MINING ENGINEERING (MINE)

MINE 201 Introduction to Mining and Mineral Processing Units: 4.00
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.
(Lec: 3, Lab: 0, Tut: 1)
Requirements: Prerequisites: must be enrolled in Mining Engineering, or permission of instructor Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 12
Complementary Studies 0
Engineering Science 36
Engineering Design 0
Offering Faculty: Smith Engineering

MINE 202 Computer Applications and Instrumentation in Mining Units: 1.50
The objective of this course is to offer students a hands-on introduction to some of the fundamental tools and techniques of contemporary instrumentation and data analysis, with application examples from both surface and underground mining. Topics covered include an introduction to engineering measurements and the statistical nature of measured data, fundamentals of signal analysis and computer-based data acquisitions systems, introduction to common sensors and their applications, and the use of standard engineering software for data processing and analysis. Course material is delivered via a sequence of workshop-style sessions.
COURSE DELETED 2019-2020
(Lec: 0, Lab: 1.5, Tut: 0)
Requirements: Prerequisites: Must be registered in BSCE or BASC program. Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 12
Engineering Design 6
Offering Faculty: Smith Engineering

MINE 220 Explosives Technology Units: 4.50
This course covers the properties of explosives and the basis for the selection of explosives for specific applications. It includes an introduction to the theory of detonation (ideal and non ideal), sensitivity, performance and numerical modelling of detonation, and the description of modern commercial explosives including typical compositions, mixing, priming and handling. Specific problems related to the use of explosives such as desensitization, sympathetic detonation, gas and dust explosions, as well as the technology associated with initiation methods are also discussed. (0/18/0/36/0) ~ COURSE DELETED IN 2008/09 ~
Requirements: Prerequisites: Must be registered in BSCE or BASC program. Corequisites: Exclusions:
Offering Term: W
Offering Faculty: Smith Engineering

MINE 267 Applied Chemistry for Mining Units: 3.50
This course provides an overview of the chemistry of inorganic and organic compounds used in the practice of mining and mineral processing including hydro-and pyro-extractive methods. Chemistry and chemical interactions for selected reagent formulations used in blasting, flotation/flocculation, leaching/precipitation, solvent extraction/electrowinning and pollution control technologies are outlined with relevant stoichiometry. Mineral stability and its relevance to metal extraction is discussed. Unary, binary and ternary phase diagrams are explored. The properties of solutions of interest are reviewed.
(Lec: 3, Lab: 0, Tut: 0.5)
Requirements: Prerequisites: APSC 131, APSC 132 Corequisites: MINE 268 or permission of the instructor Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 12
Complementary Studies 0
Engineering Science 30
Engineering Design 0
Offering Faculty: Smith Engineering

MINE 268 Analytical Methods in Mining Units: 1.00
This course exposes the students to the analytical techniques utilized in the mining and the mineral processing industries. The first part of each laboratory includes the principles of the analytical technique while the second part is concerned with the practical use of the technique. The analytical techniques are typical of those of analytical groups in most mining companies. The techniques studied include: sampling, digestion, Atomic Absorption Spectroscopy, Induction Coupled Plasma Spectroscopy, X-Ray Diffraction and fire assay. Safety in handling of hazardous chemicals is emphasized with a review of selected Material Safety Data Sheets and industry standards.
(Lec: 0, Lab: 1, Tut: 0)
Requirements: Prerequisites: APSC 131, APSC 132 Corequisites: MINE 267 Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 3
Complementary Studies 0
Engineering Science 9
Engineering Design 0
Offering Faculty: Smith Engineering

MINE 272 Applied Data Science Units: 4.50
This course presents a comprehensive overview of the key elements of data science for engineers. Topics include data cleaning, organization and manipulation, data collection, visualization and noise filtering. Data analysis techniques including regression, decision trees, feature selection, clustering and classification are covered. Emphasis is on spatial analysis and visualization, as well as the analysis of time series. An introduction to advanced topics such as deep learning, big data management and analysis is provided. The focus is on the practical application of data science in the engineering context to make predictions and decisions based on the statistical inference of data.
(Lec: 3, Lab: 3, Tut: 0)
Requirements: Prerequisites: APSC 142 or APSC 143 or CISC 101 or MNTC 313, and CHEE 209 or STAT 263 or MECH 203 or MTHE 224 or ENPH 253 or permission of the department Corequisites: Exclusions: CISC 251, CMPE 251
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 54
Engineering Design 0
Offering Faculty: Smith Engineering

