SMITH ENGINEERING
Queen's University

Robert M.Buchan
Department of Mining

The Robert M. Buchan Department of Mining
Graduate and Undergraduate Teaching Assistantships
Fall Term 2026

Posting Date: Friday, June 26, 2026
Closing Date: 11:59pm, Monday, July 20, 2026

The Robert M. Buchan Department of Mining Engineering, Smith Engineering at Queen's University invites applications from suitably qualified candidates interested in Teaching Assistantships for the fall 2026 session.

The posted positions are conditional upon enrollment figures and budgetary approval. Positions will remain posted until they have been filled (no less than 7 business days) from the date of posting and remuneration will be in accordance with the Collective Agreement.

TA assignments could include duties such as leading laboratories, tutoring, hosting virtual office hours, marking of assignments, reports, quizzes, and exams. Due to changes in enrollments, some positions may have their hours adjusted once the semester begins. Any necessary training will be included in the assignment.

It is your responsibility to ensure you make yourself available to complete the TA work. If you are planning on being away from internet access for a significant amount of time during the semester, please indicate this when submitting your application and keep your employment supervisor up to date.

Note that for Fall 2026, final exams are scheduled until December 23 so it is possible that marking may be required right to the end of the month.

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Graduate Teaching Assistantships

Following the Collective Agreement, students who are studying in The Robert M. Buchan Department of Mining will be given preference over students from outside the department.

It is recommended that you read the PSAC Local 901, Collective Agreement for Graduate Teaching Assistants found at:
https://www.queensu.ca/facultyrelations/psac%20901-1/collective-agreements/MoAs/LoUs

As TA-ships do not form part of the funding package for graduate students in the Robert M. Buchan Department of Mining, TA-ships will only be offered as per the criteria outlined in Second Preference – Group B or to candidates in Group C, D, and E. In addition, we will do our best to match your preference to course offerings.

Second Preference – Group B: for qualified **full-time** graduate students registered as:
(i) students in a department, program or faculty in which the TA-ship will be offered;
(ii) there is currently no funding commitment provided by Queen's University (all unfunded years), and for whom;
(iv) students in an interdisciplinary program without TA budget resources.

Third Preference – Group C: for qualified graduate students registered as:
(i) students in a department, program or faculty in which the TA-ship will be offered;
(ii) students in an interdisciplinary program without TA budget resources, and for whom;
(iii) the TA-ship will not form part of the funding commitment offered by Queen's University.

Fourth Preference – Group D: for qualified graduate students who have previously held a TAship for the Employer.

Fifth Preference – Group E: for qualified graduate students that have not yet met the criteria as set out in B, C, or D.

Undergraduate Teaching Assistantships

Third and fourth year undergraduate students are invited to apply for an Undergraduate Teaching Assistantships.

Students who are studying in the Robert M. Buchan Department of Mining will be given preference over students from outside the department.

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Application Process

- Review the list of available TA positions for the Fall 2026 Term.

  MINE - https://www.queensu.ca/academic-calendar/engineering-applied-sciences/courses-instruction/mine/

  MNTC - https://www.queensu.ca/academic-calendar/engineering-applied-sciences/courses-instruction/mntc/

- Make note of your top 3 preferences.

- Complete the **application form**. Please note that you are required to upload your CV, cover letter, and transcript in the application form.

Applications will be reviewed at the end of the application period.

