

**MNGE 455**  
**MINE ENVIRONMENT, HEALTH, AND SAFETY ENGINEERING**  
**Spring Semester 2017**

**Instructor:** Dr. Joseph C. Hirschi                      Office: ENGR E10  
Email: [jhirschi@siu.edu](mailto:jhirschi@siu.edu)                      Phone: 618-453-7923  
Office Hours: Monday and Wednesday                      8:00-11:00am  
Tuesday and Thursday                      8:00-9:30am

**Class Schedule:** MWF at 12:00-12:50pm in ENGR A29

**Course Objectives:**

1. Familiarize students with the major environmental, health, and safety laws that govern mining activities in the United States and internationally.
2. Familiarize students with the Mine Safety and Health Administration (MSHA), Office of Surface Mining (OSM), and other regulatory agencies that oversee mining activities as well as the many regulations they promulgate for mines.
3. Teach students the ethical responsibilities of a mining engineer including the obligation to safeguard the health and safety of the mine workforce, the surrounding community, and the local environment.
4. Teach students proven techniques for safely managing and directing a workforce.

**Texts:** Relevant technical papers will be provided by instructor; otherwise, there is no formal text.

**References:**

1. SME Mining Engineering Handbook
2. Mining Environmental Handbook: Effects of Mining on the Environment and American Environmental Controls on Mining, editor: J. Marcus, publisher: Imperial College Press, ©1997, 816 pp.
3. Mine Health and Safety Management, editor: M. Karmis, publisher: Society for Mining, Metallurgy, and Exploration (SME), ©2001, 452 pp.
4. Code of Federal Regulations (CFR), Title 30 – Mineral Resources.

**Grading:**

1. Homework – 6 assignments @ 100 points per assignment → 30% of grade.
2. Quizzes – 6 quizzes @ 100 points per quiz → 30% of grade.
3. Exams – 2 midterms @ 200 points per midterm → 20% of grade,  
– 1 final exam @ 400 points → 20% of grade.
4. Extra Credit available at Instructor's discretion for related Saluki Miner activities.
5. Grading scale is shown in the following table. A grading curve will not be used.

≥90%	A
80-89%	B
70-79%	C
60-69%	D
<60%	F

## **Course Topics:**

### **Section 1: Mining and Mineral Rights<sup>1,3,5</sup>**

Overview, Structure, and Organization of Mining Law; 1872 Mining Law; 1920 Mineral Leasing Act; 1947 Materials Act; 1952 Submerged Lands Act; 1955 Multiple Minerals Development Act of 1955; Mineral Rights Law on Private and Federal Land

### **Section 2: Environmental Regulations in Mining<sup>3,4,7</sup>**

National Environmental Policy Act; Clean Water Act; Clean Air Act; Title 5 Permits; Surface Mining Control and Reclamation Act (SMCRA); Resource Conservation and Recovery Act (RCRA); Superfund; Toxic Substances and Control Act; Methods for Dust Control; Passive Enclosures; Wet Suppression; Dry Collection; Storm Water Permitting; Storm Water Protection and Structural Control Practices

### **Section 3: Engineering Ethics<sup>1,2,6</sup>**

Ethics in Engineering; Dealing with Clients and Employers; Dealing with Suppliers; Professional Engineering Registration; Working with Other Engineers; Dealing with the Public; Competitive Bidding; Employee Rights; Ethical Case Studies

### **Section 4: Mine Health and Safety Regulations and Mine Disaster Case Studies<sup>3,5,8</sup>**

History of Mine and Safety Legislation; 1966 Federal Metal and Nonmetallic Mine Safety Act; 1969 Federal Coal Mine Health and Safety Act; 1977 Federal Mine Safety and Health Act; 2006 MINER Act; Referencing Title 30 of the Code of Federal Regulations (CFR) with the 1977 Federal Mine Safety and Health Act; Mine Disaster Case Studies

### **Section 5: Other Mine Health and Safety Topics and MSHA Requirements<sup>8</sup>**

Mine Evacuations; SCSRs; Rescue Chambers; Disaster Response; Registration and Reporting; MSHA Guidance Sections; Part 48 and Part 46 Miner Training; Roof and Ground Control Regulations and Practices; Noise Regulations and Safety; HAZCOM; Mine Ventilation Basics and Regulations for Underground Mines; Diesel Particulate Standards

### **Section 6: Health and Safety Management (Managing and Directing a Workforce)<sup>5</sup>**

The Need for Health and Safety Management; Health and Safety Management Failures in Mining; Effective Means for Integrating a Health and Safety Program in the Workplace and Developing Buy-in; CORE Safety; A Model for Health and Safety Management; Measuring Health and Safety Performance (Incident Rates); Measuring Health and Safety with Control Charts

## **References Cited Above:**

<sup>1</sup> “Board of Ethical Review Cases.” National Society of Professional Engineers.

<sup>2</sup> “Code of Ethics.” National Society of Professional Engineers.

