Program Change Request

Date Submitted: 09/26/17 4:13 pm

Viewing: ENEGMS : Environmental Engineering, Master of Science in Environmental Engineering

Last approved: 05/17/16 1:34 pm
Last edit: 11/08/17 1:33 pm
Changes proposed by: rdw

Catalog Pages Using this Program

Environmental Engineering (ENEG)

Submitter: calison  Phone: 575-7535 675-6731

Program Status: Active
Academic Level: Graduate
Type of proposal: Major/Field of Study

Are you adding a concentration? No
Are you adding a track? No
Are you adding a focused study? No

Effective Catalog Year: Fall 2018
College/School Code: College of Engineering (ENGR)
Department Code: Department of Civil Engineering (CVEG)
Program Code: ENEGMS
Degree: Master of Science in Environmental Engineering
CIP Code: 14.1401 - Environmental/Environmental Health Engineering.
Program Title: Environmental Engineering, Master of Science in Environmental Engineering
Program Delivery Method: On Campus

Is this program interdisciplinary? No
Does this proposal impact any courses from another College/School? No

What are the total hours needed to complete the program? 30

Program Requirements and Description

Requirements

Admission Criteria: In addition to the requirements of the Graduate School, the following are the minimum criteria for admission to the M.S.En.E. degree program:
GPA: 3.00 or higher
GRE Scores: No less than 302 (verbal + quantitative) and 3.5 analytical writing

Degree Requirements:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEG 5203</td>
<td>Water Chemistry (Sp)</td>
<td>3</td>
</tr>
<tr>
<td>CVEG 5213</td>
<td>Water Treatment &amp; Distribution System Design (Sp)</td>
<td>3</td>
</tr>
<tr>
<td>CVEG 5214</td>
<td>Advanced Wastewater Process Design &amp; Analysis (Fa)</td>
<td>4</td>
</tr>
<tr>
<td>CVEG 5233</td>
<td>Microbiology for Environmental Engineers (Irregular)</td>
<td>3</td>
</tr>
<tr>
<td>CVEG 5273</td>
<td>Open Channel Flow (Irregular)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Thesis Option:** Accreditation of the M.S. En.E program by the Accreditation Board for Engineering and Technology (ABET) requires candidates to fulfill some baccalaureate degree requirements in non-engineering and engineering undergraduate courses. Candidates must complete the State of Arkansas Minimum Core Curriculum for baccalaureate degrees, which includes American History, Government, English Composition, Higher Mathematics, Science, Humanities & Fine Arts, and Social Sciences. Regardless of undergraduate discipline, each candidate must complete a number of basic undergraduate engineering courses. In general, graduates of ABET accredited engineering programs will have already completed most, if not all, of these courses. However, the prerequisite requirements for graduates of programs other than engineering can be quite significant. All M.S. En.E. degree candidates, regardless of previous degree status, must demonstrate completion of the Basic Engineering Education and Environmental Engineering breadth requirements listed below. The cumulative grade-point average on basic engineering education and environmental engineering breadth courses must be at least 2.70. Candidates who do not possess a degree from a program accredited by ABET must also satisfy the basic level ABET accreditation requirement. These include completion of no less than 32 credit hours of university-level mathematics and science, and 48 credit hours of approved engineering topics. Candidates must also demonstrate to the satisfaction of the student's graduate study committee, that he/she possesses the abilities and characteristics required of graduates from ABET accredited engineering programs. This shall include the completion of a course that concentrates on a major design project which results in the production of a design report or other design product as appropriate. The design project must build on and require engineering
knowledge and skills from previous coursework and must incorporate engineering standards and realistic constraints. The course selected to satisfy this requirement is subject to the approval of the student’s graduate study committee. Exceptions to these degree requirements may be requested by means of a petition outlining the reasons for the exceptions and presenting an alternate plan for completing the program. The petition shall be subject to the approval of the student’s graduate study committee, program faculty, and the Director of the M.S. En. E. program. Credit for courses taken at another institution is subject to the approval of the Director of the M.S. En. E. program.

