

# TIMREX - Diplomski studijski program inovativnoga istraživanja mineralnih sirovina [Brošura]

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Timrex brošura /  
Timrex Booklet

# Diplomski studij s oznakom EIT kvalitete EIT-Labelled Master Programme



TIMREX – Diplomski studijski program inovativnoga  
istraživanja mineralnih sirovina

TIMREX – T-Shaped Master Programme for Innovative  
Mineral Resource Exploration

Prosinac 2022. /  
December 2022

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## Koji su ciljevi projekta i koji diplomski studijski programi sudjeluju?

Cilj projekta TIMREX je osnovati diplomski studij koji rezultira dvostrukom diplomom s oznakom [EIT RawMaterials](#) kvalitete. Studij iz područja istraživanja mineralnih sirovina se temelji na postojećim relevantnim diplomskim programima koje izvode [University of Miskolc \(UM\)](#), [University of Zagreb – Faculty of Mining, Geology and Petroleum Engineering \(UNIZG-RGNF\)](#), [Luleå University of Technology \(LTU\)](#) i [Wroclaw University of Science and Technology \(WUST\)](#).



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UNIVERSITY OF MISKOLC



University of Zagreb  
**FACULTY OF MINING,  
GEOLOGY AND PETROLEUM  
ENGINEERING**



Wroclaw  
University  
of Science  
and Technology

**The objective and Master's programs involved?** The objective of the TIMREX project is to provide an [EIT RawMaterials](#) labelled double-degree master programme in the field of mineral resources exploration on the basis of existing four relevant master programmes led by [University of Miskolc \(UM\)](#), [University of Zagreb – Faculty of Mining, Geology and Petroleum Engineering \(UNIZG-RGNF\)](#), [Luleå University of Technology \(LTU\)](#) and [Wroclaw University of Science and Technology \(WUST\)](#).

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**UM** održava inženjerski [diplomski program Znanosti o Zemlji](#). Program je orijentiran na obrazovanje inženjera geologije i geofizike s primarnim fokusom na istraživanje mineralnih sirovina s naglasakom na geofizici i analitičkim tehnikama.

**UM** has [Earth Science Engineering MSc program](#). This programme educates geological and geophysical engineers with primary focus on mineral prospecting and exploration and emphasis on geophysical methods and analytical techniques.



Studijski program na [UNIZG-RGNF](#) je Primijenjena geologija i geološko inženjerstvo, modul Geologija mineralnih sirovina i okoliša, sa specijalizacijom usmjerenom na istraživanje nemetalnih mineralnih sirovina.

[UNIZG-RGNF](#) has Applied Geology and Geological Engineering MSc, Exploration and Environmental Geology module with specialisation focused on prospecting and exploration of non-metallic mineral resources.



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**WUST** nudi [diplomski studij Rudarstva i geologije](#), s fokusom na karakterizaciju mineralnih sirovina tijekom faze planiranja rudnika i eksploatacije. Specijalizacija je geomatematika, geomodeliranje i rudarska geologija.

**WUST** offers the [Mining and Geology MSc](#), where the focus is on the resource definition – mine planning phase and mining geology of the value chain. Their specialization is in Geomatics, Geomodelling and Mining geology.



**LTU** održava međunarodno-priznati diplomski program usmjeren na geološku prospekciju i [Znanost o okolišu](#). LTU vodi jedan od najjačih programa u Europi vezan za istraživanje i vađenje mineralnih sirovina.

**LTU** has MSc in [Exploration and Environmental Sciences](#) that is an internationally well-recognized education programme on mineral exploration. LTU provides one of the strongest master trainings in Europe in ore minerals-focussed exploration and mining.



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## Što je T-stručnjak?

T-stručnjaci posjeduju veliku širinu u klasičnim disciplinama poput geologije i geofizike upotpunjenim uskim setom usmjerenih vještina poput kompleksnih 3D modeliranja, obrade velikih setova podataka i slično. Razumiju sve izazove koji se pojavljuju duž cijelog vrijednosnog lanca vezanog za mineralne sirovine. Otvoreni su ne samo drugim disciplinama, već i društvenim i građanskim pitanjima.



