

Graduate Programs
ENVIRONMENTAL SCIENCE, ENVIRONMENTAL ENGINEERING
AND CIVIL ENGINEERING

www.ou.edu/coe/cees/grad_programs/environmental

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INTRODUCTION

The School of Civil Engineering and Environmental Science (CEES) at the University of Oklahoma has a longstanding tradition of excellence in graduate education in the environmental field and offers degrees at both the master's and doctoral levels. This brochure describes the requirements for the following degree programs: Master of Environmental Science, Master of Science in Environmental Engineering, Master of Science in Civil Engineering (water resources engineering) and the doctoral degrees in environmental science, environmental engineering, and civil engineering. The Master of Civil Engineering and doctoral degree programs in structural and geotechnical engineering are described in a separate document.

DEGREE PROGRAMS

Master's Degree Programs (MES, MS Env. Engr., and MSCE)

The MES program is open to students with undergraduate degrees in the physical, natural, or life sciences or related disciplines who have completed certain minimum undergraduate coursework. The MS Env. Engr. and MSCE programs are open to students with undergraduate degrees in environmental or civil engineering or related engineering or science disciplines who have completed certain minimum undergraduate coursework. Specific entrance requirements for each degree program are described in the following section, "Entrance Requirements for the MES, MS Env. Engr., and MSCE Degree Programs".

Both thesis and coursework only options are available for all master's degree programs. The coursework only option requires completion of 32 semester credit hours, and the thesis option requires completion of 30 semester credit hours including five hours devoted to thesis research and one hour to a course on technical communications. The thesis option also requires a final defense.

Each degree program consists of discipline-specific core courses, technical electives, and a writing component as outlined in Tables 1-3. As shown in Table 3, there is an environment-related program area for the MSCE degree: Water Resources Engineering.

In some cases, core course requirements for the master's degree may be satisfied by undergraduate coursework, but courses completed as part of an undergraduate degree program cannot count toward the number of credit hours required for a graduate degree. Discuss a course substitution with your faculty advisor.

Entrance Requirements

MES Program: Admission to the MES program requires an undergraduate degree in environmental science, biology, chemistry, math, physics, geology, meteorology, environmental engineering, chemical engineering, or a related discipline and completion of the following courses: Two semesters of calculus (MATH 1823 and MATH 2423, or equivalent¹); One semester of physics (PHYS 2414 or equivalent); One semester of chemistry (CHEM 1415 or equivalent); One semester of biological sciences (ZOO 1114 or BOT 1114 or BIOL 1134 or equivalent).

Courses not completed prior to admission will be assigned as deficiency courses (see below).

MSEE Program: Admission to the MS Env. Engr. program requires an undergraduate degree in a related engineering or science discipline and completion of the following courses:

- Calculus through differential equations (MATH 1924, 2924, 2934, and G3113 or equivalent¹)
- Two semesters of physics (PHYS 2514 and 2524, or PHYS 2414 and 2424, or equivalent)
- At least one semester of introductory college chemistry (CHEM 1415 or equivalent)
- Fluid Mechanics (CEES 2223 or equivalent)
- Statics (CEES 2113 or equivalent)
- Water and Wastewater Treatment (CEES 3243 or equivalent)
- Water Resources Engineering (CEES 3213 or equivalent)

Courses not completed prior to admission will be assigned as deficiency courses (see below). If an applicant has not completed the equivalent of either of these two-semester physics sequences, then PHYS 2514 and 2524 will be assigned as deficiency courses.

MSCE Program: Admission to the MSCE program in Water Resources Engineering requires an undergraduate degree in a related engineering or science discipline and completion of the following courses:

- Calculus through differential equations (MATH 1924, 2924, 2934, and G3113 or equivalent¹)
- Two semesters of physics (PHYS 2514 and 2524, or PHYS 2414 and 2424, or equivalent)
- At least one semester of introductory college chemistry (CHEM 1415 or equivalent)
- Fluid Mechanics (CEES 2223 or equivalent)
- Statics (CEES 2113 or equivalent)
- Water Resources Engineering (CEES 3213 or equivalent)

Courses not completed prior to admission will be assigned as deficiency courses (see below). Because of diverse student backgrounds, either PHYS 2514 and 2524 or PHYS 2414 and 2424, or equivalent, can be used to satisfy the MSCE admission requirements for physics. If an applicant has not completed the equivalent of either of these two-semester physics sequences, then PHYS 2514 and 2524 will be assigned as deficiency courses.

