



University of Nevada, Reno  
Statewide • Worldwide

## GRADUATE PROGRAM IN ENVIRONMENTAL ENGINEERING

### Program Overview

Graduate-level training and research is a vital function of the [University of Nevada, Reno](#) (UNR). The activities of the graduate faculty and students in research and scholarship reinforce the mission of this land-grant university. To fulfill the university's missions in education, research, and public service, the graduate faculty encourages students to develop skills of intellectual inquiry and critical analysis. Students are trained in both the disciplinary and interdisciplinary skills necessary for solving a variety of environmental engineering problems in addition to developing a dedication to creative thought and the search for knowledge.

The graduate program in [Civil and Environmental Engineering](#) at the [University of Nevada, Reno](#) is an interdisciplinary engineering and science program within the [College of Engineering](#). Emphasis is placed on unit operations and processes of water and wastewater treatment, environmental chemistry, and environmental microbiology. Elective courses are available in the areas of hydrology, hydraulics, and water resources engineering; hazardous and solid waste management; water quality modeling; air pollution; chemical engineering; environmental sciences; geology; chemistry; and others. The degrees offered include a Master of Science (M.S.) in [Civil and Environmental Engineering](#) and a Doctor of Philosophy (Ph.D.) in [Civil and Environmental Engineering](#).

Admission to both the M.S. and Ph.D. programs requires an accredited B.S. degree in engineering or a related field such as biology, chemistry, geology, math, or physics. Other disciplines will be considered with the requirement that all prerequisite mathematics, chemistry, physics, and basic engineering courses are completed. For admission to the Ph.D. program it is recommended that an applicant have completed an M.S. degree in an appropriate engineering discipline and exhibit outstanding ability in academics and research.

The [Civil and Environmental Engineering](#) graduate program is designed to provide the student with the engineering, technical, scientific, and communication skills necessary to address the challenges associated with all aspects of environmental engineering. Close interactions between faculty and graduate students foster a dynamic research and learning atmosphere. Both applied and fundamental research is conducted in well-equipped laboratories and facilities.

Further information about the graduate program in Civil and Environmental Engineering at UNR is available at the program website, <http://www.unr.edu/cee/students/grad/>.

## **ADMISSION TO THE GRADUATE SCHOOL**

### **Application Information**

Prospective applicants can access the UNR Graduate School Web site at <http://www.unr.edu/grad/> for the most current information and for online applications for admission to the program (<http://www.unr.edu/grad/ApplyOn-line.asp>). An applicant for admission to the graduate program must file an application with the Graduate School and pay the appropriate application fee. The completed application will include the following: (i) official transcripts from all institutions attended; (ii) three letters of reference from academic and/or professional contacts; (iii) a 1-2 page statement of purpose; (iv) official scores from the Graduate Record Examination; and (v) results for the Test of English as a Foreign Language examination (international students only). The Graduate School will process the application and verify its completeness before forwarding it to the [Civil and Environmental Engineering](#) graduate program director.

The deadline for applications is February 15 for fall admittance and October 1 for spring admittance. Additional applications will be considered anytime during the academic year; however, assistantships are normally assigned by April for the next academic year.

### **Admission Requirements**

Admission to the M.S. and Ph.D. programs requires a minimum GPA of 3.0 and 3.25 (on a 4.0 scale), respectively. Applicants must also take the Graduate Record Examinations (GRE) General Test and have results forwarded to the UNR Graduate School as part of the application process. A student who is a graduate of an ABET-accredited engineering program (or equivalent for international students) will likely have met all of the undergraduate course requirements. Other students are required to have taken the following additional courses before completing the degree.

