

Mining Engineering B.S.



Contact Information

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Faculty

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Supporting Faculty

Professor Hansen; Associate Professor Klasi.

Mining Engineering

The mining engineering and management program, introduced as a new program in 2003, is designed to better meet the needs of the mining industry. It combines traditional mining engineering education with selected management-related concepts in order to better prepare the graduates for the modern mining industry.

Mining engineering is the application of engineering and scientific principles to the discovery, appraisal, and extraction of minerals from the Earth and sea. Mining engineering and management takes traditional mining engineering education one step farther by including management-related education in the curriculum.

The curriculum provides students with fundamental training in the basic sciences,

engineering sciences, engineering design, geology, the humanities, and mining engineering. Principles of mine operations, mine planning, mining technology, advanced 3-D design and modeling, rock mechanics, explosives technology and computer applications receive special emphasis. Key management-related concepts are introduced at all levels of the curriculum.

Significant design experience is built into the curriculum and is enhanced by the use of sophisticated 3-D design software in many of the mining courses. Teamwork is stressed in the program. As students work together in small, specialized teams during many of the laboratory exercises and to complete the final capstone design project. The students present their final design project both orally and in written form.

The mining engineering degree is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone (410) 347-7700.

A minor in mining engineering is not available.

Mining Engineering Program Objectives

The program in mining engineering is designed to meet the changing needs of the mining industry all over the nation and the world by providing graduates who are technically sound in mining engineering and can progress quickly through supervision and into management.

The curriculum has been designed to meet accreditation requirements in mining engineering. The core mining engineering curriculum provides technical training in areas such as rock mechanics, mine ventilation, ore reserve evaluation, mine design, explosive application, mining equipment selection, mining method selection, and mine land reclamation. The curriculum also includes a strong emphasis on management-related topics: health and safety, economics and finance, labor relations, project management, environmental management, international business, and communication skills.

The educational objectives of the program are:

- Graduates from the mining engineering program will have the analytical, technical and mine design abilities necessary to

work effectively in the field of mining engineering and will be informed of recent technical advances in the field.

- Graduates from the mining engineering program will be cognizant of societal issues and their role as future professional engineers working for the general benefit of society.

Professional Development

Students in the program are encouraged to become student members of their primary professional organization-the Society for Mining, Metallurgy, and Exploration (SME). Upon graduation, they are further encouraged to continue professional membership in SME. In addition, the students can become student members of the International Society of Explosives Engineers (ISEE). Both SME and ISEE have local chapter meetings, which students are encouraged to attend.

During their senior year, students in the mining engineering program are encouraged to take the Fundamentals of Engineering (FE) examination. Passing the FE examination is the first step toward registration as a Professional Engineer (PE). The second and final step in the registration process is the successful completion of the Professional Engineering examination, which is normally taken at least four years after graduation.

The mining engineering program participates in a cooperative education program that provides an opportunity for students to combine course work with meaningful work experience in industry. Participating companies in the program provide jobs for students during semesters scheduled for work. A student in the cooperative program should plan on four and one half to five years to graduate.

Mining Engineering Laboratories

Laboratory facilities exist in the department for rock mechanics, ventilation, GPS surveying and computer-aided mine design. Laboratory equipment available for student use includes equipment for rock specimen preparation, uniaxial

and triaxial rock strength testing machine, direct shear machine, computerized data acquisition system, ventilation network model, and modern GPS-based surveying equipment.

The computer laboratory consists of a new (2007) lab sponsored by industry leader in mine design software (MAPTEK) with personal computers. Available software packages are routinely used by undergraduate and graduate students for the solution of problems in rock mechanics, geostatistics, management, mineral economics, ventilation, blasting, mapping, and mine design. Contemporary geoscience modeling and mine planning software is used by students for surface and underground mine design.

Mining Engineering Curriculum/Checklist

Students are responsible for checking with their advisors for any program modifications that may occur after the publication of this catalog.

Freshman Year

First Semester

CHEM 112	General Chemistry I	3
CHEM 112L	General Chemistry I Lab	1
MATH 123	Calculus I	4
Humanities or Social Sciences	Elective(s)	3
MEM 110	Intro to Engineering	2
ENGL 101	Composition I	3
PE	Physical Education	1
TOTAL		17

Second Semester

CHEM 114	General Chemistry II	3
MATH 125	Calculus II	4
PHYS 211	University Physics I	3
MEM 120	Introduction to Mining and Sustainable Development	2
PE	Physical Education	1
Humanities or Social Sciences	Elective(s)	3
TOTAL		16

Sophomore Year

First Semester

MATH 205	Mining and Management Math I (Calc III)	2
PHYS 213	University Physics II	3
EM 216	Engineering Mechanics	

MEM 201	(Statics and Dynamics) Surveying for Mineral Engineers	4 2
MEM 203	Introduction to Mine Health and Safety	1
ENGL 279	Technical Comm. I	3
ECON 201	Microeconomics	3
TOTAL		18

Second Semester

MATH 211	Mining and Management Math II (Diff Eq)	3
GEOE 221/221L	Geology for Engineers	3
ENGL 289	Technical Comm. II	3
	Humanities/Social Science Elective(s)	3
MEM 202	Materials Handling and Transportation	2
MEM 204	Surface Mining Methods and Unit Operations	2
TOTAL		16

Junior Year

First Semester

MEM 301	Computer Applications in Mining	2
MEM 303	Underground Mining Methods and Equipment	2
MEM 305	Introduction to Explosives Engineering	3
EE 303	Circuits (for Mining)	3
IENG 366	Engineering Management	3
MEM 307	Mineral Exploration and Geostatistics	3
ATM 404	Atmospheric Thermo (for Mining)	2
TOTAL		18

