Master of Engineering Program in Mining and Georesources Engineering (International Program)

Master of Engineering (Mining and Georesources Engineering)

M.Eng. (Mining and Georesources Engineering)

1 Type 1 (Plan A Type A 1)

Degree Requirements **36 credits**

A. Thesis **36 credits**

256798 MN 798 Master's Thesis 36 credits

B. Academic Activities

1. A student has to report thesis progression to the Graduate School every semesters which approved by the Chairman of the Graduate Study Committee. The report has to submit to the department of Mining and Petroleum Engineering.
2. A student must organize and present seminars on the topics related to his/her thesis 3 times during his/her study.
3. The whole or part of thesis must be published/accepted for publication in the journal listed in TCI Tier 1 database, or published/accepted in an international journal approved by the department at least 1 paper with the student named as the first author **and** presented at an international conference providing the publication as proceeding/ distribution and approved by the department at least 1 paper, the full paper for publication/distribution is scholarly peer reviewed, with the student named as the first author. All publications/distributions must be written in English.

C. Non-credit Courses

1. Graduate School requirement : a foreign language
2. Program requirement
   - With an academic advisor's recommendation, a student with the deficient background must enroll in some necessary courses without earning any credit.

2 Type 2 (Plan A Type A 2)

Degree Requirements		**a minimum of**	**37**	**credits**
A. Coursework		**a minimum of**	**19**	**credits**
1. Graduate Courses		a minimum of	19	credits
1.1 Field of Specialization		a minimum of	19	credits
1.1.1 Required courses			4	credits
256700	MN 700	Innovative Technology in Mining and Georesources Industries	3	credits
256791	MN 791	Seminar in Mining and Georesources Engineering	1	credit
1.1.2 Elective courses		a minimum of	15	credits

Selected from the following 6 fields of study by either from the same field or from different field as recommended by advisor.

1) Field of Mine Design and Mining Method

256711	MN 711	Advanced Blasting Technology	3	credits
256712	MN 712	Advanced Surface Mine Design	3	credits
256713	MN 713	Advanced Geostatistics	3	credits
256781	MN 781	Selected Topics in Mine Design and Mining	3	credits

2) Field of Mineral Processing and Beneficiations of Minerals and Metals

256731	MN 731	Advanced Flotation	3	credits
256732	MN 732	Design of Mineral Processing Plant	3	credits
256735	MN 735	Industrial Mineral Processing	3	credits
256738	MN 738	Advanced Metallurgy	3	credits
256782	MN 782	Selected Topics in Mineral Processing	3	credits

3) Field of Georesources and Energy Management

256741	MN 741	Mineral and Georesources Industry Management	3	credits
256742	MN 742	Economics of Metallic, Energy, and Industrial Minerals	3	credits
256745	MN 745	Mining and Georesources Cost Estimation and Control	3	credits
256783	MN 783	Selected Topics in Georesources and Energy Management	3	credits

4) Field of Geo-environmental, Reclamation and Control

256751	MN	751	Environmental Management in Georesources Engineering	3	credits
256752	MN	752	Material Characterization in Georesources Engineering	3	credits
256753	MN	753	Site Reclamation in Georesources Engineering	3	credits
256754	MN	754	Monitoring Technology for Mining Area	3	credits
256784	MN	784	Selected Topics in Mine Environment	3	credits

5) Field of Petroleum Exploration and Production

256761	MN	761	Petroleum Reservoir Rock and Fluid Properties	3	credits
256762	MN	762	Well Logging Interpretation	3	credits
256763	MN	763	Advanced Drilling Engineering	3	credits
256764	MN	764	Petroleum Production System and Management	3	credits
256785	MN	785	Selected Topics in Petroleum Exploration and Production	3	credits

6) Field of Rock Mechanics

256771	MN	771	Rock Mechanics for Underground Excavation	3	credits
256772	MN	772	Numerical Techniques for Rock Mechanics	3	credits
256774	MN	774	Rock Slope Engineering	3	credits
256786	MN	786	Selected Topics in Rock Mechanics	3	credits

1.2 Other courses None

2. Advanced Undergraduate Courses None

B. Thesis **18 credits**

256799	MN	799	Master's Thesis	18	credits

C. Academic Activities

The whole or part of thesis must be published/accepted for publication in the journal listed in TCI Tier 1 database, or published/accepted in an international journal approved by the department at least 1 paper with the student named as the first author **or** presented at an international conference providing the publication as proceeding/distribution and approved by the department at least 1 paper, the full paper for publication/distribution is

scholarly peer reviewed, with the student named as the first author. All publications/distributions must be written in English.