- General Chemistry I and II with laboratory
- Engineering Calculus I, II, and III, and Differential Equations
- Physics I and II with laboratory (Calculus-based Physics is preferred)
- Fluid Mechanics (NRES 614 recommended)
- Fundamentals of Environmental Engineering (CEE 204 and/or CEE 390 depending on background)
- Environmental Engineering Design (CEE 656 or CEE 657)

Additionally, the following courses are recommended to be taken before completing the degree:

- Statics (for those students planning to take the FE Exam)
- Organic Chemistry
- Engineering Hydrology

### **International Students**

A Test of English as a Foreign Language (TOEFL) score of at least 500 (paper) or 173 (computer) or 61 (internet based version) is required for admission to the Graduate School. Alternatively, students may take the International English Language Testing Systems (IELTS) exam (must be academic version), with a minimum score of 6 required for admission. Students who have achieved a TOEFL score of at least 600 (on the paper version or 250 for computer or 100 for internet) are exempt from an evaluation by the Intensive English Language Center at UNR. Students who score below this level on the TOEFL must report to the Intensive English Language Center for an evaluation and appropriate placement in English language courses. An international student is required to have a TOEFL score of at least 550 (on the paper version or 213 for computer or 80 for internet) to be approved for a teaching assistantship. International students who have received a baccalaureate or advanced degree from an accredited U.S. university or college are exempt from the requirement to provide TOEFL scores.

## FACULTY AND RESEARCH INTERESTS

**V. Dean Adams** ([vdadams@unr.edu](mailto:vdadams@unr.edu)), Professor of Civil and Environmental Engineering, Ph.D., Utah State University, 1972. Aquatic chemistry, water and wastewater treatment, lake and reservoir ecosystems, beneficial uses of biosolids, sensitized photooxidation, analytical methods.

**Amy E. Childress** ([amyec@unr.edu](mailto:amyec@unr.edu)), Professor and Chair of Civil and Environmental Engineering, Ph.D., University of California, Los Angeles, 1997. Membrane contactor processes, pressure-driven membrane processes, membrane bioreactor technology, colloidal and interfacial aspects of membrane processes, solar ponds for brine reduction and energy recovery.

**Keith E. Dennett** ([kdennett@unr.edu](mailto:kdennett@unr.edu)), Associate Professor of Civil and Environmental Engineering, Ph.D., Georgia Institute of Technology, 1995. Drinking water and wastewater treatment, physicochemical processes, sediment transport, open channel hydraulics.

**Edward P. Kolodziej** ([koloj@unr.edu](mailto:koloj@unr.edu)), Assistant Professor of Civil and Environmental Engineering, Ph.D., University of California, Berkeley, 2005. Aquatic chemistry in natural systems, trace analysis of pharmaceutical and endocrine-disrupting chemicals in environmental systems, drinking water treatment, physicochemical processes.

**Eric A. Marchand** ([marchand@unr.edu](mailto:marchand@unr.edu)), Associate Professor and Graduate Director of Civil and Environmental Engineering, Ph.D., University of Colorado at Boulder, 2000. Biological processes for water and wastewater treatment, biogeochemical processes in the subsurface environment, application of molecular-based microbiology methods in environmental engineering, in situ bioremediation.

Faculty from other [Departments and Colleges at UNR](#) as well as from the [Desert Research Institute \(DRI\)](#) may also direct students in the [Civil and Environmental Engineering](#) graduate program.

## CORRESPONDENCE AND INFORMATION

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## M.S. DEGREE PROGRAM IN CIVIL AND ENVIRONMENTAL ENGINEERING

Two options are available for students pursuing a M.S. degree in [Civil and Environmental Engineering](#): thesis and non-thesis.

### Credit Requirements – Thesis Option

**Thesis Option** A minimum of 24 credits of acceptable graduate course work must be completed in addition to 6 thesis credits for a total of 30 credits. At least 21 of those credits must be earned in on-campus courses at the university. At least 18 credits (including thesis credits) in the program must be at least 700-level.

**Non-Thesis Option** A minimum of 32 credits of acceptable graduate course work and a comprehensive examination must be completed. At least 23 credits must be earned in on-campus courses at the university. At least 15 of the 32 total credits must be earned at the 700-level.