¹ For all classes listed here, equivalent courses taken at other universities are acceptable. For comparison, the OU course catalog is available online at: <http://www.ou.edu/bulletins/>.

Deficiency Courses: Students who have completed some, but not all, of the entrance requirements for the MES, MS Env. Engr., or MSCE degree programs may be conditionally admitted, with the condition that they successfully complete certain deficiency courses at the beginning of their degree program. Deficiency courses are required in addition to stated program course requirements (Tables 1-3) and do not count toward the master's degree.

Before applying to any master's degree program, prospective students should carefully review the entrance requirements to determine the number of deficiency courses that would be required and to determine which degree program is best for them. If conditionally admitted, it is the responsibility of each student to consult with his or her advisor to determine if he or she has the necessary prerequisite knowledge prior to enrolling in deficiency courses. A letter grade of "B" or better is required for all deficiency courses.

Please note that completion of these deficiencies will not necessarily qualify students to pursue licensure following completion of the master's degree. Students should consult with the appropriate state board of licensure for current requirements.

Doctor of Philosophy Degree (PhD)

CEES offers doctoral degrees in environmental science, environmental engineering, and civil engineering. A master's degree in a related discipline is typically required for admission to all CEES PhD degree programs, although students who have outstanding academic credentials and a documented record of research experience at the undergraduate level may occasionally be admitted to the doctoral program without a master's degree. Admission to the doctoral program in environmental engineering or civil engineering also requires at least one degree in engineering, or completion of the entrance requirements for the MS Env. Engr. or MSCE degree program. For applicants to the PhD program in environmental engineering who do not have at least one degree in engineering, Open Channel Flow (CEES 4123G or equivalent) can be substituted for Water Resources Engineering (CEES 3213 or equivalent) as an entrance requirement.

In addition to coursework, the doctoral program is tailored to the specific interests of the student and requires completion of research that expands their professional knowledge in the fundamental concepts of environmental science, environmental engineering, or civil engineering. The student is expected to produce a research dissertation that describes significant new findings in their field, and that is sufficient in scope to form the basis of two or more papers published in refereed journals. The doctoral degree requires a minimum of 48 hours of post-bachelor's coursework, a minimum of 4 and a maximum of 41 hours of dissertation research, and one hour of technical communications, all totaling at least 90 post bachelor's hours. Twenty-four hours of CEES courses or equivalent and at least 6 hours of courses outside CEES are required. The coursework required for the doctoral program is determined by each student with the approval of their advisor and a faculty committee and is based on the student's educational background and chosen research program.

ADMISSION REQUIREMENTS

Enrollment as a graduate student in CEES requires:

- an undergraduate degree in civil engineering, environmental engineering, or environmental science **or** an undergraduate degree in an associated area plus approved additional coursework
- a 3.0 GPA or above from an accredited university or college
- completed Statement of Goals or Purpose (500 words or less)
- two letters of reference (master's degree) and three letters of reference (doctoral degree) that address applicant's knowledge of engineering and scientific principles, analytical abilities, experimental abilities, initiative and communication skills, plus additional comments that would be beneficial in evaluating applicant's skills
- official GRE scores are optional and not required for admission but may be required by some potential faculty sponsors to be considered for a Qualifying Graduate Assistantship.
- TOEFL (iBT) score of at least 79 for students whose native language is not English

In addition, for admission to the doctoral program, applicants are encouraged to submit a sample of written research work, such as a refereed publication or abstract of a master's thesis.

TRANSFER CREDITS

No more than 8 hours of eligible graduate coursework may be transferred from another institution for the master's degree. No more than 30 hours of eligible graduate coursework, including a maximum of 5 hours of master's thesis research, may be transferred from another institution for the doctoral degree.