<sup>3</sup> Hartman, H.L. *SME Mining Engineering Handbook*. S.G. Britton, ed., Vol. 2, Society for Mining, Metallurgy, and Exploration (SME), 1992.

<sup>4</sup> Jarvie-Eggart, M.E., ed. *Responsible Mining: Case Studies in Managing Social & Environmental Risks in the Developed World*. SME, 2015.

<sup>5</sup> Karmis, M.K., ed. *Mine Health and Safety Management*. SME, 2001.

<sup>6</sup> Lindeburg, M.R. “FE Review Manual: Rapid Preparation for the General Fundamentals of Engineering Exam.” Professional Publications Incorporated, 2006.

<sup>7</sup> Marcus, J.J., ed. *Mining Environmental Handbook: Effects of Mining on the Environment and American Environmental Controls on Mining*. Imperial College Press, 1997.

<sup>8</sup> Mineral Resources, 30 C.F.R. § 40-104 (2016).

**Course Outline:**

<b>Week</b>	<b>Date</b>	<b>Topics</b>	<b>Graded Work</b>
<b>1</b>	1/18 1/20	Introductions, Course Overview, Begin Section 1 Section 1: Mining and Mineral Rights	Homework #1 Assigned 1/20
<b>2</b>	1/23-27	Section 1: Mining and Mineral Rights	Homework #1 Due 1/27
<b>3</b>	1/30 2/1, 3	Review of Section 1 Section 2: Environmental Regulations in Mining	Quiz #1 on 1/30 Homework #2 Assigned 2/3
<b>4</b>	2/6-10	Section 2: Environmental Regulations in Mining	
<b>5</b>	2/13, 15 2/17	Section 2: Environmental Regulations in Mining Review of Section 2	Homework #2 Due 2/15 Quiz #2 on 2/17
<b>6</b>	2/20-22 2/24	SME Annual Meeting – No Classes Midterm Exam #1	Midterm Exam #1 on 2/24
<b>7</b>	2/27-3/3	Section 3: Engineering Ethics	Homework #3 Assigned 3/1
<b>8</b>	3/6-8 3/8, 10	Section 3: Engineering Ethics Review of Section 3	Homework #3 Due 3/8 Quiz #3 on 3/10
<b>9</b>	3/13-17	Spring Break – No Classes	
<b>10</b>	3/20-24	Section 4: Mine Health and Safety Regulations and Mine Disaster Case Studies	Homework #4 Assigned 3/22
<b>11</b>	3/27-31	Section 4: Mine Health and Safety Regulations and Mine Disaster Case Studies	Homework #4 Due 3/31
<b>12</b>	4/3 4/5 4/7	Review of Section 4 Section 5: Other Mine Health and Safety Topics and MSHA Requirements	Quiz #4 on 4/3 Homework #5 Assigned 4/7
<b>13</b>	4/10-14	Section 5: Other Mine Health and Safety Topics and MSHA Requirements	Homework #5 Due 4/14
<b>14</b>	4/17 4/19 4/21	Review of Section 5 Midterm Exam #2 Section 6: Health and Safety Management	Quiz #5 on 4/21 Midterm Exam #2 on 4/19
<b>15</b>	4/24-28	Section 6: Health and Safety Management (Managing and Directing a Workforce)	Homework #6 Assigned 4/24
<b>16</b>	5/1 5/3 5/5	Section 6: Health and Safety Management Review of Section 6 Semester Review	Homework #6 Due 5/1 Quiz #6 on 5/3
<b>17</b>	5/8	Final Examination 12:30 to 2:30am	Final Exam on 5/8

***For important dates, policies, and practices, please see the campus-wide Syllabus Attachment at: [http://pvcaa.siu.edu/\\_common/documents/syllabus-attachments/syllabus-attachment-spring-2017.pdf](http://pvcaa.siu.edu/_common/documents/syllabus-attachments/syllabus-attachment-spring-2017.pdf).***

Office of the Provost: <http://pvcaa.siu.edu/>

**IMPORTANT DATES \***

<u>Semester Class Begins:</u> .....	01/17/2017
<u>Last day to add full-term course (without Dean's signature):</u> .....	01/22/2017
<u>Last day to withdraw from the University with a full refund:</u> .....	01/27/2017
<u>Last day to drop a full-term course for a credit/refund:</u> .....	01/29/2017
<u>Deadline to apply to graduate at the end of this term:</u> .....	04/2/2017
<u>Final examinations:</u> .....	5/8-5/12/2017
<u>Commencement:</u> .....	5/13/2017

Note: For more detailed information on the above deadlines, please visit <http://registrar.siu.edu/calendars>. For add/drop dates that apply to shorter-than-full-term courses, please look at the [Schedule of Classes search results at http://registrar.siu.edu/schedclass/index.php](http://registrar.siu.edu/schedclass/index.php)

**SPRING SEMESTER HOLIDAYS**

Martin Luther King Jr.'s Birthday Holiday 01/16/2017  
Spring Break 3/11-3/19/2017