### Program of Study and Advisory/Examining Committee – Thesis and Non-Thesis Options

A student may be admitted to the M.S. program with a temporary advisor. As soon as possible, usually within the first semester, each student should select a permanent advisor. The student and the permanent advisor will form an examining committee that will develop the student's program of study and either supervise thesis research or administer the comprehensive examination. The examining committee should be approved prior to the completion of 12 graduate credits. The committee consists of at least three members of the graduate faculty. Two faculty members must be selected from the [Civil and Environmental Engineering Department](#) and one faculty member is selected from the university-at-large as a [Graduate School Representative](#). All committee members are involved in the approval of the student's program of study. Changes in the program of study may be made only with the approval of the entire committee and the graduate dean. All committee members are usually involved in the approval of a thesis topic or in the design and administration of all examinations.

### Thesis Defense and Examination – Thesis Option

M.S. students who choose the thesis option must complete a public thesis defense and satisfactorily answer questions from the examining committee.

### Comprehensive Examination – Non-Thesis Option

M.S. students who choose the non-thesis option must complete a comprehensive examination that consists of both written and oral components. The comprehensive examination is designed to ensure that a student has attained a reasonable level of proficiency in environmental engineering. Examinations are administered by the environmental engineering faculty after the majority of course work is completed and the student is required to register for the comprehensive examination (1 credit-CEE 795) on a satisfactory/unsatisfactory basis during the semester when the examination takes place. The written examination consists of core areas within program with questions are submitted by the examining committee and program faculty (determined at discretion of primary advisor). The exam format is as follows: 1-day (8 hour), open book/notes, must achieve 70% overall; only 1 re-take allowed for failed sections with 75% or greater required to pass. The oral examination follows successful completion of the written exam and tests the student's general knowledge of environmental engineering. The examining committee participates in the oral exam, which must be completed satisfactorily before the student may file for degree candidacy.

### Admission to Candidacy – Thesis and Non-Thesis Options

Advancement to degree candidacy confirms that a student has successfully completed departmental course requirements and university residency requirements. Students should file for candidacy after completing the comprehensive examination or formal thesis defense.

## **REQUIREMENTS FOR THE M.S. DEGREE IN CIVIL/ENVIRONMENTAL ENGINEERING THESIS OPTION**

### Graduate School Requirements

- Minimum of 30 credits of approved course work including 6 credits of CEE 797: Graduate Thesis
- Minimum of 18 credits of 700-level course work including 6 credits of CEE 797: Graduate Thesis
- Minimum of 21 credits completed on campus
- Completion of thesis and successful thesis defense

### Core Courses

Students must take all of the following courses.

CEE 653: Environmental Microbiology	3 credits
CEE 750: Graduate Seminar	1 credit
CEE 751: Biological Unit Operations	4 credits
CEE 752: Physiochemical Unit Processes	4 credits
CEE 756: Environmental Chemical Kinetics	3 credits

### Elective Courses

At least 9 credits must be selected from the following list<sup>†</sup>.

CEE 604: Open Channel Flow	3 credits
CEE 611: Environmental Law	3 credits
CEE 613: Water Resources Engineering	3 credits
CEE 614: Water Resources Engineering II	3 credits
CEE 617: Introduction to Environmental Quality and Analysis	3 credits
CEE 618: Principles of Water Quality Modeling	3 credits
CEE 656: Design of Water Treatment Facilities	3 credits
CEE 657: Design of Wastewater Treatment Facilities	3 credits
CEE 658: Fundamentals of Environmental Chemistry	3 credits
CEE 659: Hazardous and Solid Waste Management and Control	3 credits
CEE 754: Unit Operations and Processes Laboratory	3 credits
CEE 771: Special Topics (maximum of 6 credits)	3 credits

<sup>†</sup>With committee approval, additional courses may be selected from other graduate programs such as: [Atmospheric Sciences](#), [Chemical Engineering](#), [Natural Resources and Environmental Science](#), [Geography](#), [Hydrologic Sciences](#), [Geological Sciences and Engineering](#), or other related programs.

