions beyond eight (8) years after first enrollment may be granted by the director of Graduate Enrollment Services in appropriate circumstances. These extension requests must be forwarded to Graduate Enrollment Services by the Graduate Program Coordinator after program review and approval. In order to be considered for an extension, the student must, first, provide a new Plan of Study showing how the student plans to complete the program and must include a reason for the extension. In addition, the student must submit a current resume with the new Plan of Study. For courses whose content has changed substantially since the student took the course, students may be required to retake the course for the credits to count toward the master's degree. The decision to grant an extension to a student will be made by a committee composed of a minimum of three faculty in the Environmental Engineering Program and the student will be informed of the decision in writing by letter within two weeks of submitting the formal request and accompanying paperwork (resume, etc.).

TERMINATION FROM THE DEGREE PROGRAM

(These paragraphs are a summary of the requirements outlined in the Graduate Bulletin; students are referred to the Graduate Bulletin for further details of the appeals process)

A graduate student who fails to maintain satisfactory scholarship or to make acceptable progress in a degree program may be dropped from the University. In addition to academic performance, every graduate student is expected to exhibit and promote the highest ethical, moral, and professional standards as scholars, and as future faculty, professionals, and leaders in their respective fields. A violation of ethical, moral, and/or professional standards may not necessarily involve <u>Code of</u> <u>Conduct</u> behavior, but still may result in academic sanctions including suspension or dismissal by the graduate program and/or the Graduate School, as described above. Engaging in any Code of Conduct behavior, as determined by the Office of Student Conduct, does constitute a failure to exhibit and promote the highest ethical, moral, and professional standards expected of graduate students, and may result in additional sanctions. The procedures for adjudicating Code of Conduct violations are outlined in the Graduate Bulletin.

Students who meet the requirements for termination from the program, including GPA below 3.00 for two consecutive semesters, violations of the ethical and moral standards of the profession, and/or failure to make satisfactory progress in research or other activities related to the culminating experience, will be sent notice of their potential termination from the Program through their PSU email account and by letter to the mailing address on file with the University Registrar. If the student desires such a review, the student must, within ten days of receipt of the notice, submit a written appeal to the Graduate Program Coordinator.

• If the student alleges that discrimination either was the reason for the termination or caused the unsatisfactory scholarship, and the discrimination or harassment was committed by an individual in a role of authority, such as an administrator, faculty member, instructor, teaching assistant, or research assistant, the matter shall be referred to the Affirmative Action Office of the University, established to review such claims.

If there is no allegation of discrimination within the written appeal, then the program head provides an opportunity for the student to meet with the faculty member(s) who made the decision to terminate the student's program. This meeting must be held within 30 days of receipt of the student's written appeal. Following this meeting, the program head must notify the student within five days, in writing, whether the termination decision has been sustained or reversed. If it is sustained, the program head shall notify the Dean of the Graduate School. The Graduate School may make a determination to dismiss the student from continued or future enrollment in any graduate program at the University. If the Graduate School dismisses the student from continued or future enrollment in any graduate program at the University, notification of that decision will be given to the student within this time frame as well. Within five days of receiving this notice of termination for unsatisfactory scholarship, the student may make a written request to the Dean of the Graduate School for a further review of the decision. The student is permitted to submit additional information or statements in writing.

After this review, the Dean of the Graduate School either sustains the termination or, if he/she determines that the decision was arbitrary and capricious, reverses the decision with any corrective action, and permits the student to continue in the program. If the termination is sustained, the Dean of the Graduate School directs, at his/her discretion for termination from the Graduate School and, at the discretion of the program for termination from only the graduate program in which the student is enrolled, that the termination be entered on the student's transcript. The Dean of the Graduate School gives written notice of the decision to the program head and to the student within three weeks of receipt of the student's written request to the Dean. In the event of a reversal, such written notice shall contain a statement of the basis upon which the decision was made.

The decision by the Dean of the Graduate School is final.

PART IV: MASTER OF ENGINEERING REQUIREMENTS FOR ADMITTED STUDENTS

The following policies and procedures have been adopted by the Environmental Engineering Program and its faculty to supplement the *Procedures and Regulations* contained in the *Graduate Degree Programs Bulletin*. These requirements apply to all students admitted to the Master's of Engineering (M. Eng.) in Environmental Engineering Program.

