

APPLIED SCIENCE AND MANAGEMENT
Underground and Surface Mining Methods
3 Credit Course
Fall 2014

UNDERGROUND AND SURFACE MINING METHODS

INSTRUCTOR: Dr. Joel Cubley

OFFICE HOURS: Upon request.

OFFICE LOCATION: T1090

CLASSROOM: T1090

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TIME: Monday/Wednesday (10:30-12)

TELEPHONE: 867-456-8605

DATES: September 3 – December 19, 2014

COURSE DESCRIPTION

This course provides an introduction to underground and surface mining methods and covers a broad range of topics including, but not limited to, the following: mining method selection, design, and operation; method-specific equipment and infrastructure; and pit/stope progressive reclamation strategies. Factors governing the decision to pursue surface versus underground mining are examined, including geologic variables such as overburden characteristics, ore and host rock strength, ore body geometry, and stripping ratios. Students are introduced to different types of surface mines including open pits, placer operations and quarries, as well as common underground mine excavation designs. Ground control, dewatering techniques, and mine ventilation fundamentals are presented. Students are introduced to blasting theory and design used in surface and underground mining operations. Case studies from operating and historic Yukon mines are used to lend a northern perspective.

PREREQUISITES

Successful completion of GEOL 112 (Mining Industry Overview), OR permission from the instructor.

EQUIVALENCY OR TRANSFERABILITY

In progress.

LEARNING OUTCOMES

Upon successful completion of the course, students will have demonstrated the ability to

- describe the relationship between a chosen mining method and the form and geometry of an ore body, as well as the geologic environment in which it is hosted
- identify the mining method most appropriate for ore extraction from a given deposit based on consideration of cost and market conditions, ore grades and stripping ratios, access, environmental limitations, and available infrastructure
- describe the operating cycle for underground and surface operations, as well as development stages and production scheduling
- demonstrate an understanding of the application and safe practices of blasting at surface and underground workings in different geologic environments and mine designs
- identify fundamental infrastructure requirements for underground and surface mines such as infrastructure relating to ventilation, rock support, dewatering, and hauling and hoisting

DELIVERY METHODS

This course will be delivered in an online format utilizing the EduMine course platform. The portal for these courses is the Yukon College EduMine campus page (www.edumine.com/campuses/yukon-college-centre-for-northern-innovation-in-mining/). All students registered in GEOL203 should have authorized access to all EduMine courses. On the YC EduMine campus page, click the grey “Yukon College Centre for Northern Innovation in Mining Users Join Today” button for one-time registration. Make sure you use the email address that the instructor has on file for you! After that, use the login credentials you supplied to access your course content via the Sign In button.

ASSESSMENTS

Online course assessments

You will be required to complete all or part of five courses of varying length on EduMine. Each course has built-in assessments that you must complete to continue on with the course. The results of these assessments are visible to the course instructor, and you must achieve an overall passing grade on the sum of all assessments to pass the course.

Note: You must register for certification for the desired course before you can be assessed. On the individual course's homepage, click Register for Certification for a one-time certification process. Every time after that, you can click the Enter the Course button to access your coursework.

Classroom exercises

Four classroom exercises will be conducted during the regularly scheduled GEOL203 class time (Mondays/Wednesdays; 10:30am-12:00pm). These exercises will be practical applications of the theory you've learned online, and require you to have previously completed that online component. See the course schedule for more information.

Delta Mine Training Center Field Trip

Following the conclusion of the semester, we'll be taking a short 4-day field trip to the Delta Mine Training Center in Delta Junction, Alaska. Here students will gain first-hand exposure to underground and surface mining practices and safety considerations. Participation on this field trip accounts for 20% of the overall course grade.

EVALUATION

<i>Tests and Assignments</i>	<i>Weight</i>	<i>Dates</i>
Classroom exercises	20% (4 assignments at 5% each)	Regularly scheduled throughout the semester.
Online review exercises	40%	Completed on your own time in the EduMine online course.
Participation during Delta Mine Training Center field trip	20%	Scheduled for the end of the semester after the final exam period.
Final theory exam	20%	Scheduled during the final exam period.

The letter-grading scheme used in this course is the standard Yukon College scheme. Final grades will be rounded up to the nearest decimal place and assigned a letter grade based on this scheme.

REQUIRED TEXTBOOKS AND MATERIALS

There is no required textbook for this course. Students may be required to draw on a number of key resources available on reserve at Yukon College Library. These include but are not limited to the following resources:

Darling P, editor. 2011. SME mining engineering handbook. 3rd ed. Englewood (CO): Society for Mining, Metallurgy, and Exploration. 1046 p.

Hartman HL, Mutmansky, JM. 2002. Introductory mining engineering. 2nd ed. Mississauga

(ON): John Wiley and Sons. 584 p.

Spitz K, Trudinger J. 2008. Mining and the environment: from ore to metal. New York (NY): CRC Press. 900 p.

PLAGIARISM

Plagiarism is a serious academic offence. Plagiarism occurs when students present the words of someone else as their own. Plagiarism can be the deliberate use of a whole piece of another person's writing, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material. Whenever the words, research or ideas of others are directly quoted or paraphrased, they must be documented according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Resubmitting a paper which has previously received credit is also considered plagiarism. Students who plagiarize material for assignments will receive a mark of zero (F) on the assignment and may fail the course. Plagiarism may also result in dismissal from a program of study or the College.

ACADEMIC ACCOMMODATION

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon College Academic Regulations (available on the Yukon College website). It is the student's responsibility to seek these accommodations. If a student requires an academic accommodation, he/she should contact the Learning Assistance Centre (LAC) at (867) 668-8785 or lassist@yukoncollege.yk.ca.

TOPIC OUTLINE

Modules	EduMine Course	Due Date
1,2,3,6,7,8,9	Underground Mining Practice	September 24
All	Open Pit Slope Design	October 15
All	Mine Ventilation 2 (Hazard Awareness) and 3 (Design Basics)	November 5 th
1,2,3	Blast Design and Assessment for Surface Mines and Quarries	November 26 th