Students entering the program with a non-civil/environmental engineering B.S. degree must also complete additional undergraduate courses as described previously (Page 2).

Students are required to enroll in and attend the Graduate Seminar program (CEE 750) each semester; however, no more than 2 credits of Graduate Seminar will count toward degree requirements.

Students who have not passed the Fundamentals of Engineering (FE) Exam as undergraduates are highly encouraged to do so prior to completing their graduate degree requirements.

## **REQUIREMENTS FOR THE M.S. DEGREE IN CIVIL AND ENVIRONMENTAL ENGINEERING NON-THESIS OPTION**

### Graduate School Requirements

- Minimum of 32 credits of approved course work
- Minimum of 15 credits of 700-level course work
- Minimum of 23 credits completed on campus
- Passing grade on both written and oral components of the comprehensive exam (CEE 795)

### Core Courses

CEE 653: Environmental Microbiology	3 credits
CEE 750: Graduate Seminar	1 credit
CEE 751: Biological Unit Operations	4 credits
CEE 752: Physiochemical Unit Processes	4 credits
CEE 756: Environmental Chemical Kinetics	3 credits
CEE 795: Comprehensive Exam	1 credit

### Elective Courses

At least three courses must be selected from the following list<sup>†</sup>.

CEE 604: Open Channel Flow	3 credits
CEE 611: Environmental Law	3 credits
CEE 613: Water Resources Engineering	3 credits
CEE 614: Water Resources Engineering II	3 credits
CEE 617: Introduction to Environmental Quality and Analysis	3 credits
CEE 618: Principles of Water Quality Modeling	3 credits
CEE 656: Design of Water Treatment Facilities	3 credits
CEE 657: Design of Wastewater Treatment Facilities	3 credits
CEE 658: Fundamentals of Environmental Chemistry	3 credits
CEE 659: Hazardous and Solid Waste Management and Control	3 credits
CEE 754: Unit Operations and Processes Laboratory	3 credits
CEE 771: Special Topics (maximum of 6 credits)	3 credits

<sup>†</sup>With committee approval, additional courses may be selected from other graduate programs such as: [Atmospheric Sciences](#), [Chemical Engineering](#), [Natural Resources and Environmental Science](#), [Geography](#), [Hydrologic Sciences](#), [Geological Sciences and Engineering](#), or other related programs.

Students entering the program with a non-civil/environmental engineering B.S. degree must also complete additional undergraduate courses as described previously (page 2).

Students are required to enroll in and attend the Graduate Seminar program (CEE 750) each semester; however, no more than 2 credits of Graduate Seminar will count toward degree requirements.

Students who have not passed the Fundamentals of Engineering (FE) Exam as undergraduates are highly encouraged to do so prior to completing their graduate degree requirements.

## **PH.D. DEGREE PROGRAM IN CIVIL AND ENVIRONMENTAL ENGINEERING**

The doctor of philosophy (Ph.D.) degree is conferred for work of distinction, in which a student displays original scholarship and achievement. A student must exhibit a broad mastery of the field of environmental engineering by passing a comprehensive examination. After passing the comprehensive examination, a student may apply for admission to candidacy. A student must also prove his/her ability to design and complete a program of original research by preparing a dissertation that adds to existing knowledge.

### **Credit Requirements**

At least 48 credits of acceptable graduate course work must be completed in addition to 24 dissertation credits for a total of 72 credits. A maximum of 24 credits of approved course work (with grades of B or better) from a master's degree program or previous post baccalaureate graduate studies program may be allocated toward the doctoral degree. At least 30 credits (excluding dissertation credits) in the program must be at the 700-level with a maximum of 18 of these credits being transferred from a master's degree program. For additional information on credit requirements, degree time limits, and residency requirements, refer to the Graduate School section of the University Catalog or to the [Graduate School Web site](#).

