**MSc Programmes in English offered by**

**the Faculty of Geoengineering, Mining and Geology**

**of Wroclaw University of Science and Technology**

Programmes offered by the Wroclaw University of Science and Technology belong to the Faculty of Geoengineering, Mining and Geology. The Master programmes are offered in the field of study Mining and Geology as well as Geodesy and Cartography

The Mining and Geology programme which is running in English is offered with three specializations by the Faculty or in cooperation with other HEIs. The three specialisations are:

* Mining engineering
* Geotechnical and Environmental Engineering
* Geomatics for Mineral Resource Management

Mining Engineering specialisation is a 3-semester programme running in English by the WUST, while this curriculum on the other hand is a basis for two other MSc specialisations offered in English in cooperation with partner universities.

Geotechnical and Environmental Engineering specialisation is an option which will be realized in the frame of the MOBI-US network, where the curriculum of the second semester is taught by the University of Miskolc.

The Geomatics for Mineral Resource Management specialisation is a double degree programme between the WUST and the TU Bergakademie Freiberg, Germany.

The Geodesy and Cartography programme in English offers only one specialisation –

* Geomatics

Mining and Geology MSc, Specialisation Mining Engineering

The economic development of European economies depends on natural resources, abilities to use them and required adequate technical staff. The assumed educational effects meet economy practice needs in the field of mineral resources management, technologies and techniques of their exploration and prospecting, mining, processing, industrial land reclamation and development, and enterprises (especially mines) management supported by information, environment, and people management with the use of state-of-the-art information and marketing techniques and technologies. Such the integration of economy needs and assumed educational effects makes the labour market favourable for the Faculty graduates.

A graduate will possess abilities to use in depth knowledge of problems within the domain of basic sciences, main-field-of-study and specialization subjects. The graduate will be able to manage and supervise teams, deal with high-risk situations and decisions, and use competently the knowledge of law and economics. The graduate will be prepared to design technological processes, carry out research work and work creatively.

The Mining Engineering graduate will be prepared to work for enterprises, engineering supervision bodies, state administration, design offices and research units, where in depth specialised knowledge of mining, geology and geoengineering is demanded.

 **Mining Engineering MSc - structural overview**

|  |  |
| --- | --- |
| Program components (courses) | ECTS |
| Social and managerial sciences | 7 |
| Basic sciences  | 4 |
| Field of study specific courses (major) | 52 |
| Foreign languages | 3 |
| Information technologies  | 2 |
| Free electives | 5 |
| Thesis and diploma seminar | 17 |
| Total | 90 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **semester** | **1** | **ECTS** | **2** | **ECTS** | **3** | **ECTS** |
| **hours** |  |  |  |  |  |  |
| 1 | Theory and Practice in Geomechanics | 6 | Machinery Systems | 6 | Mineral Processing Systems 10020 E | 3 |
| 2 |
| 3 |
| 4 | Environmental Management 20001Z | 3 |
| 5 | Tunnel and Underground Excavation Design | 5 |
| 6 | Computer Aided Geological Modelling & Geostatistics | 5 |
| 7 | Digital Mine 10100 Z | 2 |
| 8 |
| 9 | Computer Aided Mine Design | 5 | Operations Research 10100Z | 3 |
| 10 | Project Management, Appraisal and Risk Evaluation | 4 |
| 11 | Free Elective 20000 | 2 |
| 12 |
| 13 | Foreign Language | 2 | Diploma Seminar 00002Z | 2 |
| 14 | Engineering Geophisics | 3 |
| 15 | Master Thesis | 15 |
| 16 | Integrated Analysis of Deformations in Geomechanical Engineering | 5 | Foreign Language | 1 |
| 17 | Free Elective | 3 |
| 18 |
| 19 | Ventilation and Mine Fires | 4 |
| 20 | Occupational Health and Safety | 2 |
| 21 |
| 22 | Excavation Design in Open Pit Mining | 5 | Issues in Nuclear Physisc | 2 |
| 23 |
| 24 | Auto Cad | 2 |  |  |
| 25 |  |  |  |  |
| 26 |  |  |  |  |  |  |
| 27 |  |  |  |  |  |  |
| Total ECTS | **30** |  | **30** |  | **30** |

Mining and Geology MSc, Specialisation Mining Engineering - Curriculum

.