MINE 307 Front Line Supervision Units: 1.50
This short course provides a base for engineering graduates placed into leadership positions in mining organizations. The Supervisor role is defined, core duties of the position are examined and students are given a variety of tools or strategies to achieve the defined goals of the role. Students are exposed to basic principles of leadership particularly coaching techniques and motivation. Safety leadership is highlighted and reinforced extensively throughout the material, most importantly the Supervisor's direct responsibility for ensuring compliance with Safe Operating Procedure and associated Safety norms. The Supervisor's influence in meaningfully contributing to an organization's safety and performance culture is examined and discussed. Important aspects of Performance Management for both individuals and groups are covered with examples from real-life situations. Several cases involving direct and indirect costs associated with situations directly controlled by the Supervisor are studied to reinforce the key link nature of the position. Course material also deals with the subject of change in the workplace and includes strategies for managing it; how a Supervisor can best facilitate change that results in a positive outcome. Detailed discussions are held on common problems facing Supervisors and a simple problem solving methodology is provided along with examples. Course facilitators are experienced mining professionals with a history that includes front-line supervision up to executive positions; all material is reinforced with real-life examples. Students are graded on a pass/fail system. Offered as an intensive 2-day short course in the winter term.
NOT OFFERED 2022-2023
(Lec: 1.25, Lab: 0, Tut: 0.25)
Requirements: Prerequisite: Must have completed the 2nd year of Mining Engineering
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 18
Engineering Science 0
Engineering Design 0
Offering Faculty: Smith Engineering

MINE 321 Drilling & Blasting Units: 4.50
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.
(Lec: 3, Lab: 1.5, Tut: 0)
Requirements: Prerequisites: MTHE 367 or CHEE 209 Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 14
Complementary Studies 0
Engineering Science 25
Engineering Design 15
Offering Faculty: Smith Engineering

MINE 324 Hydraulics/Mining Applications Units: 3.50
The fluid mechanics basic to fluid hydraulic systems used in the mineral industry are introduced. Topics covered include properties of fluids, fluid statics and its application to mining. Hydrodynamic studies include the energy balance and Bernoulli's equation, energy losses in incompressible flow, the momentum equation and its application, and flow and pressure measuring devices. Flow in closed conduits, including series and parallel pipeline systems and pipe networks, is studied in detail and open channel flow is introduced. Applications include industrial pumps, sump design, hydraulic structures, underground mine dewatering systems, open pit mine drainage systems, and mine backfill and mine tailings transportation.
COURSE DELETED 2021-2022
(Lec: 3, Lab: 0, Tut: 0.5)
Requirements: Prerequisites: MTHE 225 and MECH 230 or CHEE 210 or permission of the instructor Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 12
Complementary Studies 0
Engineering Science 30
Engineering Design 0
Offering Faculty: Smith Engineering

MINE 325 Applied Rock Mechanics Units: 4.50
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.
(Lec: 3, Lab: 1.5, Tut: 0)
Requirements: Prerequisites: CIVL 230 or permission of the instructor Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 36
Engineering Design 18
Offering Faculty: Smith Engineering

MINE 326 Operations Research Units: 4.50
The course deals with the application of operations research methods in engineering with emphasis on mining applications. Topics covered are linear programming, optimization methods, transportation and network models, discrete optimization, non linear optimization, decision tree methods, simulation and elements of geostatistics as applied to mining. Lab sessions also deal with forecasting techniques, regression analysis, dispatch problems, planning and scheduling.
(Lec: 3, Lab: 1.5, Tut: 0)
Requirements: Prerequisites: APSC 142 or APSC 143 or MNTC 313 or permission of the instructor Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 20
Natural Sciences 0
Complementary Studies 0
Engineering Science 14
Engineering Design 20
Offering Faculty: Smith Engineering

MINE 330 Mineral Industry Economics Units: 3.50
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.
(Lec: 3, Lab: 0, Tut: 0.5)
Requirements: Prerequisites: Must be enrolled in Mining Engineering or permission of the instructor (or department) Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 42
Engineering Science 0
Engineering Design 0
Offering Faculty: Smith Engineering