CREDIT REQUIREMENTS

The M. Eng. degree provides the theoretical basis for advanced professional practice. A minimum of thirty graduate credits (400 level and above) of course work and a completed master's paper that would be suitable for submission to a nationally-recognized conference are required. Twenty out of the thirty required credits must be earned at an established graduate campus of Penn State University. At least eighteen (18) credits must be earned in 500-level courses. In addition, students must complete appropriate coursework in each of the five (5) core areas of environmental engineering, as outlined in the *Graduate Degree Bulletin*.

CULMINATING MASTER'S PAPER

The M. Eng. degree is intended to be a professional degree composed of a well-balanced program of study in the theory and practice of environmental engineering, with the opportunity to specialize in a specific area of the field. As a demonstration of the synthesis of the student's education, the student

shall complete a master's paper that is either original research or a synthesis of the existing research on a particular topic, as decided by the student and research adviser. Students who have activated their intent to graduate must submit an approved master's paper to the department by the published master's paper deadline. Interim deadlines for submissions of the drafts and the presentation of the research are outlined in Part V. Students who have not met these deadlines will be removed from the graduation list for the current semester.

SPECIFIC COURSE REQUIREMENTS FOR THE ENVIRONMENTAL ENGINEERING MASTER'S DEGREE

A total of 30 credits (400 or above, with a minimum of 18 credits at the 500-level or above) is required for the degree Master of Engineering in Environmental Engineering. A minimum grade point average of 3.0 must be earned for course work that is applied towards the graduate degree.

ENVIRONMENTAL ENGINEERING FOUNDATION (3 credits)

All candidates are required to take core courses that provide a foundation and context for pursuing and successfully completing a master's program in environmental engineering. The following are the required core courses.

EPC 590. Colloquium (1 cr)

ENVE 591. Research Methods in Environmental Engineering (1 cr)

C E 592. Environmental Engineering and Science Topics (1 cr)

CULMINATING EXPERIENCE (3 credits)

ENVE 594. Master's Paper Research (3 cr)

This program does require that all students complete a scholarly master's paper. ENVE 594 does count toward the 500-level requirement of 18 credits at the 500-level.

ELECTIVE COURSES (24 credits)

In addition to the requirements listed above, students must take one course (3 or 4 credits per course) in each of the following five core areas of environmental engineering theory and design, and environmental policy: Chemistry; Process Engineering; Biology; Water Resources; and Environmental Policy (see Table 2 for the list of courses that meet each core area requirement). Students must take at least one course from each core area (as shown in the table below) for a total of 15-16 credits. All courses are 3 credits except for C E 475.

The remaining 8 or 9 credits may be used by the student to specialize in an area of environmental engineering by taking classes offered not only by the Environmental Engineering Program but also from Mechanical Engineering and Civil Engineering. In addition, certain courses from the Schools of Business and Public Administrations may be approved on a course-by-course basis.

Core 1 (Chemistry)	C E 475 - Environmental Water Chemistry (4 cr) or C E 570 - Aquatic Chemistry
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Table 2. Core areas and approved courses.

Core 2 (Process Engineering)	ENVE 411 - Water Supply and Pollution Control or ENVE 550 - Chemical Fate & Transport or C E 571 - Physical-Chemical Treatment or C E 572 - Biological Treatment Processes or C E 577 - Treatment Plant Design
Core 3 (Biology)	ENVE 540 - Environmental Biodegradation and Bioremediation or C E 572 - Biological Treatment Process or C E 579 - Envir. Pollution Microbiology
Core 4 (Water Resources)	ENVE 415 – Hydrology* or C E 561 - Surface Water Hydrology* or ENVE 417 – Hydraulic Design or C E 462 - Open-Channel Hydraulics or C E 555 - Groundwater Hydrology
Core 5 (Policy)	ENVE 460 - Environmental Law or ENVE 569 - Risk Assessment or P ADM 531 - Environmental Policy

*Because of the similarity of the content (both are introductory hydrology courses), students will not be allowed to take both ENVE 415 and CE 561 for credit in the master's program. NOTE: C E 572 is listed as approved for both Cores 2 and 3. Once the course is successfully completed, the course may count for one of the two core areas. An additional course is required in either Core 2 or 3, depending on the student's interest.

Course that meet the core area requirements include, but are not limited to, the courses in the table above. Courses that deviate from this tabulated list will require pre-approval from the student's adviser. This includes summer-school courses taken at another university. If these courses were taken to meet degree requirements for a baccalaureate degree, they cannot be counted toward the graduate degree.

Students who believe that they have completed a course substantially similar to one of the specific course requirements may apply to have their previous work evaluated for the purpose of exemption to that requirement. If the exemption is granted, another approved course shall be taken in place of that required course.