Mining and Geology MSc, Specialisation: Mining Engineeing

E – examination, Z - creditation

| semester | course | assess-ment | Lec | Ex | Lb | P | Se | ECTS | course leader |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | Theory and practice in geomechanics | E | 4 | 1 |  |  |  | 6 | Dr Karolina Adach |
| 1 | Computer aided geologcial modelling and geostatistics | Z | 1 |  | 3 |  |  | 5 | Dr. Krzysztof Holodnik |
| 1 | Project management, appraisal and risk evaluation | E | 1 |  | 2 | 1 |  | 4 | Dr Gabriela Paszkowska |
| 1 | Engineering geophysics | Z | 1 |  |  | 1 |  | 3 | Dr Anna Gogolewska |
| 1 | Integrated analysis of deformations in geomechanical engineering | E | 2 |  | 2 |  |  | 5 | Dr Anna Chrzanowska |
| 1 | Occupational health and safety | Z | 1 |  |  | 1 |  | 2 | Dr Żaklina Konopacka |
| 1 | Excavation design in open pit mining | E | 2 |  |  | 1 |  | 5 | Prof. Justyna Wozniak |
|  |  |  |  |  |  |  |  | 30 |  |
|  |
| 2 | Machinery systems | E | 2 |  | 1 | 1 |  | 6 | Dr Martyna Konieczna-Fuławka |
| 2 | Tunnel and underground excavation design | E | 2 |  |  | 2 |  | 5 | Dr Karolina Adach-Pawelus |
| 2 | Computer aided mine design | E | 1 |  | 3 |  |  | 5 | Dr Witold Kawalec |
| 2 | Foreign language | Z |  | 3 |  |  |  | 2 | Language Center |
| 2 | Foreign language | Z |  | 1 |  |  |  | 1 | Language Center |
| 2 | Free elective | Z | 2 |  |  |  |  | 3 |  |
| 2 | Ventilation and mine fires | E | 1 |  |  | 2 |  | 4 | Dr Sebastian Gola |
| 2 | Issues in nuclear physics | Z | 2 |  |  |  |  | 2 | Faculty of Basic Problems of Science |
| 2 | AutoCAD | Z |  |  | 2 |  |  | 2 | Dr Dariusz Woxniak |
|  |  |  |  |  |  |  |  | 30 |  |
|  |
| 3 | Mineral processing systems | E | 1 |  |  | 2 |  | 3 | Dr Tomasz Ratajczak |
| 3 | Environmental management | Z | 2 |  |  |  | 1 | 3 | Prof. Justyna Górniak-Zimroz |
| 3 | Digital Mine | Z | 1 |  | 1 |  |  | 2 | Prof. Radoslaw Zimroz |
| 3 | Operations research | Z | 1 |  | 1 |  |  | 3 | Prof. Leszek Jurdziak |
| 3 | Free elective |  | 2 |  |  |  |  | 2 |  |
| 3 | Diploma seminar | Z |  |  |  |  | 2 | 2 |  |
| 3 | MSc Thesis |  |  |  |  |  |  | 15 |  |
|  |  |  |  |  |  |  |  | 30 |  |

Mining and Geology MSc, Specialisation Geotechnical and Environmental Engineering (GEE)

This specialisation is based on the cooperation within the MOBI-US network between the

WUST and University of Miskolc, having developed their cooperation establishing the Geotechnical and Environmental Engineering specialisation. The cooperation is based and continuing the partnership within the frame of the EGEC program between 2003 and 2017. The European Geotechnical and Environmental Course – EGEC was established in 2003 within the frame of the FEMP education programs. TU Wroclaw and the University of Miskolc had participated in the EGEC since its first year.

Environmental and geotechnical issues for the European extractive industry remain actual, especially for the Eastern and South Eastern European (ESEE) region. On the other hand, legacy of the extensive ore mining activities in the past needs site remediation and safety measures all over the ESEE countries.

The aim of the specialisation is to train mining engineering students the assessment of environmental issues closely related to mining operations and necessary remediation tools.

The cooperation is based on two master programs: Environmental engineering MSc with Remediation and geotechnics specialisation at the University of Miskolc and the Mining and Geology MSc with Mining Engineering specialisation at the TU Wroclaw.

The Environmental engineering MSc taught in English with the current curricula in Miskolc since September 2017 for Hungarian and foreign students. The program is planned to continue with the same structure in the following academic years, starting in each September. The program lengths 4 semesters, 120 ECTS in total, 30 ECTS of which are for the thesis work.