Applications are due by 11:59pm on Monday, July 20, 2026

Course Code	Title	Term	Instructor	Estimated Enrollment	# of TA ships and hours	Required Background/Skills	Description
APSC 141	*Intro to Computer Programming for Engineers*	F	TBA	1000+	9 Grad (42hrs each) 35 Undergrad (30hrs each)	Previous TA experience related to the subject matter. Must provide fall term availability for lab scheduling with application.	This course introduces concepts and practice of computer programming. The emphasis is on the design of correct and efficient algorithms, introducing variables, operators, flow control, and conditions. Applications are made to engineering problems.
APSC 151	*Earth Systems Engineering*	F	Qian Zhang	1000+	7 Grad (60hrs each)	Broad knowledge of mining processes and systems, including social impacts and sustainability. Excellent communication skills. Adept at coordinating team discussions.	This course provides an introduction to the complex Earth System (the solid earth, hydrosphere, atmosphere, and biosphere) and our interactions with it. The science behind our exploration and understanding of our planet and its ongoing evolution is explored in combination with the engineering geology of geo-materials, geo-resources, geo-dynamics and geo-risk. The connection between the Earth System and human activity is explored in depth, including local and global-scale impacts of engineering works, geopolitics, and resource issues. Examples of the terrestrial sources of geo-materials used in engineering activities are highlighted along with the technical, social, economic and environmental challenges associated with their life cycle including sustainability, contamination, biodiversity loss, social impact and climate change.
MINE 200/293	*Engineering Design & Practice II*	FW	Victor Liu	60	2 Undergrad (30hrs each)	Must be a fourth year undergradate engineering student.	In this course students will participate constructively on teams to create solutions to open-ended complex problems, using standard design methods and tools. This project-based course provides instruction primarily in the first 6 weeks of the semester focusing on problem scoping, creativity and idea generation, decision making incorporating technical, economic, societal, and environmental factors, safety, engineering codes and regulations, and engineering ethics. The final 6 weeks of the course centre around a design project delivered by each discipline. This course is integrated with APSC 293, and coordinated by the same instructor.
MINE 201	*Introduction to Mining and Mineral Processing*	F	Vlad Kecojevic Denver Cowan	60	2 Undergrad (30hrs each)	Must be a minimum of a fourth-year undergraduate engineering student. Previous experience related to the subject matter.	This course presents and overview of all aspects of mining from exploration, financing, development and mining operations. Underground and open pit mining are contrasted. Mineral processing systems for the production of gold, diamonds, copper, nickel, zinc and iron will be studied. Topics include decision-making process related to world market commodity pricing, mine planning and design, mining equipment, blasting and environmental considerations. Concepts of sustainability from economic, social and environmental perspective will be explored. Case studies, a major field trip and related assessment will be used to illustrate principles taught and how they are applied in a practical situation. Conservation equations for mass and energy, process flow diagrams, material and energy balances, First Law of Thermodynamics.
MINE 321	*Drilling and Blasting*	F	Denver Cowan	56	2 Grad (60hrs each)	Previous TA experience related to the subject matter.	This course deals with the principles of commercial explosives technology and the application of blasting in mining and construction. The planning, design, economic considerations and trends of drilling and blasting practices in the different segments of the mining and construction industries are considered. Topics covered are detonation theory, performance and sensitivity of explosives, fragmentation prediction measurement and control, vibrations from blasting, air blast, damage and special blasting techniques used in perimeter blasting and blast design methods.
MINE 325	*Applied Rock Mechanics*	F	Abbas Taheri	56	2 Grad (60hrs each) 1 Undergrad (60hrs)	Previous TA experience related to the subject matter.	This course deals with the principles of solid mechanics as applied to geologic materials in order to examine the effects of stress, strain and other factors on the geomechanical responses of such materials to these influences. Topics covered include rheological behaviour of rocks, stress measurement and prediction, and measurement procedures for determination of rock strength and other characteristic parameters. Failure theories are discussed and used to describe fracture development and design considerations for underground and surface mine structures. Analytical techniques based on empirical knowledge and supported by available theory and engineering practice are presented, including, for example: slope stability, underground structure and rock foundation design; the influences of ground water, rockbursts and backfill support on structural stability of excavations; and discussion of potential hazards associated with each. The operation and design of instrumentation used for rock mechanics studies are also discussed.
MINE 330	*Mineral Industy Economics*	F	Qian Zhang	56	1 Grad (60hrs) 1 Undergrad (60hrs)	Previous TA experience related to the subject matter.	This course for students in Mining Engineering and allied disciplines will apply basic principles of economic evaluation learned in APSC 221 to the minerals industry. Topics covered include: the project definition and economic evaluation process; economic analysis tools and techniques; taxation; inflation; cost estimation; the nature of mineral supply and demand; mineral commodity markets and pricing; uncertainty and risks associated with the mining industry, their analysis and incorporation into the evaluation process. Assignments, examples, and tutorials reflect a variety of situations and challenges faced in the evaluation of exploration and mine development opportunities, as well as important applications to mining and mineral processing design and decision-making.
MINE 331/335	*Methods of Mineral Separation*	F	Fei Wang	78	3 Grad (60hrs each)	Preference will be given to applicants with mineral processing/chemical engineering background and registered in the mineral processing area.	Mineral separation processes of a physical and physicochemical nature are studied with laboratory sessions. Topics include size reduction, classification, flotation, flocculation, gravity concentration, magnetic, electrostatic separations and dewatering. Surface phenomena involving fine particle processing, reagent classifications, flotation machines and circuits, plant practice in ore flotation are discussed. The laboratory practice includes a design project on flotation circuit analysis and sizing. Assignments will be completed based on field trip observations.
MINE 422	*Mining and Sustainability*	F	Anne Johnson	110	3 Grad (60hrs)	Previous experience and/or background in sustainability, systems thinking, community development, environmental and large scale mining issues and solutions. Proven strong written and oral communication skills.	This course describes the evolution of policies, operational procedures and management systems related to sustainability and the social, economic, environmental, ethical, and technical design challenges facing the mining industry. Themes examined will include: international and national performance expectations, standards and regulations; operational and management responses - social and environmental impact risk assessment; stakeholder engagement; impact mitigation planning and risk management systems; performance monitoring, evaluation and reporting; agreement making and benefit sharing. Students will be introduced to a range of complex situations with significant sustainability implications that need to be addressed responsibly during the life cycle of a mine, such as land acquisition, population and livelihood displacement, cultural heritage and habitat preservation, water use, waste disposal, mining-community relationships, mine closure and its community and environmental implications.