### **Qualifying Exam, Program of Study, and Advisory/Examining Committee**

Within the first year of their Ph.D. studies, all students must take and pass a qualifying exam covering core areas within the environmental engineering area. After successfully passing the qualifying exam, the student and advisor will form an advisory/examining committee that will develop the student's program of study, supervise dissertation research, review the student's research proposal, and administer the comprehensive examination. The committee consists of at least five members of the graduate faculty: the permanent advisor, two faculty members from the [Civil and Environmental Engineering Department](#), one faculty member from a department in a field related to the student's major, and one graduate faculty member from the university-at-large as a [Graduate School Representative](#). All committee members are involved in the approval of the student's program. Changes in the program may be made only with the approval of the entire committee and the graduate dean. All committee members are also involved in the approval of a thesis topic as well as in the design and conduct of all examinations.

### **Comprehensive Examination and Admission to Candidacy**

The comprehensive examination (1 credit-CEE 795) is designed to test the student's mastery of a broad field of knowledge and not merely the formal course work that has been completed. The comprehensive examination should be taken as soon as possible after the completion of all course requirements, but no later than eight months before graduation. The exam may be taken after a minimum of 75 percent of a student's required course work is completed. The comprehensive exam consists of both written and oral components. The written exam is designed and administered by the environmental engineering faculty, and the oral exam is administered and evaluated by the advisory and examining committee. Advancement to degree candidacy confirms that a student has successfully completed departmental course requirements and university residency requirements. A student should file for candidacy not later than eight months prior to graduation and not before successfully completing the comprehensive examination.

### **The Dissertation**

The dissertation must represent an original and independent investigation that comprises a contribution to environmental engineering knowledge. It should reflect not only mastery of research techniques, but also an ability to select an important problem for investigation. A student's research must indicate competent study and demonstrate the dissertation results in an acceptable manner.

## REQUIREMENTS FOR THE PH.D. DEGREE IN CIVIL AND ENVIRONMENTAL ENGINEERING

### Graduate School Requirements

- Minimum of 72 credits of approved course work including at least 24 credits of CEE 799: Graduate Dissertation
- Minimum of 48 credits of approved course work including up to 24 credits of approved course work from M.S. Program
- Minimum of 30 credits of 700-level course work including up to 18 credits of approved course work from M.S. Program
- Passing grade on both written and oral components of the comprehensive exam (CEE 795)
- Completion of dissertation and formal dissertation defense

### Core Courses

CEE 653: Environmental Microbiology	3 credits
CEE 750: Graduate Seminar	1 credit
CEE 751: Biological Unit Operations	4 credits
CEE 752: Physiochemical Unit Processes	4 credits
CEE 756: Environmental Chemical Kinetics	3 credits

### Elective Courses

At least three courses must be selected from the following list<sup>†</sup>.

CEE 604: Open Channel Flow	3 credits
CEE 611: Environmental Law	3 credits
CEE 613: Water Resources Engineering	3 credits
CEE 614: Water Resources Engineering II	3 credits
CEE 617: Introduction to Environmental Quality and Analysis	3 credits
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CEE 658: Fundamentals of Environmental Chemistry	3 credits
CEE 659: Hazardous and Solid Waste Management and Control	3 credits
CEE 754: Unit Operations and Processes Laboratory	3 credits
CEE 771: Special Topics (maximum of 6 credits)	3 credits

<sup>†</sup>With committee approval, additional courses may be selected from other graduate programs such as: [Atmospheric Sciences](#), [Chemical Engineering](#), [Natural Resources and Environmental Science](#), [Geography](#), [Hydrologic Sciences](#), [Geological Sciences and Engineering](#), or other related programs.

Students entering the program with a non-civil/environmental engineering B.S. degree must also complete additional undergraduate courses as described previously (page 2).

Students are required to enroll in and attend the Graduate Seminar program (CEE 750) each semester; however, no more than 2 credits of Graduate Seminar will count toward degree requirements.

Students who have not passed the Fundamentals of Engineering (FE) Exam as undergraduates are highly encouraged to do so prior to completing their graduate degree requirements.