**WITHDRAWAL POLICY ~ Undergraduate only**

Students who officially register for a session must officially withdraw from that registration in a timely manner to avoid being charged as well as receiving a failing grade for those classes. An official withdrawal must be initiated by the student, or on behalf of the student through the academic unit, and be processed by the Registrar's office. For the proper procedures to follow when dropping courses and when withdrawing from SIU visit: <http://registrar.siu.edu/students/withdrawal.php>

**INCOMPLETE POLICY~ Undergraduate only**

An INC grade may be assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments for the course. An INC must be changed to a completed grade within one full semester (undergraduates), and one full year (graduate students), from the close of the term in which the course was taken or graduation, whichever occurs first. Should the student fail to complete the remaining course requirements within the time period designated, the incomplete will be converted to a grade of F and such grade will be computed in the student's grade point average. For more information visit: <http://registrar.siu.edu/grades/incomplete.php>

**REPEAT POLICY**

An undergraduate student may, for the purpose of raising a grade, enroll in a course for credit more than once. For students receiving a letter grade of A, B, C, D, or F, the course repetition must occur at Southern Illinois University Carbondale. Effective for courses taken Summer 2013 or later, only the most recent (last) grade will be calculated in the overall GPA and count toward hours earned.

This policy will be applied to all transferrable credit in that only the last grade will be used to calculate grade point average. Only those courses taken at the same institution are considered repeats under this policy. See full policy at <http://registrar.siu.edu/students/repeatclasses.php>

**GRADUATE POLICIES**

Graduate policies often vary from Undergraduate policies. To view the applicable policies for graduate students, please refer to the graduate catalog at <http://gradschool.siu.edu/about-us/grad-catalog/>

**DISABILITY POLICY**

Disability Support Services provides the required academic and programmatic support services to students with permanent and temporary disabilities. DSS provides centralized coordination and referral services. To utilize DSS services, students must contact DSS to open cases. The process involves interviews, reviews of student-supplied documentation, and completion of Disability Accommodation Agreements. <http://disabilityservices.siu.edu/>

**PLAGIARISM**

Student Conduct Code <http://srr.siu.edu/student-conduct-code/>  
Guidelines for Faculty <http://pvcaa.siu.edu/common/documents/Plagiarism/Guide%20to%20Preventing%20Plagiarism.pdf>

**SAFETY AWARENESS FACTS AND EDUCATION**

Title IX makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here:

<http://safe.siu.edu>

**SALUKI CARES**

The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress—physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. For Information on Saluki Cares: call(618) 453-1492, email [siucares@siu.edu](mailto:siucares@siu.edu), or <http://salukicares.siu.edu/>

**SIU'S EARLY WARNING INTERVENTION PROGRAM (EWIP)**

Students enrolled in courses participating in SIU's Early Warning Intervention Program might be contacted by University staff during a semester. More information can be found at the Core Curriculum's Overview webpage: <http://corecurriculum.siu.edu/program-overview/>

**EMERGENCY PROCEDURES**

We ask that you become familiar with **Emergency Preparedness @ SIU**. Emergency response information is available on posters in buildings on campus, on the Emergency Preparedness @ SIU website, and through text and email alerts. To register for alerts visit: <http://emergency.siu.edu/>

**STUDENT MULTICULTURAL RESOURCE CENTER**

The Student Multicultural Resource Center serves as a catalyst for inclusion, diversity and innovation. As the Center continues its work, we are here to ensure that you think, grow and succeed. We encourage you to stop by the Center, located in Grinnell Commons, to see the resources available and discover ways you can get involved on the campus. Visit us at <http://inclusivexcellence.siu.edu/>

**LEARNING AND SUPPORT SERVICES**

Help is within reach. Learning support services offers free tutoring on campus and math labs. To find more information please visit the Center for Learning and Support Services website:

Tutoring : <http://tutoring.siu.edu/>

Math Labs <http://math.siu.edu/courses/course-help.php>

**WRITING CENTER**

The Writing Center offers free tutoring services to all SIU students and faculty. To find a Center or Schedule an appointment please visit:

<http://write.siu.edu/>

**AFFIRMATIVE ACTION & EQUAL OPPORTUNITY**

Our office's main focus is to ensure that the university complies with federal and state equity policies and handles reporting and investigating of discrimination cases. For more information visit: <http://diversity.siu.edu/#>

**MILITARY COMMUNITY**

There are complexities of being a member of the military community and also a student. Drill schedules, calls to active duty, complications with GI Bill disbursement, and other unforeseen military and veteran related developments can complicate academic life. If you are a member of the military community and in need of accommodations please visit Veterans Services at <http://veterans.siu.edu/>

Additional Resources:

ADVISEMENT: <http://advisement.siu.edu/>

SIU ONLINE: <https://online.siu.edu/>

SALUKI SOLUTION FINDER: <http://solutionfinder.siu.edu/>

MORRIS LIBRARY HOURS: <http://libguides.lib.siu.edu/hours>