

Environmental Engineering (EnvE)



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 can be defined as “the profession that cares for our planet through development of engineered solutions to existing and potential 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

Program Coordinator: Dr. Henry Mott, professor
Professors: Dr. Arden Davis and Dr. Charles Kliche
Associate Professors: Dr. Todd Menkhaus and Dr. James Stone
Assistant Professor: Dr. William Cross

Features and Strengths

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

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.

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 \$41,000.
- 100 percent of 2006-07 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 in IA, NE, CO, WY, MT and SD), 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 clubs, and more than 75 other clubs and professional student organizations. These are important activities for our students and we encourage them 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 Egnineering	2
Humanities or Social Sciences Elective(s)		3
PE	Physical Education ⁶	1
TOTAL		17

Second Semester

CHE 111	Intro. Engr Modeling	1
CHEM 114	General Chemistry II	3
CHEM 114L	General Chemistry II Lab	1
CHE 117	Prof Pract in ChE ⁵	2
MATH 125	Calculus II	4
PHYS 211	University Physics I	3
Humanities or Social Sciences Elective(s)		3
PE	Physical Education ⁶	1
TOTAL		18

SOPHOMORE YEAR

First Semester

ENVE 217	Chem Engr. I	3
MATH 225	Calculus III	4
CHEM 230	Analytical Chemistry for Engineers	2
ENGL 279	Tech. Communications I	3
BIOL 341	Microbial Processes in Engineering and Nat. Science	3
Humanities or Social Sciences Elective(s)		3
TOTAL		18

Second Semester

PHYS 213	University Physics II	3
GEOE 221	Geology for Engineers	3
EM 216	Statics and Dynamics ¹	4
MATH 321	Differential Equations	4
Gen Ed Humanities or Social Sci. elective		3
ENVE 390	Seminar	0
TOTAL		17

JUNIOR YEAR

First Semester

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

For More Information contact:

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ENVE 307	Environmental Geostatistics ⁷	2
ENVE 315	Fund. of Heat Transfer	2
ENVE 320	Thermodynamics ²	4
ENVE 326	Environmental Introductory Environmental Engineering Design	3
CHEM 332L	Analytical Chemistry Lab	1
TOTAL		17

Second Semester

CHE 250	Computer Applications in Chemical Engineering ⁵	2
CHEM 316	Fund. of Org. Chem.	3
ENVE 318	Chemical Engr. IV	3
ENVE 327	Intro Env. Eng. Design	3
EM 328	Applied Fluid Mechanics ³	3
ENVE 390	Seminar	0
Emphasis elective(s) ³		3
TOTAL		17

SENIOR YEAR

First Semester

ENVE 421	Environ Systems Analysis	3
ENVE 464	Envr Engr Design I	2
ENVE 475	Ground Water	3
Emphasis elective(s) ⁴		8
TOTAL		16

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) ⁴		3
Humanities or Social Sciences Elective		4
TOTAL		16

136 credits are required for graduation

Curriculum Notes

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

² CHE 222 and CHE 321 will satisfy the thermodynamics requirement.

³ CHE 218, EM 331, or ME 331 will also satisfy fluid mechanics requirements.

⁴ Each student must select a set of emphasis area course work totaling fourteen (14) credits.

⁵ CEE 284 (4 cr.) meets the combined requirement for ChE 117-ChE 250, four (4) credits total. Math 373, three (3) credits, may be substituted for ChE 250, two (2) credits.

⁶ 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.

⁷ Students opting for the Mining Engineering emphasis would complete MEM 307 in lieu of EnvE 307.