

**MNGE 475**  
**ROCK MECHANICS II:**  
**DESIGN AND ANALYSIS OF MINE EXCAVATIONS**  
**Spring Semester 2017**

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

**Class Schedule:** Tuesday and Thursday at 9:35-10:50am in ENGR A29

**Course Objectives:**

1. Strengthen knowledge of rock mechanics principles used in design of excavations.
2. Provide learning experiences where above principles are utilized in both surface and underground mining applications.
3. Introduce commercially available ground control software used for mine design and provide opportunities to gain experience with these tools.
4. Examine the design and the implementation of various support systems used for ground control in mining environments.
5. Investigate rock dynamics phenomena such as rock bursts and the influence of drilling and blasting on rock mass behavior.

**Texts:**

1. Design Analysis in Rock Mechanics, 2<sup>nd</sup> Edition, ©2012, 698 pp., author: W. Pariseau, publisher: Taylor & Francis. Note: 1<sup>st</sup> Edition (©2007, 578 pp.) is online in PDF format.
2. Principles of Foundation Engineering, 8<sup>th</sup> Edition, ©2015, 896 pp., author: B. Das, publisher: Cengage Learning. Note: 7<sup>th</sup> Edition (©2011, 815 pp.) is online in PDF format.
3. Other relevant technical papers will be provided by instructor.

**Grading:**

1. Homework – 6 assignments @ 100 points per assignment → 30% of grade.
2. Projects – 2 projects @ 200 points per project → 20% of grade.
3. Exams – 2 midterms @ 250 points per midterm → 25% of grade,  
– 1 final exam @ 500 points → 25% 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 Outline:**

<b>Week</b>	<b>Date</b>	<b>Topics</b>	<b>Graded Work</b>
<b>1</b>	1/17 1/19	Introductions, Review of MNGE 431 – Soils Review of MNGE 431 – Rock Masses	Homework #1 Assigned
<b>2</b>	1/24 1/26	Failure Criteria for Surface Mine Design Principles of Foundations for Soil Stability	Homework #1 Due
<b>3</b>	1/31 2/2	Soil Stability in Surface Excavations Slope Stability in Surface Excavations – Planar	Homework #2 Assigned
<b>4</b>	2/7 2/9	Slope Stability in Surface Excavations – Circular In-mine Monitoring Systems for Surface Mines	Homework #2 Due
<b>5</b>	2/14 2/16	Review Design of Stable Surface Excavations Midterm Exam #1	Midterm Exam #1
<b>6</b>	2/21 2/23	SME Annual Meeting – No Classes Review Midterm Exam #1	Project #1 Assigned
<b>7</b>	2/28 3/2	Failure Criteria for Underground Mine Design Design of Underground Openings in Massive Rock	Homework #3 Assigned
<b>8</b>	3/7 3/9	Single vs. Multiple Openings in Massive Rock Design of Underground Openings in Stratified Rock	Homework #3 Due Homework #4 Assigned
<b>9</b>	3/14,16	Spring Break – No Classes	
<b>10</b>	3/21 3/23	Single vs. Multiple Openings in Stratified Rock Review Design of Stable Underground Excavations	Homework #4 Due
<b>11</b>	3/28 3/30	Midterm Exam #2 Review Midterm Exam #2	Midterm Exam #2 Project #1 Due
<b>12</b>	4/4 4/6	Pillar Design and Abutment Loads Analysis of Longwall Pillar Stability (ALPS)	Homework #5 Assigned
<b>13</b>	4/11 4/13	Mine Subsidence – Design and Analysis Analysis of Multi-Seam Stability (AMSS), LaModel	Homework #5 Due
<b>14</b>	4/18 4/20	Analysis of Roof Bolt Systems (ARBS) Supporting with Arches, Cribs, Etc.	Project #2 Assigned
<b>15</b>	4/25 4/27	Supporting with Cables, Mesh, Etc. Supporting with Shotcrete, Concrete, Etc.	Homework #6 Assigned
<b>16</b>	5/2 5/4	Rock Dynamics, Drilling and Blasting Influence Review Design of Support Systems	Homework #6 Due Project #2 Due
<b>17</b>	5/11	Final Examination 8:00 to 10:00am	Final Exam

**Final Examination Date and Time:** Thursday, May 11, 2017 from 8:00am to 10:00am

**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>