



**ROBERT M. BUCHAN DEPARTMENT OF MINING
Term Adjunct Position
Academic Year Winter 2025**

Posting Date: Monday, October 8, 2024

Closing Date: 12noon, Monday, November 4, 2024

The Robert M. Buchan Department of Mining Engineering, Smith Engineering at Queen's University invites applications from suitably qualified candidates interested in teaching the following course for the fall 2024 session.

**MINE 448 – Underground Design
January 1 to April 30, 2025**

Qualifications

Minimum of BAsC in Mining Engineering or related field and must hold a professional engineering registration in Canada. Previous teaching experience at the University level considered an asset. Previous educational background and/or experience must be suited to teaching the course described below. Candidates must have excellent communication and presentation skills, as well as being capable of working as a member of a teaching team.

Course Description

This course provides an opportunity to apply a knowledge of basics to the design of an underground mine. Initial design information may range from diamond-drill assay data to a partially or completely designed mine. The problem of design or renovation entails ground stability, ventilation, systems analysis, equipment selection, maintenance, etc, with safety and economics as the basic criteria for design.

Course Learning Outcomes

1. Recognize the key elements of a mining study at varying levels of confidence and detail, according to the level of the study (conceptual/scoping, PEA, PFS, FS). Identify the proper position and flow of these elements for completing such a study.
2. Devise a plan for the execution of a mining engineering study taking into account the skills and experience available on the engineering team in conjunction with the



- objectives of the study. Plan the steps and tasks involved, along with a logical sequence of execution, and identify the critical path.
3. Coordinate and manage an engineering project, continually assessing its status and identifying critical issues and next steps while the project is underway.
 4. Apply team leadership and management principles to work effectively within a team environment to complete deliverables, ensuring that all team members are contributing effectively and leveraging their skills and experience to fulfill the team's objectives.
 5. With respect to the objective of a particular mining engineering study, critically assess technical information and data for completeness and quality and identify any omissions, uncertainties, and potential biases. Recognize when it is appropriate to make assumptions or generalizations according to the level of study being undertaken and in the context of the particular mining project being studied.
 6. Exercising professional judgement, recognize the limitations of their own knowledge and experience. Use appropriate resources to find information or expertise required to complete a particular objective, such as technical papers, journals, proceedings, as well as advisers and experts.
 7. Identify stakeholders and summarize the potential impacts – positive and negative – of a mining project on these stakeholders as well as on the environment. Identify measures that can be considered to mitigate negative impacts and enhance positive impacts.
 8. Develop an underground mining strategy for a particular mineral deposit, including selection of mining method, mine access strategy, material handling strategy, and other key aspects of the mine, based on a particular mining context, including geology, geometry, grade-tonnage distribution, rock mass characteristics, stress environment, groundwater conditions, etc.
 9. For a particular mining project, determine various economic parameters, such as metal/commodity/product prices and market conditions and use these to calculate various economic design parameters, including cut-off grade/value, reasonable throughput/production rate, and initial mine life.
 10. Using industry-standard tools and methodologies, assess the geotechnical characteristics of the host rock and mineralisation to determine specific mine design



parameters, such as stope dimensions and other parameters relevant to the selected mining method(s).

11. Using industry-standard tools and methodologies, design specific components of an underground mine, including mine layout, declines/ramps, stopes/production areas, stope access, and supporting infrastructure (fleet maintenance, materials handling, ventilation, backfill, etc.) according to the selected mining method(s). Describe the proposed operation of the mine.
12. Using industry-standard tools and methodologies, perform cycle time analyses to determine development advance and ore production rates, devise a sequence that considers geotechnical, engineering, logical, resource and other constraints, and create a schedule for the development and operation of the mine.
13. Estimate the labour (roles and quantities) and fleet (type, size and quantity) resources required to develop and operate an underground mine based on the selected mining method(s) and required production throughput/capacity.
14. Estimate mine capital costs (CAPEX) both for initial mine development (pre-production) as well as for sustained operations and closure. Estimate mine operating costs (OPEX) during production based on labour, consumables, equipment maintenance, and fuel/energy requirements.
15. Create an economic model for a mining project based on estimated capital and operating costs, metal/mineral prices, exchange rates, taxation & depreciation, royalties, working capital, and salvage value. Perform a discounted cashflow analysis using appropriate discount rates to determine key economic indicators, including NPV, IRR, and payback period.
16. Perform a risk assessment on the main technical, environmental, regulatory/permitting, political, and financial aspects of the project. Identify key risks and provide mitigation measures. Assess the overall viability of the project and provide recommendations for the next stage of study.
17. Produce professional quality written deliverables, including reports and presentation materials, that communicate the status and outcomes of the study effectively and in accordance with professional standards, including standards of disclosure for mineral properties.



18. Execute effective and professional project meetings, both internally and with external advisers and clients, throughout an engineering study, including the final presentation of study findings.

Course Details

Format: lectures, labs, and tutorials per week for twelve weeks. (Lec: Yes, Lab: Yes, Tut: Yes)

Audience: undergraduate level students

Location: in person

Lab Supervision - Yes

Expected Enrolment (subject to change): 50 students

Percentage of Responsibility: 100%

The above course is in person at the Kingston, Ontario campus. Lectures and exams will be conducted in person. The contract will run from January 1, 2025 to April 30, 2025. The winter session runs from January 6 to April 4, 2025 with exams running from April 6 to April 23, 2025.

The University invites applications from all qualified individuals. Queen's is strongly committed to employment equity, diversity, and inclusion in the workplace and encourages applications from Black, racialized/visible minority and Indigenous people, women, persons with disabilities, and 2SLGBTQ+ persons.

The University will provide support in its recruitment processes to applicants with disabilities, including accommodation that takes into account an applicant's accessibility needs. If you require accommodation during the interview process, please contact mine.office@queensu.ca.

Academic staff at Queen's University are governed by a collective agreement between [QUFA](#), and Queen's University.

Application Process

To comply with Federal laws, the University is obliged to gather statistical information about how many applicants for each job vacancy are Canadian citizens/ permanent residents of Canada. Applicants need not identify their country of origin or citizenship, however, all applications must include one of the following statements: I am a Canadian citizen/permanent resident of Canada; OR, I am not a Canadian citizen/permanent resident of Canada. Applications that do not include this information will be deemed incomplete.



**SMITH
ENGINEERING**
Queen's University

Robert M. Buchan
Department of Mining

Applications should include a complete and current curriculum vitae, a statement of teaching experience, the names and contact details of two referees who may be contacted, and any other relevant materials the candidate wishes to submit for consideration.

Applications can be submitted to the Adjunct Appointments Committee at the address below, or by e-mail to mine.office@queensu.ca. Applications should arrive no later than **12noon on Monday, November 4, 2024**.

Adjunct Appointments Committee
c/o Heather Drouillard
The Robert M. Buchan Department of Mining Goodwin Hall, Rm. 354
Queen's University
Kingston, Ontario K7L 3N6