Second Semester

GEOL 214L	Mineralogy for Mining Engineers	1
MEM 302	Mineral Economics and Finance	3
MEM 304	Theoretical and Applied Rock Mechanics	4
EM 328	Applied Fluid Mechanics	3
MEM 4XX	Mining Technical Elective ¹	1
MET 220	Mineral Processing and Resource Recovery	3

TOTAL 15

Senior Year

First Semester

GEOL 341/341L	Elementary Petrology	3
BADM 407	International Business	3
MEM 401	Theoretical and Applied Ventilation Engineering	4
MEM 466	Mine Management	2
	Free Elective	2
	Hum/Soc. Sci. (Language)	4
TOTAL		18

Second Semester

MEM 464	Mine Design and Feasibility Study	4
ECON 304	Managerial Economics	3
GEOE 322/322L	Structural Geology	3
MEM 405	Mine Permitting and Reclamation	3
HRM 417	Human Resource Management	3
TOTAL		16

136 credits required for graduation

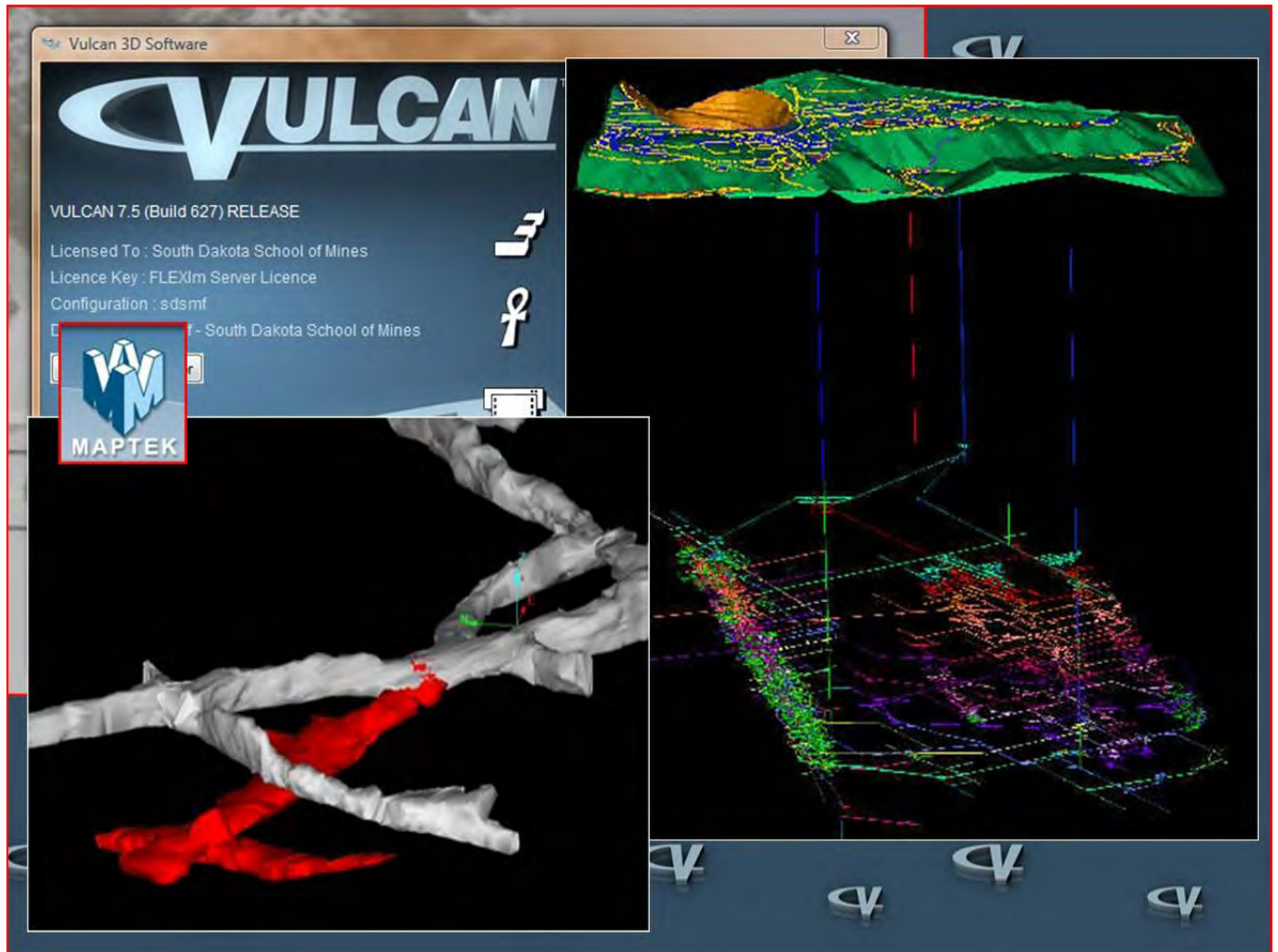
Curriculum Notes

¹Elective chosen from a list of approved mining or business courses.

MAPTEK Lab

The MAPTEK Advanced Mine Design and Global Communications Center is a modern computer design lab that is fully equipped with the world's most popular Mine Design Software – VULCAN from MAPTEK. This program is the leading design software used by the majority of mining operations worldwide. It enables students to design, review, analyze and perform extremely complex mine design tasks that are commonly performed daily at mining operations. In addition, the lab is equipped with all of the requisite audio-video equipment to conduct video conference sessions with any organization across the globe. The set-up also allows for easy

integration to distance learning modules and participation from industry executives worldwide.



Mines Matters: 3-D modeling Vulcan software donated by Maptek helps students learn advanced technical design aspects of the mining industry. The Maptek Advanced Mine Design Center enhances the faculty's ability to promote and teach advanced technical aspects of the mining industry, with emphasis on 3D-modeling and design.