## What is a “T-shaped” professional?

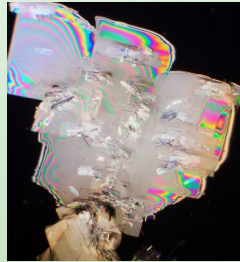
The T-shaped professional possesses great width in classical disciplines such as geology and geophysics complemented by a narrow set of focused skills such as complex 3D modeling, processing of large data sets, and the like. They understand all challenges that arise along the entire value chain related to mineral raw materials. Such experts are open to other disciplines and also to social and civic issues.

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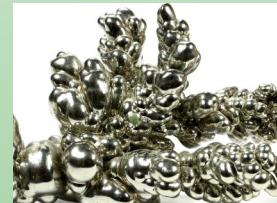
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## Get prepared for the future

From September 2023, a hybrid mobility system using double degree schemes will start. The T-shaped curriculum at each partner will include mineral exploration focused core earth science disciplines. AVSA (Added Value Student Activities) grant is available from 2023/24.



## Pripremite se za budućnost

Od rujna 2023. započinje hibridni sustav mobilnosti koristeći sheme dvostrukih diploma. T-kurikulum kod svakog partnera uključivat će temeljne discipline znanosti o Zemlji usmjerene na istraživanje mineralnih sirovina. AVSA (Added Value Student Activities) stipendija je dostupna od 2023./24. godine.



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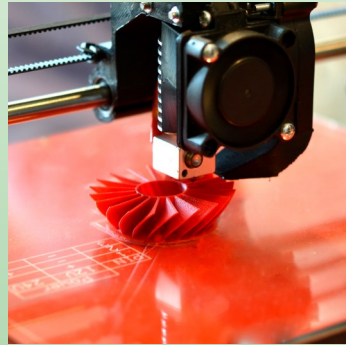
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## Temeljni ciljevi programa / Core aspects of the programm