MINE 331 Methods Of Mineral Separation Units: 4.50
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.
(Lec: 3, Lab: 1.5, Tut: 0)
Requirements: Prerequisites: MINE 201 Introduction to Mining and Mineral Processing F | 4MINE 201 or GEOE 281 , MINE 267 or GEOE 365 or CHEE 221 or permission of the instructor Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 14
Complementary Studies 0
Engineering Science 25
Engineering Design 15
Offering Faculty: Smith Engineering

MINE 335 Mineral Processing Units: 3.00
Mineral separation processes of a physical and physicochemical nature are studied. 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. Quantitative understanding of various topics is aided through problem solving in class and assignments on mass balancing, kinetic analysis and circuit sizing.
(Lec: 3, Lab: 0, Tut: 0)
Requirements: Prerequisites: PREREQUISITE(S): MINE 201 or GEOE 281 and MINE 267 or GEOE 365 or CHEE 221 or permission of the instructor Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 11
Complementary Studies 0
Engineering Science 16
Engineering Design 9
Offering Faculty: Smith Engineering

MINE 339 Mine Ventilation Units: 4.50
Hydraulics of air flow through mine openings and ducts is first studied, leading to mine ventilation Hydraulics of air flow through mine openings and ducts is studied, leading to mine ventilation design calculations and ventilation network analysis. Topics related to the design of mine ventilation systems include: statutory regulations and engineering design criteria, ventilation circuit design, natural ventilation, testing, application and selection of mine ventilation fans, auxiliary ventilation design, psychrometry, mine air heating and cooling, dust and fume control, and ventilation economics. Health hazards of mine gases, dust and radiation are reviewed, together with statutory requirements for air quality. Procedures for conducting air quantity and quality surveys are also taught.
(Lec: 3, Lab: 1.5, Tut: 0)
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 14
Complementary Studies 0
Engineering Science 15
Engineering Design 25
Offering Faculty: Smith Engineering

MINE 341 Open Pit Mining Units: 4.50
This course presents technologies and techniques employed in open pit mining with a focus on strategic and operations planning considerations. Topics of study include: pit design, application of algorithms for economic pit limit analysis, equipment selection, production scheduling, material control and reconciliation, remote sensing and geomatics applications, mine waste management, emerging trends in open pit mining, and mine safety. Regulatory controls and best practices in design are stressed for all stages of the mine life cycle. Environmental impacts of design decisions and mitigating strategies are explored. The use of software at various stages of the design and planning process is introduced and a strategic design project completed using commercial software applications.
(Lec: 3, Lab: 0, Tut: 1.5)
Requirements: Prerequisites: APSC 221 and MINE 201, or permission of instructor Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 14
Natural Sciences 0
Complementary Studies 0
Engineering Science 14
Engineering Design 26
Offering Faculty: Smith Engineering

MINE 344 Underground Mining Units: 4.00
A study of underground mining technology with special reference to economic optimization in both design and production. Conventional and up to date mining methods are reviewed. Developments and trends in mining methods are closely analyzed. Mine design is studied in relation to ore reserves, tonnage and grade distribution, equipment with emphasis on the growing importance of maintenance on underground machinery and capacities of various production units. Development and production costs associated with mining are an inherent aspect of this course. The problems and possibilities of existing and evolving mining techniques are reviewed.
(Lec: 3, Lab: 0, Tut: 1)
Requirements: Prerequisites: MINE 201 Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 12
Complementary Studies 0
Engineering Science 24
Engineering Design 12
Offering Faculty: Smith Engineering

MINE 422 Mining And Sustainability Units: 4.00
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.
(Lec: 4, Lab: 0, Tut: 0)
Requirements: Prerequisites: Must be registered in BSCE or BASC program. Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 48
Engineering Science 0
Engineering Design 0
Offering Faculty: Smith Engineering

MINE 431 Life-Cycle Assessment for Green Technologies Units: 3.50
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.
(Lec: 3, Lab: 0, Tut: 1)
Requirements: Prerequisites: APSC 132 or CHEM 112, and APSC 174 or MATH 121; open to third- or fourth-year students or permission of the department Corequisites: Exclusions: MECH 424
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 21
Engineering Science 21
Engineering Design 0
Offering Faculty: Smith Engineering