- Required Topics and Recommended Courses
  - BENG 3723: Unit Operations in Biological Engineering (Sp)
  - BENG 4933: Sustainable Watershed Engineering (Fa)
  - CHEG 3333: Chemical Engineering Reactor Design (Sp, Fa)
  - CHEG 4813: Chemical Process Safety (Fa)
  - CVEG 3133: Soil Mechanics (Sp, Fa)
  - CVEG 4203: Environmental Regulations and Permits (Fa)
  - CVEG 4243: Environmental Engineering Design (Sp, Fa)
  - CVEG 4513: Construction Management (Sp, Fa)
  - CVEG 4273: Open Channel Flow (Sp)
  - INEG 4223: Occupational Safety and Health Standards (Irregular)

Total Hours: 18

- General Education Recommended Courses
  - Humanities/Social Science (15 hours)
    - American History or American Government (3 hours)
    - HIST 2003: History of the American People to 1877 (ACTS Equivalency = HIST 2113) (Sp, Su, Fa)
    - HIST 2013: History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123) (Sp, Su, Fa)
  - English Composition (6 hours)
    - ENGL 1013: Composition I (ACTS Equivalency = ENGL 1013) (Sp, Su, Fa)
    - ENGL 1023: Composition II (ACTS Equivalency = ENGL 1023) (Sp, Su, Fa)

Mathematics and Basic Science Recommended Courses

- Calculus Through Differential Equations (15 hours)
  - MATH 2554: Calculus I (ACTS Equivalency = MATH 2405) (Sp, Su, Fa)
  - MATH 2564: Calculus II (ACTS Equivalency = MATH 2505) (Sp, Su, Fa)
  - MATH 2574: Calculus III (ACTS Equivalency = MATH 2603) (Sp, Su, Fa)

- Statistics and Probability (3 hours)
  - INEG 2313: Applied Probability and Statistics for Engineers I (Sp, Fa)

- General Chemistry (3 hours)
  - CHEM 1103: General Chemistry I (ACTS Equivalency = CHEM 2113 Lecture) (Sp, Su, Fa)
  - BIOL 2013: General Microbiology (ACTS Equivalency = BIOL 3204 Lecture) (Sp, Su, Fa)
  - CHEM 3504: Physical Chemistry I (Fa)
  - CHEM 3603: Organic Chemistry I (Sp, Fa)
  - CVEG 3133: Soil Mechanics (Sp, Fa)
  - CVEG 3223: Hydrology (Sp, Fa)

- General Engineering Education

- Required Topics and Recommended Courses
  - Statics & Mechanics of Materials (5-6 hours)
  - ENEGMS: Environmental Engineering, Master of Science in Environmental Engineering

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Fundamentals of Mechanics for Civil Engineers (Sp, Fa)
CVEG 3213  Hydraulics (Sp, Fa)
CVEG 2133  Fluid Mechanics (Sp, Su, Fa)
MEEG 3503  Mechanics of Fluids (Su, Fa)
Engineering Economics (3 hours)
INEG 2412  Engineering Economic Analysis (Sp, Fa)
Thermodynamics (3 hours)
CHEG 3144  Heat and Mass Transfer (Sp, Fa)
MEEG 2403  Thermodynamics (Sp, Su, Fa)
Environmental Engineering (3 hours)
CVEG 3213  Hydraulics or Fluid Mechanics (3 hours)
CVEG 2015  Environmental Engineering Design (Sp, Fa)
CVEG 4243  Environmental Engineering Design (Sp, Fa)

Total Hours 3

Required Courses
CVEG 2015  Fundamentals of Mechanics for Civil Engineers (Sp, Fa)
CVEG 3213  Hydraulics (Sp, Fa)
CVEG 2133  Fluid Mechanics (Sp, Su, Fa)
MEEG 3503  Mechanics of Fluids (Su, Fa)

Course Work Only Option: 30 semester hours of graded graduate-level course credits.