The Mining and Geology MSc at the TU Wroclaw is a program for 3 semesters, 90 ECTS, 15 ECTS of which are for the Master thesis. The program has recently been accredited in English and is ready to start in February 2019. First semester of the program mainly overlaps with the former EGEC semester taught in Wroclaw.

 **Geotechnical and Environmental Engineering MSc
 - structural overview**

|  |  |
| --- | --- |
| Program components (courses) | ECTS |
| Social and managerial sciences | 6 |
| Basic sciences  | 7 |
| Field of study specific courses (major) | 53 |
| Foreign languages | 3 |
| Information technologies  | 2 |
| Free electives | 2 |
| Thesis and diploma seminar | 17 |
| Total | 90 |



Mining ang Geology MSc, Specialisation Geotechnical and Environmental Engineering - Curriculum

Mining and Geology MSc, Specialisation: Geotechnical and Environmantal Engineeing

E – examination, Z - creditation

| semester | course | assess-ment | Lec | Ex | Lb | P | Se | ECTS | course leader |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | Theory and practice in geomechanics | E | 4 | 1 |  |  |  | 6 | Dr Karolina Adach |
| 1 | Computer aided geologcial modelling and geostatistics | Z | 1 |  | 3 |  |  | 5 | Dr. Krzysztof Holodnik |
| 1 | Project management, appraisal and Risk Evaluation | E | 1 |  | 2 | 1 |  | 4 | Dr Gabriela Paszkowska |
| 1 | Engineering geophysics | Z | 1 |  |  | 1 |  | 3 | Dr Anna Gogolewska |
| 1 | Integrated analysis of deformations in geomechanical engineering | E | 2 |  | 2 |  |  | 5 | Dr Anna Chrzanowska |
| 1 | Occupational health and safety | Z | 1 |  |  | 1 |  | 2 | Dr Żaklina Konopacka |
| 1 | Environmental chemistry | Z | 2 |  | 1 |  |  | 5 | Dr Danuta Szyszka |
| 1 |  |  |  |  |  |  |  | 30 |  |
|  |
| 2 | Courses at the University of Miskolc – structured mobility |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  | 30 |  |
|  |
| 3 | Mineral processing systems | E | 1 |  |  | 2 |  | 3 | Dr Tomasz Ratajczak |
| 3 | Digital mine | Z |  |  |  |  |  | 2 | Prof. Radoslaw Zimroz |
| 3 | Free elective | Z |  |  |  |  |  | 2 |  |
| 3 | Excavation design in open pit mining | E | 2 |  |  | 1 |  | 5 | Prof. Justyna Wozniak |
| 3 | Foreign language | Z |  |  |  |  |  | 1 |  |
| 3 | Diploma seminar | Z |  |  |  |  | 2 | 2 |  |
| 3 | MSc thesis | Z |  |  |  |  |  | 15 |  |
|  |  |  |  |  |  |  |  | 30 |  |

Mining and Geology MSc, Geomatics for Mineral Resource Management (GMR)

Geomatics for Mineral Resource Management focuses on the process of resource modelling and mine management. Students will be taught in a variety of subjects related to the field mining and mineral resources. This includes financial, environmental, political as well as the legal aspects of national and international mining projects. In addition to the standard courses taught by staff from partner universities and industry experts, massive open online courses (MOOC’s) are offered for the students. The MOOC’s consist of a series of web-videos, which cover the content of an individual course.

The educational content focuses on the following pillars: (1) Sensing technologies for mine data gathering, (2) Spatial (big) data management and visualization and (3) Spatial (big) data analysis and modelling. The aim of the programme is to enable students to integrate these three pillars into innovative Geomonitoring concepts. Students, who decide on the specialisation Geomatics for Mineral Resource Management, are, on default, set to study 2 semesters at Wrocław University of Science and Technology (1st and 4th semesters) and 2 semesters at TU Bergakademie Freiberg in Germany (2nd and 3rd semesters) and TU Bergakademie Freiberg in Germany (2nd and 3rd semester) and are going to graduate with a double MSc diploma. Thus graduate of this master program will be prepared to work in an international and multicultural environment in mining and exploration companies, technical supervision authorities, public administration offices, research and development institutions, everywhere advanced and state of the art interdisciplinary knowledge spanning mining and geology, computer aided design, and geomatics.

Thus graduate of this master program will be prepared to work in an international and multicultural environment in mining and exploration companies, technical supervision authorities, public administration offices, research and development institutions, everywhere where advanced and state of the art interdis¬ciplinary knowledge of mining and geology, computer aided design, geomatics are required.