MINE 434 Project Report Units: 4.00
In this course, the student is exposed to research in the mining, mineral processing and metal extraction industries. The work is performed under the supervision of a Faculty member. Standing is based on the work done, the ability of individuals to meet project deliverables according to the schedule provided, and individual written and oral presentations made. The deliverables include a research proposal, a research plan and literature review, an oral seminar presentation and a final report in the form of a technical paper. The deliverables can be based on research performed during the fall and winter terms, as an extension of a summer employment research project, or literature-derived research information. Emphasis is placed on the critical treatment of the data obtained to produce useful conclusions.
(Lec: 1, Lab: 0, Tut: 3)
Requirements: Prerequisites: Prerequisite : Completion of all 2nd and 3rd year courses in Mining Engineering and permission of the Department Corequisites: Exclusions:
Offering Term: FW
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 24
Engineering Science 0
Engineering Design 24
Offering Faculty: Smith Engineering

MINE 445 Open Pit Mine Design Units: 5.50
The material of MINE 341 is applied to the design of an open pit mine. Special attention is given to the selection of equipment and the use of computers in strategic and detailed mine planning and scheduling. The course uses commercial mine planning software to enable small groups of students (2-4) to complete mine designs starting with topography maps, drill information, and mineral inventory block models. Several real deposit databases are used including gold, copper, copper/molybdenum, copper/zinc. The deposits are evaluated, feasibility assessed, and production decisions discussed.
(Lec: 1, Lab: 3, Tut: 1.5)
Requirements: Prerequisites: MINE 330 and MINE 341, and either MINE 326 or MINE 467, or permission of the instructor Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 20
Engineering Science 0
Engineering Design 46
Offering Faculty: Smith Engineering

MINE 448 Underground Design Units: 5.50
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.
(Lec: 1, Lab: 1.5, Tut: 3)
Requirements: Prerequisites: APSC 221 or MINE 330, MINE 344, MINE 339, MINE 225 or MINE 325, and MINE 467, or permission of the instructor Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 18
Engineering Science 0
Engineering Design 48
Offering Faculty: Smith Engineering

MINE 451 Chemical Extraction Of Metals Units: 4.00
The recovery and recycling of metals by both hydrometallurgical and pyrometallurgical techniques is discussed. The thermodynamic and kinetic aspects of the solutions utilized in these processes are reviewed. The major unit operations of the hydrometallurgical and pyrometallurgical processes are studied. For hydrometallurgy, the unit operations are; ion exchange, solvent extraction, cementation, purification, precipitation, electrowinning and electrorefining. Particular emphasis will be placed on the recovery of gold. For pyrometallurgy the unit operations are; roasting, agglomeration, calcination, smelting, converting, refining and electrolysis. In the course, the importance of environmental stewardship in metal extraction is stressed.
(Lec: 3, Lab: 0, Tut: 1)
Requirements: Prerequisites: MINE 331 or permission of the instructor Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 12
Complementary Studies 0
Engineering Science 24
Engineering Design 12
Offering Faculty: Smith Engineering

MINE 455 Design, Analysis and Operation of Mineral Processes Units: 4.50
Engineering elements of a mineral processing project are examined from the concept stage to process design. Flowsheet evaluation, process equipment selection and layout, capital and operating costs, operating and control strategies are considered for real problems.
(Lec: 3, Lab: 1.5, Tut: 0)
Requirements: Prerequisites: MINE 331 , or permission of the instructor Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 0
Engineering Design 54
Offering Faculty: Smith Engineering

MINE 458 Process Investigations Units: 4.00
Projects may involve design of new processes, re-design of existing processes, process simulation and process innovation. Oral presentations and a formal report are required at the end of the term.
(Lec: 1, Lab: 3, Tut: 0)
Requirements: Prerequisites: MINE 455 or permission of the instructor Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 0
Engineering Design 48
Offering Faculty: Smith Engineering

MINE 459 Risk and Reliability Analysis for Industrial Asset Management, Health & Safety Units: 4.00
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.
(Lec: 3, Lab: 0, Tut: 1)
Requirements: Prerequisites: Must be registered in BSCE or BASC program. Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 24
Engineering Science 24
Engineering Design 0
Offering Faculty: Smith Engineering