D. Non-credit Courses

1. Graduate School requirement : a foreign language
2. Program requirement
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Type 1 (Plan A Type A 1)

1st Year

1st Semester		Credits	2nd Semester		Credits
	Enrollment for Service	-	256798	Master's Thesis	12
	Pass foreign language requirement	-		Seminar and Presentation	-
	Present thesis proposal	-			
	Total	**-**		**Total**	**12**

2nd Year

1st Semester		Credits	2nd Semester		Credits
256798	Master's Thesis	12	256798	Master's Thesis	12
	Seminar and Presentation	-		Seminar and Presentation	-
				Thesis Defense	-
	Total	**12**		**Total**	**12**

Total 36 Credits

Type 2 (Plan A Type A 2)

1st Year

1st Semester		Credits	2nd Semester		Credits
256700	Innovative Technology in Mining and Georesources Industries	3	256791	Seminar in Mining and Georesources Engineering	1
	Elective Courses	6		Elective Courses	9
	Pass foreign language requirement			Present thesis proposal	
	Total	**9**		**Total**	**10**

2nd Year

1st Semester		Credits	2nd Semester		Credits
256799	Master's Thesis	9	256799	Master's Thesis	9
				Thesis Defense	-
	Total	**9**		Total	**9**

Total a minimum of 37 Credits

MN 700 (256700) Innovative Technology in Mining and Georesources Industries

Study of innovative design in mining and georesource industries, innovative methods in mining and georesource industries, innovative equipment in mining and georesource industries, innovative beneficiation of mining and georesource, innovative information technology applications in mining and georesource industries.

MN 711 (256711) Advanced Blasting Technology

Explosives theories and applications, explosive reactions and energy calculations. Planning and design of surface and underground blasting rounds, controlled blasting techniques, directional blasting techniques, ground vibrations and air blast monitoring and control

MN 712 (256712) Advanced Surface Mine Design

Optimization of open pit mine design. Three-D ultimate pit limit algorithms and their applications. Computer-aided design for haul road and dump. Heuristic long and short term pit scheduling technique. Parametrization concepts and mathematical optimization for sequencing and scheduling. Case study illustrated by vaious computer programs

MN 713 (256713) Advanced Geostatistics

Advanced geostatistical concepts, including: linear and nonlinear geostatistics, indicator kriging, disjunctive kriging, and simulation of deposits. Application of geostatistics in mine exploration, ore reserve estimation, grade control, and mine planning

MN 731 (256731) Advanced Flotation

Advanced froth flotation by reviewing of general principles of flotation process; emphasis on flotation of sulfide and precious metals, non-sulfide minerals and coal cleaning; consideration of flotation impact on environment; economic of flotation and analysis of flotation in various mills

MN 732 (256732) Design of Mineral Processing Plant

Design of mineral processing plant emphasis on types, selection and sizing of machines and equipment; fundamental and analysis of mineral processing flow charts; unit operations in mineral processing; and research and development of machine and equipment

MN 735 (256735) Industrial Mineral Processing

Ore processing methods of industrial minerals such as asbestos, barite, boron, beryllium, clay, diatomite, feldspar and others, specifications and prices of these concentrates or final mineral product in marketing

MN 738 (256738) Advanced Metallurgy

Reviews of unit processes in metallurgical extraction, engineering material synthesis, metal/ material waste treatment, and linkage of the above- mentioned technologies. Thermodynamics of calcinations, roasting reaction**,** stability of oxides and sulfides, and their application in the industries**.** Thermodynamics of metal reduction from solution and its application in hydrometallurgical processes**.** Electrolysis and/or electro-winning of metals from leaching solutions. Reaction path synthesis, screening of reaction paths; and material balance and species allocation in industrial practices.

MN 741 (256741) Mineral and Georesources Industry Management

Principles of management. Mineral and georesources management of production, personnel and organization, finance, and environment. Case study analysis of mineral and georesources management.

MN 742 (256742) Economics of Metallic, Energy, and Industrial Minerals

Economic analysis of metallic minerals, energy minerals, and industrial minerals; including pattern of supply and demand, prices, costs, market organization and trade for selected minerals

MN 745 (256745) Mining and Georesources Cost Estimation and Control

Characteristics of mining costs, analysis and control, depreciation and tax deduction costs, capital and operation cost estimations, budget controls, case study of mining and georesources cost estimation and control.

