

# Environmental Engineering (EnvE)



between students and professors and allows for a great deal of personal attention. The environmental engineering program melds strengths and expertise from faculty with a broad range of backgrounds and experience relative to environmental engineering. It is one of but a few truly interdisciplinary baccalaureate environmental engineering programs in the nation.

## Career Profile

Environmental engineers serve our society at the most fundamental level in caring for the air we breathe, the water we drink, and the soil in which we grow our food. Environmental engineers solve existing and prevent future environmental problems. Environmental engineering is “the profession that cares for our planet through development of engineered solutions to existing and potential environmental problems.”

## Accreditation

The South Dakota School of Mines and Technology is accredited by the Higher Learning Commission of the North Central Association of Colleges and Secondary Schools, the recognized accrediting agency for the north central states.

The environmental engineering program is also accredited by the Accreditation Board for Engineering and Technology (ABET).

## Labs and Facilities

Laboratories maintained by the chemical engineering, civil and environmental engineering, geological engineering, metallurgical engineering, and mining engineering programs are equipped with up-to-date analytical instrumentation. These laboratories are used in graduate and undergraduate research and in association with undergraduate courses to enhance student understanding of critical phenomena. Computational laboratories maintained by all five programs are equipped with up-to-date personal and workstation computing equipment.

## Faculty

**Chair:** Dr. Henry Mott, professor

**Professor:** Dr. Arden Davis

**Associate Professors:** Dr. Todd Menkhaus and Dr. James Stone

**Assistant Professor:** Dr. William Cross

## Features and Strengths

The small faculty-to-student ratio throughout the programs at the School of Mines fosters relationships

## Program Overview

Students in the environmental engineering program will be educated in liberal arts, higher mathematics, basic sciences, engineering sciences, and engineering design. The experience will be augmented by laboratory courses at the freshman through senior levels. Fundamental environmental engineering course work will involve heat and mass transfer, both classical and chemical thermodynamics, ground-water and surface-water hydrology, and environmental systems analysis. Each student will opt for an emphasis consisting of five to six required and elective courses. Emphasis areas include chemical engineering, civil engineering, geological engineering, materials and metallurgical engineering, and mining engineering. Each student will participate in a two-semester capstone design experience that will involve work with a multidisciplinary team to solve a significant environmental problem.

## Outcomes

- School of Mines environmental engineering graduates received salary offers of more than \$45,000.
- 100 percent of 2007-08 School of Mines environmental engineering graduates were placed in their field or have entered a graduate program within a year of graduation.
- 75 percent of graduates gain real-life experience through internships and co-ops.
- Environmental engineering graduates have found professional placement with government (SD Dept of Environment & Natural Resources and U.S. Forest Service, Indian Health Service, and Bureau of Reclamation), consulting engineering firms, and the mining industry (Granite Construction, Cleveland Cliffs Mining).

## Student Organizations

Students at the School of Mines also have a variety of opportunities for extra-curricular activities that range from music, intramurals, and drama to ski and snowboarding, and more than 75 other clubs and professional student organizations. These are important activities for students and they are encouraged to take full advantage of out-of-classroom events.

Students in environmental engineering are encouraged to join the student chapter of the Water Environment Federation and to also consider joining the student chapter supporting their chosen emphasis area: the American Institute of Chemical Engineers, the American Society of Civil Engineers, the Association of Ground Water Scientists and Engineers, or the Society for Mining, Metallurgy, and Exploration.

The Center for Advanced Manufacturing and Production (CAMP) is designed to teach students engineering, science, and design skills, as well as the ability to work in teams. Team members design, build, market, and raise the money for their projects. All students are welcome to work on CAMP projects.

## Research

Students have the opportunity to be involved in research with professors conducting work on projects such as ground water quality assessment, funded by the United States Department of Agriculture-Forest Service; degradation of antimicrobial agents, funded by the National Science Foundation; and more.