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MINE 431	*Life-Cycle for Green Technologies*	F	Qian Zhang	50	2 Grad (45hrs)	Previous TA experience related to the subject matter.	Life-cycle assessment (LCA) is an ISO standardized framework (ISO 14040/44) for comprehensively examining and assessing the environmental impacts associated with industrial products and systems. It has been widely used by businesses and governments to support decision-making for product design and development, ecolabelling, public policy and planning, and environmental impact assessment for new technology. This course introduces the concepts and procedures of LCA, and critically reviews empirical LCA studies at both the product and systems levels, with a special focus on material cycles (mining, processing, metallurgy, metals, manufacturing, end-use, and recycling). Case-study-based learning activities are incorporated to explore the appropriate use and limitations of LCA databases and software as a tool for sustainability assessment. Topics include: systems thinking of sustainability and sustainable development; greenhouse gas (GHG) and carbon footprint accounting; the ISO LCA framework and its requirements; methods of life-cycle inventory analysis; methods of life-cycle impact assessment; interpretation of LCA results; uncertainty and sensitivity in LCA; LCA applications in assessing low-carbon technologies and products; life-cycle cost analysis; social life-cycle assessment; life-cycle management and its contribution to the circular economy and SDGs.
MINE 459	*Risk and Reliability Analysis for Industrial Asset Management, Health & Safety*	F	TBA	50	2 Grad (60hrs)	Previous TA experience related to the subject matter.	This course covers the analytical techniques and tools which form the foundations required for application of the ISO 55000 series of standards for effective life-cycle management of physical assets, as well as the ISO 45000:2018 standard for occupational health and safety management systems. The course uses risk analysis as the primary lens to investigate and evaluate a broad range of industrial challenges, ranging from equipment reliability and maintenance planning strategies, through to identification and mitigation of workplace health and safety hazards. Methodologies covered include Failure Mode, Effects, and Criticality Analysis (FMECA), Reliability Centred Maintenance (RCM), Hazards and Operability Analysis (HAZOP), and Internal Responsibility Systems (IRS) for Safety Management. The role of legislation and regulations is addressed. Selected topics in industrial hygiene, including exposure limits, are also surveyed. Examples and case studies from a variety of industry sectors are used.
MINE 467	*Geostatistics and Orebody Modelling*	F	TBA	33	1 Grad (30hrs)	Previous TA experience related to the subject matter. Experience with Vulcan software.	This course introduces those principals of geostatistics used in evaluating grade distribution in orebodies from drillhole data. Basic concepts of spatial distributions, sampling, distance weighted averages, and variograms are covered. Cases from practice will be employed to illustrate concepts. Use of commercially available software to carry out geostatistical calculations and graphical representation will be made. Utilizing these techniques, students will develop a block model of ore grade distribution for an orebody and then apply this model to a mine pre-feasibility study in a subsequent course.
MNTC 305	*Introduction to Mining*	F	Natalie Hope	25	1 Grad (45hrs)	Previous experience and/or background in course topics.	This course presents an overview of the stages of mining, from exploration and prospecting, through development, exploitation, and finally closure and reclamation. Students are introduced to mine financing, methods and design (both surface and underground), mining operations and planning, services (e.g., rock mechanics, ventilation, drilling and blasting), mineral processing, mining equipment and technologies, as well as social and environmental challenges. Case studies and examples are used to illustrate the fundamentals.
MNTC 311	Orebody Modelling & Resource Estimation	F	Alan Lambden	22	1 Grad (30hrs)	Previous experience and/or background in course topics; experience with Vulcan software.	This course presents a basic introduction to the use of classical and geostatistical estimation techniques for mineral resource estimation. Students will learn to recognize the geological influences to ore body modelling, apply various estimation methods, produce mineralization reports, and classify the mineral resources and reserves according to accepted internationally recognized methods. The course will also include basic ore exploration and sampling concepts.
MNTC 408	Mine Health and Safety	F	Al Hoffman	30	1 Grad (45hrs)	Previous experience and/or background in course topics.	This course is designed to provide knowledge about industrial health and safety practices, in general, and to relate their applications to the mining industry, in particular. The course will identify fundamental industrial physical and chemical (nontoxicological) hazards and risks and review mitigation strategies. Foundational to the course is the analysis of how a typical mine builds a safety organization. The course will examine the processes and the people that comprise award winning safety programs at top performing mining organizations. Students will explore how to design, organize, implement, and maintain a world class safety program as adapted to the mining environment in today's market. How corporate behavior policies ensure adherence to safe work practices and how risk-based safety procedures will lead to performing a job safely will be discussed. The benefits and challenges of instituting and sustaining a goal zero type safety culture will be summarized.
MNTC 415	Metal Extraction Processes	F	Fei Wang	40	1 Grad (45hrs)	Undergraduate degree in Mineral processing or Chem Eng/Eng Chem. Basic understanding of thermodynamics as applied to metallic systems and knowledge of hydrometallurgical and pyrometallurgical processes.	This course covers the fundamental and practical applications of metal extraction processes. An introduction to the chemical production of metals will be provided. Basic processing concepts of hydrometallurgical, pyrometallurgical and electrometallurgical unit operations will be discussed. The properties of solutions relevant to metal extraction are reviewed. Fundamentals of mass and heat balances in metallurgical processes will be covered. Some metal production flowsheets are utilized to illustrate the integration of unit processes required for metal extraction.