Daljinsko istraživanje /  
Remote sensing



Inovativni uređaji / Innovative  
instruments



Geofizika / Geophysics



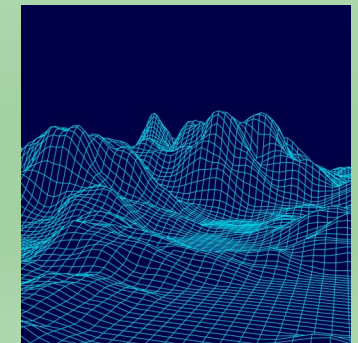
Robotika / Robotics



Analiza podataka / Data science



Modeliranje / Modelling

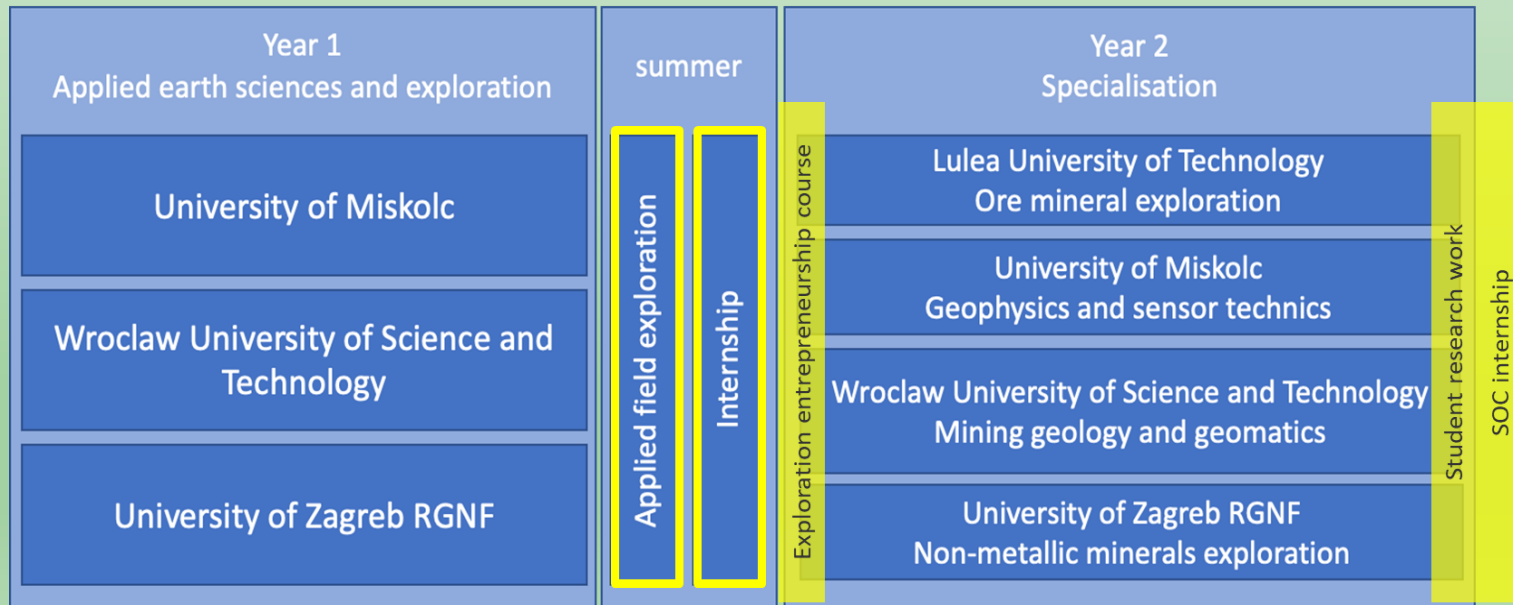


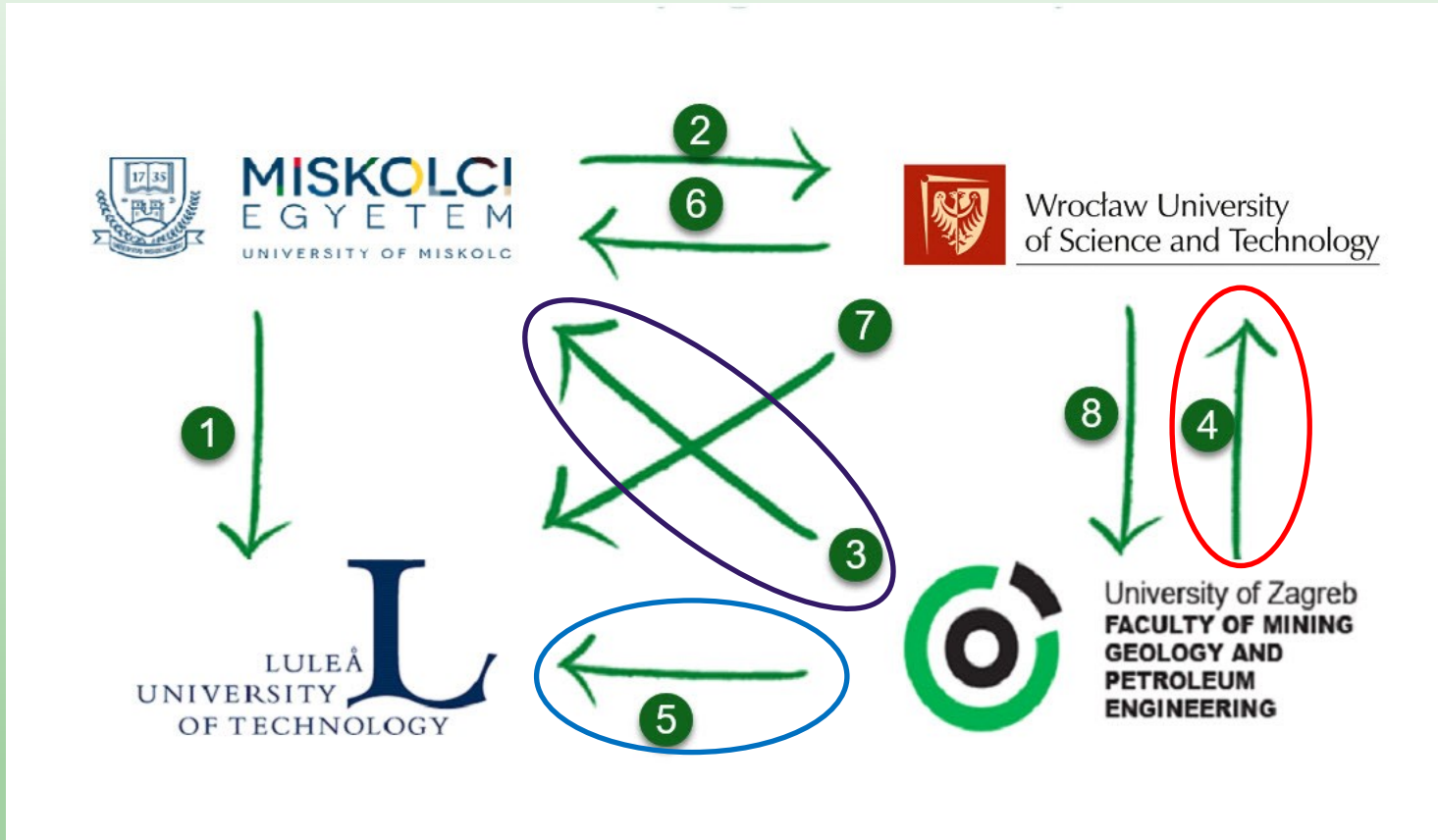




**Novi program s EIT oznakom kvalitete / New EIT labelled programm  
Obavezna mobilnost prema modelu dvostruke diplome (60 ECTSa) /  
Mandatory structured mobility (double-degree scheme; 60 ECTS)**

Studenti će imati priliku provesti godinu dana na jednom od četiri sveučilišta s ciljem dobivanja dvostruke diplome. / Students will have the opportunity to spend a year at one of four universities with the goal of obtaining a double degree.





**Eight TIMREX mobility pathways (routes) between partnering universities.**

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## Scheme mobilnosti — ruta 3 / Mobility pathways — route 3

1. godina / 1st year UNIZG-RGNF (60 ECTS)		2. godina / 2nd year UM (60 ECTS)	
1. semestar / 1st semester	2. semestar / 2nd semester	3. semestar / 3rd semester	4. semestar / 4th semester
Engineering Geological Investigations (5 ECTS)	Regional Hydrogeology (4 ECTS)	Engineering physics (4 ECTS)	Safety techniques and labor safety (2 ECTS)
Sedimentology (5 ECTS)	Seizmotectonics (4 ECTS)	Computer science for engineers (2 ECTS)	Thesis work (including SoC internship) (26 ECTS)
Petroleum Geology (5 ECTS)	<b>Industrial Mineral Deposits and Applications (5 ECTS)</b>	Data and information processing (4 ECTS)	
Mineral Deposits Exploration (5 ECTS)	<b>Analyses of Mineral Paragenesis (3 ECTS)</b>	Graduate research seminar (2 ECTS)	
<b>Exploration Geochemistry (4 ECTS)</b>	<b>Analytical Methods in Ore Deposits (5 ECTS)</b>	Geophysical interpretation and prospecting (4 ECTS)	