PROFESSIONAL REGISTRATION

If not taken prior to admission, all Environmental Engineering students are encouraged to take the Fundamentals of Engineering (FE) examination in preparation for engineering-design oriented careers leading to licensing via the Professional Engineer (PE) examination. In order to take the FE examination, students generally must possess a baccalaureate degree from an accredited engineering program. Non-traditional students (i.e., without an accredited engineering degree) who wish to pursue FE certification may wish to investigate the possibility of obtaining a baccalaureate degree in engineering first. Students without an accredited baccalaureate degree in engineering also may petition to take the FE exam, based on additional class work and other professional experience. Course work that may be required in order to be eligible to take the FE examination include the following: 32 credits of math and basic sciences, 32 credits of engineering sciences, 16 credits of engineering design, and 16 credits of humanities and social science courses. As a reference, students with non-engineering backgrounds who wish to pursue taking the FE Exam may wish to use the forms provided by the state of Maryland to determine what additional engineering-fundamentals coursework would be required to be eligible to sit for the FE exam. The form used by the State of Maryland can be found at: <u>http://www.dllr.state.md.us/license/pe/peaff.shtml#forms</u>. Students may fill out their coursework on the form and determine whether there are deficiencies in their

background education. The admissions requirements for the program may not be sufficient to guarantee acceptance by the state licensure board to sit for the FE exam. The final arbiter of eligibility in any state is the state licensing board.

PART V. COMPLETING THE MASTER'S DEGREE

In the semester that the student intends to graduate, the student MUST activate their intent to graduate in eLion/LionPath during the activation period. This period typically starts one week before the semester begins and ends two (2) weeks into the new semester. A list of students who have activated their intent to graduate is sent to the Program Coordinator for verification that their coursework is complete or that they are currently enrolled in any remaining requirements. Please note that the Program Coordinator does not receive the list of students who have activated their intent to graduate until after drop-add period is over; therefore, it is highly recommended that students review their coursework for completeness with their academic adviser as they register for their final semester so that they are enrolled in the correct courses. Students who do not meet the graduation requirements at the time of the first graduation checklist submission that semester will be removed from the list.

Because the master's degree requires a master's paper for completion and since the deadline for the submission of a draft to the research adviser is approximately halfway through the semester, it is strongly recommended by the faculty that the paper be approximately 75 - 100% complete by the time the semester starts. Students are encouraged to work with their research adviser to develop an appropriate schedule for completion. Students also are encouraged to visit the library to review past master's papers to better understand the requirements and depth of a master's paper.

TIMELINE FOR GRADUATION

Table 3 outlines the timeline for graduation. Students are encouraged to review this timeline in conjunction with a calendar to note exact dates for submission. Failure to adhere to these deadlines can result in removal from the graduation list for that semester. Students would then have to postpone their graduation for one semester and activate a new intent to graduate in the following semester. Students do not have to be enrolled in the program in the semester in which they graduate.

Date	Activity
1 week prior to the start of the semester	Activate intent to graduate in eLion/LionPATH
through 14 days into the current semester	
End of drop-add period (10 calendar days	Ensure that all degree requirements for coursework have been
after the start of the semester)	met and adjust schedule appropriately as needed
12 weeks prior to the end of classes (3	First draft of master's paper due to research adviser
weeks into the semester)	
6 weeks prior to the end of classes (9	Final draft of master's paper submitted to adviser and reader
weeks into the semester)	
4 weeks prior to the end of classes (11	Master's defense presentation completed
weeks into the semester)	
2 weeks prior to the end of classes (14	Completed Master's paper with completed signature page and
weeks into the semester)	receipt from the bursar's office for binding

 Table 3. Graduation Timeline

PART VI. ENVIRONMENTAL ENGINEERING FACULTY LIST

Katherine H. Baker, Ph.D., Associate Professor of Environmental Microbiology

Yen-Chih (David) Chen, Ph.D., Associate Professor of Environment Engineering

Shirley E. Clark, Ph.D., Associate Professor of Environmental Engineering

Susannah Gal, Ph.D., Professor of Biology; Associate Dean of Research

Sai P. Kakuturu, Ph.D., Assistant Professor of Civil Engineering

Yuefeng Xie, Ph.D., Professor of Environmental Engineering

AFFILIATED FACULTY

Richard Ciocci, Ph.D., Associate Professor of Mechanical Engineering Thomas Eberlein, Ph.D., Associate Professor of Chemistry Sairam V. Rudrabhatla, Ph.D., Associate Professor of Biology