

**SYLLABUS**

**STUDY YEAR 2024/2025**

# **Master Programme in Georesources Engineering**

## **Enrollment semester Autumn 2024**

DATE

**2020-11-10**

REFERENCE NO.

**LTU-3825-2020**

DECISION MAKER

**Dean of the Faculty of Science and Technology**

## Programme content and structure

The programme provides an in-depth knowledge of mineral resources and environmental geochemistry to act as a professional in industrial and university applications.

For the masters degree (120 ECTS) the requirements include courseworks on advanced level on following modules:

- Georesource characterisatoin (max 26,5 ECTS)
- Georesources processing (max 36 ECTS)
- Georesources modeling (max 35 ECTS)
- Georesources management (max 21 ECTS)
- Masters thesis 30 ECTS.

The students mobility goes through following scheme: 1) Liege (fall academic year 1); 2) Nancy (spring of academic year 1); 3) Luleå or Freiberg (fall of academic year 2) and 4) Master's thesis at Luleå, Nancy, Liege or Freiberg (spring of academic year 2).

The education includes an EIT sponsored summer school between the first and second academic year. Summer school is a compulsory preparation for the degree project. Students receive a certificate but no higher education credits.

Swedish for beginners is offered to overseas students. The course is not included in the degree, and is read in addition to the obligatory courses

## Credits

120 credits

## Degree

- Degree of Master of Science (120 credits) - Major; Geosciences

## Entry requirements

Bachelors degree of minimum 180 ECTS with at least 60 ECTS in the area of Physics, Chemistry, Geology, or Environmental, Minerals or Metallurgical Engineering or similar. At least 22,5 ECTS in Mathematics at university level is required.

Good knowledge in English, equivalent to English 6

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## **Selection**

The selection procedure is based on academic qualifications, quality and quantity aspects

### **Selection group**

Academic: 100%

## Compulsory courses

### Luleå 22.5 credits

Course code	Course	Cr	Level	Comment
M7003K	Mineral Processing	7.5	Master's level	
M7008K	Geometallurgy	7.5	Master's level	
O7022K	Mining Geology	7.5	Master's level	

### Liege 20 credits

Course code	Course	Cr	Level	Comment
	Process mineralogy (Second cycle)	5		
	Geostatistics (Second cycle)	5		
	Seminars on economical and societal issues in mining (Second cycle)	5		
	Waste and by-products processing (Second cycle)	5		

### Nancy 30 credits

Course code	Course	Cr	Level	Comment
	Management of resources (Second cycle)	5		
	Case study of ore processing (Second cycle)	5		
	Exploitation of mineral raw materials and environmental impact of mining (Second cycle)	2		
	Advanced characterization of mineral/water interface (Second cycle)	5		
	Advanced mineral processing (Second cycle)	8		
	Resources modelling and evaluation (Second cycle)	5		

### Freiberg 27 credits

Course code	Course	Cr	Level	Comment
	Resources management (Second cycle)	6		

Course code	Course	Cr	Level	Comment
	Process design mineral processing/recycling (Second cycle)	8		
	Practice of secondary raw materials (Second cycle)	5		
	Thermodynamics and heat transfer (Second cycle)	4		
	Selective separation of strategic elements (Second cycle)	4		

### Eligible courses: Luleå 7.5 credits

Selective space is 7.5 credits. It is mandatory to select elective courses up to the given number of credits. The given number of credits of elective courses listed must be met for degree.

Course code	Course	Cr	Level	Comment
M7001K	Simulation of Mineral Processing	7.5	Master's level	Selectable
M7005K	Senior Design Project in Mineral Processing	7.5	Master's level	Selectable

### Eligible courses: Liege 10 credits

Selective space is 10 credits. It is mandatory to select elective courses up to the given number of credits. The given number of credits of elective courses listed must be met for degree.

Course code	Course	Cr	Level	Comment
	Mine and quarry exploitation (Second cycle)	5		Selectable
	Mineral processing I (Second cycle)	5		Selectable
	Mineral resources (Second cycle)	5		Selectable
	Numerical analysis (Second cycle)	5		Selectable

### Eligible courses: Freiberg 3 credits

Selective space is 3 credits. It is mandatory to select elective courses up to the given number of credits. The given number of credits of elective courses listed must be met for degree.

Course code	Course	Cr	Level	Comment
	Mineral liberation analysis of mineral resources (Second cycle)	3		Selectable

Course code	Course	Cr	Level	Comment
	Simulation of sustainable nonferrous metallurgical process systems (Second cycle)	3		Selectable

## Master thesis 30 credits

Selective space is 30 credits. It is mandatory to select elective courses up to the given number of credits. The given number of credits of elective courses listed must be met for degree.

Course code	Course	Cr	Level	Comment
X7008K	Degree project in Georesources Engineering, master	30	Master's level	Selectable
	Master thesis Freiberg (Second cycle)	30		Selectable
	Master thesis Nancy (Second cycle)	30		Selectable
	Master thesis Liège (Second cycle)	30		Selectable

## Course offered outside the obligatory courses - not compulsory - For non Scandinavian students

Course code	Course	Cr	Level	Comment
S0046P	Swedish for International Students 1	3	Bachelor's level	Selectable

## Study schedule

### Year of study 1 Enrollment semester Autumn 2024, Is offered in 2024/2025

Study-period	Course code	Course	Cr	Comment
1-2		Process mineralogy (Second cycle)	5	
1-2		Seminars on economical and societal issues in mining (Second cycle)	5	
1-2		Waste and by-products processing (Second cycle)	5	
1-2		Geostatistics (Second cycle)	5	
1-2		Mine and quarry exploitation (Second cycle)	5	Selectable
1-2		Numerical analysis (Second cycle)	5	Selectable
1-2		Mineral resources (Second cycle)	5	Selectable
1-2		Mineral processing I (Second cycle)	5	Selectable
3-4		Advanced characterization of mineral/water interface (Second cycle)	5	
3-4		Exploitation of mineral raw materials and environmental impact of mining (Second cycle)	2	
3-4		Case study of ore processing (Second cycle)	5	
3-4		Advanced mineral processing (Second cycle)	8	
3-4		Resources modelling and evaluation (Second cycle)	5	
3-4		Management of resources (Second cycle)	5	

## Year of study 2 Enrollment semester Autumn 2024, Is offered in 2025/2026, planned study schedule

Study-period	Course code	Course	Cr	Comment
1	M7008K	Geometallurgy	7.5	
1	S0046P	Swedish for International Students 1	3	Selectable
1-2	M7001K	Simulation of Mineral Processing	7.5	Selectable
1-2	M7003K	Mineral Processing	7.5	
1-2	M7005K	Senior Design Project in Mineral Processing	7.5	Selectable
2	O7022K	Mining Geology	7.5	
3-4		Master thesis Liège (Second cycle)	30	Selectable
3-4		Master thesis Nancy (Second cycle)	30	Selectable
3-4		Master thesis Freiberg (Second cycle)	30	Selectable
3-4	X7008K	Degree project in Georesources Engineering, master	30	Selectable, Entry requirements