<b>Remote Sensing of Mineral Resources (3 ECTS)</b>	<b>Geophysical Exploration of Mineral Resources (3 ECTS)</b>	<b>Quality management (2 ECTS)</b>	
<b>GIS in Exploration of Mineral Resources (3 ECTS)</b>	<b>Field and Laboratory Practicum (6 ECTS)</b>	<b>Thesis work 1 / Student research (6 ECTS)</b>	
		<b>Exploration Entrepreneurship (4 ECTS)</b>	

## Sheme mobilnosti— ruta 4 / Mobility pathways—route 4

1. godina / 1st year UNIZG-RGNF (60 ECTS)		2. godina / 2nd year WUST (60 ECTS)	
1. semestar / 1st semester	2. semestar / 2nd semester	3. semestar / 3rd semester	4. semestar / 4th semester
Engineering Geological Investigations (5 ECTS)	Regional Hydrogeology (4 ECTS)	Computer aided geological modelling and geostatistics (5 ECTS)	Diploma seminar (2 ECTS)
Sedimentology (5 ECTS)	Seizmotectonics (4 ECTS)	Engineering geophysics (3 ECTS)	Exploration Entrepreneurship (4 ECTS)
Petroleum Geology (5 ECTS)	Industrial Mineral Deposits and Applications (5 ECTS)	Project management, appraisal and risk evaluation (5 ECTS)	Foreign language 2 (1 ECTS)
Mineral Deposits Exploration (5 ECTS)	Analyses of Mineral Paragenesis (3 ECTS)	Principles and Application of InSAR and GIS in mining (5 ECTS)	Thesis work (including student research activity and SoC internship) (23 ECTS)
Exploration Geochemistry (4 ECTS)	Analytical Methods in Ore Deposits (5 ECTS)	Digital mine (2 ECTS)	
Remote Sensing of Mineral Resources (3 ECTS)	Geophysical Exploration of Mineral Resources (3 ECTS)	Environmental management (3 ECTS)	
GIS in Exploration of Mineral Resources (3 ECTS)	Field and Laboratory Practicum (6 ECTS)	Occupational Health and Safety (2 ECTS)	
		Operations Research (3 ECTS)	
		Foreign language 1 (2 ECTS)	