FINANCIAL ASSISTANCE

The University of Oklahoma provides research and teaching assistantships to qualified graduate students. These assistantships include a stipend, tuition waiver, and health benefits. Students with assistantships can enroll for a maximum of 9 credit hours per semester and are not subjected to tuition fees. OU fellowships may be available for highly qualified students pursuing the doctoral degree. CEES also has fellowships funded by the Grand River Dam Authority for students working on projects within the Grand Lake Watershed.

All applicants are considered for funding during admission review, and you may hear back from a faculty member once they begin to review applications. You may also contact a faculty member in your area of interest to see if financial assistance is available.

Research assistants typically write their thesis or dissertation on the subject for which financial support is received. Teaching assistants typically supervise laboratory sections, hold office hours, and grade assignments. Instructor positions are occasionally available for doctoral students, particularly those interested in an academic career. Graduate students whose native language is not English must first pass an English proficiency exam before being appointed as a teaching assistant or instructor with student contact.

Master's students receiving financial assistance are almost always those who pursue the thesis option. Because students with assistantships typically spend 10-20 hours per week on their teaching or research responsibilities, such students may take up to an additional year to complete their master's degree.

THE UNIVERSITY OF OKLAHOMA

Created by the Oklahoma Territorial Legislature in 1890, the University of Oklahoma is a doctoral degree-granting research university serving the educational, cultural, economic, and healthcare needs of the state, region, and nation. The Norman campus serves as home to all the university's academic programs except health-related fields. The OU Health Sciences Center, which is in Oklahoma City, is one of only four comprehensive academic health centers in the nation with seven professional colleges. Both the Norman and Health Sciences Center colleges offer programs at the Schusterman Center, the site of OU-Tulsa. OU enrolls approximately 30,000 students, has nearly 3,000 faculty members and has 20 colleges offering 152 majors at the baccalaureate level, 160 majors at the master's level, 75 majors at the doctoral level, and 20 majors at the professional level. The university's annual operating budget is approximately \$2.4 billion and is an equal opportunity institution.

THE COMMUNITY

Norman, Oklahoma is a community of about 124,000 located 18 miles south of Oklahoma City and 190 miles north of Dallas. A variety of recreational, cultural, and social activities are available in Norman and surrounding areas. Lake Thunderbird, 10 miles east of Norman, provides an excellent setting for numerous water activities. Norman was recognized as one of the most progressive cities in the state and the Norman Public School system has been acknowledged as one of the top school systems in Oklahoma.

Oklahoma City, with a metropolitan population of approximately 1.4 million, is the state's capital and largest city, and boasts a minor league ballpark and a canal that flows beside choice restaurants, shops, and quaint cafes in the historic Bricktown entertainment district. In the downtown Oklahoma City area, you'll also find the Myriad Botanical Gardens, the Oklahoma City National Memorial, and the Oklahoma City Museum of Art. There's never a shortage of fun in the metro. With more than 50 attractions, you can catch a movie in the OmniDome large-format theater at the Science Museum Oklahoma (formerly called the Omniplex) or tour one of the nation's top zoos right next door. Don't miss a stroll through the National Cowboy and Western Heritage Museum, where galleries are full of priceless Western art and treasures.

APPLICATIONS

To apply, visit our application website at <https://www.ou.edu/coe/cees/apply> and then the university's Graduate College application website at <https://gograd.ou.edu/apply/>.

The University of Oklahoma in compliance with all applicable federal and state laws and regulations does not discriminate on the basis of race, color, national origin, sexual orientation, genetic information, sex, age, religion, disability, political beliefs, or status as a veteran in any of its policies, practices or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services. For questions regarding discrimination, sexual assault, sexual misconduct, or sexual harassment, please contact the Office(s) of Institutional Equity as may be applicable – Norman campus at (405) 325-3546/3549, the Health Sciences Center at (405) 271-2110 or the OU-Tulsa Title IX Office at (918) 660-3107. Please see www.ou.edu/eoo.

Accommodations are available by contacting (405) 325-2344 or ceesgradstudies@ou.edu.

CEES FACULTY

Websites of individual faculty members can be accessed through www.ou.edu/coe/cees/people.