MN 751 (256751) Environmental Management in Georesources Engineering

Environmental quality surveying and analysis standards for exploration and production of georeources, Contaminants from the utilization of georesources, Environmental law relates to the exploration and production of georeources, Hazardous waste management in the utilization of georesources, Environmental assessment policy and process for exploration and production of georeources, Conducting of environmental impact assessment in georesources related project.

MN 752 (256752) Material Characterization in Georesources Engineering

Theory and standards of material analysis and classification, Material analysis and characterization using microscopy, Material analysis and characterization using High Performance Liquid Chromatography (HPLC), Material analysis and characterization using Atomic Absorption Spectroscopy (AAS), Material analysis and characterization using X-ray diffraction, Material analysis and characterization using X-ray florescence instrument, Material analysis and characterization using inductively coupled plasma atomic emission spectroscopy , Material characterization selection and application

MN 753 (256753) Site Reclamation in Georesources Engineering

Theory of site remediation, Methodology of site remediation for contaminated area, Technology for remediation of contaminated area, Theory of site reclamation after the utilization of natural resources, Monitoring and protection of environmental impact, Technology for environmental impact monitoring and control after georesources-project closure, Processes and methods for site reclamation after project closure, Case study of reclamation and land utilization after georesources-project closure.

MN 754 (256754) Monitoring Technology for Mining Area

Principles of geographic information system, Application of GIS for mining, Mine monitoring using mobile GIS, Principles of remote sensing, Remote sensing in mine environment monitoring, Remote sensing in mine reclamation monitoring, Remote sensing in mine subsidence monitoring, Mine topographic monitoring technology.

MN 761 (256761) Petroleum Reservoir Rock and Fluid Properties

Reservoir rock characteristics and properties. Porosity and fluid saturation. Permeability. Measurement and relationship of porosity and permeability. Formation resistivity. Capillary pressure and wettability. Relative permeability and Darcy's law application. Reservoir fluid characteristics. Phase behavior. Oil, gas and brine systems in petroleum reservoir. Equation of state and reservoir gas properties. Reservoir liquid properties and correlations. Vapor-liquid equilibrium.

MN 762 (256762) Well Logging Interpretation

Well logging methodology for petroleum engineering. Spontaneous potential log. Resistivity log. Caliper log. Gamma ray log. Density log. Neutron porosity log. Sonic log. Photoelectric adsorption log. Combined log interpretation. Abnormal pressure and fracture detection. Shaly sand interpretation.

MN 763 (256763) Advanced Drilling Engineering

Drilling rigs and operations. Rotary drilling system. Drilling bits and selection. Drilling fluid and rheological models. Drilling hydraulics and design. Bit nozzles selection. Directional drilling and drillstring design. Casing Design. Cementing. Well Control.

MN 764 (256764) Petroleum Production System and Management

Petroleum production system components and analysis. Single phase and multiphase flow. Reservoir (Inflow) performance relationship. Pipe flow and restricted flow. Nodal analysis of production system. Artificial lift equipment design of sucker rod pumps, hydraulic pumps, electrical submersible pumps, and gas lift system.

MN 771 (256771) Rock Mechanics for Underground Excavation

Stress components and distributions; in situmeasurements; underground failure mechanisms; subsidence and caving; excavation stability and support designs

MN 772 (256772) Numerical Techniques for Rock Mechanics

Review of principles of stress, infinitesimal strain and linear elasticity; concepts of the boundary element and finite element methods; application of finite element and other numerical methods to rock mechanics problems

MN 774 (256774) Rock Slope Engineering

Mechanics of slope failure; geological data collection; shear strength of rock; ground water flow; design of rock slopes; remedial measures

MN 781 (256781) Selected Topics in Mine Design and Mining

Selected topics of current interest in mine design and mining

MN 782 (256782) Selected Topics in Mineral Processing

Selected topics of current interest in mineral processing

MN 783 (256783) Selected Topics in Georesources and Energy Management

Selected topics of current interest in Georesource and Energy Management

MN 784 (256784) Selected Topics in Mine Environment

Selected topics of current interest in mine environment.

MN 785 (256785) Selected Topics in Petroleum Exploration and Production

Selected topics of current interest in petroleum exploration and production.

MN 786 (256786) Selected Topics in Rock Mechanics

Selected topics of current interest in rock mechanics.

MN 791 (256791) Seminar in Mining and Georesources Engineering

Individual study in mining and georesources and presentation under the guidance of the instructor in charged

MN 798 (256798) Master's Thesis

Prerequisite: Approved proposal or concurrent to thesis proposal

MN 799 (256799) Master's Thesis

Prerequisite: Approved proposal or concurrent to thesis proposal