MINE 460 Special Topics In Mining Engr Units: 4.50
This course will change from year to year as subjects of special interest to mining engineers arise, or as special staff are available.
(Lec: 3, Lab: 1.5, Tut: 0)
Requirements: Prerequisites: Must be registered in BSCE or BASC program. Corequisites: Exclusions:
Offering Term: FW
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 27
Engineering Design 27
Offering Faculty: Smith Engineering

MINE 462 Occ Hlth/Safety In Mining Prac Units: 3.50
Affirms a societal rationale and framework for due diligence in health, safety and environment (HS&E). Considers the five principal categories of workplace environmental factors that may lead to ill health / death, and introduces the principles (strategies and techniques) of exposure assessment (relative to both regulatory and professional standards) and control, as part of the Anticipation-Recognition-Evaluation-Communication-Control sequence. Enables the student to resolve, by means of memorandum, a specific topical occupational health issue. In addition to providing the basic tools for undertaking occupational health risk assessment / management, reviews fundamental chemical (non-toxicological) hazards and risk parameters.
COURSE DELETED 2020-2021
(Lec: 3, Lab: 0, Tut: 3)
Requirements: Prerequisites: Completion of 3rd year Mining Engineering or permission of the instructor. Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 42
Engineering Science 0
Engineering Design 0
Offering Faculty: Smith Engineering

MINE 467 Geostatistics and Orebody Modelling Units: 4.50
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.
(Lec: 3, Lab: 1.5, Tut: 0)
Requirements: Prerequisites: MINE 326, or GEOE 359 or permission of the instructor Corequisites: Exclusions:
Offering Term: F
CEAB Units:
Mathematics 16
Natural Sciences 0
Complementary Studies 0
Engineering Science 14
Engineering Design 24
Offering Faculty: Smith Engineering

MINE 469 Stability In Advanced Design Units: 4.00
Application of rock mechanics principles to mine design. Includes planning and execution of geotechnical investigation programs, empirical and analytical methods of stability analysis and support design. Numerical methods are introduced, with emphasis on how to choose among them for particular applications and how to evaluate results. Instrumentation programs are described. Methods are illustrated using case histories.
COURSE DELETED 2019-2020
(Lec: 3, Lab: 0.5, Tut: 0.5)
Requirements: MINE325
Offering Term: F
CEAB Units:
Mathematics 12
Natural Sciences 0
Complementary Studies 0
Engineering Science 12
Engineering Design 24
Offering Faculty: Smith Engineering

MINE 471 Mine-Mechanical Design Project Units: 5.50
This course involves a design project with emphasis on the mechanical aspects of mine or plant design and operation. Typical topics include mobile equipment, materials handling, automation, equipment redesign and systems integration.
(Lec: 1, Lab: 1.5, Tut: 3)
Requirements: Prerequisites: Must be registered in BSCE or BASC program. Corequisites: Exclusions:
Offering Term: W
CEAB Units:
Mathematics 0
Natural Sciences 0
Complementary Studies 18
Engineering Science 0
Engineering Design 48
Offering Faculty: Smith Engineering

MINE 472 Mining Systems, Automation, and Robotics Units: 3.50

In order to address issues related to safety, productivity, and remote operations, the world's mineral resources industry has been gradually shifting towards the increased use of automated systems and roboticallyenhanced machines. It is important, therefore, that graduate engineers understand how these new technologies work so as to improve and make best use of them. This online course introduces senior students to the fundamental tools and techniques of automation and robotics as applied to modern mining practice. Enrolment is open to students from a range of engineering disciplines. This course provides an introduction to the basics of systems control, examples of how methods of automatic control can be applied to mining equipment and associated industrial vehicles, as well as to the fundamentals of sensing and navigation as applied to the design of robotic mobile equipment.

NOT OFFERED 2022-2023

K3.5(Lec: No, Lab: No, Tut: No)

Requirements: Prerequisites: ELEC 443 or MECH 350 or MTHE 332 or permission of the instructor Corequisites: Exclusions:

Offering Term: FWS

CEAB Units:

Mathematics 0
Natural Sciences 0
Complementary Studies 0
Engineering Science 24
Engineering Design 18

Offering Faculty: Smith Engineering