## Sheme mobilnosti— ruta 5 / Mobility pathways—route 5

1. godina / 1st year UNIZG-RGNF (60 ECTS)		2. godina / 2nd year LTU (60 ECTS)	
1. semestar / 1st semester	2. semestar / 2nd semester	3. semestar / 3rd semester	4. semestar / 4th semester
Engineering Geological Investigations (5 ECTS)	Regional Hydrogeology (4 ECTS)	Senior design project in ore geology (7.5 ECTS)	Degree project in Exploration and Environmental Geoengineering, Master (including student research activity and SoC internship) (30 ECTS)
Sedimentology (5 ECTS)	Seizmotectonics (4 ECTS)		
Petroleum Geology (5 ECTS)	<b>Industrial Mineral Deposits and Applications (5 ECTS)</b>	Exploration (7.5 ECTS)	
Mineral Deposits Exploration (5 ECTS)	<b>Analyses of Mineral Paragenesis (3 ECTS)</b>	Mining geology (7.5 ECTS)	
<b>Exploration Geochemistry (4 ECTS)</b>	<b>Analytical Methods in Ore Deposits (5 ECTS)</b>	Geochemical exploration (7.5 ECTS)	
<b>Remote Sensing of Mineral Resources (3 ECTS)</b>	<b>Geophysical Exploration of Mineral Resources (3 ECTS)</b>		
<b>GIS in Exploration of Mineral Resources (3 ECTS)</b>	<b>Field and Laboratory Practicum (6 ECTS)</b>		

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## Specijalizacija rute mobilnosti / Specialization of mobility routs

**Ruta 3 UNIZG-RGNF — UM** je prvenstveno usmjerena na istraživanje mineralnih sirovina naprednim analitičkim i geofizičkim metodama. / **Route 3 UNIZG-RGNF — UM** is primary focused on raw materials exploration activities with advanced analytical and geophysical methods.

**Ruta 4 UNIZG-RGNF — WUST** je usmjerena na istraživanje i modeliranje ležišta mineralnih sirovina. / **Route 4 UNIZG-RGNF — WUST** is focused on mineral raw materials exploration and modeling methods used.

**Ruta 5 UNIZG-RGNF — LTU** je usmjerena na istraživanje mineralnih sirovina inovativnim metodama. / **Route 5 UNIZG-RGNF — LTU** is focused on mineral raw materials exploration and innovative methods used in its exploration.

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Intenzivna terenska nastava (1 tjedan) odvijat će se tijekom ljeta, između 1. i 2. godine u istraživačkim kampovima u Švedskoj i Mađarskoj te kao dio prakse u tvrtkama. Studenti će razvijati kompetencije i vještine u inovativnim tehnikama i tehnologijama istraživanja mineralnih sirovina: prospekcija i istraživanje, rudarska geologija, strukturna i regionalna geologija, geofizika, geokemijske metode istraživanja te kompleksne analize podataka i interpretacije.

The intensive fieldwork (1 week) will take place during the summer, between 1st and 2nd year at exploration camps in Sweden and Hungary and as internship at companies. Students will develop competences and skills in innovative techniques and technologies of mineral exploration concerning the prospecting and exploration campaigns, mining geology, structural and regional geology, geophysical and geochemical exploration methods and the complex data analysis and interpretation.