Both Options:

Upon admission, Exceptions to the Graduate School and acceptance in a program, these degree requirements may be requested by means of study, candidates pursuing a thesis-based program will be assigned an adviser, who will assist a petition outlining the reasons for the candidate with course selection and with finding a major advisor. The major advisor and exceptions and presenting an alternate plan for completing, the candidate will select a graduate committee. The candidate and major advisor, with guidance from petition shall be subject to the graduate committee, will develop a plan of study that will allow for the student's graduate study and a research project for completion committee, program faculty, and the Director of the requirements for the degree. M.S. En.E. The graduate committee will serve as course selected to satisfy this requirement is subject to the examination committee for approval of the research, the thesis, and the final oral examination. Students should be aware that most or all of the courses in this program have pre-requisite requirements. Students will be required to meet these pre-requisite requirements or obtain instructor permission to enroll. Required courses listed below:

CVEG 5203  Water Chemistry
CVEG 5213  Water Treatment & Distribution System Design
CVEG 5214  Advanced Wastewater Process Design and Analysis
CVEG 5233  Microbiology for Environmental Engineers
CVEG 5273  Open Channel Flow

4. The minimum acceptable grade for each course presented for the degree is a "C" (2.0 grade points). Candidates for the degree must present a cumulative grade point average of 3.00 on all graduate courses. The minimum acceptable grade for any course presented for the degree is "C", a "C-" (2.0 grade points).

5. A comprehensive examination that will include either a defense of the candidate's thesis or a presentation and discussion of the candidate's course work. Students should be aware of Graduate School requirements with regard to master's degrees and a master's report.

6. Students should also be aware of Graduate School requirements with regard to master's degrees. Students should be aware that most or all of the courses in this program have pre-requisite requirements. Students will be required to meet these pre-requisite requirements or obtain instructor permission to enroll. Required courses listed below:

CVEG 5203  Water Chemistry (Sp)
CVEG 5213  Water Treatment & Distribution System Design (Sp)
CVEG 5214  Advanced Wastewater Process Design and Analysis (Fa)
CVEG 5233  Microbiology for Environmental Engineers (irregular)
CVEG 5273  Open Channel Flow (irregular)

Estimated Student Demand for Program NA
Scheduled Program Review Date NA

Are Similar Programs available in the area?
Program Goals and Objectives

The goal of the M.S.En.E. program is to prepare graduates for careers in environmental engineering practice with government agencies, engineering firms, or industries and to provide a foundation for continued study at the post-masters level. The objectives of the M.S.En.E. program are to provide a greater depth of understanding of environmental engineering topics for the practice of engineering and to serve as preparation for doctoral studies. Students are allowed a great deal of flexibility in designing their course of study. Students desiring to develop a deeper understanding of one sub-discipline area may select courses solely concentrated in that area while those desiring a broader-based education may select courses from several sub-disciplines including courses from other disciplines. **NA**

Learning Outcomes

1. Apply knowledge of math, science, and engineering to solve advanced-level problems in environment engineering
2. Locate and evaluate pertinent published literature relevant to a given topic, and apply the information gained to a design, analysis, or research effort
3. Effectively communicate scientific and technical information in English, both in writing and oral forms
4. Design and conduct experiments, and analyze and evaluate the resulting data
5. Design a system, component, or process to meet a scientific or technological needs

**NA**

Description and justification of the request

<table>
<thead>
<tr>
<th>Description of specific change</th>
<th>Justification for this change</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Department decided to drop the ABET accreditation for this program which removed the requirement for the completion of deficiency courses. Thus we must update the catalog description to assure student awareness of the changes</td>
<td>The previous version of this program was open to students from non-engineering programs. This version of the program is intended for students possessing a Bachelor of Science in Engineering Degree.</td>
</tr>
</tbody>
</table>

Upload attachments

Reviewer Comments

- **Norman Dennis (ndennis) (09/14/17 9:19 am):** Rollback: In the justification box you have described why you are doing this, however, you have not described what you are doing. Committees do not get to see this entire screen. They make decisions based on what shows up in the description of change in the justification box. Please summarize your changes in that box. What are the defacto pre-requisites needed to that the required 5000 level courses?
- **Norman Dennis (ndennis) (10/13/17 2:28 pm):** Modified introductory material
- **Alice Griffin (agriffin) (10/13/17 4:30 pm):** Changed effective catalog date from fall 2017 to fall 2018.
- **Alice Griffin (agriffin) (10/13/17 5:02 pm):** Minor edits to program requirements. Removed duplicate language.
- **Lisa Kulczak (ikulcz) (10/16/17 5:40 pm):** Edited information from the Program Requirements field that should be managed/edited in CAT. Emailed Rod Williams and Pat Koski with that information.
- **Norman Dennis (ndennis) (11/08/17 1:33 pm):** Added student learning outcomes