BSc in Mining Engineering

Mine Risk Management	Geomechanics	Mine Ventilation
This course will teach students on fundamentals of mine risk management related with risk of injuries / fatalities, environmental, financial, operational and technological. Demonstrates systematic application of policies, processes and procedures to identify, analyze, assess, treat and monitor risk in mining. Introduces a basis of managing the occupational safety and health risks of a mining operation.	This core course is a pre-requisite for other courses covering the engineering applications of soil and rock mechanics including rock breakage, ground control, and surface mine design and underground mine design. Hence, the course aims to establish a framework for understanding the fundamental principles governing the response of geo-materials (soil and rock) to applied loads.	This course covers the provision of a safe underground working environment through appropriate ventilation practice. Fundamentals of mine ventilation, including control of gas, dust, temperature, and humidity; ventilation network analysis and design of mine ventilation systems. Sustainable mining practices as well as governmental health and safety regulations will be discussed.
Mine Planning	**Coal Mining**	**Mine Robotics and Automation**
This course is dealing with identifying the mine planning process, mine scheduling and production planning, and analysis of cut-off grades. This course will end up with mine optimization.	This course is devoted to surface and underground coal mining systems and design	This course's general objective is to equip the students with the knowledge of the technological advances towards implementation of automation and autonomous operations in the mining industry.
Mine Services and Materials Handling	**Mine Surveying and Geographic Information Systems**	**Mine Design Project**
This course covers the fundamentals of mine services and materials handling. Mine service part consists of mine power supply, mine maintenance and mine drainage. The other part encompasses the types and selection of equipment and materials handling methods. Continuous and cyclic loading and transportation systems for surface and underground mining operations will be analyzed including: shovel-truck systems, draglines, conveyors, rails, hoisting, and auxiliary equipment.	This course introduces applications of topographic and geodetic surveying, geospatial and remote sensing technologies applied for mining. This course will present the principles of geospatial data collection using geodetic instruments (Total Stations, Levelling, and GPS etc.), space airborne and satellite technologies. GIS data will be developed in geospatial software for further storage, management, manipulations, quality assurance, spatial analytics, interpretations, cartographic design of maps, geovisualizations and dissemination of produced results.	Introduce students to the principles of mine feasibility studies for evaluation of mining projects to determine whether the mineral resource can be mined economically. Develop skills for optimal mine design based on the estimated geotechnical parameters and mining methods selection, mining equipment selection, mine production scheduling, mining costs estimation, mining project economical evaluation, and minable reserves estimation to determine definitively whether to proceed with the project.
Sustainability and Mining Environment	**Mining Geotechnical Engineering**	**Rock Breakage**
This course addresses the sustainability of mining	The course aims to cover the practical applications of the	The course covers the principal methods of rock breakage used in mining including mechanical

operations and the impact of mining operations on the environment through the introduction and analyzes of the effect of mining on sustainable development including economic, social, and policy aspects of sustainability, and the use of green techniques and technologies aimed at reducing the environmental impact of mining, increasing safety, and improving productivity towards sustainable mining operations.	principles of geomechanics. The course contents include: stability of slopes formed in soil & rock, subsidence, rockbursts and seismicity, ground support, pillar mechanics and design, rock mass classifications and applications, excavation stability, caving mechanics, mine backfill, application of numerical methods, instrumentation and monitoring. The course will incorporate fieldwork (geotechnical mapping) as well as the use of geotechnical software such as Rock science to analyze and design a wide range of geotechnical structures.	mining, drilling and blasting. Mechanical mining includes the rock cutting principles, cutting with picks and discs, effect of tool wear, impact breakage and ripping, assessment of rock cuttability and boreability, also, includes machine rock interaction and influence of parameters on mechanical rock breakage. Drilling includes the methods of drilling used in mining application. Blasting includes the chemistry of explosives and mechanics of explosive-rock interaction, selection of explosives, explosive charging techniques; and initiation and delay systems, blast design principles for surface and underground mines.
Mining and Environment This course covers studies of the interface between mining, mineral processing, metallurgical process engineering and environmental engineering areas.	**Research Project I** This course is for preparation of a literature review report. This will be later used for the Research Project II.	**Resource Estimation** This course familiarizes the students with the process of resource modeling.
Research project II Students are required to report and present the Research Project II as: final thesis, typical conference style paper, and thesis presentation. The reporting formats will be provided at the beginning of spring semesters in each year.	**Surface Mining System and Design** Analysis of elements of surface mine operation and design of surface mining system components with emphasis on minimization of adverse environmental impact and maximization of efficient use of mineral resources.	**Mineral Processing** The course is aimed at introducing undergraduate mining engineers to the fundamentals of mineral processing so that they can understand the process of ore discovery to market to allow them understand the production chain to optimize the system when needed. This is relevant to the state of the art of mine to mill.
Underground Mining Systems and Design This course introduces students to high underground mining is conducted for orebodies of different geometries and mechanical properties.		