## Curriculum Listing

<http://catalog.sdsmt.edu>

### ENVIRONMENTAL ENGINEERING CURRICULUM/CHECKLIST

#### FRESHMAN YEAR

##### First Semester

ENGL 101	Composition I	3
CHEM 112	General Chemistry I	3
CHEM 112L	General Chemistry I Lab	1
MATH 123	Calculus I	4
GE 130/130L	Intro. to Engineering	2
	General Education goal 3 or 4 elective <sup>7</sup>	3
PE	Physical Education <sup>6</sup>	1
<b>TOTAL</b>		<b>17</b>

##### Second Semester

CBE 111	Intro. Engr. Modeling	1
CHEM 114	General Chemistry II	3
CHEM 114L	General Chemistry II Lab	1
CBE 117	Prof. Pract. in ChE <sup>5</sup>	2
MATH 125	Calculus II	4
PHYS 211	University Physics I	3
	General Education goal 3 or 4 elective <sup>7</sup>	3
PE	Physical Education <sup>6</sup>	1
<b>TOTAL</b>		<b>18</b>

#### SOPHOMORE YEAR

##### First Semester

ENVE 217	Chem. Engr. I	3
MATH 225	Calculus III	4
CHEM 230	Anal. Chem. for Engr.	2
ENGL 279	Technical Communications I	3
BIOL 341	Microbial Processes in Engr. and Nat. Science	3
	General Education goal 3 or 4 elective <sup>7</sup>	3
<b>TOTAL</b>		<b>18</b>

##### Second Semester

PHYS 213	University Physics II	3
GEOE 221	Geology for Engineers	3
EM 216	Statics and Dynamics <sup>1</sup>	4
MATH 321	Differential Equations	4
	General Education goal 3 or 4 elective <sup>7</sup>	3
ENVE 390	Seminar	0
<b>TOTAL</b>		<b>17</b>

#### JUNIOR YEAR

##### First Semester

ENGL 289	Technical Communications II	3
IENG 301	Basic Engr. Economics	2

#### For More Information contact:

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ENVE 307	Environmental Geostatistics	2
ENVE 315	Fund. of Heat Transfer	2
ENVE 320	Thermodynamics <sup>2</sup>	4
ENVE 326	Introd. Env. Engr. Design	3
CHEM 332L	Anal. Chemistry Lab	1
<b>TOTAL</b>		<b>17</b>

##### Second Semester

CBE 250	Computer Apps in ChE <sup>5</sup>	2
CHEM 316	Fund. of Org. Chem.	3
ENVE 318	Chemical Engr. IV	3
ENVE 327	Env. Engr. Proc Analysis	3
EM 328	Applied Fluid Mechanics <sup>3</sup>	3
ENVE 390	Seminar	0
	Emphasis elective(s) <sup>4</sup>	3
<b>TOTAL</b>		<b>17</b>

#### SENIOR YEAR

##### First Semester

ENVE 421	Environ. Systems Analysis	3
ENVE 464	Environ. Engr. Design I	2
ENVE 475	Ground Water	3
	Emphasis elective(s) <sup>4</sup>	8
<b>TOTAL</b>		<b>16</b>

##### Second Semester

ENVE 337	Engineering Hydrology	3
ENVE 390	Seminar	1
ATM 405	Air Quality	3
ENVE 465	Envr. Engr. Design II	2
	Emphasis elective(s) <sup>4</sup>	3
	Humanities or Social Sciences Electives	4
<b>TOTAL</b>		<b>16</b>

**136 credits are required for graduation**

#### Curriculum Notes

<sup>1</sup> A combination of EM 214/321, EM 214/215, or EM 214/ME 221 may replace EM 216.

<sup>2</sup> CBE 222 and CBE 321 will satisfy the thermodynamics requirement.

<sup>3</sup> CBE 218, EM 331, or ME 331 will also satisfy fluid mechanics requirements.

<sup>4</sup> Each student must select a set of emphasis area course work totaling 14 credits.

<sup>5</sup> CEE 284, 4 credits meets the combined requirement for CBE 117-CBE 250, 4 credits total. Math 373, 3 credits, may be substituted for CBE 250, 2 credits.

<sup>6</sup> Music Ensemble courses may be substituted for physical education courses for qualified students. Any other substitutions must be approved in advance by the physical education department chair.

<sup>7</sup> Consult the section of the catalog addressing graduation requirements for a description of the combinations of lower level (1xx/2xx) social sciences and humanities courses meeting the SDBOR General Education goals #3 and #4.