**Geomatics for Mineral Resource Management** **MSc
 - structural overview**

|  |  |
| --- | --- |
| Program components (courses) | ECTS |
| Social and managerial sciences | 13 |
| Basic sciences  | 5 |
| Field of study specific courses (major) | 57 |
| Foreign languages | 6 |
| Information technologies  | 0 |
| Free electives | 9 |
| Thesis and diploma seminar | 30 |
| Total | 120 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Contact**  | **Semester 1** | ECTS | **Semester 2** | ECTS | **Semester 3** | ECTS | **Semester 4** | ECTS |
| **hours** | WUST | TUBAF |  | TUBAF |  | WUST |
| 1 | Principles and Application of InSAR and GIS in mining  | 5 | Applied Remote Sensing in Geosciences | 6 | Special Topics Geokinematics | 4 | Master Thesis | 28 |
| 2 |
| 3 |
| 4 |
| 5 | Underground Mine Surveying | 5 | Applied Spatial Data Analysis and Modelling - Case Study (GIS 2)  | 5 |
| 6 | Computer Aided Geological Modelling & Geostatistics  | 5 |
| 7 |
| 8 | Geomatics for Mineral Resource and Reserve Management  | 6 |
| 9 |
| 10 | Project Management, Appraisal and Risk Evaluation | 4 | Geomonitoring | 5 |
| 11 |
| 12 |  Reclamation | 6 |
| 13 |
| 14 | Engineering Geophysics  | 3 | Operations Management | 6 |
| 15 |
| 16 | Integrated Analysis of Deformations in Geomechanical Engineering  | 5 | Diploma Seminar | 2 |
| 17 |
| 18 | Human Resources Management & Organizational Behaviour  | 3 |  |  |
| 19 | Geomodelling – Geostatistics for Natural Resource Modelling | 5 |
| 20 | Occupational Health and Safety  | 2 | Free Electives | 6 |
| 21 |
| 22 | Foreign language | 3 |
| 23 | Foreign language | 3 |
| Free Elective | 3 |  |   |
| 24 |  |
| Sum |   | **30** |   | **30** |   | **30** |  | **30** |

Mining and Geology MSc, Geomatics for Mineral Resource Management CURRICULUM

This specialisation is functioning as a double degree programme between WUST and TU Bergakademie Freiberg. Students on this specialisation are, on default, study 1st and 4th semester at the Wroclaw University of Science and Technology and 2nd and 3rd semester TU Bergakademie Freiberg in Germany and are going to graduate with a double MSc diploma.

Classes are classified as: Lec: lectures; Ex: Auditorium classes; Lb: Laboratory classes; P: Project classes; Se: seminar classes. Classes are as number in hours per week.

Mining and Geology MSc, Specialisation: Geomatics for Mineral Resource Management

E – examination, Z - creditation

| semester | course | assess-ment | Lec | Ex | Lb | P | Se | ECTS | course leader |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | Foreign language | Z |  |  |  |  |  | 3 | Language Center |
| 1 | Principles and application of InSAR and GIS in mining | E | 2 |  | 3 |  |  | 5 | Prof. Jan Blachowski |
| 1 | Computer aided geologcial modelling and geostatistics | Z | 1 |  | 3 |  |  | 5 | Dr. Krzysztof Holodnik |
| 1 | Project management, appraisal and risk evaluation | E | 1 |  | 2 | 1 |  | 4 | Dr Gabriela Paszkowska |
| 1 | Engineering geophysics | Z | 1 |  |  | 1 |  | 3 | Dr Anna Gogolewska |
| 1 | Integrated analysis of deformations in geomechanical engineering | E | 2 |  | 2 |  |  | 5 | Dr Anna Chrzanowska |
| 1 | Occupational health and safety | Z | 1 |  |  | 1 |  | 2 | Dr Żaklina Konopacka |
| 1 | Free elective | Z | 2 |  |  |  |  | 3 |  |
| 1 |  |  |  |  |  |  |  | 30 |  |
|  |
| 2 | Courses at TU Bergacademie Freibrg |  |  |  |  |  |  | 30 |  |
| 3 | Courses at TU Bergacademie Freibrg |  |  |  |  |  |  | 30 |  |
|  |
| 4 | Master Thesis | Z |  |  |  |  |  | 28 |  |
| 4 | Diploma Seminar | Z |  |  |  |  |  | 2 |  |
|  |  |  |  |  |  |  |  | 30 |  |