COURSE OFFERINGS

Table 1. MES Degree Requirements

I. MES Thesis Option		
Core Courses (select 3 of the following)		Credit Hours
CEES 5114	Aquatic Chemistry	4
CEES 5324	Environmental Biology and Ecology	4
CEES 5843	Hydrology	3
CEES 5853	Groundwater & Seepage	3
	Total	10-11
Elective Courses		
Choose from list of MES electives ¹	Total	12-14
Writing and Research		
CEES 5021	Technical Communications	1
CEES 5980	Research for Master's Thesis	5-6
	Total Credits	30 minimum

II. MES Coursework Only Option		
Core Courses (select 3 of the following)		Credit Hours
CEES 5114	Aquatic Chemistry	4
CEES 5324	Environmental Biology and Ecology	4
CEES 5843	Hydrology	3
CEES 5853	Groundwater & Seepage	3
	Total	10-11
Elective Courses		
Choose from list of MES electives ¹	Total	21-22
	Total Credits	32 minimum

¹ All elective courses are subject to the following restrictions: (i) they must be numbered 5000 or higher, or, for 3000 and 4000 courses, have a "G" preceding the number; (ii) no G3000 courses from CEES may count toward the master's degree; (iii) no more than 9 credits of G4000 courses from CEES, including required core courses, may count toward the master's degree; (iv) no more than 12 credits of G3000 and G4000 courses from all departments, including CEES, may count toward the master's degree; and (v) no more than 2 courses from departments outside CEES may count toward the master's degree.

List of Possible MES Electives¹:

Course	Title	Credit Hours
CEES G4123	Open Channel Flow	3
CEES G4243	Water Technologies for Emerging Regions	3
CEES G4263	Hazardous and Solid Waste Management	3
CEES G4453	Geomatics Engineering	3
CEES 5244	Physicochemical Water Treatment Processes	4
CEES 5283	Environmental Organic Chemistry	3
CEES 5363	Ecological Engineering Science	3
CEES 5373	Water Resources Management	3
CEES 5624	Biological Waste Treatment	4
CEES 5673	Colloid/Surface Science	3
CEES 5833	Ground Water Quality Protection	3
CEES 5843	Hydrology	3
CEES 5853	Groundwater & Seepage	3
CEES 5873	Water Quality Management	3
CEES 5883	Environmental Modeling	3
ENGR G4513	Introduction to Sustainable Engineering	3
BIOL G4462	Limnology	2
BIOL G4472	Limnology Lab	2
BIOL 5970	Experimental Design in Ecology	3
BIOL 5970	Introduction to Stream Ecology	3
CHEM 5XXX	Any Course Related to Research	3-4
CHEM 6XXX	Any Course Related to Research	3-4
GEOG 5293	Hydrologic Science	3
GEOG 5453	Geographic Information Systems	3
GEOL 5333	Chemistry of Natural Systems I	3
GEOL 5363	Carbonate Geology	3
GEOL 5743	Organic Geochemistry	3
GEOL 6103	Petroleum Geochemistry	3
GIS 4453/5453	GIS and Spatial Analysis	3
GIS 4653/5653	Spatial Programming	3
MATH G4753	Applied Statistical Methods	3
MBIO 5810	Geomicrobiology	3
MBIO 6873	Microbial Ecology	3
PBIO 5990	Field Botany	3
PBIO 6484	Physiological Plant Ecology	4
PBIO/MBIO 5803	Plant Microbe Interactions	3

¹ MES students may choose elective courses in civil engineering, environmental science, chemistry, biology, geosciences, policy and law, air pollution, risk assessment and industrial hygiene, hydrology, and/or related subjects. Graduate courses not listed here may also be used as electives with the advisor's prior approval. See other restrictions on elective courses in footnote 1 to Table 1.