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## Program mentoriranja

Kroz mentorski program koji vode [European Federation of Geologists](#) (EFG), mali i srednji poduzetnici (MSP) i istraživački instituti kao partnera konzorcija studenti će razvijati inovativnost te društveno-socijalne i poduzetničke vještine. Mentorstvo EFG-a strukturirano je kao tečaj „*Exploration entrepreneurship*” u kojem će se razvijati navedene vještine što će utjecati na samopouzdanje i samostalnost studenata pri budućem radu.



## Mentoring programme

Entrepreneurship, innovative and socio-civic skills will be developed, intensively using the [European Federation of Geologists](#) (EFG) mentoring programme, small and medium-sized enterprises (SME) and Research and Technology Organisation (RTO) partners of the consortium. The EFG mentoring for the TIMREX programme is structured as a course „*Exploration entrepreneurship*” to develop entrepreneurship skills and build self-confidence in the skills acquired.

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## Stažiranje (4 tjedna)

Između dvije akademske godine studenti će odraditi 4-tjednu praksu te će biti potaknuti da se pridruže [RIS Internship](#) mreži. Kroz mrežu studenti diplomskih studija iz RIS regije povezati će se s industrijom gdje mogu odraditi praksu. Ova prilika studentima pruža stjecanje praktičnog i terenskog iskustva te mogućnost rada na temi diplomskog rada vezanoj uz industriju i primjenu.



## Internship (4 week)

Students will have a 4-weeks internship between the two academic years and encouraged to join the [RIS Internship](#) network. The RIS Internship network offers internship positions for MSc students from the RIS region and connects students with industrial organizations. This opportunity will provide to the students practical and field experience and involvement in industry-related thesis topics.

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## Društveno-socijalno stažiranje (2 ECTS)

Stožiranje će biti dio pripreme za diplomski rad pod nadzorom industrijskog ili istraživačkog partnera i uz mentorstvo [La Palma Research Centre](#) (LPRC) i [EFG-a](#). Stažiranje će ovisiti o specifičnosti teme diplomskog rada, a biti će povezana s održivosti i društvenom odgovornošću. Stažiranje pridonosi boljoj procjeni i razumijevanju pitanja održivosti i ponašanju u skladu s tim, kao i vještinama vodstva i međukulturalnim vještinama.



## Social and Civic internship (SoC; 2 ECTS)

SoC will be part of the thesis work preparation under the supervision of the industrial or research partner and mentored by the [La Palma Research Centre](#) (LPRC) and [EFG](#) fellows. Internship will depend on the specialty of the thesis topic, associating it with sustainability and social responsibility goals. The SOC internship contributes to better value judgements and understanding of sustainability issues, behaving accordingly, as well as to leadership and intercultural skills.

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## Studentski istraživački rad (6 ECTS)

Studenti će raditi pod nadzorom industrijskih i istraživačkih partnera kao što su [Unexmin Georobotics](#), [INESC TEC](#), [Geogold Kárpátia](#). Istraživački rad studenata bit će povezan s razvojem inovativnih metoda i rješenja kod istraživanja mineralnih sirovina. Studenti će kroz takav rad razviti inovativne i kreativne kompetencije potrebne za daljnji rad.



## Student research work (6 ECTS)

Students will work under supervision of industrial and research partners as [Unexmin Georobotics](#), [INESC TEC](#), [Geogold Kárpátia](#). The student research work will be connected to development of innovative mineral prospecting or exploration methods and solutions. Students will develop the innovation and creativity competences for future job.



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## Stipendija / Grant

**AVSA (Added value student activities)** stipendija pokriva troškove studija, puta i boravka studentima upisanima u diplomski studijski program financiran sredstvima EIT

RawMaterials.

**AVSA (Added value student activities)** grant, covers participation fee, travel and subsistence costs for students enrolled in an EIT RawMaterials labeled programme.

**Za više informacija molimo kontaktirajte /**

**For more info please contact:**

**Assoc. Prof. Ana Maričić**

**[ana.maricic@rgn.unizg.hr](mailto:ana.maricic@rgn.unizg.hr)**

**Prof. Sibila Borojević Šoštarić**

**[sibila.borojevic-sostaric@rgn.unizg.hr](mailto:sibila.borojevic-sostaric@rgn.unizg.hr)**

Za više informacija o prijavi i upisima na diplomski studij prati nas na Web stranicama i društvenim mrežama: / For more info about application and admission to the master programm please follow us on Web pages and social media:

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