

**COURSE STRUCTURE DIAGRAM 2012-13****Master of Science (MSc) in Geology and Mineralogy, Specialisation in Exploration and Mining (120 ECTS Credits)****Year/Semester**

2 / Spring	Master's thesis 30 ECTS cr
2 / Autumn	Advanced studies 30 ECTS cr
1 / Spring	Advanced studies 30 ECTS cr
1 / Autumn	Advanced and intermediate studies 30 ECTS cr

Courses are taken from the Faculty of Technology, which has a 6-period teaching system (periods 1-3 in autumn, 4-5 in spring), and from the Faculty of Science having a single period in the autumn and spring semesters. Students can already start specializing in exploration and mining during the Bachelor studies. Students are required to complete a 15 ECTS credit entity from the intermediate-level courses that are listed below and taught in the Department of Process and Environmental Engineering. Alternatively these courses can be done later during the Master's studies.

**Courses in minor subject to be taken during the Bachelor studies (second and third year), minimum 15 ECTS cr**

Code	Course	ECTS credits	Timing
<a href="#">488012A</a>	Environmental legislation	5	4-5 period
<a href="#">477011P</a>	Introduction to Process Engineering	5	1-3 period
<a href="#">488011P</a>	Introduction to environmental engineering	5	5-6 period
<a href="#">031010P</a>	Calculus I	5	1-3 period
<a href="#">477101A</a>	Fluid and particle engineering	3	1-3 period

Students specializing in exploration and mining can select a minimum amount of 25 ECTS credits of advanced-level studies (in addition to Master's thesis) in geology and mineralogy from the table below:

**Advanced-level courses in geology and mineralogy (minimum 25 ECTS credits + Master's thesis)**

Code	Course	ECTS credits	Timing
<a href="#">772671S</a>	Magmatic ore deposits	7	1st or 2nd autumn
<a href="#">772672S</a>	Hydrothermal ore deposits	7	1st or 2nd autumn
<a href="#">772674S</a>	Sedimentary ore deposits	7	1st or 2nd spring
<a href="#">772675S</a>	Geophysics in economic geology	5	1st or 2nd autumn
<a href="#">772682S</a>	Sampling, drilling, analysis, exploration geochemistry, role of surficial deposits in mineral exploration	5	1st or 2nd spring
<a href="#">772632S</a>	Regional ore geology of Fennoscandia	5	1st or 2nd spring
<a href="#">772687S</a>	Gold deposits	5	1st or 2nd spring
<a href="#">772631S</a>	Archaean Geology	5	1st or 2nd autumn
<a href="#">772628S</a>	Layered intrusions and their ore deposits	5	1st or 2nd autumn
<a href="#">774637S</a>	Isotope geochemistry for economic geologists	5	1st or 2nd spring
<a href="#">772683S</a>	Structural geology for economic geologists	7	1st or 2nd autumn
<a href="#">772689S</a>	Nickel deposits of the Fennoscandian Shield	5	1st or 2nd spring
<a href="#">772621S</a>	Geology of alkaline rocks, carbonatites and kimberlites	4	1st or 2nd spring
<a href="#">772667S</a>	Seminar in ore geology	5	1st or 2nd spring
<a href="#">772694S</a>	Geometallurgy and mineral processing	4	1st or 2nd autumn
<a href="#">772608S</a>	Mining geology	3	1st or 2nd spring
<a href="#">772640S</a>	Excursion	5	1st or 2nd autumn
<a href="#">774636S</a>	Geochemistry of mining environment	5	1st or 2nd spring
<a href="#">772613S</a>	Evolution of the bedrock of Finland	6	1st or 2nd autumn
<a href="#">772658S</a>	Special issues in geology and mineralogy	5	1st or 2nd autumn
<a href="#">772684S</a>	GIS applications	5	1st or 2nd spring
<a href="#">773679S</a>	Studies in other universities		1st or 2nd year
<a href="#">772614S</a>	Workshop in bedrock mapping	5	1st or 2nd spring
<a href="#">772615S</a>	Literature study	4	1st or 2nd year
<a href="#">773615S</a>	Studia Generalia lectures	2	1st or 2nd year
<a href="#">772666S</a>	Master's thesis	35	2nd spring

Student specializing in exploration and mining should take courses worth of a minimum of 40 ECTS credits from the list below:

**Advanced-level courses in exploration and mining (minimum 40 ECTS credits)**

<b>Code</b>	<b>Course</b>	<b>ECTS credits</b>	<b>Timing</b>
<a href="#">477702A</a>	Rock engineering	5	2-3 period
<a href="#">477703A</a>	Surface chemistry principles of minerals	3	3 period
<a href="#">477704A</a>	Principles of Mineral Processing	5	5 period
<a href="#">477705S</a>	Field course in economic geology	2	1 period
<a href="#">762302A</a>	Geophysical research methods of rock and soil	3	1-3 period
<a href="#">477707A</a>	Mining engineering	5	6 period
<a href="#">488110S</a>	Water and wastewater treatment	5	1-2 period
<a href="#">488205S</a>	Environmental load of process industry	4	6 period
	Mineral processing (Luleå University of Technology)	7.5	1-3 period
	Mineral economy and risk evaluation (Luleå University of Technology)	7.5	1-3 period
	Mine automation (Luleå University of Technology)	7.5	1-3 period
<a href="#">477724S</a>	Numerical mine modelling	5	6 period
<a href="#">477709S</a>	Financial and project valuation of mining project	3	5 period
<a href="#">774636S</a>	Geochemistry of mining environment	5	1st or 2nd spring
<a href="#">774304A</a>	Analytical methods in geochemistry	5	1st or 2nd autumn
<a href="#">773322A</a>	Surficial geology in ore exploration	5	1st or 2nd autumn
<a href="#">773641S</a>	Advanced course of surficial geology in ore exploration I	5	1st or 2nd spring
<a href="#">773642S</a>	Advanced course of surficial geology in ore exploration II	5	1st or 2nd autumn
<a href="#">477724S</a>	Numerical Mine Modelling	5	1st or 2nd year
<a href="#">772608S</a>	Mining geology	3	1st or 2nd year

The rest optional, applicable intermediate and advanced level studies that increase the total ECTS credit number to 120 can be taken from the Department of Geosciences or other departments.