Table 2. MS Env. Engr. Degree Requirements

I. MS Env. Engr. Thesis Option		
Core Courses (required)		Credit Hours
CEES 5114	Aquatic Chemistry	4
CEES 5244	Physicochemical Water Treatment Processes	4
CEES 5624	Biological Waste Treatment	4
	Total	12
Elective Courses		
Choose from list of MS Env. Engr. and MSCE electives ¹	Total	11-12
Writing and Research		
CEES 5021	Technical Communications	1
CEES 5980	Research for Master's Thesis	5-6
	Total Credits	30 minimum

II. MS Env. Engr. Coursework Only Option		
Core Courses (required)		Credit Hours
CEES 5114	Aquatic Chemistry	4
CEES 5244	Physicochemical Water Treatment Processes	4
CEES 5624	Biological Waste Treatment	4
	Total	12
Elective Courses		
Choose from list of MS Env. Engr. and MSCE electives ¹	Total	20
	Total Credits	32 minimum

¹ All elective courses are subject to the following restrictions: (i) they must be numbered 5000 or higher, or, for 3000 and 4000 courses, have a "G" preceding the number; (ii) no G3000 courses from CEES may count toward the master's degree; (iii) no more than 9 credits of G4000 courses from CEES, including required core courses, may count toward the master's degree; (iv) no more than 12 credits of G3000 and G4000 courses from all departments, including CEES, may count toward the master's degree; and (v) no more than 2 courses from departments outside CEES may count toward the master's degree.

Table 3a. MSCE Degree Requirements—Water Resources Engineering Program Area

I. MSCE Thesis Option—Water Resources Engineering Program Area		
Core Courses (required)		Credit Hours
CEES 5843	Hydrology	3
CEES 5853	Groundwater & Seepage	3
CEES G4123	Open Channel Flow	3
	Total	9
Elective Courses		
Choose from list of MS Env. Engr. and MSCE electives ¹	Total	14-15
Writing and Research		
CEES 5021	Technical Communications	1
CEES 5980	Research for Master's Thesis	5-6
	Total Credits	30 minimum

II. MSCE Coursework Only Option—Water Resources Engineering Program Area		
Core Courses (required)		Credit Hours
CEES 5843	Hydrology	3
CEES 5853	Groundwater & Seepage	3
CEES G4123	Open Channel Flow	3
	Total	9
Elective Courses		
Choose from list of MS Env. Engr. and MSCE electives ¹	Total	23
	Total Credits	32 minimum

¹ All elective courses are subject to the following restrictions: (i) they must be numbered 5000 or higher, or, for 3000 and 4000 courses, have a "G" preceding the number; (ii) no G3000 courses from CEES may count toward the master's degree; (iii) no more than 9 credits of G4000 courses from CEES, including required core courses, may count toward the master's degree; (iv) no more than 12 credits of G3000 and G4000 courses from all departments, including CEES, may count toward the master's degree; and (v) no more than 2 courses from departments outside CEES may count toward the master's degree.

List of Possible MS Env. Engr. and MSCE Electives¹:

Course	Title	Credit Hours
CEES G4243	Water Technologies for Emerging Regions	3
CEES G4263	Hazardous and Solid Waste Management	3
CEES G4333	Foundation Engineering	3
CEES G4453	Geomatics Engineering	3
CEES 5114	Aquatic Chemistry	4
CEES 5244	Physicochemical Water Treatment Processes	4
CEES 5283	Environmental Organic Chemistry	3
CEES 5324	Environmental Biology and Ecology	4
CEES 5343	Advanced Soil Mechanics	3
CEES 5363	Ecological Engineering Science	3
CEES 5373	Water Resources Management	3
CEES 5433	In-Situ Soil Testing	3
CEES 5624	Biological Waste Treatment	4
CEES 5673	Colloid/Surface Science	3
CEES 5833	Ground Water Quality Protection	3
CEES 5843	Hydrology	3
CEES 5853	Groundwater & Seepage	3
CEES 5873	Water Quality Management	3
CEES 5883	Environmental Modeling	3
ENGR G4513	Introduction to Sustainable Engineering	3
CS 5743	Large-Scale Scientific Computing	3
MATH G4753	Applied Statistical Methods	3
MATH 5103	Mathematical Models	3
MATH 5163	Partial Differential Equations	3
MATH 5173	Advanced Numerical Analysis I	3
MATH 5743	Introduction to Mathematical Statistics	3
METR 5344	Computational Fluid Dynamics I	4

¹ MS Env. Engr. and MSCE students may choose elective courses in civil engineering, environmental science, mathematics, meteorology, computer science, and/or related subjects. Graduate courses not listed here may also be used as electives with the advisor's prior approval. See other restrictions on elective courses in footnote 1 to Tables 2 and 3.